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Storm Clouds on the Horizon of Darwinism: Teaching the Anthropic Principle and Intelligent Design in the Public Schools

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Storm Clouds on the Horizon of Darwinism: Teaching the Anthropic Principle and Intelligent Design in the Public Schools

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Professor Addicott's article addresses the future legal ramifications that the fledgling intelligent design movement and the scientific concept known as the Anthropic Principle will have on the teaching of Darwinian evolution in public schools. Both ideas are associated with the concept that an "unnamed" intelligent designer is responsible for the creation and sustainment of life. Predicting that the Supreme Court will ultimately allow, for instance, school boards to incorporate intelligent design in the science curriculum, he believes neither of the two ideas violate the Establishment Clause and cannot be "dismissed as yet another back door attempt by creationists to get a secretarian religious idea into the public schools."

In tracing the evolution/creation debate, Professor Addicott clearly establishes all the interested segments in the controversy to include the Fundamentalist creationists and "Darwinian activists." Interestingly, in evaluating how the Court will view intelligent design, Professor Addicott explores what he terms the "Darwinian paradigm"—arguing that Darwinian activists may have already violated the Establishment Clause by making Darwinian evolution its own religion.

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I. INTRODUCTION

> Families entrust public schools with the education of their children, but condition their trust on the understanding that the classroom will not purposely be used to advance religious views that may conflict with the private beliefs of the student and his or her family.[1]
>
> —Justice William Brennan, Jr. (1906–1997)

Although the matter admits of some lingering dissent,[2] it is nevertheless fairly well settled that the First Amendment's Establishment Clause[3] prohibits the presentation of any religious-based ideas or theories about life sciences in the science curriculum of public schools.[4] In both *Epperson v. Arkansas*[5] and *Edwards v. Aguillard*,[6] the United States Supreme Court has disapproved of attempts to present various versions of creationism[7] in the arena of teaching life sciences, leaving the field open to a doctrine universally known as the theory of evolution.

The development of case law in this area has quite properly ensured that public science education is protected from being "[entangled] with religion,"[8] but it has also apparently proven to be a tremendous boon for those who wish to hold inviolable the teaching of the theory of evolution (and cosmic evolution[9]) to the total exclusion of all other ideas—scientific or otherwise—about the appearance and function of living things. Indeed, coupling the powerful influence exerted by the Darwinian paradigm[10] with the inescapable religious history of the creationist

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[1] Edwards v. Aguillard, 482 U.S. 578, 584 (1987).

[2] *See id.* at 610. In a strongly worded dissent, Justice Scalia took issue with the fact that the subject state law requiring equal time for the theory of evolution and creation science was invalidated on the basis of examining the religious motivations of the legislators who passed the law.

[3] U.S. CONST. amend. I.

[4] *See, e.g.*, Epperson v. Arkansas, 393 U.S. 97, 103 (1968) (striking down an Arkansas statute that forbade schoolteachers from teaching evolution or using any textbook that teaches evolution).

[5] *See id.* at 107.

[6] *See Edwards*, 482 U.S. at 584.

[7] *See infra* Part IV. Unless otherwise noted, the term "creationism" is used in this monograph in its traditional sense as a religious-based idea rooted in a Biblical interpretation.

[8] Walz v. Tax Comm'n, 397 U.S. 664, 674 (1970) ("We must also be sure that the end result—the effect—is not an excessive government entanglement with religion.").

[9] Cosmic evolution is the theory that the universe developed slowly over time through materialistic agents of development. *See generally* DONALD GOLDSMITH, THE ASTRONOMERS 105–35 (1991) (discussing the detection of cosmic background radiation and how its existence is strong proof that the Big Bang did occur). This book is a companion piece to the PBS television series, *The Astronomers*. *See* Videotape: The Astronomers (PBS Video 1991).

[10] *See infra* notes 164–66 and accompanying text.

movement, many are strongly persuaded that all future jurisprudence in this area will demonstrate an intransigent preference in favor of keeping the science classroom free from any pedagogy that might suggest the existence of a supernatural being.[11]

It is not surprising that only a handful of legal scholars[12] seem cognizant that a new and rapidly growing movement known as intelligent design theory[13] might soon find its way before the Supreme Court, through either a Free Speech[14]

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[11] *See, e.g.*, Jeanne Anderson, *The Revolution Against Evolution, or "Well, Darwin, We're Not in Kansas Anymore"*, 29 J.L. & EDUC. 398, 402–03 (2000) (removing evolution theory from state-wide testing schemes supports the theory of creationism); Marjorie George, Comment, *And Then God Created Kansas? The Evolution/Creationism Debate in America's Public Schools*, 149 U. PA. L. REV. 843, 861–65 (2001) (urging that the teaching of intelligent design as science, evolution as religion, or prohibiting the teaching of evolution are all variations on the theme of creationism); Lisa Kirkpatrick, Note, *Forgetting the Lessons of History: The Evolution of Creationism and Current Trends to Restrict the Teaching of Evolution in Public Schools*, 49 DRAKE L. REV. 125, 128 (2000) (suggesting that the Kansas approach of removing evolution from standardized exams is a sneaky move not likely to withstand constitutional scrutiny); Diana M. Rosenberg, Note, *Monkey Business and Unnatural Selection: Opening the Schoolhouse Door to Religion by Discrediting the Tenets of Darwinism*, 9 J.L. & POL'Y 611, 614 (2001) (stating that intelligent design is nothing more than a religious theory); Deborah A. Ruele, Note, *The New Face of Creationism: The Establishment Clause and the Latest Efforts to Suppress Evolution in the Public Schools*, 54 VAND. L. REV. 2555, 2561–62 (2001) (arguing that, because creationism and intelligent design presuppose a belief in Christianity, the primary effect of these theories is to teach religiously); 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, 588 (2001) (discussing an effort to remove evolution theory from a state testing scheme allowing local school boards to teach creation-based theories); Robert Vaught, Comment, *The Debate Over Evolution: A Constitutional Analysis of the Kansas State Board of Education*, 48 U. KAN. L. REV. 1013, 1044–45 (2000) (arguing that disenfranchising evolution from and adding creationism to school curricula would violate the Establishment Clause); 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, 444 (1997) (positing that teaching intelligent design is creationism in disguise).

[12] *See, e.g.*, David K. Dewolf et al., *Teaching the Origins Controversy: Science, or Religion, or Speech?*, 2000 UTAH L. REV. 39, 78–79, 98–100, 109–10 (arguing that the movement to correct exaggerations of evolutionist theory juxtaposed with the teaching of intelligent design is not unconstitutional); H. Wayne House, *Darwinism and the Law: Can Non-Naturalistic Scientific Theories Survive Constitutional Challenge?*, 13 REGENT U. L. REV. 355, 439, 441 (2001) (suggesting that intelligent design may survive constitutional scrutiny because it gives a fair representation of competing scientific theories).

[13] *See infra* Part V and accompanying text.

[14] *See, e.g.*, David K. Dewolf, *Academic Freedom After* Edwards, 13 REGENT U. L. REV. 447, 477–82 (2001) (arguing that the "right approach" for teaching creationism and evolution theory is to ensure academic freedom by allowing teachers to present scientific evidence favoring and opposing both theories).

challenge or an Establishment Clause[15] challenge, or that if it does, it will present much in the way of a serious contest to the status quo.[16] This view is far too shallow. Intelligent design theory cannot be dismissed as yet another back door attempt by creationists to get a sectarian religious idea into the public schools.[17]

In terms of constitutional significance, intelligent design theory has the potential to present a major turning point in what children are taught in school[18] and will, in the not-too-distant future, require the Supreme Court to analyze carefully a number of issues that in the evolution/creation line of cases to date have only been marginally entertained at the lower levels of jurisprudence. Although intelligent design references an intelligent designer—i.e., God—as an integral part of its doctrine, proponents strongly contend that it is nevertheless a viable scientific subject deserving academic study. Thus, because intelligent design presents itself at the doorstep of the judiciary as a science and meticulously avoids any references to the trappings of traditional religious-based concepts, the judicial fulcrum will have numerous factual and legal determinations relating to science and religion that must be addressed in deciding if the new idea comports with the Establishment Clause requirement that the public schools be religiously neutral.[19]

Juxtaposed to intelligent design theory, an even more provocative, yet well-seated, scientific doctrine known as the Anthropic Principle also awaits constitutional scrutiny by the Court. Surprisingly, although the Anthropic Principle poses a far greater probability of surviving an Establishment Clause challenge than intelligent design, there exists unwillingness by many legal commentators to distinguish the Anthropic Principle as anything other than a silent partner to intelligent design theory.[20]

The purpose of this article is to provide a general examination of the evolution/creation controversy in anticipation of the coming constitutional

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[15] *See, e.g.*, Derek H. Davis, *Kansas Versus Darwin: Examining the History and Future of the Creationism-Evolution Controversy in American Public Schools*, 9 KAN. J.L. & PUB. POL'Y 205, 218–21 (1999) (arguing intelligent design theory can be taught objectively—without a religious motivation or purpose—and survive a challenge under the Establishment Clause).

[16] *See supra* note 12.

[17] *But see* Kirkpatrick, *supra* note 11, at 145.

[18] *See, e.g.*, Philip C. Kissam, *Let's Bring Religion into the Public Schools and Respect the Religion Clauses*, 49 U. KAN. L. REV. 593, 600 (2001) (proposing that structuring high school science courses to allow for competing ideas "that conflict with the consensus in scientific communities about the kinds of theoretical knowledge in which scientists have a high degree of confidence due to empirical observations" would not violate the Establishment Clause).

[19] *See* Edwards v. Aguillard, 482 U.S. 578, 596–97 (1987).

[20] Most law review articles that address the Anthropic Principle simply lump it together under either intelligent design or creationism. *See, e.g.*, Ruele, *supra* note 11, at 2556 (discussing intelligent design and creationism, but completely ignoring the Anthropic Principle).

challenge to teaching the theory of intelligent design in public schools. According to one recent survey, serious support for teaching intelligent design "in school has boiled up at the state level in Michigan, Pennsylvania, Ohio, Nebraska, and Kansas."[21] In addition, the article suggests that the Anthropic Principle is both likely to pass constitutional muster and is uniquely suited as a bridge of common ground for both sides of this intense divide between evolutionists and creationists.

II. HISTORICAL BACKGROUND OF THE RELIGION CLAUSES

> I contemplate with sovereign reverence that act of the whole American people which declared that their legislature should make no law respecting an establishment of religion, or prohibiting the free exercise thereof, thus building a wall of separation between church and State.[22]
>
> —Thomas Jefferson (1743–1826)

Because the constitutionality of teaching either intelligent design or the Anthropic Principle in the public schools succeeds or fails on the interpretation of the Religion Clauses,[23] it is worthwhile to review briefly the historical and legal development of the Religion Clauses, set out as the first part of a list of rights enumerated in the First Amendment to the United States Constitution[24] and applied to the States through the Fourteenth Amendment.[25] The text of the Religion Clauses is embedded in a deceptively short phrase of the First Amendment, the first part known as the Establishment Clause and the second part known as the Free Exercise Clause: "Congress shall make no law respecting an *establishment of religion*, or prohibiting the *free exercise* thereof."[26]

Even a cursory examination into the legislative history of the Establishment Clause[27] reveals the powerful influences of both Thomas Jefferson and James Madison (1751–1836) and their deeply held thesis about the necessity of creating

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[21] Holly J. Morris, *Life's Grand Design*, U.S. NEWS & WORLD REP., July 29, 2002, at 52, 53.

[22] Letter from Thomas Jefferson to Nehemiah Dodge, Ephraim Robbins, and Stephen S. Nelson, A Committee of the Danbury Baptist Association in the State of Connecticut (Jan. 1, 1802), *reprinted in* THE COMPLETE JEFFERSON 518–19 (Saul K. Padover ed., 2d ed. 1969) (internal quotations omitted).

[23] U.S. CONST. amend. I.

[24] *Id.*

[25] U.S. CONST. amend. XIV.

[26] U.S. CONST. amend. I. (emphasis added).

[27] For an in-depth review on the legislative history of the Establishment Clause see MICHAEL S. ARIENS & ROBERT A. DESTRO, RELIGIOUS LIBERTY IN A PLURALISTIC SOCIETY 78–91 (1996).

what Jefferson later dubbed as a "wall of separation between church and State."[28] At a minimum, the Establishment Clause meant that government-favored churches of the kind set up in Europe should never find a foothold in the new United States of America.[29] In tandem with the Establishment Clause, the Free Exercise Clause was adopted to insulate the individual citizen from persecution by the State in the exercise of personal religious beliefs.[30]

Despite the historical backdrop from which the Religion Clauses were born—in which European nations had actively engaged in state-supported or state-sponsored religion and had persecuted individuals for religious beliefs at odds with the preferred religion—the functional importance of the Religion Clauses lay dormant for almost 100 years from the time of their adoption. Generally speaking, until the later part of the nineteenth century, inquiry by the American judiciary in any aspect of religious activity was a rarity.[31] To a degree, this phenomenon was due to the fact that the young republic was never exposed to the scale of religious persecutions seen in the European experience.[32] More importantly, however, it was not until 1940 in *Cantwell v. Connecticut*[33] that the Supreme Court ruled that "the Free Exercise Clause applied to state as well as to congressional action."[34]

Furthermore, not suffering from an identity crisis that some scholars see in the post-modernist elements of American society,[35] early American culture seemed perfectly comfortable with letting religious matters meander along

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[28] Reynolds v. United States, 98 U.S. 145, 164 (1878) (referring to a letter President Jefferson had penned some fourteen years after the adoption of the First Amendment to the Danbury Baptist Association); *see also supra* note 22.

[29] *See* Everson v. Bd. of Educ., 330 U.S. 1, 11 (1947).

[30] *See* Edwards v. Aguillard, 482 U.S. 578, 605 (1987) (Powell, J., concurring).

[31] For an excellent discussion of state case law regarding religious issues, see ARIENS & DESTRO, *supra* note 27, at 148–65 (covering several state cases relating to religious education and schools prior to 1920).

[32] *But see Everson*, 330 U.S. at 9:

> With the power of government supporting them, at various times and places, Catholics had persecuted Protestants, Protestants had persecuted Catholics, Protestant sects had persecuted other Protestant sects, Catholics of one shade of belief had persecuted Catholics of another shade of belief, and all these had from time to time persecuted Jews.

[33] 310 U.S. 296 (1940).

[34] ARIENS & DESTRO, *supra* note 27, at 204. The Court incorporated "into the Fourteenth Amendment the Free Exercise and Establishment Clauses, in 1940 and 1947, respectively, thus extending the reach of the Religion Clauses to state as well as federal actions." *Id.* at 203.

[35] For an excellent outline of this issue, see CHARLES HAYES, BEYOND THE AMERICAN DREAM 3, 122–25 (1998). Postmodernism is a mid-twentieth century intellectual movement that asserts that there is no real objective knowledge, only interpretations. The movement is traced to nihilist philosopher Friedrich Nietzsche. One of the elements of postmodernism is moral relativism.

without much attention to expanding Jefferson's metaphor of erecting a wall of separation between church and state. It was considered as wholly unremarkable that the public posture of the government not only accepted as a given basic notions about the general nature of God, but also that society itself was oriented around the idea that God was responsible for both life and, to some degree, the everyday affairs of the human race. This religious wellspring is particularly evident in the Declaration of Independence,[36] where the Founders simply reflected the belief that the nation was established and rooted in a heritage which expressly recognized the existence of a supreme being.[37] Even the fact that the nascent public schools engaged in various activities related to religion seemed beyond the reach of the Establishment Clause.[38]

The Supreme Court did not interpret the Religion Clauses until 1878, in *Reynolds v. United States*.[39] In *Reynolds*, the Court held valid a federal statute that outlawed the Mormon practice of polygamy and made multiple marriages a criminal offense.[40] Even then, the Court premised its ruling more on inherent governmental notions of maintaining good public order and social stability than it did on the Religion Clauses.[41] The *Reynolds* Court ruled that the government could not interfere with mere religious beliefs and opinions, but it could regulate certain practices.[42] Despite upholding the constitutionality of the statute, the Court noted with approval the Jeffersonian warning: "[T]hat to suffer the civil

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[36] In the declaration, there are two primary references to a Creator/God:

> When in the Course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth, the separate and equal station to which the Laws of Nature and *Nature's God* entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.
>
> We hold these truths to be self-evident, that all men are created equal, that they are endowed *by their Creator* with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness. . . .

THE DECLARATION OF INDEPENDENCE paras. 1, 2 (U.S. 1776) (emphasis added).

[37] *See, e.g.*, WILLIAM J. FEDERER, AMERICA'S GOD AND COUNTRY 247 (1994). There is no serious debate that the Founding Fathers accepted the fact that religious practices and beliefs were often overtly reflected in the nation's institutions. Benjamin Franklin expressed this perception in a pamphlet entitled "Information to Those Who Would Remove to America," in which he wrote that "serious religion [in the United States], under its various denominations, is not only tolerated, but respected and practiced." *Id.*

[38] *See* ARIENS & DESTRO, *supra* note 27, at 148–65.

[39] 98 U.S. 145 (1878).

[40] *Id.* at 168 (citing Utah Territorial Act, § 2, 12 Stat. 501 (1862)).

[41] *See id.* at 167 ("To permit this would be to make the professed doctrines of religious belief superior to the law of the land, and in effect to permit every citizen to become a law unto himself. Government could exist only in name under such circumstances.").

[42] *See id.* at 166 ("Laws are made for the government of actions, and while they cannot interfere with mere religious beliefs and opinions, they may with practices.").

magistrate to intrude his powers into the field of opinion, and to restrain the profession of propagation of principles on supposition of their ill tendency, is a dangerous fallacy which at once destroys all religious liberty . . . ."[43]

A telling aspect of *Reynolds* in terms of constitutional significance was the Court's realization that it was waking a sleeping giant.[44] Perhaps recognizing the potential legal and social minefields that would be presented if the Religion Clauses were ever applied to the States,[45] the Court chose to leave judicial pronouncements to future times.[46] In terms of the Establishment Clause, those future times did not arrive until a full sixty-nine years later in the 1947 Supreme Court case of *Everson v. Board of Education*.[47]

In *Everson*, the Court finally provided its first analytical framework in which to view the Establishment Clause of the First Amendment. The Court wrote:

> [The Religion Clauses mean] at least this: Neither a state nor the Federal Government can set up a church. Neither can pass laws which aid one religion, aid all religions, or prefer one religion over another. Neither can force nor influence a person to go to or to remain away from church against his will or force him to profess a belief or disbelief in any religion. No person can be punished for entertaining or professing religious beliefs or disbeliefs, for church attendance or non-attendance. No tax in any amount, large or small, can be levied to support any religious activities or institutions, whatever they may be called, or whatever form they may adopt to teach or practice religion. Neither a state nor the federal Government can, openly or secretly, participate in the affairs of any religious organizations or groups and *vice versa*.[48]

With the broadly staked *Everson* rationale serving as its touchstone, the Court decided that a New Jersey statute authorizing subsidies for the transportation of school children to Catholic parochial schools was not an impermissible form of assistance to a religious institution.[49] A majority of the Court concluded that the "wall of separation"[50] was not disturbed because the state did not make a financial contribution directly to the Catholic schools, but merely facilitated the

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[43] *Id.* at 163 (citation and internal quotations omitted).

[44] *Id.* at 167.

[45] *See supra* notes 33–34 and accompanying text.

[46] *See* Bradfield v. Roberts, 175 U.S. 291, 300 (1899) (refusing to strike down as unconstitutional a Congressional appropriation for the construction of a public hospital to be administered by the Catholic Church).

[47] 330 U.S. 1 (1947).

[48] *Id.* at 15–16.

[49] *See id.* at 17.

[50] *Id.* at 18. Jefferson's "wall of separation" metaphor has since been "blurred." *See* Lemon v. Kurtzman, 403 U.S. 602, 614 (1971) ("[T]he line of separation, far from being a 'wall,' is a blurred, indistinct, and invariable barrier depending on all the circumstances of a particular relationship.").

opportunity of children to be transported safely to and from school.[51] In short, the first real application of the Establishment Clause to a given set of facts was viewed in a very narrow manner. Nevertheless, with the Establishment Clause now fully applicable to the states, *Everson* served to open the judicial floodgates.

Challenges to virtually any initiative or action regarding religious activity vis-à-vis public facilities soon demanded the Court's attention. Since *Everson*, the Court has greatly expanded the reach of the Establishment Clause, ruling on such varied matters as Christian nativity scenes;[52] prayer in school;[53] purchases of textbooks for religious schools;[54] compulsory attendance of (Amish) children in public schools;[55] salary subsidies for Catholic school teachers;[56] tax-exempt status for church property;[57] declaring religious beliefs;[58] reading the Bible at the opening of school days;[59] providing public aid to the parents of children to attend religious schools;[60] and, the topic of concern, the teaching of creationism in the public school system.[61]

To better navigate the swiftly moving waters of the Establishment Clause, the Court has entertained a number of analytical standards since *Everson*. The most well-known is the *Lemon* test set forth in *Lemon v. Kurtzman*.[62] *Lemon* established a three-pronged approach to assess the validity of a legislative statute or governmental action as related to the Establishment Clause: (1) the statute or governmental action must have a secular purpose; (2) the primary or principal effect of the statute or governmental action must be one which neither advances

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[51] *See Everson*, 330 U.S. at 18.

[52] *See* County of Allegheny v. Am. Civil Liberties Union, 492 U.S. 573, 621 (1989).

[53] *See* Sch. Dist. v. Shempp, 374 U.S. 203, 225–27 (1963); Engel v. Vitale, 370 U.S. 421, 436 (1962).

[54] *See* Bd. of Educ. v. Allen, 392 U.S. 236, 248–49 (1968).

[55] *See* Wisconsin v. Yoder, 406 U.S. 205, 234–63 (1972).

[56] *See* Lemon v. Kurtzman, 403 U.S. 602, 625 (1971).

[57] *See* Walz v. Tax Comm'n, 397 U.S. 664, 680 (1970).

[58] *See* Welsh v. United States, 398 U.S. 333, 342–44 (1970); United States v. Seeger, 380 U.S. 163, 187–88 (1965); Torcaso v. Watkins, 367 U.S. 488, 496 (1961). *Welsh* and *Seeger* dealt with the application of § 6(j) of the Universal Military Training and Service Act of 1948 that provided an exemption from combat for those persons who were "consciously opposed to participation in war in any form" due to their "religious training and belief." Universal Military Training and Service Act of 1948, 50 U.S.C. app. § 456(j) (2000); *see also Welsh*, 398 U.S. at 336–37; *Seeger*, 380 U.S. at 164–65.

[59] *See* Sch. Dist. v. Schempp, 374 U.S. 203, 225–27 (1963).

[60] *See* Zelman v. Simmons-Harris, 122 S. Ct. 2460, 2461–62 (2002).

[61] *See* Edwards v. Aguillard, 482 U.S. 578, 596–97 (1987); Epperson v. Arkansas, 393 U.S. 97, 109 (1968).

[62] 403 U.S. 602 (1971).

nor inhibits religion; and (3) the statute or governmental action must not foster an excessive governmental entanglement with religion.[63]

All three prongs of the *Lemon* test must be met to hold the law constitutional. Citing *Walz*, the *Lemon* Court agreed that the Establishment Clause was intended to prevent "three main evils"[64]—"sponsorship, financial support, and active involvement of the sovereign in religious activity."[65]

Although the *Lemon* test has never been overturned by the Court,[66] the Court's fealty to the standard has waxed and waned over the years[67]—sometimes as a function of ideological inclinations of the Justices themselves and sometimes simply in an effort to decide better where the line between church and state should be drawn, or redrawn.[68] In *County of Allegheny v. American Civil Liberties Union*,[69] which ruled that a crèche inside a county courthouse displaying the words "Glory to God in the Highest" was unconstitutional, the Court sidelined the *Lemon* test and applied Justice O'Connor's newly formulated endorsement test[70] where the secular purpose and primary effect prongs of the *Lemon* test are essentially merged.[71] In the summer of 2002, the Court's 5–4

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[63] *See id.* at 612–13.

[64] *Id.* at 614.

[65] *Id.* at 612 (citing Walz v. Tax Comm'n, 397 U.S. 664, 668 (1970)).

[66] In *Agostini v. Felton*, 521 U.S. 203 (1997), the Court applied the *Lemon* test, upholding the constitutionality of a federal school-aid program that sent public school teachers to religious schools to help teach and provide counseling to disadvantaged students. *Id.* at 237–40.

[67] In *Lynch v. Donnelly*, 465 U.S. 668 (1984), the Court held that "no fixed *per se* rule" could be framed for all Establishment Clause cases. *Id.* at 678.

[68] Justices Stevens and Souter have advanced their own ideas on how to interpret the Establishment Clause. Justice Stevens advocates replacing the "secular legislative purpose" prong of the *Lemon* test (the first prong) with a deeper analysis turning on whether the state's actual purpose was to endorse or disapprove of religion. See Wallace v. Jaffree, 472 U.S. 38, 56 (1985) (referencing Justice O'Connor's concurring opinion in *Lynch*). Justice Souter's approach to the matter focuses on whether the State fails to exercise authority in a religiously neutral way by preferring one religion to another, or, religion to irreligion. *See* Bd. of Educ. v. Grumet, 512 U.S. 687, 703–05 (1994). Another championed analytical framework is the coercion test, championed by Justice Kennedy in *Lee v. Weisman*, 505 U.S. 577 (1992). Determining that a school district may not allow clergy members to lead prayers during school graduation ceremonies, Justice Kennedy proposed the application of two underlying principles: (1) the government may not coerce anyone to support or participate in a religion and (2) the government may not give direct benefits to a religion to such a degree that it establishes a de facto state religion. *See id.* at 587.

[69] 492 U.S. 573 (1989).

[70] *Id.* at 592–94. Justice O'Connor first set out the endorsement test in her concurring opinion. *See Lynch*, 495 U.S. at 690–94 (1984) (O'Connor, J., concurring). The Court ruled that a city's outdoor Christmas display of a nativity scene joined by other non-religious objects, including a Santa Clause and reindeer, was constitutional. *See id.* at 685–87.

[71] *See* Agostini v. Felton, 521 U.S. 203, 232–33 (1997).

ruling in *Zelman v. Simmons-Harris*,[72] reaffirmed the significance of at least two parts of the *Lemon* analysis—the secular purpose prong and the principal or primary effect prong. Justice O'Connor's concurring opinion in *Zelman* noted that the decision did not "signal a major departure from this Court's prior Establishment Clause jurisprudence."[73] Then, after providing a brief review of the *Lemon* test,[74] Justice O'Connor noted that *Lemon* was still active, but in her view, the entanglement inquiry had been folded into the primary effect inquiry because "both inquires rely on the same evidence."[75] Justice O'Connor concluded that "[t]he test today is basically the same as that set forth in *School District of Abington Township v. Schempp* . . . [cited] over 40 years ago."[76]

The endorsement test, which currently predominates in the Court's Establishment Clause jurisprudence, focuses on whether the governmental action in question is perceived by an objective observer as endorsing, favoring, or promoting religion.[77] In short, the endorsement test asks: "[W]hether [the] government's purpose is to endorse religion and whether the statute actually conveys a message of endorsement."[78] Under the endorsement test, a crèche was viewed as an "'obvious' allegiance"[79] between the state and a particular religious belief and could not be displayed.[80] Although it is fairly clear that the Court now prefers the endorsement test to evaluate Establishment Clause cases, the Court seems unwilling to overturn the *Lemon* test. Thus, as a practical matter the *Lemon* test, not the endorsement test, remains as the preferred analytical starting place for the lower federal courts.[81]

While criticizing the Court's expansive reading of the Establishment Clause is common grist for some,[82] it is a mistake to characterize the post *Everson* line of

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[72] 122 S. Ct. 2460 (2002).

[73] *Id.* at 2476 (O'Connor, J., concurring).

[74] *See id.*

[75] *Id.*

[76] *Id.* (citations omitted).

[77] *See* County of Allegheny v. Am. Civil Liberties Union, 492 U.S. 573, 589, 592–94 (1989).

[78] Wallace v. Jaffree, 472 U.S. 38, 69 (1985).

[79] *County of Allegheny*, 492 U.S. at 608.

[80] *See id.* at 621. Interestingly, however, the Court found that the display of a Jewish menorah placed outside of the state building did not violate the Establishment Clause. *See id.* at 620–21.

[81] *See* Freiler v. Tangipahoa Parish Bd. of Educ., 185 F.3d 337, 344 (5th Cir. 1999), *cert. denied*, 530 U.S. 1251 (2000). The Court voted 6-3 to deny certiorari and let stand the Fifth Circuit's use of the *Lemon* test to strike down a Louisiana requirement for science teachers to read a disclaimer to students that essentially informed students that the theory of evolution should not dissuade them from believing in the biblical story of the creation. *See id.* at 1251.

[82] *See, e.g.*, Jesse H. Choper, *The Religion Clauses of the First Amendment: Reconciling the Conflict*, 41 U. PITT. L. REV. 673, 696–701 (1980) (concluding that the Court's so-called

cases as a newfound disapproval of all things religious in the public square.[83] On the contrary, the Court has affirmed selected public expressions by the government of the nation's Judeo-Christian heritage—for example, in the national motto "In God We Trust,"[84] which is engraved on United States currency[85] (and in stone in the House of Representatives); in paying for religious leaders to open religious prayers before sessions of the Congress;[86] in teaching religious subjects as secular religious studies in public schools;[87] in allowing public schools to offer a silent time for voluntary prayer;[88] in allowing for the release of students during the day to attend religious centers for religious instruction off school premises;[89] and, most recently, in allowing for a school voucher program that provides aid to

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neutrality principle produces hostility toward religion by failing to understand notions of state neutrality and the positive benefits of religious freedom); *see also* Frederick Mark Gedicks, *Public Life and Hostility to Religion*, 78 VA. L. REV. 671, 693–96 (1992) (arguing that religion is disabled by the Supreme Court's interpretation of the Establishment Clause).

[83] *See* STEPHEN L. CARTER, THE CULTURE OF DISBELIEF 51–56 (1993). Carter's book explores America's schizophrenic approach to religion which often requires people to split their public and private lives, allowing adherence to private religious faith while discouraging religious beliefs from becoming the basis for public action. *See id.* at 11–17.

