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Evolution and Intelligent Design in Biology Curricula: Secular Science in a Multicultural Public Education System

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2005-2006
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ABSTRACT

Science and religion tend to provide conflicting explanations for natural phenomena, such as the origin of man, as they rely on different epistemological foundations. In the United States, the government is required to maintain a secular presence, while acknowledging and protecting individuals and minority groups of varying faiths and cultures. This becomes problematic as the provision of primary goods by the federal government necessarily implies that the institutions representing these goods must remain secular, whilst not impeding upon cultural and individual rights. Due to the heterogeneous nature of the U.S. populace, it would be impossible to provide a perfectly multicultural representation of the entire variety of beliefs and values in the public schools. Therefore, the system must adopt a set of criteria by why to justify the inclusion of various curricular components in public education, keeping in mind that the federal funding necessarily requires secularism. Thus, it stands to reason that the public schools should offer a range of subjects that apply to a citizen's daily life and academic/vocational potential, accurately representing each of the disciplines. By this rationale, the sciences must be represented in a secular (non-sectarian) manner, presented as scientific theory (not as universal truth), and taught in adherence to the discipline, excluding any representation of supernatural explanations for natural phenomena.

INTRODUCTION

The liberal democratic ideology of the United States often is associated with a long-standing commitment to a multicultural public sphere within which citizens may acknowledge their personal identity or culture when engaging in civil discourse and the democratic process. In contrast, the US Government must maintain a secular presence in the public sphere, whilst not infringing upon the private sphere of individuals' personal lives and liberties. The exact nature of secularism in the U.S. has been a malleable concept since the framing of the Constitution, and each legal case from the Scopes trial to *Kitzmiller v. Dover Area School District* modifies legal precedent as it is guided by society's ever-changing view of the division between the public and private dimensions of citizenship. Because law is a human construct, it fluctuates with the developments of society as well as human innovation and discovery; constantly struggling between change and conservatism.

Because there are no cultural convictions that are held more dearly than those of faith, some of the greatest tensions arise when the state endorses education of the citizenry in a way that some feel may threaten their faith or that of their children. This is evident in the ongoing battle for control over public education curricula, and the conflict between the empirical sciences and faith-based knowledge. This controversy compels us to question what we as a nation endorse in the way of 'knowledge,' and to what standards we hold our citizenry in terms of education. Furthermore, we are then forced to justify the value of education in the biological sciences, not by claiming the value of knowledge itself, but in terms of preparing a labor-force for competition in the global economy. The United States is one of the few industrialized nations that does not

have a centralized policy on academic standards and curricula, and as a matter of public policy, this controversy between Creationists and scientists pressures the state not only to determine the value of knowledge, and what the federal and state governments can legitimately endorse, but also how to make exceptions in the name of cultural preservation and the liberties of citizens.

SECTION 1: SCIENCE AND RELIGION

A fundamental understanding of the relationship between Western science and religion is necessary in approaching the modern conflict between Creationists and science education in U.S. public schools. The first divide between these two modes of knowing originated most clearly with Copernican heliocentrism, which contradicts Psalms 93, 104, and Ecclesiastes 1:5 as they speak of the movement of the celestial bodies, and as stated in Psalm 93, "the world also is stablished, that it cannot be moved." Christian literalists originally interpreted Ecclesiastes 1:5, "he sun also ariseth, and the sun goeth down, and hasteth to his place where he arose" to mean that the sun rose and set about the earth. Copernicus's heliocentrism was further defended by Galileo Galalei, for which he would spend the last 9 years of his life under house arrest. Newton would further defend these principles with mathematical proofs.

Discoveries in physics, however, would not offend the church nearly as much as the geological dating of the age of the earth, the origin and divergence of species, and the descent of man. Heliocentrism may contradict vaguely addressed issues of celestial motion, though