[84] Sch. Dist. v. Schempp, 374 U.S. 203, 303 (1963) (Brennan, J., concurring); *see also* 36 U.S.C. § 302 (2000) (codifying our national motto as "In God We Trust"); Gaylor v. United States, 74 F.3d 214, 217–18 (10th Cir. 1996) (holding the federal statute mandating the inscription of the national motto on printed and coined currency did not violate the Establishment Clause); O'Hair v. Murray, 588 F.2d 1144, 1144 (5th Cir. 1979) (per curiam) (affirming the district court's dismissal of a challenge to the statute mandating inscription of national motto on currency on the grounds that the constitutionality of the statute had already been decided and bore no resemblance to governmental sponsorship of a religious exercise); Aronow v. United States, 432 F.2d 242, 243 (9th Cir. 1970) (holding that the national motto had nothing to do with the establishment of religion).

[85] *See Schempp*, 374 U.S. at 303–04 (Brennan, J., concurring). There are two references to God on the U.S. One Dollar Bill: one in English—"In God We Trust"; and the other in Latin—"*Annuit Coeptis*." The Latin phrase located above the pyramid of the dollar bill means "God has favored our undertaking."

[86] *See* Marsh v. Chambers, 463 U.S. 783, 792–94 (1983).

[87] *See* Edwards v. Aguillard, 482 U.S. 578, 607–08 (1987) (Powell, J., concurring); Stone v. Graham, 449 U.S. 39, 42 (1980) (per curiam); Epperson v. Arkansas, 393 U.S. 97, 106, 109 (1968); *Schempp*, 374 U.S. at 225–27. Public school educators may use religious documents or teach comparative religions to facilitate course approved objectives so long as they were not used to "advance a particular religious belief." *Edwards*, 482 U.S. at 608 (Powell, J., concurring).

[88] *See* Brown v. Gilmore, 258 F.3d 265, 281–82 (4th Cir.), *cert. denied*, 534 U.S. 996 (2001). The Supreme Court denied certiorari to an ACLU challenge declaring a Virginia statute unconstitutional that mandated a one-minute period of silence at the start of each school day. *Id.* at 270. Students were permitted to "meditate, *pray*, or engage in any other silent activity which does not interfere with, distract, or impede other pupils in the like exercise of individual choice." *Id.* at 271 n.1 (emphasis added).

[89] *See* Zorach v. Clauson, 343 U.S. 306, 315 (1952).

parents to send their children to religious schools.[90] This recognition of religion as a part of the cultural heritage of the United States has been often repeated but is best encapsulated in a single sentence from *Engel v. Vitale*: "The history of man is inseparable from the history of religion."[91]

The final area of judicial application of the Religion Clauses (primarily the Establishment Clause) concerns the issue of teaching evolution and creationism in public schools. Because of the new challenges posed by intelligent design theory and the Anthropic Principle, it is efficacious first to expend some time reviewing the historical context of the creation/evolution debate. To date, the courts have largely exhibited an unwillingness to identify fully the protagonists and place them in their respective camps.

III. DEFINING THE SIDES AND TERMS IN THE EVOLUTION/CREATION DEBATE

> I was a young man with unformed ideas. I threw out queries, suggestions, wondering all the time over everything; and to my astonishment the ideas took like wildfire. People made a religion of them.[92]
>
> —Charles Darwin (1809–1882)

A. *The Theory of Evolution*

Although ideas excluding God from the creation and function of the universe and life have been proposed in philosophical settings from the time of Plato,[93] it was not until the nineteenth century that the idea was encapsulated in a scientific cloak of respectability, particularly as it applied to living things.[94] This first occurred in 1859, when the English naturalist Charles Darwin proposed his thought provoking theory of evolution in a book entitled *The Origin of Species*.[95]

The basic tenets of evolution are well known by scientists and laymen alike. First, Darwinism teaches that about 3.5 billion years ago a solitary living prokaryotic cell (a cell without a nucleus) emerged spontaneously in an ancient

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[90] *See* Zelman v. Simmons-Harris, 122 S. Ct. 2460, 2473 (2002).

[91] 370 U.S. 421, 434 (1961).

[92] FEDERER, *supra* note 37, at 199.

[93] *See, e.g.*, WERNER JAEGER, THE THEOLOGY OF THE EARLY GREEK PHILOSOPHERS 1–17 (1947) (exploring the idea that philosophy sought to answer the eternal questions); Dewolf et al., *supra* note 12, at 46 (noting that ancient Greek, Roman, Jewish, and early Christian philosophers all attempted to determine how "life arose").

[94] *But see* DOUGLAS J. FUTUYMA, SCIENCE ON TRIAL 13 (1995) (asserting that that "Hinduism and Buddhism are variants of the typical evolutionary world view, beginning as they do with an eternally self-existing universe").

[95] CHARLES DARWIN, THE ORIGIN OF SPECIES (Random House 1993) (1869). The original title of Darwin's book was THE ORIGIN OF SPECIES BY MEANS OF NATURAL SELECTION.

body of water.[96] Second, Darwinism explains that, from one or a very few primitive organisms, the order and complexity of all life forms developed by means of a process consisting of chance and necessity.[97] Darwin's theory of evolution has undergone some modifications over the years,[98] but it essentially consists of two intertwined factors that, working together, purport to account for the appearance, interrelationship, and purposefulness of all livings things. These two factors are (1) the random existence of favorable genetic mutations[99] in life forms, i.e., chance, and (2) the operation of a process called natural selection, or the survival of the fittest, i.e., necessity.[100]

The theory of evolution holds that the appearance of any new life form results from the natural selection of small, accidental, cumulative changes in the deoxyribonucleic acid (DNA) of pre-existing life forms.[101] In mainstream evolutionary circles[102] this painfully slow-moving process is known as gradualism and is often expressed in the Latin phrase—*natura non-facit saltum*

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[96] *See, e.g.*, MICHAEL BEHE, DARWIN'S BLACK BOX: THE BIOCHEMICAL CHALLENGE TO EVOLUTION 3–5 (1996).

[97] *See id.*

[98] The modern neo-Darwinism synthesis developed in the first half of the nineteenth century. *See* FUTUYMA, *supra* note 94, at 40.

[99] Early Darwinists believed that, since naturally occurring environmental conditions worked so effectively in shaping diversity in any given species, this alone could provide a satisfactory explanation for the appearance of all living things. Then, in the early part of the twentieth century, evolutionists gladly enlisted the new discoveries relating to the workings of genetic mutations during sexual reproduction as the missing key ingredient in the Darwinian formula. *See id.* at 39. Thus, natural selection not only operates on the existing gene pool, but, more importantly, it operates on the mutated genes that randomly pop up from time to time in the genome.

[100] The discovery of genes and mutations was made after Darwin's initial publication so that the technical modern term for Darwinism is neo-Darwinism. First, through the random operation of chance, a very slight beneficial mutation in the DNA of a particular species of plant or animal occurs. Second, those variations in the genetic code that are most beneficial to the animal are favored through a process of natural selection (survival of the fittest) until a totally new, and in most cases, more advanced species develops. This process may evolve over a period of hundreds of thousands of years. *See generally id.* at 38–41.

[101] Darwin rejected the typological model expressed by Louis Agassiz (1807–1873). *See* LOUIS AGASSIZ, METHODS OF STUDY IN NATURAL HISTORY 41–71 (1863). Recognizing the ease with which living things can be placed into distinct categories of classification, typology holds that individual members of a particular classification are simply variations of a distinct underlying design. Although typology can sometimes prove to be rather blurred at the species level, the higher groupings of taxonomy appear to be largely immutable among living plants and animals. Darwin proposed that his theory could go beyond the model and link all biological life forms together through an intricate system of shared ancestral connections.

[102] Modern Darwinists are split into a number of conflicting camps concerning the rates and mechanisms of evolutionary forces. *See infra* note 169.

(nature does not make jumps).[103] For mainstream Darwinists[104] gradualism rests at the very heart of the theory of evolution. As incredulous as it might seem, this simplistic formula has been used to account for absolutely every aspect of life one can imagine, ranging from such things as the shape of a bird's wing to why people smile.[105]

1. *Evolution—Theory or Fact?*

Darwin's idea is popularly known as the theory of evolution, despite strong objection by some that it is not a theory of science but a fact of science.[106] Of course, the foundational corollary that attenuates the debate over whether evolution is a fact of science or a theory of science rests as much in how one defines the term evolution as it does in analyzing the evidence for evolution.[107]

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[103] For instance, where improved speed or sight becomes a criterion for survival in a particular species of land animals, those mutated animals that can run the fastest, or have better eyesight, or both, will outlive the others in their species. This happens because in each generation only those that can best adapt to environmental changes, e.g., climate, predators, etc., survive. In turn, these surviving animals will then breed together to produce offspring that carry on their superior characteristics for speed or sight. This part of gradualism is uncontroversial. Nevertheless, the theory contends that this process slowly and blindly continues bit-by-bit, over eons of time, until an entirely new kind of animal is evolved, in many cases complete with totally different appendages, organs, and instincts. *See infra* note 158.

[104] These are currently referred to as ultra-Darwinists. *See infra* note 169.

[105] *See* CARL SAGAN, THE DEMON HAUNTED WORLD 45 (1995); *see also* FRANCIS CRICK, THE ASTONISHING HYPOTHESIS: THE SCIENTIFIC SEARCH FOR THE SOUL 10 (1994) (attributing the human conscience and free will as "the end product of a long process of evolution by natural selection").

[106] *See, e.g.*, FUTUYMA, *supra* note 94, at xi. In his preface, the well-known champion of evolution begins by stating: "Evolution has, by now, the status of fact." *Id.*; *see also* Ernst Mayr, *Darwin's Influence on Modern Thought*, SCI. AM., July 2000, at 79, 83 ("No educated person any longer questions the validity of the so-called theory of evolution, which we now know to be a simple fact.").

[107] *See, e.g.*, Eric Meikle, *State Board of Education Adopts Another Evolution Disclaimer*, NAT'L CTR. FOR SCI. EDUC., *at* http://www.ncseweb.org/resources/news/2001/AL/123_state_board_of_education_adopt_11_8_2001.asp (Nov. 8, 2001). On November 8, 2001, the Alabama State Board of Education voted to require a new prefatory insert in all Alabama's state-approved science texts. The insert reads in part:

> The word "theory" has many meanings. Theories are defined as systematically organized knowledge, abstract meaning, a speculative idea or plan, or a systematic statement of principles. . . .
>
> . . . .
>
> The theory of evolution by natural selection is a controversial theory that is included in this textbook. It is controversial because it states that natural selection provides the basis for the modern scientific explanation for the diversity of living things. Since natural selection has been observed to play a role in influencing small changes in a population, it is

From a jurisprudential aspect, this matter cannot be properly discussed until it is properly defined.

There is no doubt that Darwin's theory of evolution is the most revolutionary scientific idea of the modern era. Not only has it become the mantra for the profession of science, but concepts washed in "evolution speak" have pushed their way into the very fabric of western thinking.[108] Emphatically, the word evolution permeates almost every aspect of the cultural vocabulary. Widely divergent fields of endeavor—such as economics, politics, law, psychology, and linguistics—have readily incorporated the word to explain various processes associated with their respective disciplines. In terms of epistemology, this has led to a great deal of confusion about what the term evolution actually means. For instance, one hears about computers, automobiles, and even our criminal and civil laws as having evolved from earlier models or concepts. But what does it mean when one says that something has evolved? In many instances, the word evolution is used to describe the phenomenon of change without giving any credit to the underlying mechanics of that change.[109]

In the lexicon of scientific jargon, evolution is used in a very different sense. In science, the word can be used both to acknowledge the phenomenon of change and/or to describe the mechanism for that change. On the mechanical side of this duality, the word evolution means that matter is self-developing through a material or natural process. Most evolutionists therefore conclude that an intelligent being (God) has nothing whatsoever to do on any level with the development of living things.[110] Since the time of Darwin, this is the way that the word has been used by evolutionists.

Despite continuing criticisms of Darwin's thesis,[111] most will agree that Charles Darwin presented the first plausible theory portraying the study of life in a purely non-religious light. The idea remains so compelling that the theory of evolution currently exhibits a firm, but not complete, ideological hold over the scientific and educational communities of western culture. Nevertheless, if there is no question that Darwinism is now touted as fact in much of science, education,

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> assumed that it produces large changes, event though this has not been directly observed. . . .

Id.

[108] For an excellent overview of this concept, see David Barton, *A Death-Struggle Between Two Civilizations*, 13 REGENT U. L. REV. 297, 303–11 (2000–2001).

[109] Certainly, everyone should understand that by using the word evolution to describe, for example, the improvements in the next generation of cars, no one is suggesting that the new line of cars somehow made themselves from the old line of cars. Intelligent beings made the first automobile as well as the subsequent improvements in design to produce better versions of cars.

[110] *See* Futuyma, *supra* note 94, at 14 ("[B]iology provides no evidence for omnipotence, intelligence, purpose, or design."); *see also infra* notes 174–88 and accompanying text.

[111] *See infra* notes 135–40 and accompanying text.

and the multimedia, the etiology of this hegemony deserves a greater degree of study than it has received, particularly in light of the constitutional dilemma of deciding what is science and what is religion in terms of the Establishment Clause.[112]

In every field of science, from geology to physics, the goal of science is to approximate the reality of a particular truth. In some areas of science, the task of truth-seeking is fairly simple because it can be accomplished by means of objective scrutiny through the scientific method.[113] Through empirical observation information can be gathered, hypotheses tested to validate particular truths, and scientific facts[114] and laws firmly established. Such is the realm of certain knowledge, and the collective opinion of scientists in this area is almost always correct.[115] Thus, a scientific law[116] refers to an item of fact, which is the best approximation of a particular reality; a hypothesis (used in the context of the scientific method) is an idea about a fact or series of facts that can be tested in the field or laboratory and either proved or disproved. In contrast, a theory is an idea

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[112] *See* Rosenburg, *supra* note 11, at 621.

[113] One of the most positive developments of the Enlightenment was the development of a systematic method for approaching discovery. This method was quickly adopted and is in use today throughout all scientific endeavors. Known as the scientific method, it involves the development and testing of a hypothesis using data gathered through observation and experimentation. The basic steps of the scientific method are as follows: (1) Observe and record a particular event or series of events; (2) Form a hypothesis concerning a truth related to the particular event or series of events; (3) Design and conduct experiments to test whether the hypothesis is true or false.

[114] *See generally* INTRODUCTORY READINGS IN THE PHILOSOPHY OF SCIENCE (E.D. Klemke et al. eds., 1988). Without question, if there is a single glaring flaw in understanding the world of science and scientific jargon, it is the failure to distinguish between fact and theory. For example, it is important to understand the difference between a fact (a fossil of a hominid) and a theory (an interpretation of its demise). To help make the distinction between fact (certain knowledge) and theory (uncertain knowledge), it is vital to realize that all issues of study in any given scientific discipline can be described under one of four headings—law, hypothesis, theory, or speculation. Philosophers of science might argue that all such descriptive terms are only attempts to approximate reality, but clearly some approximations are better than others.

[115] For example, the mathematical equation $2H_2 + O_2 = 2H_2O$ represents a firm item of certain knowledge about a fixed process in the world that can be verified via the scientific method.

[116] *But see* W. Wayt Gibbs, *Beyond Physics: Renowned Scientists Contemplate the Evidence for God*, SCI. AM., Aug. 1998, at 20, 20–22. Gibbs argues that what are termed as scientific laws or the laws of nature are misnomers. The so-called scientific laws are based on statistical assumptions that the present universe operates according to fixed norms and will continue to do so. Some scientists note that science is rather hypocritical in all this because it blindly takes for granted "the existence of any physical laws at all and the nature of the physical laws that do hold." *Id.* at 22 (internal quotations omitted). This matter-of-fact attitude is curious because these laws were not originated by science and science certainly cannot enforce or perpetuate them. Science cannot even guarantee that they will continue to function as previously observed. *See id.*

about a fact or a series of facts that has some supporting evidence but which cannot be fully validated; a speculation is nothing more than pure guesswork about something, the worst approximation of a particular reality.[117]

Unfortunately, the central thesis of the theory of evolution cannot be tested or verified by the scientific method and rests instead on inductive reasoning.[118] Because the evolutionary process of one creature changing into another entirely different creature is said to take so much time, it cannot be observed through traditional avenues of experimentation.[119] Under this analysis, the idea known as the theory of evolution is properly classified as a theory. Darwinism has some supporting evidence from various fields of investigation but not enough evidence to qualify as a fact of science.[120]

2. *Proofs of Evolution*

The reading segment of America is now generally aware of the laundry list of reasons that the theory of evolution is currently under siege from both within and

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[117] *See, e.g.*, ROBERT ARDREY, THE HUNTING HYPOTHESIS 11–12 (1976). Ardrey's book provides a typical illustration of this process of speculation. He begins with the assumption that man evolved from extinct hominids and then proceeds to list various unverifiable speculations concerning how this transformation happened. Ardrey's conjectures range from the effects of hunting pressures on these primates to changes in the earth's climate; *see also* SAGAN, *supra* note 105, at xvii (1995). Speculating on how humans developed such a complex brain—the human brain was developed long before the need for such a magnificent piece of equipment—the late astronomer and evolutionary theorist Carl Sagan (1934–1996) wrote in his last book:

> As soon as the infant can see, it recognizes faces, and we now know that this skill is hardwired in our brains. Those infants who a million years ago were unable to recognize a face smiled back less, were less likely to win the hearts of their parents, and less likely to prosper.

Id. at 45.

[118] The Greek philosopher Chrysippus (280–206 B.C.) is best known to history as the father of prepositional logic. He rightly believed that human logic was a servant of knowledge and so divided the universe into two distinct categories—things that were evident (known) and things that were unclear (unknown). Chrysippus proposed that the things that were evident were understood immediately while the things that were unclear had to be grasped indirectly by a system of logical thinking that could take the inquirer from the known to the unknown.

[119] *See generally* ERNST MAYR, POPULATIONS, SPECIES, AND EVOLUTION 8–9 (1970) (explaining that because scientists cannot observe evolution first-hand, they instead examine the fossil record of past events to infer causal processes).

[120] Law and hypothesis relate to things in the realm of certain knowledge; they are the best approximations of objective realities. Theory and speculation relate to things in the realm of uncertain knowledge. All issues of scientific study will fall into one of these four categories. To better categorize these concepts, the author developed the following graph:

without the scientific community,[121] the greatest challenge, of course, being the fossil record itself.[122] Long before Darwin proposed his theory of evolution, naturalists understood that there existed a distinctive pattern to nature by which things could be categorized into separate groupings.[123] Swedish naturalist Carolus Linnaeus (1707–1778) was the first to divide the animal kingdom into definitive groups according to the structure of an animal's body form and other specific defining or diagnostic characteristics.[124] After many years of contemplation,

KNOWLEDGE	CERTAIN	Law	Something that has been established with certainty.
		Hypothesis	A testable idea concerning a phenomenon capable of proof or disproof.
	UNCERTAIN	Theory	An explanation not capable of proof, but with some supporting evidence.
		Speculation	Pure guesswork.

[121] For an excellent compilation of the critiques from within the scientific community, see DeWolf et al., *supra* note 12, at 50–53.

[122] *See id.*

[123] For example, because mammals share such things as mammary glands and hair, and because non-mammals do not, distinctions can be easily established. Linnaeus' system of classification proved so useful that it forms the basis for how living things are categorized today. The system operates as follows: The largest division of classification is termed the phylum, which separates into major groups those creatures with fundamentally different body parts. Each phylum is further divided into classes, the classes into orders, the orders into families, the families into genera, and finally, each genus is divided into a great number of species. While the definition of a species is somewhat fluid, the general rule of thumb is that all members of the same species are capable of interbreeding and producing fertile offspring; animals of different species cannot interbreed to produce fertile offspring. *See* JOHN MAYNARD SMITH, THE THEORY OF EVOLUTION 217 (1993); AGASSIZ, *supra* note 101, at 41–71.

[124] To pinpoint where a particular plant or animal belongs in Linnaeus' classification, each is designated with a short two-word Latin name that is the nomenclature of its genus and species. This designation is roughly equivalent to providing the street name and number to locate a house in a particular city. For example, a domesticated cat is *Felis domesticus* and a jaguar is *Felis onca*. Both belong to the same genus, *Felis*, but to different species, *domesticus* and *onca*. On the other hand, dogs and cats do not appear to be closely related at all. Both, however, are vertebrates and meat-eating mammals. Hence they belong to the same phylum,

Darwin proclaimed in *Origin of Species* that the process of natural selection not only accounted for the physical differences that occur at the lowest levels of Linnaeus' system of classification (the so-called special theory of evolution),[125] but also explained how all new living things have come to be on the earth. Darwin called his process of transmutation of species the general theory of evolution.[126]

To those even marginally familiar with the theory of evolution, it is well known that the strongest argument for Darwin's bold extrapolation has always been an indirect appeal to what is called homology,[127]or the comparison of physical similarities found in different organisms.[128] The display entitled "Human Biology and Evolution" at New York's American Museum of Natural History latches on to this theme in a main wall poster that reads: "Our place in this great tree of life is seen in the structure of our bodies. In every plant and animal from

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Chordata; class, Mammalia; and order, Carnivora (flesh eaters); but to different families—dog, Canidae; cat, Felidae. The theoretical expression for this system of classification is called typology. *See* AGASSIZ, *supra* note 101, at 41–71.

[125] *See supra* note 99 and accompanying text. The special theory of evolution is referred to today as microevolution.

[126] *See generally* DARWIN, *supra* note 95, at 148–60 (describing how over time, species evolve by gaining new traits that are advantageous for survival and losing traits that they don't use).

[127] Darwin masterfully expressed the belief now echoed by all evolutionists that structural similarities in various types of creatures can best be explained by the fact that all descended with modification from a common ancestor. *See* DARWIN, *supra* note 95, at 579:

> We have seen that members of the same class, independently of their habits of life, resemble each other in the general plan of their organisation. This resemblance is often expressed by the term "unity of type"; or by saying that the several parts and organs in the different species of the class are homologous. . . . What can be more curious than that the hand of a man, formed for grasping, that of a mole for digging, the leg of the horse, the paddle of the porpoise, and the wing of the bat, should all be constructed on the same pattern, and should include similar bones, in the same relative positions?

[128] *See generally* GAVIN DE BEER, HOMOLOGY, AN UNSOLVED PROBLEM (1971). The seminal work in looking at homology as a proof for Darwinism was done by evolutionist Gavin De Beer. Interestingly, De Beer's disappointing conclusions are encapsulated by the title he chose for his book on this subject. In this regard, no matter how suggestive the circumstantial evidence from homology may be for common descent, similarities in structure do not prove either common descent or ancestral relationships.

Proponents of an evolutionary interpretation of homology assume that if *A* is older than and in some way similar to *B*, then the only permissible explanation is some sort of evolutionary transformation from one to the other. Standing alone, such thinking is simply a post-hoc fallacy that holds that because *B* has some similar characteristics and followed *A* in time, then *A* must have caused *B*. For instance, a blue American-made Ford pick-up truck and a white German-made BMW roadster both have very strong similarities, but they are not derivations one from the other.

bacteria to elephants, these processes follow exactly the same pattern, evidence that all life on Earth evolved from a common ancestor."[129]

So convinced by the idea of transmutation of species, Darwin was untroubled by the unbridgeable typological gaps among living organisms, believing that the fossils[130] would ultimately demonstrate an ancient past of a perfect continuity of evolving life forms. Most certainly, Darwin's theory could best be validated by gathering the sedimentary rocks which contained the fossilized remains of long since dead animal and plant matter and then tracing back the gradual mutations that revealed the transitional ancestral forms.[131] For instance, if *A1* evolved into *A5*, then the fossils should chronologically show *A1* → *A2* → *A3* → *A4* → *A5*. Darwin understood that the actual hard evidence for the supposed transmutations

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[129] American Museum of Natural History, New York, exhibit entitled, "Human Biology and Evolution," visited by author, Jan. 2000. Many critics argue that from the perspective of the fossil record evolution is clearly a fact-free science. Anyone who thinks this is not the case need only visit any museum of natural history and ask to see an exhibit that shows sequential fossil evidence of one significantly different creature evolving into another significantly different kind. Examples of microevolution abound in museums (e.g., the horse exhibit depicting extinct members of the horse family), but nothing is shown of macroevolution.

[130] *See, e.g.*, CYRIL WALKER & DAVID WARD, FOSSILS 125–26 (1992). The science of paleontology concerns the study of fossils. Fossils are the remains of long-dead animals and plants found imbedded in the earth's crust. A fossil may be the preserved remains of the organism itself or the imprints left by the organism. For animals, fossilization generally involves the replacement of the original skeleton with a more preservative inorganic material. In most cases the original form is replaced by mineral salts such as silica, calcium carbonate, or hematite—a process known as mineralization. The basic framework for evaluating fossils borrows much from Darwinian theory. This is due in part to the early union between geology and the theory of evolution when Scottish geologist Charles Lyell (1797–1875) formulated a geologic time scale based on James Hutton's (1726–1797) uniformitarian concept of geology.

[131] MICHAEL DENTON, EVOLUTION: A THEORY IN CRISIS 284–90 (1986). The often-repeated mantra that evolution is proved in the laboratory at the molecular level because the protein sequences of creatures show a definite pattern of evolutionary relationship is hotly contested. According to Denton, an objective understanding of the field of comparative biochemistry provides no evidence of evolutionary sequence. Denton writes:

> There is not a trace at a molecular level of the traditional evolutionary series: cycolstome → fish → amphibian → reptile → mammal. Incredibly, man is as close to lamprey as are fish! . . . .
>
> . . . .
>
> . . . So amphibia, always traditionally considered intermediate between fish and the other terrestrial vertebrates, are in molecular terms as far from fish as any group of reptiles or mammals! To those well acquainted with the traditional picture of vertebrate evolution the result is truly astonishing.
>
> . . . .
>
> It is now well established that the pattern of diversity at a molecular level conforms to a highly ordered hierarchic system. Each class at a molecular level is unique, isolated and unlinked by intermediates.

Id. at 284, 285, 290.

of one kind of creature changing into an entirely new kind must rest in the data of the fossil record, *ex libro lapidum historia mundi* (from the record of the rocks comes the history of the earth).[132] Undoubtedly, however, the greatest objection to the theory of evolution is the discontinuous nature of the fossil record.[133] Charles Darwin freely admitted the problem no less than seven times in *Origin of Species*, and recognized that the future absence of empirical fossil evidence could actually negate his theory.[134]

Since Darwin's time, the fossil record has continued to defy the fundamental precepts of Darwinian thought,[135] prompting not only a great deal of consternation among scientists, but also the development of alternate so-called naturalistic offshoots, such as the punctuated equilibrium theory.[136] On the

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[132] *See supra* note 119.

[133] *See, e.g.*, J. Madeleine Nash, *When Time Exploded*, TIME, Dec. 4, 1995, at 66, 68. The oldest representatives of each significant kind of animal or plant suddenly appear in the fossil record already highly specialized and distinctive as a class. For example, the oldest rocks on the Earth (precambrian) contain complex single-celled organisms like algae, bacteria, and fungi. Then the rocks show nothing until about 600 million years ago when the "Cambrian Explosion" occurs. This term refers to the explosive appearance of all the basic body types of invertebrates in the oceans. The Cambrian Explosion witnessed the arrival of fully formed sponges, worms, sea urchins, trilobites, brachiopods, etc., in abundance and seemingly out of nowhere. *See id.*

[134] *See* DARWIN, *supra* note 95, at 406. Darwin wrote:

> [T]he number of intermediate varieties, which have formerly existed [on the earth], [must] be truly enormous. Why then is not every geological formation and every stratum full of such intermediate links? *Geology assuredly does not reveal any such finely-graduated organic chain; and this, perhaps, is the most obvious and serious objection which can be argued against the theory.*

Id. (emphasis added).

[135] *See, e.g.*, PIERRE-P. GRASSÉ, EVOLUTION OF LIVING ORGANISMS: EVIDENCE FOR A NEW THEORY OF TRANSFORMATION 31–32 (1977). The eminent French zoologist Pierre-Paul Grassé (1895–1985), editor of the twenty-eight volume *Traite de Zoologie* and former president of Paris' prestigious Académie des sciences wrote:

> From the almost total absence of fossil evidence relative to the origin of the phyla, it follows that any explanation of the mechanism in the creative evolution of the fundamental structural plans is heavily burdened with hypotheses. . . . [W]e do not even have a basis to determine the extent to which these opinions [about the theory of evolution] are correct.

Id. at 31.

[136] *See* RICHARD B. GOLDSCHMIDT, THEORETICAL GENETICS 488 (1955); Stephen Jay Gould, *The Return of Hopeful Monsters*, NAT. HIST., June–July 1977, at 22, 22–30; Nash, *supra* note 133, at 74. The father of punctuated equilibrium was Dr. Richard Goldschmidt (1878–1958) who proposed that all major groups of life forms did not appear over a continuous process of evolution, but rather transformed from one type to another almost instantaneously (relative to gradualism) in a series of macromutational acts (saltationism) powered by some unknown force. Along with Stephen Jay Gould, Steven Stanley, and Niles Eldredge, many influential evolutionists have taken up a watered down version of Goldschmidt's idea due to the "trade secret of paleontology":

consternation side of the ledger, the renowned and influential paleontologist and evolutionist George Gaylord Simpson (1902–1984) best sums up the assessment of fossil links in his much-read textbook on evolution, *The Major Features of Evolution*. "[I]t remains true, as every paleontologist knows, that *most* new species, genera, and families and that nearly all new categories above the level of families *appear in the record suddenly* and are not led up to by known, gradual, completely continuous transitional sequences."[137]

In light of Simpson's assessment,[138] the conundrum continues to echo: Where is the fossil evidence to meet even the most modest demands for verifiable links?[139] Given the grand scale of Darwin's claims about gradualism,

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> The theory of punctuated equilibria, which I established with my colleague Stephen Jay Gould, attempts to explain the episodic nature of the comings and goings of species: for species tend to appear rather abruptly in the rock record, frequently lingering for millions of years with little, if any change—and then abruptly disappearing.

NILES ELDREDGE, LIFE PULSE 10 (1987) (footnote omitted).

[137] GEORGE GAYLORD SIMPSON, THE MAJOR FEATURES OF EVOLUTION 360 (1953) (second emphasis added); *see also* ALFRED SHERWOOD ROMER, VERTEBRATE PALEONTOLOGY 2–3 (3d ed. 1966). Harvard paleontologist Alfred Romer (1894–1973) spent almost his entire professional life studying vertebrate evolution and yet his impressive compilation of fossilized remains provides no actual evidence of transitional links between any of the primary groups. *See id.* at vii.

[138] *See* GEORGE GAYLORD SIMPSON, TEMPO AND MODE IN EVOLUTION 105 (1944). Simpson also acknowledged that there are no fossil links in any of the thirty-two orders of mammals, nor are there any links to the appearance of the first mammals. Simpson states:

> The earliest and most primitive known members of every order [of *Mammalia*] already have the basic ordinal characters, and *in no case is an approximately continuous sequence from one order to another known*. In most cases the break is so sharp and the gap so large that the origin of the order is speculative and much disputed.

Id. at 106 (emphasis added). The most important group of animals supposed to have come from the evolutionary process is mammals. Mammals are divided into thirty-two orders with half of those continuing in existence today. However, apart from therapsids ("mammal-like" reptiles), not a single linking ancestor can be found between reptiles and mammals and not one solid linking ancestor can be identified among any of the thirty-two mammalian orders. Paleontologists can only speculate that the "modern mammalian orders *emerged* and differentiated into families, genera, and species after the Cretaceous-Tertiary (K-T) extinction 65 million years ago." Dennis Normile, *New Views of the Origins of Mammals*, 281 SCI. 774, 774–75 (1998) (emphasis added).

[139] *See, e.g.*, RICHARD MILTON, SHATTERING THE MYTHS OF DARWINISM 110 (1997). Milton notes:

> [T]here are so many billions of fossils available from so many thousands of strata that the failure to meet this modest demand is inexplicable if [Darwinian] evolution has taken place .... It ought to be relatively easy to assemble not merely a handful but hundreds of species arranged in lineal descent. Schoolchildren should be able to do this on an afternoon's nature study trip to the local quarry, but even *the world's foremost paleontologists have*

paleontology should have produced thousands upon thousands of indisputable fossil proofs for the theory. Evolutionists may chant the aphorism that "absence of evidence is not evidence of absence," but negative evidence is sometimes just that—evidence that there are no transitional forms. In other words, absence of evidence *may be* evidence of absence. It all depends on the extent to which such fossil evidence would logically be expected to exist.[140]

In the law, interpretation stops when the text is clear—*interpretation cessat in claris*. If one applies this maxim to the theory of evolution in the most generous light, the truth of the matter is that the text—i.e., the fossil record—will never approach clarity, meaning that interpretation will never cease.

3. *Evolution as a* Weltanschauung

If solid empirical evidence for Darwin's claim is so lacking, thoughtful students can hardly fail to pose to themselves the question, what makes the theory of evolution so successful an idea? In answer to this perplexing question, one might assert that the phenomenon of acceptance by otherwise thoughtful observers is propelled to some degree by a deep-seated urge to formulate a non-religious model to explain the appearance of all living things through natural laws. With the establishment of a natural law model such as Darwinism, it is invariably true that only ideas or theories based on natural principles will be accepted.

In exploring the rise and influence of Darwinism, it is certainly true that Darwin had the good fortune of coming on the historical scene on the heels of Europe's Age of Enlightenment.[141] Not only was it a time when science was looked upon as the championed solution for many social and economic

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failed to do so with the whole Earth to choose from and the resources of the world's greatest universities at their disposal.

Id. (emphasis added).

[140] Most evolutionists advance three defensive arguments focused on the jumbled nature of the earth's crust, the impact of local and global extinction events, and the issue of soft tissue fossils. First, evolutionists correctly point out that the earth's crust, which is 75% sedimentary rocks, has literally been put through a geological mix-master from erosion, flooding, shifting, crushing, and volcanic activity. This fact, they say, makes it unrealistic to expect evolution's full picture to be adequately documented in the fossil record. Second, evolutionists point to localized and even global extinction events as the culprit in obliterating entire families, orders, and even classes, which are then quickly replaced by new unrelated families, orders, and classes. *See* NILES ELDREDGE, THE TRIUMPH OF EVOLUTION AND THE FAILURE OF CREATIONISM 124 (2000). Third, evolutionists assert that many fossil links are missing from the fossil record because only hard tissues survive as fossils so that the evolution of soft-bodied parts goes largely unrecorded. *See id.*

[141] The Age of Enlightenment was an intellectual movement of the eighteenth century that "emphasized the use of reason to examine accepted doctrines and traditions." THE AMERICAN HERITAGE COLLEGE DICTIONARY 457 (3d ed. 1997).

problems,[142] but the concepts of Deism[143] and relativism[144] were also in full bloom, dovetailing quite comfortably with the new theory.

Some commentators have amplified the issue of Darwinian irresistibility further. They claim that it was the medieval Catholic Church's wide-spread persecution of independent thought during the Dark Ages[145] that set both the stage for the meteoric rise of Darwin's ideas, on the one hand, and the attendant antagonism toward creationism, on the other. To be sure, the medieval Catholic Church emerged as a dominant force in the Middle Ages and very often discouraged independent investigation that conflicted with church dogma.[146]

In *God and The New Physics*, physicist Paul Davies devotes an entire chapter to exploring the relationship between Darwin's theory and the persecutions of the medieval Catholic Church.[147] In effect, he concludes that the theory of evolution was rocketed to preeminence as a backlash against the intransigent views of an intolerant Catholic Church.[148] Even today, Davies argues, "[m]any scientists are critical of organized religions, not because of their personal spiritual content, but

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[142] *See generally* SAGAN, *supra* note 105, at 27–39 (discussing the shortcomings of scientific thought and its usefulness).

[143] The central thrust of Deism is that God simply set the universe in motion and allowed things to proceed according to set natural laws without interference. For the Deist, Darwin's exclusion of God from the operation of nature actually presented only a very short intellectual step.

[144] The message of relativism that centers on the assumption that everything—morality, ethics, etc.,—is relative to the situation (situational ethics) caused many to reject intrinsic truths altogether. Thus, if there were no intrinsic truths, it was not hard to cease to believe in the operation of God vis-à-vis the development of life, as evolution required.

[145] *See* SAGAN, *supra* note 105, at 115–33 (characterizing the world as demon-haunted during the Dark Ages).

[146] For example, the great astronomer, physicist, and mathematician Galileo Galilei (1564–1642) was condemned by the Church's Inquisition in Rome as "vehemently suspected of heresy." Peter Machamer, *Introduction*, *in* THE CAMBRIDGE COMPANION TO GALILEO, 23–24 (Peter Machamer ed., 1998). The unfortunate Galileo was threatened with torture, imprisoned in a dungeon, and then spent the last eight years of his life under house arrest on his estate at Arcetri, near Florence. All these persecutions were inflicted because Galileo, after studying the night skies with his telescope, pointed out that the planets revolve around the sun, and that the sun was at the center of the solar system. *See generally* GALILEO GALILEI, DIALOGUE CONCERNING THE TWO CHIEF WORLD SYSTEMS—PTOLEMATIC & COPERNICAN (Stillman Drake trans., 2d ed. 1967) (1632). Galileo Galilei's book was inspired by Nicolaus Copernicus's (1473–1543) own masterful work. *See generally* NICOLAUS COPERNICUS: ON REVOLUTIONS OF THE HEAVENLY SPHERES (A.M. Duncan trans., 1976) (1543). Galileo's book was immediately placed on the index of forbidden books by the Catholic Church and removed in 1822.

[147] *See* PAUL DAVIES, GOD AND THE NEW PHYSICS 1–8 (1983).

[148] "The early attempts by the Church to hold back the flood-gates of scientific advance have left a deep suspicion of religion among the scientific community." *Id.*

for their *perverting influence* ... especially when they involve themselves in power politics."[149]

Other commentators are more sympathetic to religion in their analyses and point out that the medieval Catholic Church was, in essence, burned because it was too slow to abandon its ties to the secular Aristotelian view of the world.[150] In this view, the secular thinkers in Darwin's day quickly jettisoned Aristotle, while the Church remained reluctant to discard the synthesis of Aristotelian thought and Catholic theology created by Albertus Magnus (1200–1280) and Thomas Aquinas (1224–1274).[151] This intransigence left the Catholic Church isolated and vulnerable to any future shifts in secular theory. Owen Gingerich, a professor of astronomy and the history of science at Harvard University, notes: "In a certain sense, religion got burned for locking itself too deeply into a particular scientific view [Aristotle's] which was then discarded."[152]

Perhaps the best way to capture the power of evolution's *Weltanschauung* (world-view) is to view the matter as a function of three interrelated factors. First, there is an unwillingness to separate the portion of the theory of evolution that is correct and factual from the portion which is purely theoretical. Second, Darwinian thought has been completely institutionalized in western science and culture as the dominant paradigm. Third, many adherents of evolution possess an unrelenting religious-like faith in Darwinism.

a. *Fact from Theory*

The first reason that Darwinian thinking has been able to dominate the scene hinges on the fact that to a degree the theory of evolution is certainly correct and very provable under the strict criteria of the scientific method. Anyone who has read *Origin of Species* cannot help but appreciate the compelling case for a "limited degree" of evolution set out in the first five chapters (the book was written for lay readers at the request of his publisher, John Murray). There is no question that plants and animals can make gradual changes in form and function over time so that living things undergo limited degrees of modification under the agencies of mutation[153] and natural selection. This process of limited change is

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[149] *Id.* at 4 (emphasis added).

[150] Prior to the nineteenth century, the prevailing view among scholars was that the universe consisted of a stationary set of stars that, for all anyone could imagine, had existed ad infinitum. This concept was based loosely on the Greek philosopher Aristotle's (384–322 B.C.) ideas on the cosmos and the Creator.

[151] For an excellent discussion, see HAROLD J. BERMAN, LAW AND REVOLUTION: THE FORMATION OF THE WESTERN LEGAL TRADITION (1983).

[152] Kenneth L. Woodward, *How the Heavens Go*, NEWSWEEK, July 20, 1998, at 52, 52.

[153] It was an Austrian monk by the name of Gregor Johann Mendel (1822–1884) whose work, although unnoticed until after his death, became the basis of modern genetics. By experimenting with peas, Mendel demonstrated that a genetic code is responsible for the

commonly known as microevolution and objective studies have conclusively demonstrated it to be a fact of science.[154]

The real question is just how far the principle of microevolution can be stretched in order to justify the all-encompassing theory of evolution, i.e., macroevolution? A general search of the literature reveals that attempts to answer that question through objective observation have fallen short.[155] Examples proffered range from the ridiculous—the peppered moth of Greater Manchester, England[156]—to the disappointing genetic studies of evolution's most celebrated

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passage of traits (Mendel referred to them as factors) from the parents of one species to their offspring. Biologists now know that a specific inheritance code is contained in the DNA of practically each cell of the vast majority of living creatures. In sexual reproduction the DNA of each parent is joined to form a new DNA code. Along with horses, dogs, chickens, and a whole host of other domesticated animals, breeders have long manipulated this genetic information in order to enhance certain physical characteristics. This genetic engineering is related to desired traits of such things as speed, height, or strength, etc. (The same is true with plants.)

[154] Microevolution in the wild (apart from human manipulation) has been demonstrated in several scientific studies. *See* Peter R. Grant, *Natural Selection and Darwin's Finches*, SCI. AM., Oct. 1991, at 82, 82–83. Microevolution served as the basis of Darwin's argument in his comparative study of different species of South American finches. These birds lived on thirteen small volcanic islands known as the Galapagos Archipelago off the coast of Ecuador. Although Darwin could not prove it, he believed that all the separate Galapagos finches developed from one common finch ancestor. *Id.* at 83. Interestingly, a pioneering study conducted by Peter Grant was actually able to document the oscillation of the average depth of the beaks (beak depth is the distance between the top and bottom) in Galapagos finches as related to the amount of rainfall and access to different food sources on Daphne Major, one of the smaller islands. *Id.* at 83–84. Grant's very persuasive study regarding this limited aspect of microevolution was even more convincing as it was conducted over a twenty-year period. *See generally* JONATHAN WEINER, THE BEAK OF THE FINCH (1994). It is beyond dispute that microevolution also occurs at the microscopic level as well. For example, it is well-documented that because of microevolutionary forces, bacteria can quickly develop resistance to man-made pesticides. The old strain of a particular bacteria may die out under human attack, but a new strain, which can come from a spontaneous genetic mutation or resistant gene, can rapidly take its place. Most insecticide resistance, however, is due not to mutations but to inactivating enzymes. *See* ERNST MAYR, POPULATIONS, SPECIES, AND EVOLUTION 351 (1970).

[155] *See generally supra* note 117. As every breeder knows full well, there appears to be a genetic limit to how much change can be achieved within a species. In fact, after thousands of years of directed breeding of domesticated animals and plants, man has failed to create a single new species. The process of genetic variability in a species might be called genetic homeostasis. *See* THE AM. MED. ASS'N, ENCYCLOPEDIA OF MEDICINE 544 (Charles B. Clayman ed., 1989) (defining homeostasis as "the dynamic process by which an organism maintains a constant internal environment despite external changes").

[156] The most famous example cited by evolutionists as direct evidence of evolution is the case of a certain moth that had the habit of resting on the city walls of Greater Manchester, England in the nineteenth century. This case is worthy of note because it illustrates the system of thinking whereby evolutionists observe microevolution and disingenuously proclaim indirect proof of evolution. The particular species of moth in question (*Biston betularia*) come in two varieties that differ in color (white or peppered), the white variety being the most numerous.

geneticist Theodosius Dobzhansky (1900–1975).[157] Nevertheless, despite disappointing real-time experiments concerning the fluidity of genetic change to bridge the gaps between species, there does exist strong circumstantial evidence of microevolution operating fully across species lines in the wild—even perhaps at echelons past the species level.[158]

Curiously, in the course of studying the moth over a period of years, British researchers noted that the white-colored moths had almost become extinct in certain cities, while the peppered moths experienced a population explosion. The answer for this drastic change appeared to rest in a perfectly valid application of survival of the fittest at the microevolutionary level. With the advent of the Industrial Revolution in Europe, the white-washed walls of English cities had become covered with coal dust and soot. Consequently, white moths resting on the blackened city walls or adjoining forests were easy prey for sharp-eyed birds, while peppered moths, now perfectly camouflaged against a dark background, were more capable of eluding predators. *See* JONATHAN WELLS, ICONS OF EVOLUTION 137–57 (2000).

The Industrial Revolution created an environmental change that, in turn, had a direct impact on which moth was better adapted to its environment. Peppered moths continued to reproduce peppered offspring whereas the reduction in the white moth population caused their offspring numbers to dwindle. Well-known evolutionists such as Sir Gavin De Beer (1899–1972), professor of embryology in London from 1950 to 1960 and director of the British Museum of Natural History, have cited this particular case study as the most striking example of an evolutionary change actually witnessed. This, of course, is wholly misleading. At the very most, the moth case study is merely an example of an environmental change that shaped the continuation of one colored moth over another via the survival of the fittest. This is best explained as microevolution. There is certainly no transmutation of species involved between the white moth and the peppered moth as De Beer and others seem to imply. *See* GAVIN DE BEER, A HANDBOOK ON EVOLUTION 43, 49–52 (1970).

[157] Dobzhansky and his colleagues chose the common fruit fly, *Drosophila melanogaster*, as the perfect candidate for their studies in genetic variability. Because fruit flies have only four pairs of chromosomes and the ability to breed a new generation in about two weeks, results of change are rapidly apparent. Extensive experiments were conducted on *Drosophila* targeting certain visible characteristics such as the eye, wings, legs, and even the number of bristles growing on its body. Through continuous selective breeding experiments, researchers hoped to produce solid statistical proof of significant microevolutionary processes actually at work. Paradoxically, however, the primary significance of the study was to confirm the fact of genetic homeostasis. What they found was a limit to change; a genetic dead end. This, of course, was the exact opposite of what Dobzhansky had hoped to demonstrate. No matter what they tried by way of repetitive breeding and cross breeding, a genetic ceiling in the fly species was reached and never broken. In the experiment regarding increasing or decreasing the number of bristles, for instance, absolute limits of change were reached after thirty generations. Further breeding in the flies simply led to sterility.

Genetic research within the past thirty years has generally confirmed Dobzhansky's findings; there appears to be a natural barrier beyond which change cannot be shown in the laboratory to occur. Genetic agencies of change, i.e., biochemical mutations, seem unable to go beyond certain comparatively narrow boundaries. For an excellent overview see, ERNST MAYR, ANIMAL SPECIES AND EVOLUTION 182–214 (1963).

[158] One of the most interesting field studies concerning just how far the forces of microevolution might reach concerns the parallel species lines of the Hawaiian *Drosophila*. An exhaustive comparison of the chromosomes of various species of *Drosophila* spread throughout

In the overall picture, it is certain that microevolutionary forces have had an impact in the development of biological characteristics of living things for a very long time. Therefore, to say that the process of natural selection has only peripheral application to the animal and plant kingdom is clearly incorrect. Microevolution, if one understands the term properly, is an absolute fact of nature in the development of biological order. Paul Davies put the matter this way: "Whether one is prepared to accept that the Darwinian mechanism of evolution is the whole story, it cannot be denied that mutation and natural selection must be a major *contributory factor* in the development of biological order."[159]

Still, without greater proofs, microevolution cannot be automatically expanded to support the idea that Darwinism accounts for the appearance of all living things across the major divisions of nature.[160] The distinction should not be blurred. Microevolution is based on fact; macroevolution is based on faith.

b. *Evolution as the Dominant Paradigm*

The second reason that the theory of evolution maintains its hegemony is that it has been institutionalized as the dominant paradigm[161] in the scientific

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the tropical islands of Hawaii suggests that from one or two original *Drosophila* came several hundred other *Drosophila* species. *See* THEODOSIUS DOBZHANSKY ET AL., EVOLUTION 271–76 (1977).

[159] DAVIES, *supra* note 147, at 166 (emphasis added).

[160] *See* DENTON, *supra* note 131, at 87. Denton writes:

> However attractive the extrapolation, it does not necessarily follow that, because a certain degree of evolution has been shown to occur [(microevolution)], therefore any degree of evolution [(macroevolution)] is possible. There is obviously an enormous difference between the evolution of a colour change in the moth's wing and the evolution of an organ like the human brain, and the differences among the fruit flies of Hawaii, for example, are utterly trivial compared with the differences between a mouse and an elephant, or an octopus and a bee. . . . [T]here is an enormous difference in scale.

Id.

[161] *See* THOMAS S. KUHN, THE STRUCTURE OF SCIENTIFIC REVOLUTIONS 23 (1996). Thomas S. Kuhn was the first to explore the importance of paradigms in science and revealed how they can sometimes function as a double-edged sword. On the one hand they can help to frame information in useful ways so that absolutes can be discovered and categorized, but on the other hand, they can also serve to act as blinders to stifle alternate avenues of investigation. Kuhn writes:

> Paradigms gain their status because they are more successful than their competitors in solving a few problems that the group of practitioners has come to recognize as acute. To be more successful is not, however, to be either completely successful with a problem or notably successful with any large number.

Id.

community.[162] All people have a core system of beliefs about how they view the world. Similarly, all institutions have a guiding paradigm or way of thinking that both underscores and, in some cases, justifies their existence. Regardless of whether one is speaking about the individual or the collective institution, paradigms exert a powerful influence and strongly mold the thought patterns of their subjects. They are the templates that orient and coordinate the thoughts, words, and acts of those who practice them.[163]

Many eminent scientists complain that Darwinian evolution is so powerful a premise that newer information that has become available has not yet been able to affect the paradigm much, let alone point the way to a new and more accurate dialectic.[164] This situation is further exacerbated by the fact that the theory of evolution is generally presented as an unchangeable fact in classrooms, museum displays, books, academic journals, newspapers, radio, and television.[165] Thus,

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[162] For an excellent discussion concerning the impact of misguided science, see RICHARD BAUM & WILLIAM SHEEHAN, IN SEARCH OF PLANET VULCAN: THE GHOST IN NEWTON'S CLOCKWORK UNIVERSE (1997).

[163] For example, if one lived in a time when everyone believed that water caused the bubonic plague, then he or she would avoid taking baths but would take no action to stop the movement of the rat population that was the real vehicle for spreading the Black Death. (When the bubonic plague broke out in the fourteenth century, it was transmitted to humans by parasitic fleas living on infected rats.) *See, e.g.*, DAVID HARRIS WILLSON, A HISTORY OF ENGLAND 162 (2d ed. 1972).

[164] *See, e.g.*, Wolfgang Smith, *The Universe is Ultimately to be Explained in Terms of a Metacosmic Reality*, *in* COSMOS, BIOS, THEOS 111, 113 (Henry Margenau & Roy Abraham Varghese eds., 1992). To observe that such a myopic attitude is not at all in concert with the true goal of scientific thought is an understatement. Professor Wolfgang Smith, Ph.D. in mathematics, Columbia University, and on the faculties at the Massachusetts Institute of Technology, the University of California, and Oregon State University, reminded his colleagues of the most fundamental pillar of science: Theory, no matter how appealing to one's personal worldview, cannot be regarded as fact or doctrine until it is proven by solid and uncontroverted evidence.

> I am opposed to Darwinism, or better said, to the transformist hypothesis as such, no matter what one takes to be the mechanism or cause. . . . I am convinced, moreover, that Darwinism (in whatever form) is not in fact a scientific theory, but a pseudo-metaphysical hypothesis decked out in scientific garb. In reality the theory derives its support not from empirical data or logical deductions of a scientific kind but from the circumstance that it happens to be the only doctrine of biological origins that can be conceived within the constricted *Weltanschauung* [worldview] to which a majority of scientists no doubt subscribe.

Id.

[165] *See, e.g.*, ENCYCLOPEDIA OF THE ANIMAL WORLD 9 (1972). In its introduction, the writers make an emotionally assertive statement about Darwin's initial 1859 proclamation on evolution by stating "[t]hat it [(the theory of evolution)] was the absolute truth, *everything discovered* since that date has confirmed." *Id.* (emphasis added). However, there are a handful of textbooks that are much less adamant about elevating evolution to the level of fact.

since all information is heavily influenced by this paradigm, the theory of evolution is constantly reinforced by endless repetition.[166]

The widely respected astrophysicist Sir Fred Hoyle (1915–2001) aggressively argued that being educated in the school system of any Western nation meant being baptized into Darwinism as the way of thinking about life sciences.[167] Exposed to evolutionary dogma in grade school, students quickly realize that all fields of scientific endeavor associated with the study of life have succumbed to the juggernaut of Darwinism.[168] Furthermore, no alternative or modes of investigation that are outside the Darwinian paradigm are tolerated. If permitted at all, academic discussions are strictly limited to arguments between the various schools within Darwinian thought.[169]

Curiously, a few are even drawn to a "theistic evolution" of life. In this view, God initiated the evolutionary process at the molecular level and then guided it through to man. *See* DOUGLAS DIXON ET AL., THE MACMILLAN ILLUSTRATED ENCYCLOPEDIA OF DINOSAURS AND PREHISTORIC ANIMALS 17 (1988) (acknowledging that experts argue about the "rates and pattern of evolution" but adding, "[t]here is nothing in this [Darwinian theory] that necessarily contradicts a belief in God or even in Divine intervention").

[166] *See, e.g.*, Thomas C. Emmel, *The Creative Process May Well Be What We Observe, Deduce, and Call Evolution*, *in* COSMOS, BIOS, THEOS, *supra* note 164, at 166, 171. Thomas C. Emmel, professor of Zoology and Director of the Division of Lepidoptera Research at the University of Florida, provides an even more interesting insight into this narrow-mindedness:

> I feel that many scientists reach a point during their graduate student days or perhaps a little later in which they feel it is *unfashionable* to consider metaphysical views [(any view other than evolution)], and so they bury their heads in the sand for the rest of their lives, not making any effort to see a perspective broader than their own immediate field.

Id.

[167] *See, e.g.*, FRED HOYLE, THE ORIGIN OF THE UNIVERSE AND THE ORIGIN OF RELIGION 18 (1993). The vast majority of scientists work in isolated areas of science and base most of their opinions about evolution on what they have been taught. Being similarly indoctrinated since grade school, they are just as likely to follow the dominant evolutionary paradigm as the non-scientist. Hoyle calls this type of mental conditioning "respectable ignorance" because it is the antithesis of what science is supposed to represent. *Id.*

[168] In a profound assessment concerning the utility of a paradigm that is unable to solve an issue in the area of uncertain knowledge, Hoyle wrote:

> So you can be pretty certain that wherever problems resist solution for an appreciable time by an appreciable number of scientists the ideas used for attacking them must be wrong[, i.e., the popular paradigm is probably incorrect]. It is therefore a mistake to have anything to do with popular ideas for solving uncertain issues, and the more respectable the ideas may be the more certain it is that they are wrong.

Id. at 17–18.

[169] *See* NILES ELDREDGE, REINVENTING DARWIN 33–48 (1995); DANIEL DENNETT, DARWIN'S DANGEROUS IDEA: EVOLUTION AND THE MEANINGS OF LIFE 264–79 (1995). Currently, the two primary schools of Darwinian thought consist of the ultras and the pluralists. Led by the likes of Daniel Dennett and Richard Dawkins, the ultras are known as the hard-core fundamentalists who adhere strictly to the neo-Darwinian synthesis. Ultras believe that natural

Other commentators point out that issues of research funding and individual career development in the scientific community also contribute as suppressors of all forms of fresh thinking.[170] Those who challenge the paradigm often incur the associated negative consequences that run from communal ridicule, to lack of consideration for job placement,[171] to an inability to secure financial support for research.[172]

Some further complain that those few scientists who attempt to publicize discoveries or opinions challenging evolution in the leading popular scientific journals such as *Science*, *Nature*, or *Scientific American*, often find the doors slammed in their faces.[173] When John Horgan, a senior writer at *Scientific American* interviewed Hoyle on this distressing state of affairs, Hoyle underscored the assessment: "Science today is locked into paradigms. . . . Every avenue is blocked by beliefs that are wrong, and if you try to get anything published by a journal today, you will run against a paradigm and the editors will turn it down."[174]

The institutionalization of evolution is especially evident in the educational realm.[175] The vast majority of textbooks and public television documentaries

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selection operating under gradualism regulates everything of any importance in evolution. This position is in direct contrast to the pluralists who maintain that other materialistic factors besides natural selection (some of which are not yet fully understood) are deeply involved in shaping life.

[170] *See* PHILLIP E. JOHNSON, REASON IN THE BALANCE 95–96 (1995). In his thought provoking book, Johnson addresses the issue of how the Darwinian paradigm has been so successfully guarded:

> Scientists are highly vulnerable to peer pressure because their careers depend on favorable peer reviews. To become a scientist at all requires satisfying dissertation and appointment committees. Thereafter, professional standing depends on one's ability to satisfy the anonymous referees who decide what is to be published in journals and the study groups that decide what projects are to be funded.

Id.

[171] *See id.*

[172] For example, over the past forty years *National Geographic Magazine* has awarded over 7,000 money grants to the Leaky family and other teams who conduct searches for human origins, but "only after extensive review of the proposals' scientific merit by a distinguished panel of scientists." *See* Bill Allen, *From the Editor*, NAT'L GEOGRAPHIC, Oct. 2001. In other words, if the proposal does not fit the acceptable paradigm, no funding is awarded.

[173] *See* BEHE, *supra* note 96, at 165–86.

[174] JOHN HORGAN, THE END OF SCIENCE 109 (1996); *see also* MILTON, *supra* note 139, at 213 (summarizing the main alternatives to neo-Darwinism and calling Hoyle a heretic).

[175] *See, e.g.*, Edward J. Larson & Larry Witham, *Scientists and Religion in America*, SCI. AM., Sept. 1999, at 88; PHILLIP E. JOHNSON, DEFEATING DARWINISM 15 (1997). It was only with great reluctance, for example, that the 1995 official position statement on evolution of the American National Association of Biology Teachers ("NABT") was revised. The NABT elected at the last minute to remove the words "unsupervised" and "impersonal" from the

choose to ignore the possibility of any type of non-Darwinian model whatsoever—that an intelligent designer could have played a role in the process—and wholeheartedly accept the notion that evolutionary theory is the only vehicle to explain the existence of living things.[176] Biologist Jonathan Wells, a postdoctoral biologist and senior fellow at the Discovery Institute, certainly struck a solid cord of anathema when he evaluated ten widely used biology textbooks from high school to the graduate level and cataloged the continued propagation by the publishers of various falsehoods and myths associated with evolution.[177]

c. *The Darwinian Creed*

The final reason for evolution's dominance revolves around the uncompromising attitude and, in many instances, "theological" fervor exhibited by some of its leading advocates. For lack of a better term, one might call them "Darwinian activists."[178] For this particular brand of Darwinist, it is not a matter of separating religious beliefs from the province of the natural sciences; for them it is taking the scientific idea, known as the theory of evolution, and making it the basis for an entire philosophy of life.[179] Since their perception of reality demands that God does not exist, belief in the existence of God and acceptance of the theory of evolution are presented as mutually exclusive positions. Simply put, the argument proclaims that evolution excludes God; therefore, God does not exist. This movement is most commonly known as evolutionism,[180] a materialistic

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policy statement, because they wanted to avoid defending the terms in biology classes: "The diversity of life on earth is the outcome of evolution: an [unsupervised, impersonal] unpredictable and natural process of temporal descent with genetic modification that is affected by natural selection, chance, historical contingencies and changing environments." Larson & Witham, *supra* at 91.

176 *See, e.g.*, JONATHAN WELLS, ICONS OF EVOLUTION 249 (2000).

177 *See id.* at 249–58.

178 *See* JACQUES MONOD, CHANCE AND NECESSITY at xi (Austryn Wainhouse trans., 1971) (1970).

179 KENNETH R. MILLER, FINDING DARWIN'S GOD 17 (1999). Miller takes great objection to those evolutionists who view the theory of evolution as proof that God does not exist. *Id.* He answers with a "resounding *no*" to those who ask if evolution "rigorously exclude[s] belief in God?" *Id.*

180 The American Scientific Affiliation ("ASA") defines evolutionism as "a religious position antagonistic to Christian theism." THE AM. SCIENTIFIC AFFILIATION, MEMBERSHIP PAMPHLET (on file with author). The ASA "is a fellowship of men and women of science and related disciplines . . . who share a common fidelity to the Word of God and a commitment to integrity in the practice of science." The American Scientific Affiliation, *Information About the American Scientific Affiliation, at* http://www.asa3.org/ASA/ aboutASA.html (last visited Dec. 21, 2002). Founded in 1941, the ASA has grown significantly since then. *See id.* The stated purposes of the ASA are to "'investigate any area relating Christian faith and science' and 'to

philosophy totally antagonistic to the idea of God,[181] or Secular Humanism, a more benign "philosophy that advocates human rather than religious values."[182]

Phillip Johnson, the Boalt Professor of Law at Berkeley, coined the term "metaphysical naturalism" to describe the use of the theory of evolution to advance this anti-theistic agenda based on the so-called logical implications of evolutionary science.[183] In short, evolutionism, or Johnson's metaphysical naturalism, takes the position that if all existence sprang from an algorithmic process based on unpredictable mutations and necessity, or Darwinian selection, then the rational mind must automatically conclude that life and all things that make up the entire universe happened by accident, and nothing anywhere has any intrinsic meaning whatsoever. For these Darwinian activists, then, the meaning of life is that there is no meaning. As the famous French molecular biologist Jacques Lucien Monod (1910–1976) announced in 1970 concerning what the public must conclude about the meaning of life:

> [M]an must at last wake out of his millinery dream; and in doing so, wake to his total solitude, his fundamental isolation. Now does he at last realize that, like a gypsy, he lives on the boundary of an alien world. A world that is deaf to his music, just as indifferent to his hopes as it is to his sufferings or his crimes.
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> . . . .
>
> . . . [M]an knows at last that he is alone in the universe's unfeeling immensity, out of which he emerged only by chance. His destiny is nowhere spelled out, nor his duty.[184]

Zoologist Richard Dawkins of Oxford, perhaps the best-known modern day proponent of evolution, typifies Johnson's metaphysical naturalism where evolution is embraced as the central linchpin to a metaphysical philosophy antagonistic to God.[185] Dawkins readily describes himself as an unapologetic atheist who desires to stamp out any notion that God is responsible for the design of life.[186] In the name of evolutionism, he leads an unrelenting assault against all who question the theory of evolution. Echoing Monod, Dawkins writes: "The universe we observe has precisely the properties we should expect if there is, at bottom, no design, no purpose, no evil and no good, nothing but blind, pitiless

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make known the results of such investigations for comment and criticism by the Christian community and by the scientific community.'" *Id.*

[181] *But see* John Angus Campbell, *Intelligent Design, Darwinism, and the Philosophy of Public Education*, 1 RHETORIC & PUB. AFF. 469, 476 n.42 (1998) (arguing that Darwin was not an atheist, Campbell counts 108 references to God, the act of creation of life, etc. in the first edition of *Origin of Species*).

[182] THE AMERICAN HERITAGE COLLEGE DICTIONARY, *supra* note 141, at 1232.

[183] JOHNSON, *supra* note 170, at 16.

[184] MONOD, *supra* note 178, at 172–73, 180.

[185] *See* HORGAN, *supra* note 174, at 116–19.

[186] *See id.*

indifference."[187] Other evolutionists, like paleontologist Niles Eldredge, are not as blatant in their use of evolution to attack theism and choose to portray themselves as agnostics who are convinced that God, if He exists at all, has no role whatsoever in life sciences.[188]

In a very real sense, evolutionism has established itself in the minds of Darwinian activists as a new pseudo-religion, albeit in a secular and ideological form, with the theory of evolution serving as the creative centerpiece. Even if evolutionism is not a religion in the most common sense of the word,[189] it clearly has parallel dimensions: the claim to absolute ultimacy,[190] the requirement of commitment by its followers,[191] the fear of apostasy,[192] the cadre of missionaries, and its role as providing the sole interpretation of the meaning of life.

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[187] RICHARD DAWKINS, RIVER OUT OF EDEN 133 (1995).

[188] *See* ELDREDGE, *supra* note 140, at 17.

[189] *See infra* notes 330–61 and accompanying text.

[190] *See, e.g.*, HORGAN, *supra* note 174, at 116–17; *cf.* RICHARD DAWKINS, THE BLIND WATCHMAKER 287 (1986). The remarkable aspect of raising objections or criticisms to evolution is the intensity of the opprobrium one incurs. In many instances, to question Darwinism is to incur *ad hominem* attack. For example, Dawkins describes the powerful anti-Darwinian book, SHATTERING THE MYTHS OF DARWINISM, by science journalist Richard Milton, as "loony," "stupid," "drivel," and calls Milton a "harmless fruitcake." *See* Richard Dawkins, *Fossil Fool*, NEW STATESMAN & SOC'Y, Aug. 28, 1992, at 33, 33–34 (reviewing RICHARD MILTON, SHATTERING THE MYTHS OF DARWINISM (1992)). Nonetheless, Milton claims to have no religious beliefs of any kind. "Let me make it unambiguously clear," writes Milton, "that I am not a creationist, nor do I have any religious beliefs of any kind." MILTON, *supra* note 139, at 269. So, what was Milton's sin that caused such a venomous outpouring from Dawkins? Simply put, Milton had crafted an impressive argument against the theory of evolution. His interpretation of the hard scientific evidence regarding the complexity of biological life strongly refuted evolution and supported the concept of intelligent design, particularly in his field of microbiology.

[191] *See, e.g.*, SAGAN, *supra* note 105, at 212. Carl Sagan devotes an entire chapter discussing the need for the rational person to employ a "baloney detection kit" for identifying untruths. *Id.* The baloney detection kit "helps us recognize the most common and perilous fallacies of logic and rhetoric." *Id.* Of course, the utility of a baloney detection kit is laudable, but it is certain that Sagan has never bothered to point his detector at the theory of evolution.

[192] To protect the theory of evolution from criticism, meaningful debate between evolutionists about the workings of evolution is often difficult to find. Even the ultras are usually cautious about attacking the pluralists in public fora because, to their way of thinking, at least both groups are united against the creationists. Sometimes, however, if one follows their discussions very carefully, it is possible to catch a candid glimpse of just how deep the anxiety factor actually runs. The ultra-Darwinian John Maynard Smith, Emeritus Professor at Sussex, wrote the following about the leading and most recognized voice for evolutionary pluralism in the world, Stephen Jay Gould (1941–2002):

> [Stephen Jay] Gould[, a Darwinian pluralist,] occupies a rather curious position, particularly on his side of the Atlantic. Because of the excellence of his essays, he has come to be seen by non-biologists as the preeminent evolutionary theorist. In contrast, the evolutionary biologists with whom I have discussed his work tend to see him as a man

Leading evolutionists like Dawkins, Provine,[193] and Futuyma[194] are often accused of pledging unqualified allegiance to Darwinian orthodoxy because in their worldview there is nothing else to replace it.[195] Apart from evolution, whether one is an ultra or a pluralist,[196] there are no naturalistic or secular theories that exclude the input of intelligent design as a possible answer. Therefore, to abandon any of the fundamental tenets of Darwinism would require an admission that a supernatural intelligent designer may indeed exist, and that Dawkins, Provine, and Futuyma are unwilling to do, ever.

Like a jungle canopy that occludes the sun, those who elevate the theory of evolution to a supreme insight into ultimate realities actually advocate what they once so proudly sought to destroy—a very narrow and cause-driven view of the world that pays little attention to contrary evidence and advocates a high sacrosantic philosophical position. All these warning signals are present in evolutionism. Hoyle finds it particularly ironic that "science only exchanged the older religious prison house for a new one of its own making."[197] Consequently, with their paradigm set in stone, the very mention of the word evolution has taken on a religious fervor.

Curiously, and despite Dawkin's contention regarding evolution's power, when the famous evolutionary biologist Ernst Mayr polled his Harvard University colleagues in the National Academy of Science concerning why they did not believe in God, they did not anchor their unbelief as a logical deduction fueled by

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> whose ideas are so confused as to be hardly worth bothering with, but as one who should not be publicly criticized because *he is at least on our side agcinst the creationists.*

John Maynard Smith, *Genes, Memes, & Minds*, N.Y. REV. BOOKS, Nov. 30, 1995, at 46 (emphasis added).

[193] William Provine is an evolutionary biologist and historian of science at Cornell University. *See* MILLER, *supra* note 179, at 171–72 (quoting William Provine):

> "Modern science directly implies that there are no inherent moral or ethical laws, no absolute guiding principles for human society.... We must conclude that when we die, we die, and this is the end of us.... Finally, free will as it is traditionally conceived—the freedom to make uncoerced and unpredictable choices among alternative courses of action—simply does not exist.... There is no way that the evolutionary process as currently conceived can produce a being that is truly free to make moral choices."

[194] Douglas J. Futuyma is an evolutionary biologist and professor in the Department of Ecology and Evolution at the State University of New York at Stony Brook.

[195] *See* JOHNSON, *supra* note 170, at 12–17.

[196] The late Stephen Jay Gould was often cited as a moderating voice regarding the issue of evolutionism. *See, e.g.*, Wexler, *supra* note 11, at 469. Some question his sincerity in this matter. For example, Gould has publicly stated his disbelief in the "story" of God when discussing the implications of the theory of evolution. *See* MILLER, *supra* note 179, at 170 (quoting *CBS Sunday Morning* (CBS television broadcast, Nov. 29, 1998)).

[197] HOYLE, *supra* note 167, at 59.

the inherent power of the theory of evolution.[198] On the contrary, Mayr was generally told something quite different, something quite unscientific. According to Mayr's informal query, the general consensus among his fellow evolutionists revealed a disbelief in God because of a subjective dissatisfaction with the realities of suffering, pain, and death in the world.[199] Accordingly, each stated a similar refrain: "I just couldn't believe that there could be a God with all this evil in the world."[200]

Certainly, the claim that the most vocal proponents of Darwinism are either self-proclaimed atheists or agnostics who view the theory of evolution as a metaphysical philosophy that defines all of reality is not without merit.[201] Questioning whether these leaders have impermissibly violated the Establishment Clause's principle of neutrality in the sphere of public education is an issue that has been raised in the courts by those who assert that the theory of evolution is actually a two-headed coin. On the one side, the theory of evolution attempts to explain life sciences only, but on the other side it exhibits all the components of a religion or, alternatively, an anti-religion, causing it to violate the Establishment Clause. To date, the courts have generally refused to acknowledge the problem.[202]

Peloza v. Capistrano Unified School District[203] best illustrates the concern. Peloza, a public high school biology teacher, sued his school district asserting that, because he was obliged to teach evolutionism to his students, he was engaged in an unconstitutional establishment of religion.[204] In weighing Peloza's claim, the court noted that Peloza used the term evolution and evolutionism

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[198] *See* Larson & Witham, *supra* note 175, at 90.

[199] This myopic thinking is not restricted to the atheistic scientist. Expressing a similar theme, the author Fyodor Dostoyevsky (1821–1881) has the character Ivan exclaim in a burst of emotional frustration: "I don't accept this world of God's, and although I know it exists, I don't accept it at all. It's not that I don't accept God, you must understand, it's the [evil] world created by Him I don't and cannot accept." *See* FYODOR DOSTOYEVSKY, THE BROTHERS KARAMAZOV 235 (Alfred A. Knopf 1992) (1881).

[200] Larson & Witham, *supra* note 175, at 90, 91; *see also* ELDREDGE, supra note 140, at 17 ("I will say that I am extremely skeptical that the kind of all-knowing, all-caring, all-doing God pictured in some circles exists."); MILLER, *supra* note 179, at 101–02 ("We would also have to attribute every plague, pestilence, and parasite to the intentional actions of our master designer. Not exactly a legacy calculated to inspire love and reverence.").

[201] *See infra* note 331 and accompanying text. Near the end of his life Darwin realized that people had used his theory to propagate a new "religion." Darwin is said to have remarked: "I was a young man with unformed ideas. I threw out queries, suggestions, wondering all the time over everything; and to my astonishment the ideas took like wildfire. People made a religion of them." FEDERER, *supra* note 37, at 199.

[202] *See infra* note 302 and accompanying text.

[203] 37 F.3d 517 (9th Cir. 1994).

[204] *See id.* at 519–21.

interchangeably in his complaint.[205] It held this was constitutionally irrelevant, for it found that evolution and evolutionism were synonyms to simply describe a scientifically accepted "*biological* concept"[206] that related strictly to "higher life forms evolv[ing] from lower ones."[207] Refusing to delve into the issue, the court dryly remarked that "[a]dding 'ism' does not change the meaning nor magically metamorphose 'evolution' into a religion."[208]

"Charitably read," the court concluded, "Peloza's complaint at most makes this claim: the school district's actions establish a state-supported religion of evolutionism, or more generally of 'secular humanism.'"[209] Finding that neither the Supreme Court nor the Ninth Circuit had ever held that "evolutionism or secular humanism are 'religions' for Establishment Clause purposes,"[210] the court dismissed Peloza's complaint. Curiously the court specifically acknowledged that an actionable claim might be made if one defined "'evolution' and 'evolutionism' as does Peloza as *a concept that embraces the belief that the universe came into existence without a Creator* . . . ."[211]

In order to advance the argument that evolutionism is a part and parcel of the theory of evolution, future legal challenges must clearly spell out and define what evolutionism entails. For certain, it is not difficult to show that evolutionism is not restricted to the quest to understand biological origins. Darwinian activists have provided an abundance of ammunition to those who would characterize it as a religion or an anti-religion. Per *Peloza*'s guidance, evolutionism is a metaphysical concept that wholeheartedly embraces the belief that "the universe came into existence without a Creator."[212]

B. *Creationism*

In the context of the theory of evolution, the term creationism is usually associated with the "position that the account of the creation in Genesis is literally true."[213] In its widest definition, however, all those who believe in the existence

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[205] *See id.* at 520.

[206] *Id.* at 521 (emphasis added).

[207] *Id.*

[208] *Id.*

[209] *Peloza*, 37 F.3d at 521.

[210] *Id.* "The Supreme Court has held unequivocally that while the belief in a divine creator of the universe is a religious belief, the scientific theory that higher forms of life evolved from lower forms is not." *Id.* (citations omitted).

[211] *Id.* (emphasis added).

[212] *Id.*

[213] THE AMERICAN HERITAGE COLLEGE DICTIONARY, *supra* note 141, at 325.

of a Creator-God of the Bible[214] are labeled creationists. Although the term creationist has suffered gross distortion in recent times, in the context of a belief system it should mean simply this: Creationism includes anyone who believes that God is responsible for making and sustaining the universe and all it contains, whether through myriad natural laws and agencies that He created and set in operation, through direct omnipotent intervention, or a combination of both. Given the expanded meaning of the term, courts weighing the issue of intelligent design theory and the Anthropic Principle will need to take cognizance of the fact that creationists can be categorized into three general camps (of which there are many sub-categories): (1) Fundamentalist creationism; (2) Generalist creationism; and (3) Theistic evolutionism.

Until the middle of the nineteenth century, creationism held philosophical sway in almost every academic and social circle in the western world. Society itself was oriented around the idea that God was responsible for the entire universe[215] and leading scientists were quick to acknowledge the influence of the Divine in practically every field of endeavor.[216] As previously noted, Darwinism caused a significant shift in the scientific community in both viewpoint and approach. It was no longer acceptable for scientists to frame their disciplines as an adjunct of God's handiwork. Instead, all the sciences were to be approached from purely a naturalistic standpoint without reference to God.

Traditionally, creationists have shown little interest in developing empirical or scientific templates to see if non-naturalist forces can be revealed in the realm of biology or cosmology.[217] Most of the action has focused on how the actual

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[214] Creationists believe that the God of creation is the Hebrew and/or Christian God revealed in the Bible. *See, e.g.*, GERALD L. SCHROEDER, THE SCIENCE OF GOD 80 (1977) ("Of all the ancient accounts of creation, only that of Genesis has warranted a second reading by the scientific community. It alone records a sequence of events that approaches the scientific account of our cosmic origins.").

[215] French philosopher René Descartes (1596–1650) postulated in his second principle that God is the necessary and independent cause of existence.

[216] The list of creationists would include such individuals as the English discoverer of the first law of thermodynamics, James Joule (1818–1889); English Lord William Kelvin (1824–1907), famous for his statement of the second law of thermodynamics; Swedish taxonomist Carlolus Linnaeus (1707–1778), the founder of the modern system of classification of plants and animals; French scientist Louis Pasteur (1822–1895), famous for disproving the scientific theory of "spontaneous generation" of life; Englishman John Ray (1627–1705), who developed classification based on species; English scientist Francis Bacon (1561–1626), famous for creating the scientific method; and English scientist Robert Boyle (1627–1691), the father of modern chemistry.

[217] *But see* WEBSTER'S NEW WORLD DICTIONARY 325 (3d ed. 1988) (defining creation science as "a theory, concerning the origin of the universe, which states that the literal biblical account of creation can be scientifically verified"). The creation-science movement was the first Fundamentalist attempt to incorporate some aspects of science into an interpretation of the Bible.

biblical passages on creation should best be understood. Unfortunately, because Bible creation passages are sharply focused on the results of various broadly painted creation events, and not on the mechanics of how things were done, it is certain that creationists will never be able to reach a consensus. Not only is there a lack of specific scientifically-styled details, but much of what is revealed is set out in thumbnail sketches of general events framed in accommodating anthropomorphisms and anthropopathisms—language understandable to the peoples of the ancient world.[218]

1. *Fundamentalist Creationism*

Fundamentalist creationism is known by many names to include young earth creationism, old earth creationism, biblical creationism, creation science and even scientific creationism.[219] Those who advocate the Fundamentalist view claim scriptural literalism as the basis for their belief and attempt to transform the broad outline styled creation passages into a specific and detailed catechism. The general principles include the belief that the laws of nature, the galaxies, stars, planets, and all life were created directly by God in six twenty-four hour days,[220] and that all living things have remained largely unchanged since that time.[221]

The Fundamentalist brand of creationism is the largest and the most vocal of the creationist positions.[222] The movement is extremely active in the United

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[218] For a common anthropomorphism, see *Isaiah* 66:1–2 (New American Standard) [hereinafter all references to the Bible are to the New American Standard edition; unless otherwise noted]: "Thus says the Lord, 'Heaven is My throne, and the earth is My footstool. . . . For *My hand* made all these things. Thus all these things came into being.' declares the Lord" (emphasis added).

[219] For an overview of the various subcategories of the Fundamentalist movement, see House, *supra* note 12, at 370–73 nn.51–58. Scientific creationism also starts with the biblical account in Genesis and strives to match scientific data to the creation account. *See id.*

[220] Two significant figures in the Fundamentalist movement were Anglican Archbishop James Ussher (1581–1656) and English naturalist John Ray (1627–1705). In 1650, Ussher published official dates for the creation of the first human being and of the universe. Ussher proclaimed that God created Adam on October 23, 4004 B.C. and began all creative work on October 18, 4004 B.C. While many modern Fundamentalists now fudge on the 4004 B.C. start date, most still contend that the Earth is extremely young (10,000 years old). Ray, a contemporary of Ussher, codified the view that the true number of species was fixed and unchangeable from the first act of creation to the present day. *See* JOHN RAY, WORKS OF CREATION 6 (1691).

[221] A major figure in the modern Fundamentalist movement is Henry M. Morris. *See, e.g.*, HENRY M. MORRIS, BIBLICAL CREATIONISM: WHAT EACH BOOK OF THE BIBLE TEACHES ABOUT CREATION AND THE FLOOD 74 (2000).

[222] Polls repeatedly demonstrate that a vast number of Americans identify with the Fundamentalist movement. *See* Cathy Lynn Grossman & Anthony DeBarros, *Still One Nation Under God*, USA TODAY, Dec. 24, 2001, at 1D (citing a study by the American Religious Identification Survey which showed that 81% of Americans claim a religious identity).

States and bolstered by a variety of organizations, such as the influential California-based "Institute for Creation Research."[223] Fundamentalists have also been the moving forces behind initiatives to either exclude the theory of evolution from public schools altogether[224] or to gain equal time for their view under the guise of scientific creationism.[225]

Paradoxically, it is precisely because of the concerted efforts of this organized religious movement that the Supreme Court has twice been able to find a prima facie violation of the first prong of the *Lemon* test without having to address the far more difficult issues associated with defining religion, science, or evolution (to determine if a particular doctrine runs afoul of the Establishment Clause).[226] As discussed in Part IV of this article, the Court in *Edwards* quickly found that the statute in question had an unconstitutional religious purpose, not that ideas or doctrines in opposition to evolution were inherently religious.[227] The Court stated that "[t]he preeminent purpose of the Louisiana Legislature [in passing the statute] was clearly to advance the religious viewpoint that a supernatural being created humankind."[228]

Interestingly, the Fundamentalist view of creation continues to be the primary target for attack and the one that many evolutionists erroneously attribute to anyone who professes a belief in the Bible or, for that matter, to anyone who calls himself a creationist. For instance, in a popular 1982 book devoted to attacking the creationist position, Philip Kitcher characteristically lumps all creationists together under the Fundamentalist camp.[229] Kitcher tends to describe all creationists as people who believe in a young universe and "that all the animals

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[223] The Institute for Creation Research ("ICR") was founded in 1970 as the research division of Christian Heritage College. *See* Inst. for Creation Research, *Short History of ICR*, *at* http://www.icr.org/abouticr/history.htm (last visited Dec. 21, 2002). ICR's present name was adopted in 1972. *See id.* In 1981, ICR severed its relationship with the Christian Heritage College. *See id.* ICR is a private non-profit corporation chartered by the State of California and is devoted to research, publication, and teaching in those fields of science related to the study of origins. *See id.*; *see also* Creation Research Society, *at* http://www.creationresearch.org (last visited Dec. 21, 2002); Answers in Genesis, *at* http://www.answersingenesis.org (last visited Dec. 21, 2002).

[224] *See generally* Kirkpatrick, *supra* note 11, at 133–35 (describing the Christian Fundamentalist push for so-called "balanced treatment" legislation); Ruele, *supra* note 11, at 2557 (noting that Christian Fundamentalists have taken multiple approaches towards eliminating evolution from the public school curriculum).

[225] *See supra* note 224.

[226] *See infra* Part IV.

[227] Edwards v. Aguillard, 482 U.S. 578, 594 (1987) ("[T]eaching 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.").

[228] *Id.* at 591.

[229] *See* PHILIP KITCHER, ABUSING SCIENCE 127 (1982).

that have ever existed were formed in one original event."[230] In his book *The Triumph of Evolution and the Failure of Creationism*, Niles Eldredge of Cambridge engages in the same tactic. He writes, "[c]reationists say that the universe, the Earth, and all of life are young. All were created within the last few thousand years or so."[231] And, "I am . . . not about to buy the possibility that people didn't evolve but rather were created by God sometime within the last ten thousand years. . . ."[232]

Needless to say, the tactic of lumping all creationists into the Fundamentalist camp has led to a great deal of confusion among the general public. Since the Fundamentalist view most certainly has serious scientific contradictions, evolutionists are provided with just the sort of "straw-man" arguments needed to attack creationism as a whole, while diverting attention away from the many failings of evolution.[233] Thus, evolutionists regularly cite improbable Fundamentalist straw-men—e.g., that the universe is 6,000 years old—and then proceed to tear them apart.[234]

In addition, Darwinian activists are also quick to cast all creationists together as uneducated malevolents who are out to destroy science,[235] pervert the public educational system,[236] or destroy the ecosystem.[237] Admittedly, this tactic has been remarkably effective.

2. *Generalist Creationism*

The borrowed quip of Galileo Galilei best sums up the position of the Generalist creationist: "The [Bible] teach[es] how one goes to heaven, not how

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[230] *See id.*

[231] ELDREDGE, *supra* note 169, at 98.

[232] *Id.* at 17. Eldredge certainly knows that many of his colleagues believe in God, but not in the Fundamentalist position; he simply fails to acknowledge the existence of any other creationist position. Some creationists are perfectly willing to concede that the universe, the earth, and life are all very old.

[233] *See* TIM M. BERRA, EVOLUTION AND THE MYTH OF CREATIONISM 132, 138, 143 (1990).

[234] *See, e.g.*, Ken Van Dellen et al., *ASAers Appear on PBS Evolution TV Series*, NEWSL. OF THE AM. SCI. AFFILIATION & CANADIAN SCI. & CHRISTIAN AFFILIATION (Am. Sci. Affilation, Ipswich, Mass.), Nov.–Dec. 2001, at 8 ("They want people to think that the only criticism of Darwin's theory today is from religious fundamentalists. They routinely try to stigmatize scientists who question Darwin as 'creationists.'"); *see also* PHILLIP E. JOHNSON, THE WEDGE OF TRUTH 132 (2000) (criticizing evolutionist Kevin Miller for creating a straw man argument relating to elephant species).

[235] *See, e.g.*, ELDREDGE, *supra* note 140, at 149, 169.

[236] *See id.*

[237] *See id.* at 164.

the heavens go."[238] Generalist creationism also has a number of subgroups[239] but basically holds that the true facts of science—things squarely in the realm of certain knowledge—should not be in conflict with the true revelation of God. Theologian Thomas Aquinas argued this position over 700 years ago in *Summa Theologica* when he wrote that scripture and the senses (i.e., the sciences) are not only compatible but also complementary.[240]

Given the paucity of information contained in the Bible regarding the Creation, Generalists argue that the Bible is read at its best when one focuses on the underlying principles such as "God created Man."[241] For Generalists, the power and beauty of the Bible passages on the Creation rest in their encompassing assessment of origins. For instance, in the most familiar creation passage of all—"In the beginning God created the heavens and the earth"[242]—the Creator is simply said to have brought the universe into existence *ex nihilo* at a

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[238] Woodward, *supra* note 152, at 52.

[239] The most interesting branch of Generalist Creationism is known as Ruin/Reconstruction. *See generally* GEORGE H. PEMBER, EARTH'S EARLIEST AGES AND THEIR LESSONS FOR US (1876); R.B. THIEME, JR., CREATION, CHAOS, AND RESTORATION (1995). Thomas Chalmers (1780–1847) and George Pember (1837–1910) were two of the leading Christian reformers who rejected the Fundamentalist six-day interpretation as it pertained to the age of the universe and the earth. Buttressed by discoveries of extinct plant and animal fossils, they promoted what is now called Ruin/Reconstruction or the Gap Scenario. Relying strictly on a straightforward reading of scripture, Ruin-Reconstructionism presents the following sequence of divinely ordered events:

(1) The entire physical universe, including the earth, is created at some unknown time in the far past. While this original earth may or may not have contained life forms, it did not have humans. *Genesis* 1:1.

(2) Next, the original earth suffers a total catastrophe, plunging it into a state of darkness. This is the *ruin* portion of the theory described sharply in *Genesis* 1:2.

(3) Finally, God performs the six "days" of work in which He restores the earth for habitation, creates plant and animal life, and forms the first humans. This is the *reconstruction* part of the process recorded in *Genesis* 1:2 and continuing through the remainder of chapter one and throughout chapter two.

Unlike the Six-Day view, the chronology of Ruin-Reconstruction sets no particular dates for the creation of the universe and the earth, positing that the universe could be many thousands, millions, or even billions of years old. Likewise, the gap of time which passed between the original earth and the reconstructed earth (as well as the days in the reconstruction) could both be indeterminate in length.

[240] *See* Eleonore Stump, *Biblical Commentary and Philosophy*, *in* THE CAMBRIDGE COMPANION TO AQUINAS 252, 258 (Norman Kretzmann & Eleonore Stump eds., 1993).

[241] The analytical process of hermeneutics is absolutely essential in correctly understanding Biblical passages. Under hermeneutics, the passages are understood within the context of when they were written as well as how they relate to other similar passages. *See generally* R.B. THIEME, JR., CANONICITY 58–64 (1973) (providing examples of how various words and phrases have changed meaning over time).

[242] *Genesis* 1:1.

specific point in the far past called the beginning.[243] No information is given regarding the mechanics of this event, nor are time lines set out as to how long it might have taken. Generalists believe that all other biblical passages on creation follow suit, paralleling the general view of "God created."[244]

Generalists also tend to avoid the dogmatic pitfalls associated with the so-called trouble passages such as the term "day"[245] and the term "kind"[246] in the creation sequence of Genesis. While all Generalists agree that the pattern of creation—from life in the water, to life on land, to Man—is correct, many simply interpret the "days" of creation as blocks of unspecified time.[247] Similarly, Generalists agree that the process of microevolution has been a fact of nature from the start,[248] but most assert that the major categories of life forms arose from different "kinds"—however the term might be defined—as indicated in Genesis.[249]

Finally, Generalists believe that the early fathers of Christianity never interpreted the Biblical creation passages in the strained specifics of the Fundamentalist camp.[250] A fair reading of Tertullian's (160–230) *Against*

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[243] *See id.*

[244] There are numerous general passages on creation. "By the word of the Lord the heavens [the universe and all it contains] were made . . . He spoke and it was done." *Psalms* 33:6, :9. "AND, THOU, LORD, IN THE BEGINNING DIDST LAY THE FOUNDATION OF THE EARTH; AND THE HEAVENS ARE THE WORKS OF THY HANDS," *Hebrews* 1:10, is simply taken as a general statement that God created the Earth and not that the Earth somehow has a foundation or is flat, or that God has human type hands, etc. *See Psalms* 102:25.

[245] Saint Augustine would be classified as a Generalist. He spoke of the light God created as spiritual and did not interpret the "days" in Genesis, chapter 1 as twenty-four hour days. *See* 1 ST. AUGUSTINE, THE LITERAL MEANING OF GENESIS 154 (John Hammond Taylor trans., 1982) ("He made that which gave time its beginning, as He made all things together, disposing them in an order based not on intervals of time but on causal connections . . . ."); *see also* THE SCOFIELD REFERENCED HOLY BIBLE 1 (C.I. Scofield ed., new int'l ed. 1984) (arguing that the word "day" is a period of time).

[246] *See Genesis* 1:21, :24, :25.

[247] *See* HUGH ROSS, THE FINGERPRINT OF GOD 141, 146 (1991). Needless to say, the use of the term "day" in Genesis has spawned extensive theological debate. The Hebrew word for day is *yowm*, which can be interpreted as a literal twenty-four hour period or as a block of unspecified time.

[248] Generalists also have little trouble with the evidence of great extinctions in the far past. Some Ruin/Reconstrucitonists, for example, identify the Cretaceous-tertiary (K-T) extinction (Dinosaur Extinction) with the ruin part of their interpretation of *Genesis* 1:1. For the groundbreaking book on the K-T extinction, see WALTER ALVAREZ, T. REX AND THE CRATER OF DOOM 9–17 (1997).

[249] "'Let the earth bring forth living creatures after their kind: cattle and creeping things and beasts of the earth after their kind'; and it was so." *Genesis* 1:24.

[250] One can also cite early non-Christian scholars as well. *See, e.g.*, THE WORKS OF PHILO 791 (C.D. Yonge trans., 1993). Philo (Philo Judaeus) or Philo of Alexandra (20 B.C.–50 A.D.) wrote: "[Question]: Why does Moses, revolving and considering the creation of the world, say:

Marcion,[251] Origen's (185–254) *De Principiis*,[252] and Augustine's (354–430) *City of God*[253] show that each posited a universe far older than would ever be allowed under a Fundamentalist concept.[254] In short, the flexibility inherent in the Generalist view ensures that God cannot be against the laws and processes by which He operates. For them, the workings of evolution are correctly evaluated simply as one of the many laws of nature and in no way militate against the existence of God.

3. *Theistic Evolution*

Compared with the other two creationist schools, Theistic evolution is far less precise about what it believes, and it encompasses a wide array of followers.[255] For example, the Christian based American Scientific Affiliation ("ASA") is an organization in which scientists, social scientists, philosophers, and theologians seek to discuss and shape Christian views of science to include the theory of evolution.[256] Many members of the ASA are Theistic evolutionists.[257] Proponents of Theistic evolution seem quite willing to consider whatever scientific model happens to be in vogue, but believe that "in creating and preserving the universe God has endowed it with contingent order and intelligibility, the basis of scientific investigation."[258] For them, even if life came about in a step-by-step "evolution of nature" on God's behalf, the theory of evolution cannot ultimately rule out God or his sustaining activity as evolutionism attempts to proclaim.[259]

'This is the book of the generation of heaven and earth, when they were created?' (Genesis 2:4). [Answer:] The expression, 'when they were created,' indicates as it seems an indeterminate time not accurately described." *Id.* (internal quotations omitted).

[251] 3 ANTE-NICENE FATHERS 271–474 (Alexander Roberts & James Donaldson eds., 2d ed. 1995).

[252] 4 *Id.* at 239–382.

[253] AUGUSTINE, CITY OF GOD 360–61 (Marcus Dods trans., 1950).

[254] Augustine comments that since Satan turns up in the Garden of Eden as a fallen angel, his revolt against God must have transpired long ago in the past. *See id.*

[255] *See* FUTUYMA, *supra* note 94, at 13. Futuyma rejects theistic evolution but acknowledges the movement. He describes its followers as those people "who believe that evolution, as conceived and documented by biologists, is the method God has used to achieve his aims." *Id.*

[256] *See supra* note 180.

[257] *See id.* Most members of the ASA are either Generalists or Theistic evolutionists.

[258] *See* Am. Scientific Affiliation, *What Does the ASA Believe?*, *at* http://www.asa3.org/ASA/faithASA.html (last visited Dec. 21, 2002).

[259] *See supra* note 253 and accompanying text.

Most who believe in Theistic evolution suggest that God may have started the processes of life and then watched and guided as evolution shaped them.[260] This is implied, they say, in such passages as Genesis, chapter one, verse twenty-four, in which God commands or directs the Earth to bring forth living creatures, and then in verse twenty-five, in which God "saw that it was good."[261] In fact, God sees that "it is good" five separate times in the creation account of Genesis, chapter one.[262]

Theistic evolution has received strong support from the Roman Catholic hierarchy. As early as 1950, Pope Pius XII (1876–1958) called Darwin's theory a "serious hypothesis," and in 1996, Pope John Paul II declared that there was no conflict between religious teachings and the theory of evolution.[263] In a message to the Pontifical Academy of Science, a group of eighty academicians that advises him, the Pope wrote: "Today ... new knowledge leads to recognition of the theory of evolution as more than a hypothesis."[264] Nevertheless, John Paul II went on to say that while the human body may have evolved gradually, the soul "is immediately created by God" in each human.[265]

C. *Conflict of Vision*

Many who write about the evolution/creation debate often use combat metaphors in their analysis. For instance, Rosenberg opens her law review article with, "As the *war* between Darwinism and creationism *rages* ... the creationists have developed a new *battle plan to infiltrate* ...."[266]

Considering the deeply entrenched philosophical dimensions manifested by the extreme wings of the respective positions, warfare symbolism is probably apropos. On one side, Darwinian activists adamantly oppose any scientific pedagogy that even remotely suggests the existence of a non-materialistic agency. On the other side, Fundamentalist creationists find the entire concept of evolution

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[260] *See* MILLER, *supra* note 179, at 292. Although Darwinism as a theory excludes the operation of Divine influence in the evolutionary formula, Charles Darwin himself apparently believed that God did play a role in the process of creation. Darwin closed the second edition of *Origin of Species* with the following lines: "There is a grandeur in this view of life, with its several powers, having been originally breathed by *the Creator* into a few forms or into one ...." DARWIN, *supra* note 95, at 648–49 (emphasis added).

[261] *Genesis* 1:25.

[262] *Genesis* 1:10, :12, :18, :21, :25. In verse thirty-one, God saw that it was "very good." *Genesis* 1:31.

[263] Jeffrey L. Sheler, *The Pope and Darwin*, U.S. NEWS & WORLD REP., Nov. 4, 1996, at 12.

[264] John Paul II, Address to the Pontifical Academy of Sciences (Oct. 22, 1996), *available at* http://www.cin.org/jp2evolu.html (last visited Dec. 21, 2002).

[265] *Id.*

[266] Rosenberg, *supra* note 11, at 611 (emphasis added).

a corrupting affront to the morals of human society and to the very meaning of life.

Since the extreme wings of the two camps are diametrically opposed along philosophical lines, the public and private antagonisms that have sprung up between the two were certainly predictable. As Darwin feared, his ideas generated a firestorm of religious and moral objections that have only intensified over the years, particularly in the United States.[267] Beginning with the much-publicized debate between Anglican Bishop Samuel Wilberforce (1805–1873) and atheist Thomas Huxley (1825–1895),[268] to present day efforts by Fundamentalists to present religious views on creation in science classrooms, ill will between the two groups has only multiplied. And, because they have proven to be the loudest voices in the debate, the tone of the discussion has, at times, degenerated into a tragicomic circus with each side disparaging the other's intelligence, integrity, and even mental stability.[269] This, of course, guarantees that judicial rulings in the area always receive top billing.

As the fight over whether intelligent design can be taught in public science curriculum makes its inexorable journey towards ultimate resolution in the judiciary, it is shaping up to be one of the bloodiest battles ever fought in the history of the controversy. Unlike previous Supreme Court rulings in the evolution/creation controversy, the legal battle is sure to surge past the purpose prong of the *Lemon* test in the demand for clear working definitions regarding science and religion.

IV. JURISPRUDENCE AND THE EVOLUTION/CREATION CONTROVERSY

> [T]he First Amendment does not tolerate laws that cast a pall of orthodoxy over the classroom.[270]
>
> —*Epperson v. Arkansas*

A. *Applying the Establishment Clause*

Not surprisingly, as Darwin's theory of evolution gained prominence in the scientific community,[271] the clash between evolutionism and creationism shifted

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[267] *See infra* Part IV and accompanying text.

[268] *See, e.g.*, KARY DOYLE SMOUT, THE CREATION/EVOLUTION CONTROVERSY: A BATTLE FOR CULTURAL POWER 33 (1998).

[269] *See infra* note 192. Voices of compromise are all but disregarded. Richard Morris believes that it is not the job of science to ponder things outside of natural laws. "[S]cientists should not make such remarks [about intelligent design], which would only cause the public to confuse scientific with religious ideas. . . ." RICHARD MORRIS, COSMIC QUESTIONS 179 (1993).

[270] 393 U.S. 97, 105 (1968) (quoting Keyishian v. Bd. of Regents, 385 U.S. 589, 603 (1967)).

from the realm of theologians and philosophers and found its way into the nation's public schools.[272] Many communities, particularly in the conservative South, believed that teaching the theory of evolution in school was simply a subterfuge for indoctrinating and recruiting new followers into atheism or Secular Humanism.[273] Some feared that Darwinian activists were not content with presenting the theory of evolution to students as a possible avenue to study material phenomena only, but were out to promote an entire philosophy of life by removing any reference to God as the possible originator or sustainer of life.[274] Even those who wished to teach evolution purely as a theory of science were nevertheless wrongly identified by various Fundamentalist groups as disciples of atheism.[275]

Consequently, in the first half of the twentieth century, Fundamentalist creationists set about creating barriers to the teaching of the theory of evolution in public schools. In Tennessee, for instance, a state law was enacted that forbade the teaching in public schools of "any theory that denies the story of the divine creation of man as taught in the Bible, and to teach instead that man descended from a lower order of animals."[276] With Fundamentalists firing the first salvo, the courts were reluctantly forced into the fray.

The most famous case in the string of legal battles associated with the evolution/creation debate occurred in 1925, Tennessee's now infamous *Scopes v. State*[277] monkey trial.[278] Prompted by the American Civil Liberties Union (ACLU),[279] a high school biology teacher by the name of John Scopes (1900–

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[271] Darwin's ideas were not immediately accepted in the scientific community at large. *See* House, *supra* note 12, at 355–57.

[272] For a pointed analysis of the early opponents to Darwinism, see Wexler, *supra* note 11, at 444–46 (noting that southerners were largely instrumental in the anti-evolution movements in the 1920s).

[273] *See generally id.* at 444–46 & n.61 (quoting the statement of an antievolution leader: "[T]he honest, God-fearing taxpayers of this country need to realize the terrible, Bible-destroying, Christ denying, soul-destroying scourge that is being spread among their children . . . .") (citation omitted).

[274] *See* PHILLIP JOHNSON, REASON IN THE BALANCE: THE CASE AGAINST SCIENCE, LAW & EDUCATION 37 (1995) (arguing that the "established religious philosophy [holds that] God is really dead and that humankind is therefore on its own").

[275] *See generally* Phillip Johnson, *The Creationist and the Sociobiologist: Two Stories About Illiberal Education*, 80 CAL. L. REV. 1071, 1080 (1992) (reviewing DINESH D'SOUZA, ILLIBERAL EDUCATION: THE POLITICS OF RACE AND SEX ON CAMPUS (1991)).

[276] TENN. CODE ANN. §§ 2344–45 (1934) (repealed 1967). According to this law, violators could be charged with a misdemeanor and fined from $100–500 per offense. *See id.*

[277] 289 S.W. 363 (Tenn. 1927).

[278] *See* Wexler *supra* note 11, at 446. The law was called the "Tennessee 'Monkey Law.'" *Id.* (citation omitted).

[279] The ACLU is a nonprofit law organization founded in 1920. It is primarily devoted to civil liberties issues. *See, e.g.*, House, *supra* note 12, at 360 n.17.

1970) intentionally challenged a Tennessee law that forbade the teaching of Darwin's theory of evolution in public schools. In *Scopes*, two of the most famous lawyers of the day lined up to do battle. For the defense, the well-known activist Clarence Darrow (1857–1938) engaged against the three-time unsuccessful Democratic presidential candidate, William Jennings Bryan (1860–1925), who represented the state. Egged on by the popular press, both sides spent most of the trial making stump speeches to the assembled reporters and creating a carnival atmosphere.[280] The entire affair was dubbed the "monkey trial," which further agitated the bad blood between Darwinian activists and Fundamentalist creationists.[281]

Interestingly, the actual case did not turn on the worthiness of evolution as an academic subject or, as the ACLU had hoped, on constitutional grounds.[282] The State of Tennessee won the case at trial under the proposition that Tennessee had the constitutional right to determine the academic curriculum of its own schools. As it turned out, however, the *Scopes* case proved to be a Pyrrhic victory for the Fundamentalists. Not only is the theory of evolution now taught in all public schools throughout the United States, but evolution has also emerged as the de facto prism through which life science issues are evaluated.[283] By largely prohibiting public schools from conducting activities associated with establishing religion, subsequent Supreme Court and federal decisions have ensured that students in the public classroom may only wear evolutionist lenses when viewing life sciences.

In terms of the creation/evolution controversy, the Supreme Court has only addressed the issue on two occasions. Its first application of the Establishment Clause did not occur until 1968, when the issue before the Court turned on what public schools could or could not include in their curriculum.[284] Unlike the Tennessee Supreme Court's handling of the similar question in *Scopes*,[285] earlier notions that a state public school board held broad discretion to set its own curriculum would quickly dissolve in the light of the Court's interpretation of the

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[280] *Id.* at 364 (citations omitted).

[281] Joyce F. Francis, Comment, *Creationism v. Evolution: The Legal History and Tennessee's Role in That History*, 63 Tenn. L. Rev. 753, 769 (1996).

[282] *See generally Scopes*, 289 S.W. at 363.

[283] *See* WELLS, *supra* note 176, at 237 ("Dogmatic defenders of Darwinian evolution control not only most American universities, but they also wield enormous power over most public school systems.").

[284] *See generally* Epperson v. Arkansas, 393 U.S. 97 (1968) (holding that a state statute criminalizing the teaching of the theory of evolution violated the First Amendment).

[285] *See Scopes*, 289 S.W. at 364–67 (stating that "the state or government . . . 'may require that [public services, such as setting a school curriculum] be carried out only in a way consistent with its views of public policy, and may punish a departure from that way'") (citation omitted).

Establishment Clause.[286] In *Epperson v. Arkansas*,[287] the Court weighed the constitutionality of a forty-year-old Arkansas State statute that made it unlawful to teach in public schools "the theory or doctrine that mankind ascended or descended from a lower order of animals" or "to adopt or use in any such institution a textbook that teaches [the theory of evolution]."[288]

With little effort, the Supreme Court determined that the Arkansas Supreme Court was in error when it ruled that the State of Arkansas had the right to exclude the teaching of the theory of evolution as a constitutional "exercise of [a] state's power[s] to specify the curriculum in its public schools."[289] Reversing the Arkansas Supreme Court, the United States Supreme Court specifically found that the real goal of the Arkansas statute was to protect a particular religious view by prohibiting the teaching of the theory of evolution.[290] The *Epperson* Court used the purpose and primary effect test set out in *School District of Abington Township v. Schempp* in its Establishment Clause analysis.[291]

Accordingly, the Court easily struck down the anti-evolution statute as blatantly unconstitutional. Both the purpose and effect of the statute clearly provided preference to a particular sectarian religious view contrary to the Establishment Clause's requirement of neutrality. Thus, the statute violated the First Amendment:[292]

> The overriding fact is that Arkansas' law selects from the body of knowledge a particular segment which it proscribes for the sole reason that it is deemed to conflict with a particular religious doctrine; that is, with a particular interpretation of the Book of Genesis by a particular religious group.[293]

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[286] *See Epperson*, 393 U.S. at 104. Courts will not intervene to resolve conflicts "which do not directly and sharply implicate basic constitutional values." *Id.* (footnote omitted).

[287] 393 U.S. 97 (1968).

[288] *Id.* at 99 n.3 (citing ARK. STAT. ANN. § 80-1627 (1929)). The Arkansas statute was closely patterned after the Tennessee statute in *Scopes*. *See supra* note 276.

[289] State v. Epperson, 416 S.W.2d 322, 322 (Ark. 1967) (per curiam). The reasoning of the Arkansas State Supreme Court was almost identical to that of the Tennessee State Supreme Court in *Scopes* four decades earlier. *See supra* note 282.

[290] *See Epperson*, 393 U.S. at 107–08 (stating that "[i]t is clear that fundamentalist sectarian conviction was and is the law's reason for existence") (footnote omitted).

[291] *Id.* at 107 ("What are the purpose and primary effect of the enactment? If either is the advancement or inhibition of religion then the enactment exceeds the scope of legislative power as circumscribed by the Constitution.") (quoting Sch. Dist. v. Schempp, 374 U.S. 203, 222 (1963)).

[292] *See id.* at 103.

[293] *Id.*

If the goal of public education is to develop critical thinking apart from the dogma of religious beliefs,[294] few can argue with the inherent soundness of the majority opinion in *Epperson*. Not only should students be presented with the full flow of available knowledge based on objective reasoning, be it fact or theory, but it is certainly not the function of the state to promote or indoctrinate students in a particular religious view. The Establishment Clause "forbids alike the preference of a religious doctrine or the prohibition of a theory which is deemed antagonistic to a particular dogma."[295] In addition, the Court held that the First Amendment was not violated because children were exposed to information that contradicts a religious belief.[296] "[T]he state has no legitimate interest in protecting any or all religions from views distasteful to them . . . ."[297] Finally, gauging American society's fear of religious domination of its politics and culture, the Court took special note of the fact that similar types of anti-evolution laws had already been repealed at the state level in all but two of the twenty states that had enacted them since the 1920s, and that the two remaining states had never even enforced the law.[298]

Disappointment with *Epperson* centers on the failure of the majority to address the more problematic contention that advocating the theory of evolution in the public classroom might in itself be tantamount to promoting an anti-religious doctrine and therefore equally in violation of the Establishment Clause.[299] In his concurring opinion, Justice Hugo Black (1886–1971) correctly understood that the theory of evolution could very well qualify as an anti-religion in its own right, raising its own set of constitutional concerns.[300] Recognizing that the majority had failed even to define the term "religion," Black wisely cautioned that the Court should not move too quickly into the debate: "Unless this Court is prepared simply to write off as pure nonsense the views of those who consider

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[294] *See* Edwards v. Aguillard, 482 U.S. 578, 583 (1987) ("States and local school boards are generally afforded considerable discretion in operating public schools, [so long as that discretion is exercised in a manner consistent with the Establishment Clause].") (citations omitted).

[295] *Epperson*, 393 U.S. at 106–07.

[296] *See id.* at 107.

[297] *Id.* (quoting Joseph Burstyn, Inc. v. Wilson, 343 U.S. 495, 505 (1952)).

[298] *See id.* at 101 n.8. In 1968, the only other state beside Arkansas that had an anti-evolution statute on the books was Mississippi. *See id.* The *Epperson* case entered the Arkansas State Chancery Court when a high school biology teacher named Susan Epperson sought a declaratory judgment to enjoin the State from firing her for violating the statute. *See id.* at 100.

[299] *See id.* at 112–14.

[300] *See id.*; *see also* Charles Mann, *Lynn Margulis: Science's Unruly Earth Mother*, 252 SCI. 378, 380 (1991). Commenting on the belief in Darwinism by the scientific community in spite of the lack of empirical evidence, research scientist Lynn Margulis predicts that Darwinism will one day be called "a minor 20th-century religious sect within the sprawling religious persuasion of Anglo-Saxon biology." *Id.* (footnote omitted).

evolution as anti-religious doctrine, then this issue presents problems under the Establishment Clause far more troublesome than are discussed in the Court's opinion."[301]

As expected, the group that greeted *Epperson* with the most disdain was the Fundamentalists. Galvanized by the ICR,[302] their strategy to blunt *Epperson* was to promote a "balanced treatment"[303] approach in the public classroom where their interpretation of the biblical story of creation, now called "creation science,"[304] would be taught in conjunction with the theory of evolution. The misguided hope was that such a balanced treatment would provide equal time in the curriculum to both ideas and hence pass constitutional muster. This notion led to a number of states adopting so-called balanced treatment statutes.[305]

In 1987, the Supreme Court considered balanced treatment in *Edwards v. Aguillard*.[306] In a rather straightforward 7–2 decision, the Court ruled that the Louisiana statute forbidding the teaching of the theory of evolution in public schools unless accompanied by instruction in creation science violated the first prong of the *Lemon* test; hence, the statute was unconstitutional under the Establishment Clause.[307] Reminiscent of the approach taken in the *Scopes* case, the ruling did not turn on a determination of the actual merits of the theory of evolution versus creationism.[308] Instead, the Court decided that, since the position that a supernatural being directly created humankind was a central belief of a "particular religious doctrine by those responsible for the passage of the

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[301] *Epperson*, 393 U.S. at 113. Justice Black went on to say:

> Certainly the Darwinian theory, precisely like the Genesis story of the creation of man, is not above challenge. In fact the Darwinian theory has not merely been criticized by religionists but by scientists, and perhaps no scientist would be willing to take an oath and swear that everything announced in the Darwinian theory is unquestionably true.

Id. at 114.

[302] *See supra* note 223 and accompanying text.

[303] This approach was followed in a number of states. The Louisiana statute, for example, was entitled "Balanced Treatment for Creation-Science and Evolution-Science in Public School Instruction." LA. REV. STAT. ANN. § 17:286.1, .7 (West 2001).

[304] *Id.*

[305] *See* Wendell R. Bird, Note, *Freedom of Religion and Science Instruction in Public Schools*, 87 YALE L.J. 515, 515–17 (1978).

[306] 482 U.S. 578 (1987).

[307] *Id.* at 589, 593.

[308] *See id.* at 578. The Court called evolution a theory that some individuals could find partially compatible with their religious views: "While the belief in the instantaneous creation of humankind by a supernatural creator may require the rejection of every aspect of the theory of evolution, an individual instead may choose to accept some or all of this scientific theory as compatible with his or her spiritual outlook." *Id.* at 591 n.11 (citation omitted).

Creationism Act,"[309] the Louisiana Act violated the secular purpose prong of the *Lemon* test.

Amplifying the pragmatism of *Epperson*, the *Edwards* majority went to great lengths to uncover the so-called religious motivations of the state legislators who enacted the statute, claiming that "we need not be blind in this case to the legislature's preeminent religious purpose in enacting this statute."[310] The Court further indicated that the Act would also fail the second prong of the *Lemon* test because the Act's purpose "was to clearly advance the religious viewpoint that a supernatural being created humankind."[311]

B. *A Matter of Free Speech?*

Free speech has never been viewed as an absolute right. With *Epperson* and *Edwards* as backdrop, the lower federal courts have repeatedly refused to allow public school teachers unilaterally to teach ideas associated with a religious view in science classes[312]—even if the public school forum is not compulsory.[313] In *Webster v. New Lenox School District*,[314] the Seventh Circuit held that, because creation science is a form of religious advocacy, a public junior high school teacher's free speech rights[315] were not violated by the school when that teacher was prohibited from teaching creation science.[316]

A year after *Webster*, the Eleventh Circuit extended the same principle in spirit to the college level in *Bishop v. Aronov*.[317] The University of Alabama's Board of Trustees prohibited a university professor from interjecting his Christian religious beliefs during class and from conducting optional classes to discuss

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309 *Id.* at 591.

310 *Id.* at 590.

311 *Id.* at 591 (footnote omitted).

312 *See generally* Johnson, *supra* note 275, at 1073–80 (arguing that the Court erred in its application of the Religion Clauses).

313 *But see* Tinker v. Des Moines Indep. Cmty. Sch. Dist., 393 U.S. 503, 506 (1969) ("It can hardly be argued that either students or teachers shed their constitutional rights to freedom of speech or expression at the schoolhouse gate.").

314 917 F.2d 1004 (7th Cir. 1990).

315 The teacher "argued that the school board should permit him to teach a nonevolutionary theory of creation in his social studies class," and that their refusal to allow him to teach creation science was a violation of his First Amendment right to free speech. *Id.* at 1006.

316 The Court stated that "the school board has successfully navigated the narrow channel between impairing intellectual inquiry and propagating a religious creed." *Id.* at 1008. Thus, the teacher did "not have a First Amendment right to teach creation science in a public school." *Id.* at 1006.

317 926 F.2d 1066 (11th Cir. 1991). Professor Aronov taught exercise physiology at the University of Alabama. *See id.* at 1068.

religious perspectives regarding evidences of God in the human physiology.[318] In holding that Professor Aronov's free speech rights had not been violated, the federal appeals court barely acknowledged the principle of academic freedom at the university level, finding instead that expressing religious views regarding human physiology "understandably produce[s] more apprehension than comfort to students."[319] In short, the First Amendment does not protect the teacher's expression in such instances.[320]

Despite the lower court rulings associated with the evolution/creation issue and free speech, some commentators predict a possible shift in thinking due to the Supreme Court's decision in *Rosenberger v. Rector and Visitors of the University of Virginia*.[321] In *Rosenberger*, a closely divided Court held that the university engaged in viewpoint discrimination by refusing to provide funding to an evangelical Christian religious group to publish a newspaper based on the group's views. The University of Virginia argued that providing state funding to the group would violate the Establishment Clause by promoting religion.[322] The Court ruled otherwise, prompting some legal scholars to declare a "Rosenberger Revolution,"[323] in which the government may not regulate speech "based on its substantive content or the message it conveys"[324] (in a way that favors some viewpoints at the expense of others), even when the content of the speech is clearly rooted in religion.[325]

Of course, the Rosenberger Revolution may have little impact in the realm of what goes on in the science classroom. As discussed above, federal courts have repeatedly stressed the importance of protecting the classroom from the injection of religious-based ideas in the context of teaching life sciences. Thus, if viewpoint discrimination is exercised against a particular public school teacher, the State

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[318] For a general overview of the issue of free speech activity within the public classroom, see Sarah Howard Jenkins et al., *God Talk by Professors Within the Classrooms of Public Institutions of Higher Education: What is Constitutionally Permissible?*, 25 AKRON L. REV. 289, 296–308 (1991).

[319] *Aronov*, 926 F.2d at 1072.

[320] *See also* Peloza v. Capistrano Unified Sch. Dist., 37 F.3d 517, 522 (9th Cir. 1994) (holding that a school district could prohibit a biology teacher from commenting on his personal religious beliefs in the classroom environment).

[321] 515 U.S. 819 (1995). Rosenberger, a student at the University of Virginia, sued when the university refused to grant his religious organization's newspaper the same financial support as given to other university organizations. *See id.* at 825–27. The university based its refusal on the belief that providing funding to a religious group would violate the Establishment Clause. *See id.* at 828.

[322] *See id.* at 827–28.

[323] Dewolf et al., *supra* note 12, at 103 (italics omitted).

[324] *Rosenberger*, 515 U.S. at 828 (citation omitted).

[325] *See id.* at 828–29.

may always defend its action to quash such speech on the ground that the activity in question violates the Establishment Clause.[326]

C. *The Primary Critiques*

Those who fault the jurisprudential progression in the evolution/creation matter assert two principal lines of criticism. First, as noted by Justice Black in *Epperson*,[327] it is repeatedly argued that courts have been particularly naïve in their refusal to recognize that teaching the theory of evolution might be tantamount to endorsing the "religious" metaphysical philosophy of evolutionism and hence in violation of the Establishment Clause. Second, there is a chorus of dissent from legal and philosophy of science scholars over the definition of science as set out in the oft-cited federal district court case of *McLean v. Arkansas Board of Education*.[328] This second critique is significant because it is likely to be a pivotal issue in any future ruling on the constitutionality of intelligent design theory or the Anthropic Principle.

1. *Evolution as Religion*

Traditionally, when people thought about the meaning of life—Where did they come from? Where will they end? What does it all mean?—they usually turned to their religious beliefs for answers. Since the advent of Darwin's theory of evolution, however, Darwinian activists proclaim that only Darwinistic thinking can unlock life's most pressing questions and, at most, all ideas about the existence of a Creator-God are nothing more than a collection of folklore, void of scientific or historical value.[329]

In this context, the overriding issue is not about factually determining the degree to which the theory of evolution can or cannot explain the phenomena of living things in terms of material or natural processes. The real concern is how anti-theists wield the theory of evolution as an iconoclastic bludgeon in order to marginalize those who believe in God (to include many scientists who profess a belief in a personal God that they can pray to) and to proselytize all the rest of society into their philosophy of life. For those who adhere to evolutionism—i.e., Darwinian activists—the unbiased mind is absolutely obliged to interpret the theory of evolution in only one way—as an explains-all, materialistic philosophy that proves that God does not exist.[330]

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[326] *See* Lamb's Chapel v. Ctr. Moriches Union Free Sch. Dist., 508 U.S. 384, 394 (1993).

[327] Epperson v. Arkansas, 393 U.S. 97, 113–14 (1968) (Black, J., concurring).

[328] 529 F. Supp. 1255 (D.C. Ark. 1982).

[329] *See supra* notes 184–86 and accompanying text.

[330] *See* KENNETH MILLER, FINDING DARWIN'S GOD, at xii, 16 (1999). For Darwinian activists, no one, especially no educated professional, can possibly advocate belief in a personal

Ironically, asserting that understanding the theory of evolution at the scientific level demands an unqualified belief in the philosophy of evolutionism may be evolution's greatest liability in terms of public acceptance. A pointed example of this matter was seen in August 1999, when the Kansas Board of Education decided not to require the teaching of evolution for kindergarten through twelfth-grade students.[331] Scientific journals sounded alarm bells. In an editorial piece in *Nature*, for example, the editors clearly detested this move and "bemoan[ed] the polling data suggesting that [not only does] the U.S. public support the creationist point of view, but that U.S. scientists feel the same way."[332]

Polls regularly indicate that most Americans seem not to doubt the validity of God, but the validity of the theory of evolution.[333] In part, this may be the result of committed ideologues such as Dawkins who have so deeply associated the theory of evolution with their metaphysical philosophy that no one in American culture can talk about the one without invoking the other. This point may be lost on the editors of *Nature*, but it is crystal clear to the public at large. Hearing the voices of Monod and company—evolution demands atheism—polls repeatedly reveal that a large percentage of the American population simply rejects the all-encompassing view of the theory of evolution. Given the choice of belief in God and belief in a theory that they are told rejects God, people choose God. In part, one might argue that the theory of evolution lacks credibility as a natural law, then, because of the demands of evolutionism. Dawkins may take pride that the theory of evolution "made it possible to be an intellectually fulfilled atheist,"[334] but such statements only exacerbate the acceptance of the theory and lend

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deity. Moreover, anything that refuses to conform to the dictates of evolutionism is labeled as irrational and superstitious.

331 *See* Pam Belluck, *Board for Kansas Deletes Evolution from Curriculum*, N.Y. TIMES, Aug. 12, 1999, at A1. In the Republican primary election of August 2000, voters replaced three of the six school board members who voted to delete references to macroevolution. *See id.* The new school board reinstated the teaching of macroevolution in the science classes on February 14, 2001. *See id.*; Rosenberg, *supra* note 11, at 621–22.

332 *The Difference Between Science and Dogma*, 400 NATURE 697, 697 (1999). *But see* JOHNSON, *supra* note 234, at 86. Johnson cites the 1998 Edward Larson and Larry Witham survey of scientists that revealed that disbelief in "supernatural theism" among the National Academy of Science was over ninety percent in general, with ninety-five percent for biologists. Forty percent of scientists-in-general believe in a personal God. *See id.*

333 *See, e.g.*, Stephanie Simon, *Creation Museum to Counter Evolution Theory*, L.A. TIMES, Dec. 19, 2001, at A42. "Polls consistently show that just 10% of Americans believe in evolution unaided by external force." *Id.* "In contrast, 45% accept the biblical account that God created mankind within the last 10,000 years." *Id.*; *see also* Grossman & DeBarros, *supra* note 222 (citing a study by the American Religious Identification Survey that showed that 81% of Americans claim a religious identity).

334 DAWKINS, *supra* note 190, at 6 ("[A]lthough atheism might have been *logically* tenable before Darwin, Darwin made it possible to be an intellectually fulfilled atheist.").

ammunition to those who insist that evolution is a form of religion or an idea antagonistic to religion.[335]

The demands of evolutionism may also prove to be extremely counterproductive from a legal perspective; touting such an anti-religious agenda clearly opens the door to judicial scrutiny under the Establishment Clause.[336] The argument that the theory of evolution might one day qualify as a either a religious belief, or an anti-religion (since it is not religiously neutral),[337] is certainly a real possibility.

The starting point for assessing this challenge begins with the Court's own struggle to articulate a legal definition of religion.[338] A survey of Supreme Court cases regarding the definition of religion reveals that the Court uses the term to mean different things in different contexts.[339] For example, those who wished to avoid the draft laws in the Vietnam era by claiming they were "conscientiously opposed" to participation in war due to their "religious training and belief,"[340]

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[335] The message of evolution as a religious belief has also registered in the United States Senate. In 2001, Senator Rick Santorum (R-Pa.) introduced a non-binding science education resolution that was adopted by the Senate (91-8):

> It is the sense of the Senate that—(1) good science education should prepare students to distinguish the data or testable theories of science from the 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.

S. Res. 6147–48, 107th Cong. (2001).

[336] *But see* MILLER, *supra* note 179, at 169. Miller notes that the National Academy of Science recognizes that the opposition to evolution is stirred, in part, by the leading voices of evolution who demand that belief in evolution and in God are mutually exclusive. "At the root of the apparent conflict between some religions and evolution is a misunderstanding of the critical difference between religious and scientific ways of knowing." *Id.*

[337] *See* Epperson v. Arkansas, 393 U.S. 97, 110 (Black J., concurring).

[338] *See* Wexler, *supra* note 11, at 458; *see also* United States v. Seeger, 380 U.S. 163, 166 (1965) (viewing religion as a sincerely held belief).

[339] *See* Wexler, *supra* note 11, at 458. Commentators have analyzed the Court's definitions of religion based on either a content-based or substantive analysis. Regardless, Wexler is certainly on point when he notes that the Supreme Court "has not provided a clear, concrete, and consistently employed definition of religion in the First Amendment context, and it has been particularly reluctant to craft such a definition with respect to the Establishment Clause." *Id.*

[340] *See* Seeger, 380 U.S. at 166. Section 6(j) of the Universal Military Training and Service Act of 1948 provided the exemption from combat. *See* 50 U.S.C. app. § 456(j) (2000).

reveals just how broad a meaning the Court has accorded religious beliefs and how the Court has flirted with circularity in its reasoning.[341]

Recognizing the growing diversity in religious beliefs and practices in the United States, the traditional American idea that a religion was understood to be a belief that "has reference to one's view of his relations to his Creator, and to the obligations imposed on his being and character" has been greatly broadened.[342] In *Torcaso v. Watkins*, for instance, the Supreme Court recognized that some religions need not be based in a belief in the existence of a personal God when it said that neither a state nor the federal government can "aid those religions based on a belief in the existence of God as against those religions *founded on different beliefs*."[343] Indeed, in a footnote, the *Torcaso* Court wrote: "Among 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."[344]

Two years after *Torcaso*, in *Schempp*,[345] the Supreme Court affirmatively included Secular Humanism as a religion, stating that "the State may not establish a 'religion of secularism' in the sense of affirmatively opposing or showing hostility to religion, thus 'preferring those who believe in no religion over those who do believe.'"[346] Then, in *Welsh v. United States*,[347] the Court stretched the definition of religious belief to its furthest reaches by stating that Congress "cannot draw the line between theistic or nontheistic religious beliefs on the one hand and secular beliefs on the other."[348] Thus, if Secular Humanism qualifies as a religion in the Supreme Court's broadly staked constitutional definition of religious beliefs, a fortiori, the argument can surely be made that the theory of evolution also qualifies as a religion since Darwinian activists brazenly tout the theory of evolution as the central principle of either evolutionism[349] or Secular Humanism.

Perhaps recognizing the problems associated with its expanded definition of religion, the Court has seemingly heeded the advice of Justice Black and has simply refused to address fully the dilemma vis-à-vis the theory of evolution and

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[341] *See, e.g.*, Michael W. McConnell, *Religious Participation in Public Programs: Religious Freedom at a Crossroads*, 59 U. CHI. L. REV. 115, 120 (1992) (criticizing the Warren Court for its treatment of religion and for pressing towards a more secular society).

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

[343] Torcaso v. Watkins, 367 U.S. 488, 495 (1961) (emphasis added).

[344] *Id.* at 495 n.11. (emphasis added).

[345] Sch. Dist. v. Schemmp, 374 U.S. 203 (1963).

[346] *Id.* at 225 (quoting Zorach v. Clauson, 343 U.S. 306, 314 (1952)).

[347] 398 U.S. 333 (1970).

[348] *Id.* at 356.

[349] *See* House, *supra* note 12, at 432; *see also* Judith A. Villarreal, Note, *God and Darwinism in the Classroom: The Creation/Evolution Controversy*, 64 CHI.-KENT L. REV 335, 367 (1988) (arguing that Secular Humanism is misclassified as a religion).

the Establishment Clause. In *Epperson*, the Court did not deem it necessary to define religion because the state statute in question specifically referred to the Bible.[350] Similarly, in *Edwards*, the Court saw no need to explore troublesome definitions when it could dispatch the subject state statute at the first prong analysis of the *Lemon* test. Nevertheless, the lower federal courts have not treated the high court's silence as a yellow cautionary light, but rather as a signal to reject any attempt by those who argue that teaching evolution is tantamount to advancing a religious belief or a belief hostile to religion in violation of the Establishment Clause.[351] While one might expect the argument to have greater traction when applied to evolutionism—Secular Humanism is far too benign a religion to attract the Establishment Clause interest—the lower courts have not been sympathetic.

In *Wright v. Houston Independent School District*,[352] high school students alleged that the school district and the Texas State Board of Education violated the Establishment Clause because the teaching of evolutionary theory was tantamount to "lending official support to a 'religion of secularism.'"[353] The court rejected the claim, refusing to recognize Secular Humanism as a religion under the Establishment Clause.[354] In *McLean v. Arkansas Board*, the district court also refused the argument noting that "it is clearly established in the case law, and perhaps in common sense, that evolution is not a religion and that teaching evolution does not violate the Establishment Clause."[355] Also as already noted in *Peloza*,[356] the Ninth Circuit rejected the claim from a high school biology teacher that the theory of evolution qualified as the religion of evolutionism under the Establishment Clause.[357]

Despite the holdings in the lower federal courts refusing to equate the theory of evolution as a religion or as a doctrine hostile to religion, the Supreme Court has never squarely addressed the issue and the argument continues to be

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[350] *See* Epperson v. Arkansas, 393 U.S. 97, 108–09 (1968).

[351] *See, e.g.*, Wright v. Houston Indep. Sch. Dist., 366 F. Supp. 1208, 1212 (S.D. Tex. 1972), *aff'd per curiam*, 486 F.2d 137 (5th Cir. 1973).

[352] *Id.*

[353] *Id.* at 1209.

[354] *See id.*; *see also* Smith v. Bd. of Sch. Comm'rs, 827 F.2d 684, 694–95 (11th Cir. 1987). In *Smith*, plaintiffs alleged that the school district was in violation of the Establishment Clause because it promoted Secular Humanism. *See id.* at 686. The Eleventh Circuit refused to accept the district court's finding that Secular Humanism qualified as a religion for these purposes. *See id.* 694–95.

[355] Mclean v. Ark. Bd. of Educ., 529 F. Supp. 1255, 1274 (D.C. Ark. 1982); *see also* Peloza v. Capistrano Unified Sch. Dist., 37 F.3d 517, 521 (9th Cir. 1994) (noting that "evolution" is a biological concept and has nothing to do with how the universe was created).

[356] *See Peloza*, 37 F.3d at 521–22.

[357] *See id.* at 520–21. The Ninth Circuit also rejected the idea that Secular Humanism was a religion for Establishment Clause purposes. *See id.*

advanced.[358] Interestingly, in light of the continuing drum beat of Darwinian activists that the theory of evolution dismisses all religious beliefs and answers all ultimate realities, the Supreme Court may ultimately be forced to fashion a remedy to protect neutrality in the public science classroom. Such actions might require excluding certain educational materials that advance atheistic interpretations, mandating that classes on the theory of evolution explicitly inform students that evolution cannot be used to discredit religious beliefs,[359] or even allowing—in the words of one legal commentator—for "creationist positions" to be presented as a counterbalance.[360]

2. *Defining Science*

The other issue of complaint relates to how the lower courts have defined science. Again, the Supreme Court has yet to provide a definition of science, leaving commentators in this area of the law to focus their attention primarily on *McLean*.[361] *McLean* involved the constitutionality of an Arkansas statute that mandated balanced treatment for creation science and evolution science.[362] Using the *Lemon* test, District Judge William Overton determined that the Act violated first and second prongs of the three-pronged test because it was intended to advance a religious belief called creation science.[363] In reaching this complex decision, the court rejected the argument that the theory of evolution also qualified as a religion or anti-religion[364] and then went to great lengths to set out a detailed legal definition of "science" which he applied to the ideas of the theory of evolution and creation science. The judge's definition of what constituted a

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[358] *See, e.g.*, John A. Campbell, *Intelligent Design, Darwinism, and the Philosophy of Public Education*, 1 RHETORIC & PUB. AFF., 469, 487 (1998) ("Pretending that evolutionary science, as understood by the vast majority of its most accomplished advocates, is religiously neutral advances neither the public understanding of science nor the public discussion of the values and assumptions that inevitably inform its teaching.") (footnote omitted).

[359] For an example of how evolutionists have "opened the door," see WILLIAM K. PURVES, LIFE: THE SCIENCE OF BIOLOGY 438 (5th ed. 1998). In this high school biology textbook, the authors not only present students with the standard Darwinian interpretation, they also attack the creationist position: "The claim made repeatedly by creationists that the fossil record does not contain examples of intermediates [fossils] is false." *Id.* at 438.

[360] *See* Wexler, *supra* note 11, at 469–70 ("If scientists continue to urge that evolution implies atheism, the Court might become less receptive to their arguments altogether, particularly those aimed at keeping 'creationism' out of the public schools.").

[361] *See* McLean v. Ark. Bd. of Educ., 529 F. Supp. 1255, 1264–67 (1982).

[362] *See id.* at 1256.

[363] *See id.* at 1264.

[364] *See id.* at 1268. The Court noted that several persons, including the author of the Act, had made the claim that, if creation science is deemed grounded in a religious belief because of its apparent lack of scientific support, then the equally unsupported evolution theory is also a type of religion. *See id.*

legitimate science included five parts: (1) guidance by natural law; (2) capable of explanation by reference to natural law; (3) testable against the empirical world; (4) any conclusions are only tentative; and (5) it is falsifiable.[365]

When Judge Overton evaluated creation science by his definitional formula he marginalized it as a religious belief because it failed to meet his essential characteristics for a science, thus making it a non-science.[366] The judge proclaimed that "creation-science is not [a] science,"[367] but a religious belief based on an interpretation of the Bible.[368] Conversely, applying his definition of science to the theory of evolution, Judge Overton ruled that the theory of evolution qualified as a science.[369] Therefore, he reasoned, if the theory of evolution qualifies as a science, it cannot be a religious belief.[370]

Judge Overton's simplistic definition of science has been soundly refuted by numerous legal and scientific commentators as woefully inadequate and unrealistic.[371] For instance, because many of the giants of science came up with theories prior to empirical scientific support, their ideas would fail to satisfy Judge Overton's arbitrary third prong.[372] Furthermore, such accepted concepts as punctuated equilibrium[373] would equally fail to qualify as science since the idea

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[365] *See id.* at 1267.

[366] *See id.*

[367] *McLean*, 529 F. Supp. at 1272.

[368] "[T]he conclusion is inescapable that the *only* real effect of Act 590 is the advancement of religion." *Id.* (emphasis added).

[369] *See id.* at 1273.

[370] *See generally id.*

[371] *See, e.g.*, House, *supra* note 12, at 412–18. House argues that Overton demonstrated "bias at trial for the plaintiff." *Id.* at 413.

[372] *Id.* at 433–35 (arguing that under Overton's definition both Charles Darwin and Isaac Newton (1642–1727) would be deemed unscientific because they came up with their ideas before the laws of physics and chemistry could lend support to them).

[373] Again, the theory of punctuated equilibrium holds that new complex life forms appeared so quickly (in geological terms, quickly could mean thousands of years) that the fossil record does not record their lineage. *See supra* note 136. But their admission raises a whole new series of troubling questions, chief of which is how these fantastically complex and coordinated mega transformations occurred. Recounting the philosophical rise of punctuated equilibrium, Mayr acknowledges that the fossil record does not support gradual change:

> On the contrary, long, continued, gradual changes of phyletic lineages were rare, if they existed at all. Instead, new species and higher types invariably turned up in the fossil record very suddenly, and most lineages became extinct sooner or later. To be sure, one could invoke the incompleteness of the fossil record, but since this seemed too much like sweeping a valid objection under the rug, many paleontologists adopted saltationism [appearance of life forms via sudden leaps] and were gratified when geneticists such as de Vries and Goldschmidt postulated evolution by macromutations ("hopeful monsters").

ERNST MAYR, THIS IS BIOLOGY 194 (1997).

could be interpreted as having supernatural connotations,[374] running afoul of Judge Overton's first and second prongs.[375]

When the Supreme Court finally takes up the issue in the context of intelligent design, it is doubtful that the *McLean* definition will serve much use, particularly in light of the Court's 1993 ruling in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*[376] Essentially, Judge Overton's analysis is nullified by the Court's decision to abandon the old "general acceptance" test for determining what is and is not science. Under *Daubert*, the test for scientific legitimacy will be evaluated not on a bandwagon approach or by the fulfillment of a *McLean*-styled set of arbitrary criteria. Instead, the Court will now evaluate the legitimacy of a

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[374] Darwin himself recognized the issue of saltationism and its obvious implications for belief in the supernatural. For Darwin, to believe in saltationism was to believe in divine miracles:

> He who believes that some ancient form was transformed suddenly through an internal force or tendency . . . will further be compelled to believe that many structures beautifully adapted to all the other parts of the same creature and to the surrounding conditions, have been suddenly produced; and of such complex and wonderful co-adaptations, he will not be able to assign a shadow of an explanation. . . . *To admit all this is, as it seems to me, to enter into the realms of miracle, and to leave those of Science.*

DARWIN, *supra* note 95, at 316 (emphasis added); *see also* ERNST MAYR, POPULATIONS, SPECIES, AND EVOLUTION 253 (1970):

> The occurrence of genetic monstrosities by mutation . . . is well substantiated, but . . . [t]hey are so utterly unbalanced that they would not have the slightest chance of escaping elimination through stabilizing selection. Giving a thrush the wings of a falcon does not make it a better flier. Indeed, having all the other equipment of a thrush, it would probably hardly be able to fly at all. . . . To believe that such a drastic mutation would produce a viable new type, capable of occupying a new adaptive zone, is equivalent to believing in miracles.

[375] Proponents of punctuated equilibrium strongly dispute that the theory has supernatural implications. *See, e.g.*, E. Richard Moxon & Christopher Wills, *DNA Microsatellites: Agents of Evolution?*, SCI. AM., Jan. 1999, at 94, 95, 99 (arguing that "hopeful monsters" are possible because massive amounts of beneficial genetic material in the empty segment of the DNA are somehow precisely formed, cataloged, and stored up in a latent library waiting for chance or some unknown force to trigger their release in order to introduce a new specialized creature); NILES ELDREDGE, THE TRIUMPH OF EVOLUTION AND THE FAILURE OF CREATIONISM 48–49 (2000) (arguing that the trigger for the burst of rapid evolutionary change is somehow caused by sudden environmental changes in the ecosystem); SUSUMU OHNO, EVOLUTION BY GENE DUPLICATION 89–97 (1970) (exploring the speculation of tandem gene duplication during reproduction where the resulting genome is essentially given an increased quantity of genetic material); Morris, *supra* note 22, at 53 (noting that most supporters of evolution refuse to "specify the designing force in evolution (at least, not publicly)—it could be God, aliens, or time travelers").

[376] 509 U.S. 579, 597 (1993) (overturning the seventy-year reign of the Frye test, which had taken the position that only evidence generally accepted within the scientific community would be allowed).

new theory—even if a minority view—on the basis of a variety of factors, with emphasis on the actual empirical research.[377] At a minimum, *Daubert* certainly offers minority scientific views, including intelligent design, a proper opportunity to be heard.[378]

V. THE COMING STORM—INTELLIGENT DESIGN

> A decision respecting the subject matter to be taught in public schools does not violate the Establishment Clause simply because the material to be taught happens to coincide or harmonize with the tenets of some or all religions.[379]
>
> —Justice Lewis F. Powell, Jr. (1907–1998)

Intelligent design theory holds that certain unique aspects inherent in the physical nature of living things[380] manifest the marks of an intelligent designer. The existence of an intelligent designer is therefore necessary to account for many of the functions of life. As state school boards across the nation debate whether intelligent design should be taught in public schools[381] and individual science teachers exercise academic freedom to present the new theory to their classes apart from state curriculum guidelines,[382] it is only a matter of time before the

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[377] *See Daubert*, 509 U.S. at 592–95.

[378] *Id.* at 593–94. The case dealt with the admissibility of expert scientific testimony. *Id.* The Court will now consider a variety of factors to determine the admissibility of such testimony. *Id.*

[379] Edwards v. Aguillard, 482 U.S. 578, 605 (1987) (Powell, J., concurring) (quoting McGowan v. Maryland, 366 U.S. 420, 442 (1961)) (internal quotations omitted).

[380] Life is technically defined as the state of a material complex or individual characterized by the capacity to perform certain activities including metabolism, growth, reaction to stimuli, and reproduction. Biologists generally divide life forms into three categories: eukaryotes, organisms with a nucleus; bacteria, organisms without a nucleus; and archaea, microbes that need neither oxygen nor sunlight to exist. *See* LIFE: THE SCIENCE OF BIOLOGY 531–32 (1998) (William K. Purves et al. eds., 1998). Nevertheless, despite the occasional media-driven sensation about possible extinct microbes on Mars, there is absolutely no conclusive evidence that life in any form can be found anywhere else in the universe except on Earth. *See* W. Wayt Gibbs, *Endangered: Other Explanations Now Appear More Likely Than Martian Bacteria*, SCI. AM., Apr. 1998, at 19, 19–20. Scientists have found out that bacteria are far hardier than anyone suspected; bacteria have been found in boiling springs in America's Yellowstone National Park, in the ice of Antarctica, and in 250° thermal vents on the ocean floor.

[381] *See Ohio to Teach Evolution, Pro and Con*, USA TODAY, Oct. 15, 2002, at 6D; Jen Waters, *Challenging Darwin: Advocates of Intelligent Design Argue for New Thought*, WASH. TIMES, Sept. 18, 2002, at B1; Richard N. Ostling, *Ohio School Board Debates Teaching "Intelligent Design"*, Associated Press, (Mar. 14, 2002), *available at* 2002 WL 16390222.

[382] *See, e.g.*, John Gibeaut, *Evolution of a Controversy: Almost 75 years After the Scopes Trial, a New Species of the Old Darwin vs. Creation Debate Has Come to Life in a Suburban Seattle Community*, A.B.A. J., Nov. 1999, at 50.

courts will be called on to consider directly whether the matter of intelligent design is a constitutionally acceptable academic discipline or simply another religious spin from the Fundamentalist creationist movement to inject God into the classroom.

A. *History of Intelligent Design*

The idea that the order and structure found in living things reflects the influence of an intelligent designer rather than material self-sufficiency can be traced back to the very foundations of western civilization.[383] Prior to Darwin, it was the highly respected biologist William Paley (1743–1805) who best reflected the general scientific paradigm of the day. Initially given as a series of lectures at the Cambridge University, Paley expressed the rationality for believing in an intelligent designer when he penned the following anecdote in his book, *Natural Theology*:

> In crossing a heath, suppose I pitched my foot against a *stone* and were asked how the stone came to be there, I might possibly answer that for anything I knew to the contrary it had lain there forever; nor would it, perhaps, be very easy to show the absurdity of this answer. But suppose I had found a *watch* upon the ground, and it should be inquired how the watch happened to be in that place, I should hardly think of the answer which I had before given, that for anything I knew the watch might have always been there. Yet why should not this answer serve for the watch as well as for the stone . . . ?[384]

Before the advent of molecular biology, the primary counter to Paley's argument, at least in the context of living organisms, came from the philosopher David Hume (1711–1776).[385] Hume argued that Paley's analogy of comparing living organisms with machines (like a watch) was ineffective because living

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[383] *See generally*, GIORGIO DE SANTILLANA, THE ORIGINS OF SCIENTIFIC THOUGHT: FROM ANAXIMANDER TO PROCLUS, 600 B.C. TO 500 A.D (1961).

[384] WILLIAM PALEY, NATURAL THEOLOGY 3 (Bobbs-Merrill 1963) (1802) (emphasis added). The answer to Paley, of course, is that a watch is a thing far too complex to simply happen—anyone would quickly admit that an intelligent designer manufactured it. Most certainly, then, if one answered, a fortiori, that Paley's watch demands an intelligent designer, how many times stronger must one acknowledge that the fantastic complexity of the life and all that it involves provides undeniable evidence of a super intelligent designer with abilities infinitely greater than those of an ordinary watchmaker?

[385] *See* DAVID HUME, *Dialogues Concerning Natural Religion*, *in* PRINCIPAL WRITINGS ON RELIGION 78–83 (J.C.A. Gaskin ed., 1993). Postulating the existence of an intelligent designer in light of Paley's argument seems fundamentally reasonable. However, does Paley's argument have the same force of logic when it comes to living organisms? After all, Darwinian thought is rooted in the soil of the theory of *biological* evolution. Hume argued that it did not.

organisms were natural and simple in essence, and did not act like machines.[386] In short, Hume and his followers believed that the individual components of living things were really not that complex and surely did not have intricate parts that acted like complex machines. With the flourishing of modern molecular biology, however, many intelligent design scientists feel that Paley was right on the mark with his simple, yet brilliant analogy.[387]

Modern critics of intelligent design continue to dispute the inherent logic of Paley's underlying analogy by evoking the action of Darwinian gradualism. Evolutionists invariably respond to biological complexity by pointing to creatures who get by with less complex structures, and then argue that the more complex must have evolved from the less complex, in small steps. Dawkins typifies this approach: "[N]ot a single case is known to me of a complex organ that could not have been formed by numerous successive slight modifications. I do not believe that such a case will ever be found."[388]

In essence, Darwinian activists offer the usual homological argument and arrive at a conclusion on complexity by including it in the premise. Ignoring the matter of probability,[389] Dawkins seemingly falls directly into the trap of imagining simple starting points from which to launch all subsequent

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386 *See id.*

387 *See, e.g.*, DENTON, *supra* note 131, at 329. Molecular biologist Michael Denton argues that the basic structure of living organisms not only resembles machines, but they are also machine-like structures of vast molecular sophistication and complexity:

> We would see that nearly every feature of our own advanced machines had its analogue in the cell: artificial languages and their decoding systems, memory banks for information storage and retrieval, elegant control systems regulating the automated assembly of parts and components, error fail-safe and proof-reading devices utilized for quality control, assembly processes involving the principle of prefabrication and modular construction. In fact, so deep would be the feeling of *deja-vu*, so persuasive the analogy [to Paley], that much of the terminology we would use to describe this fascinating molecular reality would be borrowed from the world of late twentieth-century technology.

Id.

388 DAWKINS, *supra* note 190, at 91. In other words, since there are less complex structures in nature, like the eye found in the oyster or the jellyfish, the more complex types must have somehow come from these forms. The steps, Dawkins asserts, are both progressive and simple—even if the fossil evidence is lacking to prove that such transformations ever actually occurred in the real world.

389 *But see* RICHARD DAWKINS, CLIMBING MOUNT IMPROBABLE 75 (1996). Dawkins strongly believes that evolution is not a theory of random chance. *See id.* "It is a theory of random mutation plus *non-random* cumulative natural selection." *Id.* Therefore, Dawkins argues that the improbability argument is solved because natural selection operating under gradualism simply breaks the statistical equation into small manageable parts that "inch by million-year inch" led to "the astronomic improbability of eyes and knees, enzymes and elbow joints . . . ." *Id.* at 77. "Why, I wonder," writes Dawkins, "is it so hard for even sophisticated scientists to grasp this simple point?" *Id.* at 75.

speculations, i.e., the simplest eye.[390] In the case of the eye, even the simplest eye in the simplest creature contains a molecular complexity that is absolutely staggering. Microbiologist Michael Behe calls this sort of myopic thinking by evolutionists the "black box syndrome."[391] By using the term black box, Behe notes that many of the so-called simple structures evolutionists use as their starting points of evolution are actually individual black boxes, each containing intricate machine-like components of immense complexity.[392]

> Each of the anatomical steps and structures that Darwin thought were so simple [e.g., primitive eyes] actually involves staggeringly complicated biochemical processes that cannot be papered over with rhetoric. Darwin's metaphorical hops from butte to butte [a simple to a more complex form] are now revealed in many cases to be huge leaps between carefully tailored machines . . . .[393]

Another objection to Paley's analogy for intelligent design is as follows: If these complex structures were made by an intelligent designer, then why are some things in nature not put together as perfectly as "we" would have expected them to be?[394] Commenting on the human eye, for instance, evolutionists point out that the eye is constructed so that there exists a blind spot in the retina.[395] The

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[390] *Id.* at 77.

[391] BEHE, *supra* note 96, at 6–10. Michael Behe is a professor of biochemistry at Lehigh University.

[392] *See id.* at 252 ("The simplicity that was once expected to be the foundation of life has proven to be a phantom; instead, systems of horrendous, irreducible complexity inhabit the cell.").

[393] *Id.* at 22. Behe contends that modern day evolutionists certainly know about these black boxes, but they simply refuse to open any of them. Instead, they are content to line the boxes up in long imaginary rows and then marvel at what they often call the "miracle" of evolution; *see also* R. Merle d'Aubigne, *How Is It Possible to Escape the Idea of Some Intelligent and Organizing Force?*, *in* COSMOS, BIOS, THEOS, *supra* note 164, at 157, 158. Weighing the claims of the evolutionist regarding this issue, Dr. R. Merle d'Aubigne, head of the Orthopedic Department at the University of Paris notes:

> Personally, I cannot be satisfied by the idea that fortuitous mutation selected by modifications in conditions for life can explain the complex and rational organization of the brain, but also of lungs, heart, kidneys, and even joints and muscles. How is it possible to escape the idea of some intelligent and organizing force?

Id.

[394] *See, e.g.*, STEPHEN JAY GOULD, THE PANDA'S THUMB 20–21 (1980); MILLER, *supra* note 179, at 101 ("To adopt the explanation of design, we are forced to attribute a host of flaws and imperfections to the designer.").

[395] *See* Randolph M. Nesse & George C. Williams, *Evolution and the Origins of Disease*, SCI. AM., Nov. 1998, at 86, 86; MILLER, *supra* note 179, at 101:

> Speaking of eyes, we would have to wonder why an intelligent designer placed the neural wiring of the retina on the side facing incoming light. This arrangement scatters the light,

vertebrate eye is marvelous, they say, but not perfect.[396] Therefore, the argument is made that the eye, or the human body,[397] or the Panda's thumb (said to be a less than useful appendage),[398] etc., could not have been the result of an intelligent designer. After all, an intelligent designer would have done a better job.

Because evolutionists would or would not design an irreducibly complex[399] item in a particular fashion cannot be used to support the conclusion that Darwinian evolution produced the item, or certainly that the item is not "that complex." It is clear that there are many imperfections in nature and they extend from the vertebrate eye, to the adverse effects of mutations on various organs, to the ultimate undesirable—death. Nevertheless, the problem of accounting for complexity simply overshadows any non sequitur argument that an intelligent designer does not exist. Certainly, given the complexity issue one might more reasonably conclude that an intelligent designer has His own reason for choosing a particular design or process—e.g., microevolution allows for mutations, both beneficial and harmful—that is beyond human perspicacity.

At the end of the day, Paley's analogy for intelligent design retains its power and may render all other anti-Darwinian arguments largely superfluous. Hoyle

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making our vision less detailed than it might be, and even produces a blind spot at the point that the wiring is pulled through the light-sensitive retina to produce the optic nerve that carries a visual message to the brain.

396 *See* Nesse & Williams, *supra* note 397, at 86 ("Contrary to any sensible design, blood vessels and nerves traverse the inside of the retina, creating a blind spot at their point of exit."). The authors also lament that "[s]trands of DNA direct the development of the 10 trillion cells that make up a human adult but then permit his or her steady deterioration and eventual death." *Id.*

397 *See generally* DIAGRAM GROUP, THE HUMAN BODY: A COMPLETE GUIDE 135–49 (1994). The issue of black boxes cannot be passed without considering the most complex creature of all—man. The human body is the most complicated system in existence. Operating by means of several hundred patterns of coordinated controls, creationists argue that it is incredulous to suppose evolution as the sole force behind its creation and operation. To construct a human about three billion bits of information are contained in 100,000 genes saddled across twenty-three pairs of chromosomes in the thirteen-foot DNA strand that is packed into a nucleus less than a thousandth of an inch across and weighs less than 10^{-16} grams. This blueprint is command-coded with all the information needed to create and then to sustain the entire organism of over ten trillion cells. Not only is it responsible for creating the skeletal system; muscular system; nervous system; respiratory system; digestive system; urinary system; endocrine system; reproductive system; and skin, nails and hair; it also sets up intricate operational function. For example, the circulatory system sends the body's blood 168 million miles each day, the equivalent to 6,720 trips around the world. (The human heart beats thirty-five million times a year, without pausing.)

398 *See* GOULD, *supra* note 394, at 24.

399 *See* BEHE, *supra* note 96, at 39 (defining irreducibly complex as "a single system composed of several well-matched, interacting parts that contribute to the basic function, wherein the removal of any one of the parts causes the system to effectively cease functioning").

and fellow astronomer Chandra Wickramasinghe note that "[i]t is ironic that the scientific facts throw Darwin out, but leave William Paley, a figure of fun to the scientific world for more than a century, still in the tournament with a chance of being the ultimate winner."[400]

B. *Intelligent Design in the Scientific Community*

In terms of Establishment Clause scrutiny, modern proponents of intelligent design in the scientific community have moved beyond the logic of Paley and have now established a working template for investigating specific evidences of intelligent design.[401] This approach is significant in the judicial analysis because it takes the matter of intelligent design out of the realm of a concept based on reason and faith and into an empirical scientific study. The template that intelligent design scientists have proposed is based on information and probability theory.[402] According to Stu Pullen, a pioneer in the field of intelligent design theory, the basic tenets of intelligent design as related to the origin and subsequent development of biological life are as follows:

(1) The information needed for life is contained in a molecule known as DNA. This information can be analyzed with a field of science called information theory.
(2) The complexity of life is a measure of the information in its DNA. Information and complexity are synonyms.

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[400] FRED HOYLE & N.C. WICKRAMASINGHE, EVOLUTION FROM SPACE 96–97 (1981). *See also* DENTON, *supra* note 131, at 341:

> The almost irresistible force of the analogy [Paley's watch] has completely undermined the complacent assumption, prevalent in biological circles over most of the past century, that the design hypothesis can be excluded on the grounds that the notion is fundamentally a metaphysical *a priori* concept and therefore scientifically unsound. On the contrary, the inference to design is a purely *a posteriori* induction based on a ruthlessly consistent application of the logic of analogy. The conclusion may have religious implications, but it does not depend on religious presuppositions.

[401] *See, e.g.*, BEHE, *supra* note 96, at 39 (using the concept of irreducibly complex to suggest the input of an intelligent designer); PERCIVAL DAVIS & DEAN H. KENYON, OF PANDAS AND PEOPLE: THE CENTRAL QUESTION OF BIOLOGICAL ORIGINS 133–48 (Charles Thaxton ed., 1993) (calling for quantifiable approaches based on biochemical similarities); WILLIAM A. DEMBSKI, INTELLIGENT DESIGN 122–52 (1999) (discussing how design is empirically detectable through the two main features of complexity and specification); DEAN L. OVERMAN, A CASE AGAINST ACCIDENT AND SELF ORGANIZATION 181–97 (1997) (reviews discoveries in molecular biology and physics and applies mathematical possibility theory to demonstrate the validity of intelligent design).

[402] For a comprehensive analysis of intelligent design theory, see Dewolf et al., *supra* note 12, at 61–66.

(3) Natural selection does not create information. It only modifies existing information. Thus, new information must be created by genetic drift—random changes to DNA.
(4) The odds associated with . . . events in the past can be accurately determined using information and probability theory.
(5) If the odds associated with . . . the origin and evolution of life are too small, then design is implicated, and it may be inferred.[403]

Two of the leading proponents of intelligent design theory are probability theorist William Dembski and microbiologist Michael Behe. Dembski has written a number of books pointing out that the activity of intelligent agents in irreducibly complex structures is a common and fully accepted mode of inference in the real world.[404] Behe has coined the term "irreducibly complex" to describe the contention that there are myriad structures in the world of microbiology that show irrefutable evidence of intelligent design.[405]

Like Pullen, Dembski has developed a well-defined investigatory methodology for detecting the effects of intelligence.[406] Dembski calls his method for detecting complexity-specification the "explanatory filter."[407] The explanatory filter explores the factors of contingency, complexity, and specification to decide whether an "event, object or structure" should be attributed to necessity, chance, or design.[408] Briefly, intelligent design theory infers that an

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[403] House, *supra* note 12, at 399 (quoting Pullen's tenets of intelligent design). Much of the theory draws from the inability of the theory of evolution to account for the creation of new information. All life requires a system to store the plans for a creature's design and instructions for putting it together. This process is accomplished through DNA, which stores, duplicates, and passes on information that makes life. Located in practically every cell of the vast majority of life forms, the DNA code is universal and spells out the detailed blueprints for inheritance in every creature from a bacterium to a man. The DNA code is structured as a double helix, resembling a twisted ladder that is set out in threadlike strands called chromosomes. Humans have a total of twenty-three pairs of chromosomes in their blueprint. On each chromosome the two main strands of the spiral ladder twine around each other and are linked by pairs of neatly fitting nucleotide bases identified by their initial letters—C, T, A, and G (cytosine, thymine, adenine, and guanine). The bases are the molecular points of information and form the rungs of the DNA ladder. In mammals there are approximately three billion nucleotide base pairs per set on the code. Even in the simplest of all life forms, archaea, the single DNA instruction code would still fill eighty newspaper pages of tiny print.

[404] *See generally supra* note 401.

[405] *See* BEHE, *supra* note 96, at 39.

[406] DEMBSKI, *supra* note 401, at 133–39.

[407] *Id.* at 133–34. "Intelligent design holds to three tenets: (1) Specified complexity is well-defined and empirically detectable. (2) Undirected natural causes are incapable of explaining specified complexity. (3) Intelligent causation best explains specified complexity." *Id.* at 247.

[408] *Id.* at 133–34.

intelligent agent is responsible for an effect if the subject effect is both complex and specified.[409]

In summary, intelligent design theory does not supplant the theory of evolution. Adherents of intelligent design theory accept evolution up to a point,[410] but are convinced by the accumulated scientific data that natural selection alone cannot account for the complexity of life. Similar to the meshing of punctuated equilibrium with classic Darwinian thought,[411] they offer a theory to be read in tandem with the theory of evolution. In this context, intelligent design literature shuns theological arguments[412] and relies on a strict template designed to see if a particular observable biological complexity is consistent with their theory.[413]

C. *Intelligent Design as Religion*

With the ascendancy of intelligent design theory, school districts are besieged with conflicting demands from both sides of the creation/evolution controversy. The case of public science teacher Roger DeHart of Washington State[414] illustrates the confusion that now reigns and the need for judicial resolution by the Supreme Court. As an early supporter of intelligent design, DeHart had presented intelligent design theory to his biology class since 1988. After a threatened court challenge by the ACLU, the Seattle school board prohibited DeHart from teaching intelligent design theory, but then allowed him to present "the concept of irreducible complexities."[415] Of course, the school board solved nothing in all this because irreducible complexity is simply a synonym for intelligent design.

As previously noted, the Supreme Court has not ruled on whether presenting intelligent design theory as a topic for inclusion in science curricula runs afoul of the Establishment Clause.[416] Again, turning to *Epperson* and *Edwards* for

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[409] *See id.* at 133.

[410] *See id.* at 47.

[411] *See supra* notes 136 & 373.

[412] *But see* Reule, *supra* note 11, at 2602 (voicing the concern that while intelligent design portrays itself as religiously neutral, many of the proponents have religious bias).

[413] For an excellent outline of the various charges that intelligent design is unscientific see DEMBSKI, *supra* note 401, at 252.

[414] *See* Gibeaut, *supra* note 382, at 50.

[415] *Id.* at 53–54.

[416] *See, e.g.*, Freiler v. Tangipahoa Parish Bd. of Education, 975 F. Supp. 819, 821 (E.D. La. 1997) (holding that intelligent design was equivalent to teaching creation science), *aff'd*, 185 F.3d 337 (5th Cir. 1999), *reh'g denied en banc*, 201 F.3d 602 (5th Cir. 2000), *cert. denied*, 530 U.S. 1251 (2000); *see also* M. Drew DeMott, Note, Freiler v. Tangipahoa Parish School Board of Education: *Disclaiming "The Gospel of Modern Science"*, 13 REGENT U. L. REV. 597, 616 (2001) (lamenting that the Supreme Court missed an opportunity to correct a misunderstanding of the First Amendment "to prohibit the invasion of science into the sphere of religious inquiry" when it denied certiorari to *Freiler*).

meaningful guidance is disappointing, as the Court never really advanced beyond analyzing the legislative purpose of the subject pieces of legislation. Nevertheless, the Court has never directly framed intelligent design theory so as to case it in the sphere of a religious belief.

In part, the Court can be forgiven for failing to address the issue of intelligent design theory as almost every Establishment Clause issue brought before it has, in some manner, had to do with promoting a particular religious-based version of creation saturated in the religious biases of those responsible for drafting the subject legislation. Similarly, almost every legal scholar who writes on the matter of intelligent design has not only found it irresistible to characterize all proponents of intelligent design as religious Fundamentalists, it has been outcome determinative in their tautological analysis of how the Court will view intelligent design. For them, intelligent design easily fails the secular purpose prong of the *Lemon* test as well as the endorsement test because any non-naturalistic doctrine offered in opposition to Darwinism has been so tainted by the Fundamentalist movement that a religious purpose must be inferred per se.[417] The result, given their premise, flows in inexorable logic to its end state.

Freiler v. Tangipahoa Parish Board of Education[418] provides the perfect illustration of the prevalent belief that all future attacks on Darwinism can be easily dismissed because such attacks will invariably fall into the same pattern, i.e., involving the promotion of the Fundamentalist agenda. At issue before the court was a disclaimer adopted by the local school board to be read to students in elementary and secondary classes prior to the teaching of the theory of evolution.[419] The disclaimer stated in part:

> "It is hereby recognized by the Tangipahoa Board of Education, that the lesson to be presented, regarding the origin of life and matter, is known as the Scientific Theory of Evolution and should be presented to inform students of the scientific concept and not intended to influence or dissuade the Biblical version of Creation or any other concept.
> "It is further recognized by the Board of Education that it is the basic right and privilege of each student to form his/her own opinion and maintain beliefs taught by parents on this very important matter of the origin of life and matter. Students

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[417] A number of law review articles contend that the intelligent design movement is tied to the creationist movement. *See, e.g.*, Kirkpatrick, *supra* note 11, at 139–40 (calling intelligent design a neo-creationist movement); Rosenberg, *supra* note 11, at 614 (arguing that "intelligent design is a religious theory"). *But see* House, *supra* note 12, at 436 (arguing that the history of the creationist movement may have poisoned the well for intelligent design "to receive a fair hearing [from] the courts or society"). House states that "[p]erception is nine-tenths of the problem." *Id.* at 439. *See generally* FUTUYMA, *supra* note 94, at 184 (attributing the argument "that complex systems could not have arisen by chance, and so must have been formed by an intelligent designer" as exclusively creationist).

[418] 185 F.3d 337 (5th Cir. 1999).

[419] *See id.* at 341.

> are urged to exercise critical thinking and gather all information possible and closely examine each alternative toward forming an opinion."[420]

Applying the *Lemon* test, the Fifth Circuit held that the disclaimer passed the first prong,[421] but failed the second prong, as the disclaimer conveyed a message of endorsement of religion. The court held that "the primary effect of the disclaimer [was] to protect and maintain a particular religious viewpoint, namely belief in the Biblical version of creation."[422] Thus, the Tangipahoa disclaimer "impermissibly advances religion, violating the second prong of the *Lemon* test."[423] The court concluded that "[t]he disclaimer, taken as a whole, encourages students to read and meditate upon religion in general and the 'Biblical version of Creation' in particular."[424] The words "Biblical version of Creation" certainly served as a large red flag and were determinative for the court. If the disclaimer had referenced intelligent design theory instead of the Bible or religion, then would the result have been different?

Obviously, when the courts do consider intelligent design they will not enjoy the luxury of dealing with the sophomoric attempts by Fundamentalist creationists to inject religion into the science classroom as was the case in *Freiler*. To do proper justice to the concept of intelligent design theory a more forthright approach is necessary. True, the United States Supreme Court must look at the underlying purpose of any particular attempt to introduce intelligent design theory into the classroom, but simply to dismiss intelligent design out of hand as a Fundamentalist concept is far too cursory an approach.

One can easily imagine scenarios in which intelligent design theory could pass constitutional muster under the enumerated criteria of the *Lemon* test. Indeed, when measuring the theory under *Lemon* a reasoned argument may be summarized as follows.

First, under the secular purpose prong, intelligent design must be presented in a way that is in keeping with the school's secular purpose of providing students with critical thinking and excellence in education.[425] Even in *Freiler*, for example, the circuit court was still able to find two secular purposes.[426] Second,

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[420] *Id.* (quoting Tangipahoa School Board Resolution).

[421] *See id.* at 344–46. The court found that the disclaimer advanced two secular purposes as proposed by the school board. First, it disclaimed any orthodoxy of belief that might be inferred from the exclusive discussion of evolution. Second, it reduced any possible offense caused by teaching the theory of evolution.

[422] *Id.* at 346.

[423] *Id.* at 348.

[424] Freiler v. Tangipahoa Parish Bd. of Education, 185 F.3d 337, 346 (5th Cir. 1999).

[425] *See* Roberts v. Madigan, 702 F. Supp. 1505, 1516–17 (D. Colo. 1989) (providing guidance for elementary schools regarding permissible uses of biblical material from impermissible religious works).

[426] *Freiler*, 185 F.3d at 344–46.

under the primary effect prong, the school must take precaution that it is not perceived as approving or advancing any religious or non-religious viewpoint. Third, under the excessive entanglement prong the school must be able to demonstrate that the teaching materials (and the presentation of those materials by the teachers) have no significant religious purpose and are non-discriminatory and secular in nature. Similarly, if the endorsement test is used, the Court will measure both what the school is intending to communicate by presenting intelligent design theory as well as the message that is actually conveyed to the public.[427]

At the end of the day, from a jurisprudential standpoint, the crux of any Establishment Clause analysis revolves around the matter of determining whether intelligent design theory is a religious-based idea passed off as a scientific theory or a genuine scientific theory. Undoubtedly, if the Court determines that intelligent design is simply a religious idea packaged as a scientific theory, it stands a far better chance of being struck down as unconstitutional. On the other hand, if the Court determines that intelligent design is a valid scientific theory it will be upheld. These are the easy ends of the string. The gray area, of course, is whether intelligent design is viewed as a scientific theory with some degree of religiosity—either because its advocates are too religious (motivated to act by religious bias) or because the theory itself contains an unacceptable level of religiosity.

With the basic issues framed, the first matter to address is the oft-heard claim that, because scientists who subscribe to intelligent design are religiously biased and linked to the Fundamentalist movement, the entire doctrine of intelligent design is fatally tainted as an academic subject. A review of intelligent design literature shows both acknowledgement and concern over this accusation with some of the leading proponents of intelligent design going to great lengths to point out that they have no particular religious beliefs and are certainly not "creationists."[428] And those who do hold religious beliefs insist that their personal beliefs have no relevance to the study of intelligent design theory.[429] House points out that proponents of intelligent design in the scientific community come from a diversity of religious backgrounds—Eastern Orthodox, Unitarian Church, Judaism, Protestant, and Roman Catholic.[430]

Furthermore, advocates of teaching intelligent design in the classroom assert that if the lower courts can discount the philosophical implications of the theory of evolution[431] and rule that it is a science and not tantamount to a religious or

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[427] *See* Lynch v. Donnelly, 465 U.S. 668, 678 (1984).

[428] *See, e.g.*, BEHE, *supra* note 96, at book jacket cover ("Michael Behe is not a creationist.").

[429] *See* House, *supra* note 12, at 401–02.

[430] *See id.* at 403.

[431] *See supra* notes 299–300 and accompanying text.

anti-religious belief, a fortiori, intelligent design should be evaluated under the same standard and considered in legal terms as a legitimate, non-religious area of science.[432] The fact that Fundamentalists are attracted to the theory of intelligent design should be weighed in the same manner that atheists and Darwinian activists are attracted to the theory of evolution.

To be sure, the matter of religious bias by lawmakers may have proven to be a pivotal issue in *Edwards*, but this reasoning cannot be used to dismiss automatically the inherent validity of a growing theory of science. Although a bitter debate between evolutionists and those opposed to evolution has been raging for some time, their theoretic duel cannot be used to automatically paint every idea that stands in opposition to evolution as a sectarian religious idea.[433]

The second matter the Court must determine is whether intelligent design is a religion in terms of the Establishment Clause. As already discussed, the Court's doctrinal schizophrenia in defining religion engenders considerable confusion in predicting exactly what the Court will do. Some legal commentators suggest that a fresh direction for the Court in this matter may be found in the case of *Alvarado v. San Jose*.[434] Ruling that the city of San Jose did not violate the Establishment Clause by erecting a sculpture of the Aztec god Quetzalcoatl,[435] the Ninth Circuit adopted a three-part test to define religion:[436]

> 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.[437]

The argument that intelligent design easily passes all three parts of the *Alvarado* test has been well presented elsewhere and need not be covered in detail here.[438] It might be summarized as follows: As to the first prong, intelligent

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[432] *See* Andrew A. Cheng, *The Inherent Hostility of Secular Public Education Toward Religion: Why Parental Choice Best Serves the Core Values of the Religion Clauses*, 19 U. HAW. L. REV. 697, 779 (1997) (arguing that in public education "[s]ecular ideological answers to the "Big Questions" are privileged, while religious ones [are] [sic] marginalized, resulting in the nurturing of a secular mentality and worldview in children").

[433] *See* Kirkpatrick, *supra* note 11, at 145 ("It is simply impossible to look at the history of the evolution-creationism controversy, coupled with the universal scientific acceptance of evolution, and not infer a religious purpose that ultimately runs afoul of the First Amendment to the United States Constitution.").

[434] Alvarado v. City of San Jose, 94 F.3d 1223, 1229 (9th Cir. 1996), *quoted in* DeWolf et al., *supra* note 12, at 84–85, and House, *supra* note 12, at 438.

[435] *See Alvardo*, 94 F.3d at 1228–31.

[436] The court took the test from Malnak v. Yogi, 592 F.2d 197, 207–10 (3d Cir. 1979) (Adams, J., concurring).

[437] *Alvardo*, 94 F.3d at 1229.

[438] *See* House, *supra* note 12, at 438; DeWolf et al., *supra* note 12, at 84–85.

design theory does not address ultimate questions such as belief in an afterlife or the meaning of life. Under the second prong, intelligent design offers nothing in respect to a comprehensive set of faith-based norms or values. Finally, intelligent design certainly survives the third prong of *Alvarado*. No critic can point out intelligent design "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."[439]

Nevertheless, those who advocate a very broad definition of religion when it pertains to science, where absolutely any mention of an intelligent designer is a prima facie violation of the Establishment Clause,[440] regularly point first[441] to *Malnak v. Yogi*.[442] The district court held that any ideas suggesting the existence of an intelligent creator should automatically be deemed as "functional equivalents of religions."[443] According to *Malnak*, any ideas that had any reference to a "creative intelligence"[444] would not "shed [their] religiosity merely because they are presented as . . . a science."[445] The *Malnak* court absolutely refused to accept the argument that ideas associated with the idea of creative intelligence have nothing to do with religion.[446] However, *Malnak* predates the real rise of intelligent design theory where proponents advocate quantifiable studies, not just ideas, about a creative intelligence.

Malnak may be wonderfully efficient as a bright-line test, but it is unworkable in the real world. The Supreme Court recognizes that the wall between church and state is a blurred line at best that must be weighed in the totality of the circumstances.[447] There are no bright lines. This point is wonderfully made by Justice O'Connor's hypothetical in *Wallace v. Jaffree*, where she observes that a state would not be able to make murder a capital crime for fear that some would automatically claim a violation of the Establishment

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[439] *Alvarado*, 94 F.3d at 1229 (quoting Africa v. Pennsylvania, 662 F.2d 1025, 1035–36 (3d Cir. 1981)) (quotations omitted).

[440] *See* Rosenberg, *supra* note 11, at 658.

[441] *Accord* McLean v. Ark. Bd. of Ed., 529 F.Supp. 1255, 1265 n.20 (1982); *see also supra* note 295.

[442] 440 F. Supp. 1284 (D.N.J. 1977).

[443] *Id.* at 1322 n.23.

[444] *Id.* at 1323.

[445] *Id.* at 1322.

[446] *See id.*

[447] *See generally* Wallace v. Jaffree, 472 U.S. 38, 89 (1984) (Burger, C.J., dissenting) ("We have repeatedly cautioned that *Lemon* did not establish a rigid caliper capable of resolving every Establishment Clause issue, but that it only sought to provide 'signposts.' 'In each [Establishment Clause] case, the inquiry calls for line drawing. No fixed *per se* rule can be framed.'") (citation omitted).

Clause because such a law would "promote the Biblical command against killing [murder]."[448]

The Court has never determined that any idea that embraces the concept of an unnamed intelligent designer would automatically qualify as a religious belief, and it is doubtful that the Court will succumb to such shallow thinking. In this regard, one can find some tantalizing signals from *Edwards* that one might be able to craft a proposal that would survive constitutional scrutiny. For instance, in its desire to stamp out the presentation of "a particular religious belief,"[449] the Court stated that an alternate scientific theory to the theory of evolution could be taught if done with the secular interest of enhancing science education: "[*T*]*eaching 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."[450] Since everyone already understands that secular scientific theories can be introduced in the classroom, the Court's phraseology might well be interpreted as an indirect positive signal to a scientific theory, e.g., intelligent design, that had some religious tangential implications but was entered into the pedagogy with a secular intent only. Intelligent design literature certainly was in the public eye when *Edwards* was decided.

The only other part of *Edwards* that is useful is found in the section of text that amplifies why the Louisiana statute failed the first prong of the *Lemon* test. First, the Court said that "[t]he preeminent purpose of the Louisiana Legislature was clearly to advance the *religious viewpoint* that a supernatural being created humankind.[451] Second, the Court stated the "term 'creation science' . . . embodies the *religious belief* that a supernatural creator was responsible for the creation of humankind."[452] Clearly, these two sentences should be read with an emphasis on the religious aspect as predominating the discussion. Those who assert that these two passages should be interpreted to mean that any mention of an intelligent

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[448] *Wallace*, 472 U.S. at 70 (O'Connor, J., concurring). Definitional problems regarding the lawfulness of killing another human can be traced back to the biblical prohibition on this matter found in the Decalogue, which most English translations incorrectly render as: "Thou shalt not kill." *Exodus* 20:13 (King James); *Deuteronomy* 5:17 (King James). The correct translation into the English is: "Thou shalt not murder." *Exodus* 20:13; Deuteronomy 5:17. The Hebrew word for kill is not used in the prohibition. The Hebrew word that is used is *lo tirtzach* and "refers *only* to the criminal act of homicide, not [for example] taking the life of enemy soldiers in legitimate warfare." *See* R.B. THIEME, JR., FREEDOM THROUGH MILITARY VICTORY 50–51 (3d ed. 1996).

[449] Edwards v. Aguillard, 482 U.S. 578, 593 (1986) ("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.").

[450] *Id.* at 594 (emphasis added).

[451] *Id.* at 591 (emphasis added).

[452] *Id.* at 592 (emphasis added).

designer in a scientific theory automatically equates to a religious belief are reading far too much into the language.[453]

Paradoxically, those who entertain such a proposition—that any hint of an intelligent force in nature is impermissible—would find themselves inexorably painted into a very difficult philosophical and legal corner. For example, in *McLean*, the court's assertion that a sudden creation of the universe out of nothing "convey[ed] an inescapable religiosity", and that such a creation required a supernatural deity as found in Western religions,[454] would arguably rule out numerous so-called secular scientific theories, chief among them the "Big Bang" theory that essentially assumes that something came from "nothing."[455] As Justice Powell recalled in *Edwards*, "[a] decision respecting the subject matter to be taught in public schools does not violate the Establishment Clause simply because the material to be taught 'happens to coincide or harmonize with the tenets of some or all religions.'"[456]

Indeed, the currently popular "Out of Africa" theory[457] about the origin of mankind might be challenged as unconstitutional because it closely parallels the biblical version of the creation of mankind. Both accounts state that mankind came from a single line of individuals from somewhere on the African continent and then spread out across the globe giving rise to the various races of people. In

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[453] *Cf.* Rosenburg, *supra* note 11, at 621 ("Although no creationist will go so far as to name this designer God, most proponents of this theory [intelligent design] believe that the two are synonymous.").

[454] McLean v. Ark. Bd. of Ed., 529 F. Supp. 1255, 1265 (E.D. Ark. 1982).

[455] The big bang theory holds that an unknown singularity exploded and transformed itself into an ordered universe with fixed laws. *See* William Stoeger, *The Origin of the Universe in Science and Religion*, *in* COSMOS, BIOS, THEOS, *supra* note 164, at 254, 257 (explaining how science must accept the concept of something coming *ex nihilo*); *see also* Arthur S. Eddington, *The End of the World: From the Standpoint of Mathematical Physics*, 127 NATURE 447, 450 (1931) (lamenting the theological implications of the Big Bang.). *See generally* TIMOTHY FERRIS, THE WHOLE SHEBANG 17 (1997) (noting that "the big bang did not take place in pre-existing space; all space was embroiled *in* the big bang").

[456] *Edwards*, 482 U.S. at 605 (Powell, J., concurring) (quoting McGowan v. Maryland, 366 U.S. 420, 442 (1961)).

[457] The "Out of Africa" theory is rooted in various comparative studies focused on the mitochondrial DNA (mt-DNA) of various racial groups. The theory contends that the first humans independently appeared in Africa within the last 200,000 years from some unknown hominid ancestor dubbed "African Eve" and then quickly migrated to Europe, Asia, and across the globe where they now appear as races. *See, e.g.*, THE CAMBRIDGE ENCYCLOPEDIA OF HUMAN EVOLUTION 249 (Steve Jones et al. eds., 1992) ("Genetic evidence indicates that all living people are closely related and share a recent common ancestor who probably lived in Africa. From that African ancestral group, all the living peoples of the world originated.").

fact, the "Out of Africa" theory even goes so far as to call the first female "African Eve."[458]

It is unlikely that the Supreme Court will simply dismiss intelligent design as unconstitutional because it has some reference to an unnamed intelligent designer. The Court will certainly carefully measure intelligent design theory to see if it is "based" in a religious belief or advocates any particular religious belief.[459] No doubt, the Court will hear the argument that, taken at face value, the foundational pillars of intelligent design theory exhibit none of the traditional matters associated with a religious belief. There are no particular religious creeds, no religious pronouncements, no roots in any particular religious ideology, and no religious ritual. Dembski notes:

> [I]ntelligent design makes no claims about the origin or duration of the universe, is not committed to flood geology, can accommodate any degree of evolutionary change, does not prejudge how human beings arose and does not specify in advance the mode by which a designing intelligence brought the first organisms into being.[460]

Dembski's assessment is a powerful and compelling argument. Instead of trying to develop a detailed *Alvarado*-styled test for religion, a clear line of demarcation that may be helpful to the Court in fashioning a ruling is that all religious beliefs are ultimately matters of faith[461]—a system of perception or "[b]elief that does not rest on logical proof or material evidence."[462] If intelligent design theory is based on empiricism or rationalism—as it so strongly claims—and not faith, the idea should certainly qualify as scientific doctrine despite having a de minimus degree of religiosity.

After fully analyzing intelligent design theory, the Court may simply choose to parlay its emphatic position that the secular study of religious subjects may be taught in public schools into upholding the secular presentation of a scientific

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458 *See, e.g.*, JOHN H. RELETHFORD, GENETICS AND THE SEARCH FOR MODERN HUMAN ORIGINS 76–77, 79 (2001). *But see* HENRY H. HALLEY, HALLEY'S BIBLE HANDBOOK 24 (24th ed. 1965) (asserting that the location of the Garden of Eden was in southwest Asia).

459 *Edwards*, 482 U.S. at 607–08 (Powell, J., concurring) (noting that public school educators may use religious documents to facilitate course objectives so long as they are not used to "advance a particular religious belief").

460 DEMBSKI, *supra* note 401, at 252.

461 Thus, in mainstream Christianity the concept of faith (*pistis*) is used in the passive and active sense. Faith refers to what is believed and also to the mechanics of achieving salvation. *See, e.g.*, *John* 3:16 ("For God so loved the world, that He gave His only begotten Son, that whoever believes in Him should not perish, but have eternal life."); *Acts* 16:30, :31. In this passage of Acts, a Roman soldier asks Paul and Silas: "Sirs, what must I do to be saved?" *Acts* 16:30. Paul and Silas replied, "Believe in the Lord Jesus, and you shall be saved, you and your household." *Acts* 16: 31.

462 THE AMERICAN HERITAGE COLLEGE DICTIONARY, *supra* note 141, at 491.

doctrine that has religious implications.[463] Again, the same reasoning that prompts refusal to equate the theory of evolution with a religious belief, i.e., Secular Humanism[464] or evolutionism,[465] can easily be applied in refusing to link the study of intelligent design with a religious belief. Both ideas may have metaphysical or religious implications, but both are based on a scientific framework, not faith.

VI. THE ANTHROPIC PRINCIPLE

> The probability that life came about as a product of the random combination of chemicals in some evolutionary process would be as if I stood at this lectern and flipped a coin a billion billion times and it came up heads every time.[466]
>
> —Cyril A. Ponnamperuma (1923–1994)

Modern science has revealed a universe in which the earlier Newtonian principles[467] are vague shadows of the astonishing exactness and harmony of structure inherent in the universe.[468] The fact that mathematical formulas, both complex and simple, can be used to describe effectively the operation of almost everything now known in the physical universe indicates that things and forces operate on a stringent basis related to a set of well-defined laws.[469] Or, to put it another way, scientists discover the differential equations of physics only because

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[463] *See* Stone v. Graham, 449 U.S. 39, 42 (1980); Epperson v. Arkansas, 393 U.S. 97, 106 (1968); Sch. Dist. v. Schempp, 374 U.S. 203, 225 (1962).

[464] *See supra* note 182 and accompanying text.

[465] *See supra* notes 180–81 and accompanying text.

[466] Cyril A. Ponnamperuma, Address at the University of Maryland on cosmic evolution, (Aug. 1977) (on file with author). The author was a student under Dr. Ponnamperuma for one year. Although Dr. Ponnamperuma never made any other remarks about probability vis-à-vis cosmic evolution, the students understood the implication of his demonstration.

[467] *See* STEPHEN HAWKING, BLACK HOLES AND BABY UNIVERSES, at viii (1993). Astronomy's reigning theoretical genesis, Hawking credits Newton and Galileo with pointing the way to an understanding that the universe does "not behave in an arbitrary manner but [is] governed by precise mathematical laws." *Id.*

[468] *See id.* at 170. Commenting on what people may have gotten out of his popular best seller BLACK HOLES AND BABY UNIVERSES, Stephen Hawking noted: "They may not have finished it or have understood everything they read. But they have at least got the idea that we live in a universe governed by rational laws that we can discover and understand." *Id.*

[469] *See* PHILIP J. DAVIS & REUBEN HERSH, THE MATHEMATICAL EXPERIENCE 407 (1981). But why is mathematics so astonishingly effective at describing so much about the universe? It may be conceded that "these geometric figures and arithmetical functions and algebraic operators, are mysterious to us," but whether one is examining the design of the universe with its trillions of light years of space or the phenomenally ordered structure of an atom, everything has design, order, and law. *Id.* at 407.

they reflect the reality of an exact and ordered system in the universe.[470] All things everywhere[471]—from the action of subatomic particles in cellular biology to the impact of the sun's gravity on comets—function under a series of exacting laws generally referred to as either the laws of nature or the laws of physics.

A. *Scientific Axiom*

Conceptually, the most intriguing thing that science of the late twentieth century has shown us about life is that it could not exist unless the established laws of chemistry and physics were fine-tuned to a mathematical precision—that is, to state it kindly, highly improbable. This axiom is not just elemental, it is absolutely immutable. If life is to be, thousands of exact circumstances and uniquely balanced combinations of forces must perfectly fold together in an inconceivable series of highly restricted conditions. Not only do these fundamental constants include such basics of physics as the required energy of the Big Bang,[472] the force of gravity, the four perceptible dimensions of space-time, the relative masses of protons and neutrons in an atom, etc.; but they also relate (to a far lesser degree) to all of the more commonplace phenomena such as the

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[470] *See* HAWKING, *supra* note 467, at 18, 55, 101. Dealing with the world of subatomic reality, the mysteries of quantum physics seemingly contradict our common sense notion of how the universe works. To amplify this point, consider the law governing radioactivity relating to the utility of the carbon-14 dating test. The carbon-14 test refers to a dating system that allows technicians to predict that in a given amount of carbon an exact number of atoms will decay, or be cast off, in an exact amount of time. This law enables scientists to determine the approximate age of plants and animals long since dead by measuring the amount of carbon-14 remaining in the sample. Upon reflection this seems quite remarkable, for who or what determines which particular atom will disintegrate in the sample to maintain such a precise rate? That is, why will one atom dissipate instead of another identical atom, or, why will they not all dissipate together? *See* 2 PAUL A. TIPLER, PHYSICS 1003 (1987) ("The decay of any one nucleus is completely random; all we can say is that, on the average, half of some original matter of radioactive nuclei will decay, in one half-life, then half of those left will decay in the next half-life, etc.").

[471] Of all the assumptions that undergrid science, the most fundamental is the uniformity of nature—the assumption that the physical laws of the universe do not change and are the same everywhere. *But see, e.g.*, George Musser, *Inconstant Constants*, SCI. AM., Nov. 1998, at 24 (commenting on the speculation that the laws of physics were "slightly different billions of years ago").

[472] Dr. Steven Weinberg, a co-winner of the 1979 Nobel Prize for Physics, acknowledges that life "would be impossible if any one of several physical quantities had slightly different values." Steven Weinberg, *Life in the Universe*, SCI. AM., Oct. 1994, at 44, 49. Weinberg meticulously points out that if the energy of the Big Bang explosion were different by only one part in 10^{120}, or 1 in 1,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000, 000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000, 000,000,000, life would never have made an appearance. *Id.*

placement of Earth to the Sun, the unique properties of water, and so on.[473] In short, the universe, laws of nature, and Earth are perfectly calibrated for life's existence and tailor-made for the higher forms of living things, including humans. The scientific term used to describe this overpowering realization is called the Anthropic Principle.[474]

In his thought-provoking book *Cosmic Questions*, Richard Morris defines the Anthropic Principle as "[t]he principle which attempts to deduce certain facts about the universe from the fact that we exist and can perceive it."[475] In other words, focusing directly on the non-biological facts associated with the structure of our universe, the Anthropic Principle is really an objective and rational appraisal of what that means.

The focal point in assessing the Anthropic Principle is the recognition that many of the factors that are vital for life have little, if any, room for variance. Certainly, many of the primary Anthropic Principle factors must be astronomically precise. If any of a number of the fundamental forces of nature was changed by a fraction of a fraction, then atoms would not bind together, stars would not be born, and there would not be life on Earth.[476] Stating that "the list of numerical accidents that appear to be necessary for the observed world structure" is extremely long, Paul Davies adds:

> What impresses many scientists is not so much the fact that alterations in the values of the fundamental constants would change the structure of the physical world, but that the observed structure is remarkably sensitive to such alterations.

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[473] *See, e.g.*, ALAN HAYWARD, GOD IS 58–68 (1978).

[474] One of the first to articulate the Anthropic Principle in detail was astrophysicist Brandon Carter. *See* HAWKING, *supra* note 467, at 52–53, 56, 60–62, 66, 151; MILLER, *supra* note 179, at 228–32. *See generally* Roy Abraham Varghese, *Introduction*, *in* COSMOS, BIOS, THEOS, *supra* note 164, at 1, 21 (defining the Anthropic Principle as "the principle that attempts to explain the extraordinary array of cosmic coincidences that made human life possible in terms of a universe 'tailor made' for *Homo sapiens*"); FREEMAN DYSON, INFINITE IN ALL DIRECTIONS 296 (1988) (describing the Anthropic Principle as "illuminating").

[475] MORRIS, *supra* note 269, at 183.

[476] *See, e.g.*, PAUL DAVIES, THE ACCIDENTAL UNIVERSE, at vii (1982). Professor of Mathematical Physics at the University of Adelaide, Davies points out that the universe is orchestrated in a way that works directly for the benefit of humans. In the preface to his book *The Accidental Universe*, he states the following:

> More intriguing still, certain crucial structures, such as solar-type stars, depend for their characteristic features on wildly improbable numerical accidents that combine together fundamental constants from distinct branches of physics. And when one goes on to study cosmology—the overall structure . . . of the universe—incredulity mounts. Recent discoveries about the primeval cosmos oblige us to accept that the expanding universe has been set up in its motion with a cooperation of astonishing precision.

Id.

> Only a minute shift in the strengths of the forces brings about a drastic change in the structure.[477]

B. *Competing Interpretations of the Anthropic Principle*

Acknowledging the reality that the universe is uniquely structured to accommodate life, the logical implications of the Anthropic Principle are quite compelling because the serious thinker is immediately forced to one of two quite opposite conclusions. Is it simply a case of accidental luck that Earth and the myriad factors associated with the workings of the universe just happen to provide the perfect environment for life? Or, does the Anthropic Principle serve as a gigantic, galactic fingerprint revealing a superior directive force that transcends the limits of the physical universe? Scientists have recognized and hotly debated this split in opinion for the past thirty years.[478] As Hawking noted a decade ago: "It is now generally accepted that the universe evolves according to well-defined laws. These laws may have been ordained by God, but it seems that He does not intervene in the universe to break the laws."[479]

The former interpretation—which denies a place for a superior directive force—has spawned four major approaches, the most popular being the weak Anthropic Principle and the strong Anthropic Principle, with a few supporters preferring the participatory Anthropic Principle and the final Anthropic Principle. While it is important for the courts to have a working knowledge of these four interpretations of the Anthropic Principle, it is the latter interpretation—the superior directive force Anthropic Principle ("SDF")—that will require detailed judicial scrutiny because it acknowledges the existence of a superior supernatural being, i.e., God(s).

1. *Weak Anthropic Principle*

As stated, the weak Anthropic Principle is probably the largest of the four positions that seeks to explain the Anthropic Principle without reference to a superior directive force.[480] Proponents of the weak Anthropic Principle believe

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[477] DAVIES, *supra* note 147, at 188.

[478] *See* FRED HEEREN, SHOW ME GOD 233–252 (1997).

[479] HAWKING, *supra* note 467, at 98.

[480] *See* DAVIES, *supra* note 147, at 170. Davies correctly encapsulates the weak Anthropic Principle as follows:

> If you pick up a pebble on a beach at random, and carefully measure its size and shape you could correctly conclude that it was wildly improbable that you had selected a pebble of those exact dimensions. But you would not be justified in proceeding to claim it must have therefore been a miracle that you made the choice you did .... Such arguments carry no conviction *after the event.*

that the wildly improbable coincidences that underscore a life-friendly universe should simply be taken as brute facts since it is meaningless to entertain concepts of probability on an a posteriori basis.[481] Thus, the structure of the universe need elicit no particular amazement or surprise.[482] Advocates rely on what might be termed the "lucky Bill syndrome." Like Bill who wins the State lottery with a lucky purchase at the local grocery store, the odds may have been greatly against him when he purchased the ticket, but he did win the lottery with that particular ticket. "Therefore," weak Anthropic Principle supporters say, "we need not bother with calculating the probability associated with how or why Bill got so lucky; it is sufficient to realize that he did."

Critics of the weak Anthropic Principle counter that the Anthropic Principle is not about the unlikelihood of winning a single lottery as is implied in the argument.[483] It is about winning incredibly impossible individual lotteries not just once or twice, but over and over again.[484] Furthermore, to make matters even more complicated (i.e., improbable) none of the really big lotteries have any relationship to each other.[485] Thus, if Bill won the state lottery every month for

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Id.

[481] *See id.* at 170–71.

[482] *See id.*

[483] The concept of luck is subject to much confusion. One often observes luck in action, but seldom are probability calculations applied to quantify how lucky something might be. Since random events within the natural system are credited for the appearance of life, randomness can be evaluated through the mathematical concept of probability.

[484] *See supra* note 466 and accompanying text. Weinberg's mind-boggling estimate for the lottery of getting the exact amount of energy out of the Big Bang in order for our universe to exist is one part in 10^{120}. If one wished to write the number 10^{120} and used one sheet of paper for each number, the entire universe would fill up with paper long before accomplishing the task.

[485] *See* MARTIN REES, JUST SIX NUMBERS 1–4 (2001). Astronomer Royal Martin Rees of the Institute of Astronomy at Cambridge University lists six primary factors that he believes best highlight the absolute improbability that the universe is the product of random luck. Of Rees's six factors, two speak to basic forces, two relate to the size and texture of the universe, and two are concerned with the very properties inherent in space. He calls the six, "E," "N," "Ω," "λ," "Q," and "D." E regards the strength of the force that holds together atomic nuclei. N regards the strength of the forces that hold atoms together, divided by the force of gravity between them. Ω measures the relative force of gravity in an expanding universe. If Ω was stronger by only a tiny fraction, the universe would not expand; if Ω were weaker, no stars could have formed. λ stands for a newly discovered force that controls the expansion of the universe. Q signifies the phenomena of ripples in the universe that spawn the growth of planets and galaxies. Q's ratio is 1/100,000. If this figure were smaller, the universe would consist of lifeless gas; if Q were bigger, mass would have condensed into gigantic black holes. D is the number of dimensions in space-time. Rees further compounds the improbability of the existence of these factors by emphasizing that none of the six factors are dependent for their existence on any other factor. But for life to exist, all must precisely fold together. *See also* JOHN BARROW & FRANK J. TIPLER, THE ANTHROPIC COSMOLOGICAL PRINCIPLE (1986) (examining ten basic conditions for the existence of life and concluding that not even one could occur at random in the space of time allowed by the Big Bang).

fifty years in all of the States that held them, would the reasonable person be satisfied with his explanation that he just got lucky, or that it was simply a brute fact that needed no further inquiry?[486]

Philosopher John Leslie objects to the brute fact approach used in the weak Anthropic Principle.[487] Drawing an analogy from a person who survives a firing squad, he cautions against such perfunctory thinking.[488] Professor Rees restates Leslie's analogy: "Suppose you are in front of a firing squad, and they all miss. You could say, 'Well if they hadn't all missed, I wouldn't be here to worry about it.' But it is still something surprising, something that can't be easily explained. I think there is something there that needs explaining."[489] At a minimum, the position of brute force cannot be advocated without fully addressing the luck factor.

Hawking and his Cambridge colleague Barry Collins conceded in 1973 that "life could only exist in a universe where the galaxies were spewed out from the big bang at just the right rate to avoid re-collapse."[490] Or, to put it another way, at a point in time calculated at 10^{-43} seconds after the Big Bang (when the entire universe could easily pass through the eye of a microscopic needle) the fate of the life-bearing universe was set at this just right rate. And the probability for this just right rate? The two "found that the probability that this precise rate of expansion would be achieved was *zero*."[491] Gerald Schroeder, a former professor at the Massachusetts Institute of Technology, continues in this vein:

> We won at the choice for the strength of the strong nuclear force (which holds atomic nuclei together; were it a bit stronger the diproton and not hydrogen would be the major component of the universe, and no hydrogen means no shining stars). Other winning lotteries were . . . the strength of gravity . . . , the mass and energy of the big bang, the temperature of the big bang, the rate of expansion of the universe, and much more. Lottery upon lottery, and all winners.

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[486] *See* Brad Lemley, *Why is There Life?*, DISCOVER, Nov. 2000, at 64, 66 ("The exquisite order displayed by our scientific understanding of the physical world calls for the divine," contends Vera Kistiakowsky, a physicist at the Massachusetts Institute of Technology.").

[487] *See id.* at 66.

[488] *Cf.* DAVIES, *supra* note 147, at 170. Continuing with his analogy of the pebble, Davies argues that amazement would certainly follow if the selected pebble had turned out to be exactly spherical. "A sphere is a very special sort of shape with the property that it is mathematically highly regular. Even after the event the random selection of an exactly spherical pebble would be regarded as a remarkable circumstance deserving some sort of explanation." *Id.*

[489] Lemley, *supra* note 485, at 66.

[490] *See* HEEREN, *supra* note 478, at 236.

[491] *Id.* In short, anything that has a probability factor of greater than 10^{50} to 1 will never happen.

> They have meshed to produce the wonderful world in which we live. By chance? Not if our understanding of the laws of nature is even approximately correct.[492]

2. *Strong Anthropic Principle*

Recognizing that the probability factor is astronomically set against the weak Anthropic Principle, some rely on the strong Anthropic Principle (also known as the inflationary theory of existence)[493] to help increase the odds.[494] The strong Anthropic Principle argues that the Anthropic Principle is answered best by considering the possibility that our visible universe is but one of zillions of other invisible universes of which only this one was lucky enough to be configured to produce life.[495] Thus, while some of these other countless universes might resemble ours, most would be unrecognizable wrecks incapable of producing anything of consequence. According to cosmologist Andrei Linde of Stanford University, the inflationary theory speculates that there is not just one universe in existence, but an infinite and eternal number of bubbles, each containing its own separate universe.[496] Our universe may well be fine-tuned for life not because it was designed that way by an intelligent designer, but, "because even such a delicate arrangement was bound to happen in one of the myriad [universe] bubbles."[497] Unfortunately, the speculation that there are zillions of other universes is beyond the tools of human investigation and will remain forever in the realm of speculation.[498]

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[492] SCHROEDER, *supra* note 211, at 26.

[493] *See, e.g.*, FERRIS, *supra* note 455, at 299–302 (discussing the various versions of the anthropic principle to include the panuniversal speculations regarding multiple universes).

[494] The odds were extremely restricted with the acceptance of the expanding universe or big bang theory. Many scientists greeted the suggestion that the universe had a fixed beginning under the big bang theory with disdain. This was because a universe with a beginning opened the door to the concept of an independent Beginner or God. If nothing else, an expanding universe was a universe with a history; no longer could the matter of cause and effect be ignored as it had been under the restful universe theory and no longer was there an unlimited amount of time for things to happen. When first confronted with the idea of an expanding universe the famous British astrophysicist and agnostic Sir Arthur Eddington (1882–1944) disdained the theological implications. He wrote: "Philosophically, the notion of a beginning of the present order of Nature is repugnant to me. . . . I should like to find a genuine loophole." Eddington, *supra* note 455, at 450.

[495] For an excellent discussion of the strong Anthropic Principle, see HEEREN, *supra* note 478, at 233–68 (covering the various subgroupings of the strong Anthropic Principle to include the steady state theory first proposed by Fred Hoyle but later abandoned).

[496] *See* Gibbs, *supra* note 116, at 21.

[497] *Id.*

[498] *See* HEEREN, *supra* note 478, at 285.

3. *Participatory Anthropic Principle*

In contrast to the weak Anthropic Principle and the strong Anthropic Principle, the participatory Anthropic Principle and the final Anthropic Principle attract few followers in the scientific community. Acting as an adjunct view to the weak Anthropic Principle, the participatory Anthropic Principle simply holds that if the universe were not so perfectly established, one would not be here to comment on it.[499] In essence, our existence is used "to discount all improbabilities necessary for our existence."[500] In addition, the final Anthropic Principle is based on an existentialistic speculation that the most advanced forms of life could have evolved into a being with powers tantamount to a God who could then create things in the past.[501]

4. *SDF Anthropic Principle*

Finally, the SDF Anthropic Principle stands in direct contrast to all of the other interpretations and, to be sure, has had a profound influence on modern scientific thought. In addition, because it unabashedly advances the proposition that a superior being exists, the SDF Anthropic Principle position has attracted the most attention from the popular media.[502] The Court will not be able to miss the signposts, ranging from a 1998 cover of *Newsweek*, its title emblazoned: "SCIENCE FINDS GOD,"[503] to scores of recurring national seminars about religion and science.[504] For many, the existence of the universe's incredible harmony of function apart from the action of God is an absolutely improbable proposition.[505] This teleological argument is made even more attractive[506] since

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[499] *See* GEORGE GREENSTEIN, THE SYMBIOTIC UNIVERSE: LIFE AND MIND IN THE COSMOS 57–58, 83–84 (1988).

[500] HOYLE, *supra* note 167, at 31.

[501] *See* BARROW & TIPLER, *supra* note 485, at 659–60. John Barrow is an astronomer and Frank Tipler is a mathematical physicist.

[502] *See, e.g.*, Sharon Begley, *Science Finds God*, NEWSWEEK, July 20, 1998, at 46, 48.

[503] *Id.*

[504] David Grinspoon, *When I Heard the Learn'd Theologians*, ASTRONOMY, Dec. 1998, at 54, 55. For example, the conference on Science and the Spiritual Quest held first at the University of California (Berkeley) brings together cosmologists, biologists, computer scientists, and theologians on a recurring basis. *See id.*

[505] *See* Edward J. Larson & Larry Witham, *Scientists Still Keeping the Faith*, 386 NATURE 435, 435 (1997) (noting that 40% of scientists "believe in a personal God and an afterlife").

[506] *See, e.g.*, Gibbs, *supra* note 116, at 21. George Ellis, a cosmologist at the University of Cape Town, believes that the Anthropic Principle is nothing less than a huge database of information providing unequivocal proof of the existence of God. *See id.* Interestingly enough, Ellis was a one-time acknowledged atheist. Nevertheless, after Ellis became fully cognizant of the Anthropic Principle he reached the conclusion that God exists. *See id.* at 22.

each passing day rubricates that life cannot be sustained without the continuation of these perfect and stable conditions.[507] In *The Cosmic Blueprint*, Davies writes:

> The very fact that the universe *is* creative, and that the laws have permitted complex structures to emerge and develop to the point of consciousness—in other words, that the universe has organized its own self-awareness—is for me powerful evidence that there is "something going on" behind it all. The impression of design is overwhelming.[508]

A growing number of scientists have found themselves intellectually obliged to pay serious consideration to the SDF Anthropic Principle.[509] In fact, far from regarding science and the existence of a superior directive force as antithetical, there is actually a significant cadre of scientists[510] who contend that empirical scientific discoveries offer a far surer proof of the existence of God than any faith-based religious approach ever could.[511] Hoyle thought that those who rejected the SDF Anthropic Principle—which he believed was self-evident—did so for psychological rather than for scientific reasons: "The theory that life was assembled by intelligence has, we believe, a probability vastly higher than one part in $10^{40,000}$ [this figure is Hoyle's estimate for the proper proteins forming at random from the proper combination of amino acids]."[512] Hoyle also remarked:

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[507] *See* HAWKING, *supra* note 467, at 99. Even Hawking is forced to exclaim, "What is it that breathes fire into the equations [the precise laws of nature] and makes a universe for them to govern?" *Id.* Physicists may someday discover a unified theory that governs all of physical reality, but, as Hawking suggests, they will never be able to explain what actualizes the laws in a real cosmos. *Id.* at 91; *see also* PETER A. BUCKY, THE PRIVATE ALBERT EINSTEIN 86 (1992) Albert Einstein considered the matter of God as revealed by the order of the universe. "In essence, my religion consists of a humble adoration for this illimitable superior spirit that reveals itself in the slight details that we are able to perceive with our frail and feeble minds." *Id.*

[508] PAUL DAVIES, THE COSMIC BLUEPRINT 203 (1988).

[509] *See* HAWKING, *supra* note 467, at 85 ("The problem of the origin of the universe is a bit like the old question: Which came first, the chicken or the egg? In other words, what agency created the universe, and what created that agency?").

[510] One of the largest such organizations is the American Scientific Affiliation ("ASA"). *See supra* note 180. There is also a similar Canadian organization called the Canadian Scientific & Christian Affiliation ("CSCA"). *See* The Canadian Scientific and Christian Affiliation, *at* www.csca.ca/about.html (last visited Dec. 21, 2002). CSCA's mission "is to integrate, communicate, and facilitate properly researched science and biblical theology in service to the Church and the scientific community. CSCA members have confidence that such integration is not only possible, but is necessary to an adequate understanding of God and his creation." *Id.*

[511] *See* DAVIES, *supra* note 147, at ix. "It may seem bizarre," he writes, "but in my opinion science offers a surer path to God than religion." *Id.* Davies also asks: "Is it easier to believe in a cosmic designer than the multiplicity of universes necessary to make the weak Anthropic Principle work?" *Id.* at 189.

[512] *See* HOYLE & WICKRAMASINGHE, *supra* note 400, at 130.

"Indeed, such a theory [SDF Anthropic Principle] is so obvious that one wonders why it is not widely accepted as being self-evident. The reasons are psychological rather than scientific."[513]

In an extremely profound book published in 1992, aptly entitled *Cosmos, Bios, Theos*, sixty eminent scientists, twenty-four Nobel prizewinners among them, each gave their professional opinions on the universe, life, and God.[514] The co-editor, Yale physicist Henry Margenau, summed up the general consensus when he wrote: "What is the origin of the laws of nature? For this I can find only one convincing answer: they are created by God, and God is omnipotent and omniscient."[515]

C. *Compromising the Debate*

The Anthropic Principle is perhaps the only common ground that will ever be found in the evolution/creation controversy. If the Court ultimately finds that the Anthropic Principle does not run afoul of the Establishment Clause, then it will likely base that opinion on six primary lines of reason.

First, the doctrine is recognized as a legitimate scientific axiom within the scientific community. In contrast to the small number of scientists who adhere to the intelligent design theory, the vast majority of scientists recognize the Anthropic Principle as a valid scientific concept.

Second, the Anthropic Principle is consistent with all scientific experiments. Unlike Fundamentalist creationism, the doctrine does not require the scientific community to be in error.

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[513] *See id.* at book jacket (concluding "that the complexity of terrestrial life cannot have been caused by a sequence of random events but must have come from some greater cosmic intelligence"); *see also* HORGAN, *supra* note 174, at 109–10. When asked about his views on a supernatural being as the driving force, Hoyle remarked, "That's the way I look on God. It is a fix, but how it's being fixed I don't know." *Id.* (internal quotations omitted).

[514] *See supra* note 164. The title is in Greek. The English translation would be *Heaven, Life, God.*

[515] Henry Margenau, *The Laws of Nature are Created by God, in* COSMOS, BIOS, THEOS, *supra* note 164, at 57, 61; *see also* SCHROEDER, *supra* note 214, at 25. The SDF Anthropic Principle presents so powerful an argument that physicist Gerald Schroeder described how his study of science led him away from atheism and to a belief in God because, in his words, the "universe looks like a put-up job." *Id.* at 26. Schroeder explained:

> For years I had been on that adversary's team. As a scientist trained at Massachusetts Institute of Technology I was convinced I had the information to exclude Him—or is it Her?—from the grand scheme of life. But with each step forward in the unfolding mystery of the cosmos, a subtle yet pervading ingenuity, a contingency kept shining through, a contingency that joins all aspects of existence together into a coherent unity.

Id. at 25.

Third, the doctrine is firmly rooted in empiricism. The Anthropic Principle is not an idea born or based on faith, but rather on an interpretation of empirical data gathered from a diverse number of scientific disciplines. Similar to the claim of intelligent design theory, the conclusion that the structure of the universe is the product of intelligent design flows naturally from the hard quantifiable data itself and not from sectarian religious dogma.[516]

Fourth, the Anthropic Principle primarily deals with investigating the things and forces that make up the non-living aspects of the universe. While the SDF Anthropic Principle certainly makes evolutionism untenable as a philosophy, it does not necessarily rule out the validity of the theory of evolution at the biological level.[517] The Anthropic Principle simply looks at the universe as the platform for biological life.

Fifth, unlike intelligent design theory or, for that matter, the theory of evolution, the Anthropic Principle is not dogmatic in what it requires as a logical conclusion, even if the primary interpretation is clearly tied to a recognition of God(s). Indeed, the Anthropic Principle has at least four major interpretations as to what it means—three of them naturalistic and only one supernatural. Undoubtedly, for some scientists the Anthropic Principle is the sine qua non in the search for the meaning of life, but accepting the existence of a non-naturalistic force should not be viewed under an Establishment Clause as a religious belief or a doctrine that advances a particular religious belief. Again, the Anthropic Principle itself has none of the trappings of religion and makes absolutely no pronouncements about who or what He, She, or It[518] may be.[519]

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[516] *See* BEHE, *supra* note 96, at 193 ("Inferring that biological systems were designed by an intelligent agent . . . requires no new principles of logic or science. It comes simply from the hard work that biochemistry has done over the past forty years . . . .").

[517] *See, e.g.*, Peloza v. Capistrano Unified Sch. Dist. 37 F.3d 517, 521 (9th Cir. 1994) ("'*Evolution*' and '*evolutionism*' define a biological concept: higher life forms evolve from lower ones. The concept has nothing to do with *how* the universe was created; it has nothing to do with whether or not there is a divine Creator . . . .").

[518] HOYLE & WICKRAMASINGHE, *supra* note 400, at 51–67 (chapter four is entitled "Life in Space and its Arrival on Earth").

[519] Even if one takes the Anthropic Principle to confirm the presence of God, the Anthropic Principle has little to offer concerning the character of God. As an analogy, although not allowed into the kitchen of a restaurant, one would quickly conclude that a directive force (read an intelligent person) created a seven-course meal served to them. The empirical circumstantial evidence for a chef may be clear. (Anyone who suggested that the chocolate cheesecake came about as a quantum fluctuation would be asked to leave the table!) Nevertheless, unless the chef comes out from the kitchen and reveals himself or herself, the eater can only comment on the quality of the meal. Professor Walter E. Thirring, Director of the Institute for Theoretical Physics and Professor at the University of Vienna, wrote:

> I think that scientists who devote their lives to exploring the *harmonia mundi* (harmonious working of the universe) cannot help seeing in it some divine plan. So the question is not so much whether they believe in the existence of God but what kind of

Finally, the objection so often heard regarding intelligent design—that adherents are impermissibly religiously motivated even if the concept is not religious-based—is not applicable to the Anthropic Principle. At best, atheists and non-atheists alike can only trace the origins of the Anthropic Principle to the middle of the twentieth century and since that time it has received wide recognition.[520] The Anthropic Principle has none of the so-called religious baggage some associate with the roots of the intelligent design movement.[521]

VII. CONCLUSION

> The kind of science that deserves to be defended isn't afraid to meet criticism with its own methods: reasoned argument, precise definitions, repeatable experiments, and an open mind about all questions that can't be settled by unbiased scientific testing.[522]
>
> —Phillip Johnson

In a law review article on teaching non-naturalistic scientific theories, Professor H. Wayne House offers a chart to compare better the mutual exclusivity of evolution and creationism.[523] Along those lines, and in terms of clarity and constitutional relevance, one might chart the primary elements of intelligent design and the Anthropic Principle as follows:

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notions they connect with this word and with what attributes they would like to endow him.

Walter E. Thirring, *The Guidance of Evolution Lets God Appear to Us in Many Guises*, *in* COSMOS, BIOS, THEOS, *supra* note 164, at 119, 119.

[520] *See* DEMBSKI, *supra* note 401, at 264–68.

[521] *Cf.* Reule, *supra* note 11, at 2603 (calling for a new analysis of the Establishment Clause in light of religious biases within different scientific theories, including intelligent design).

[522] JOHNSON, *supra* note 234, at 83.

[523] *See* House, *supra* note 12, at 392:

Evolution	*Creation*
Humanism	Theism
Naturalism	Supernaturalism
Nature	God
Impersonal Force	Personal being
Chance	Design
Mediterranean cosmologies	Hebrew Scriptures
Man as animal	Man as image of God
Relative truth	Absolute Truth
Amoral or non-moral	Moral law of Creator

Id.

Intelligent Design	*Anthropic Principle*
Pertains primarily to life sciences	Pertains to the non-living universe
Minority view in scientific community	Accepted by scientific community
Based on empirical evidence	Based on empirical evidence
One interpretation: Intelligent Designer	Several competing interpretations
Some roots in Creationism by adherents	No roots in any religious belief
Does not use religion to critique science	Does not use religion to critique science

In the past two decades there have been a wealth of books and articles from scientists and layman who have thoughtfully challenged the efficacy of the theory of evolution to explain numerous aspects of the life sciences. Some of these new ideas, such as punctuated equilibrium, have received attention in public science classrooms, but others, such as intelligent design theory, have been greeted with great consternation by some due to the perceived religious implications. While many of the objections to the theory of evolution and the theory of intelligent design are well-reasoned and worthy of continued discussion, the matter of concern from a legal perspective has little to do with weighing the validity of competing pedagogical ideas; it has everything to do with determining whether any of them violate constitutional proscriptions regarding the establishment of religion (or hostility to religion) by a state institution.[524]

School districts have the responsibility to maximize the comprehensiveness of science instruction in a way that does not violate the Establishment Clause. Again, the most convincing argument that proponents of intelligent design theory make is that just as the theory of evolution should be viewed in its proper place—as a working scientific concept and not as the central linchpin to a metaphysical philosophy antagonistic to God—so too should intelligent design theory be viewed—as a working scientific concept and not as an a priori belief designed to promote belief in any specific concept of God(s). Exposing students to a scientific regime that reveals that life is rubricated with clear and convincing evidence of irreducible complexity should not constitute a violation of the Establishment Clause. If the goal of science is to provide the very best approximation of truth, then intelligent design should at least be offered to students in a heuristic methodology.

While the case can certainly be made that the United States Supreme Court may allow some tailored version of intelligent design theory to be presented in the public science classroom, it is far more likely that the scientific idea known as the

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[524] *See* Davis, *supra* note 15, at 221 (arguing that even creationism can be taught if it is not used to "achieve a religious objective"); Kissam, *supra* note 18, at 606. Kissam believes that a pedagogically neutral stance can be achieved in part by presenting classes on "subjects such as the 'theories of our origins.'" *Id.* "Contemporary scientific theories could be presented together with religious . . . theories of our origins." *Id.* at 606.

Anthropic Principle will be allowed entrée. Because the Anthropic Principle is a recognized scientific doctrine that offers the student a number of competing conclusions to the accumulated scientific data—only one of them being the existence of an undefined supernatural being—the Anthropic Principle does not endorse or establish a religious belief in violation of the Establishment Clause.

Unfortunately, the history of the evolution/creation controversy has produced intransigency in both camps and has cast a pall of "guilt by association" over both the intelligent design theory and the Anthropic Principle. Accordingly, retrenchment in thinking about what our children can and cannot learn will not occur until the Court addresses the new theories of science and provides definitive guidance in defining science and religion.[525] In the interim, science educators who wish to engage their students in these new and exciting areas of thinking will probably be forced, like Professor Ponnamperuma, to simply flip coins and smile (a simple, yet effective technique).[526]

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[525] *See, e.g.*, Villarreal, *supra* note 349, at 373–74 (1988). This critique of has been made since the *Edwards* opinion in 1987.

[526] *See* Ponnamperuma, *supra* note 466.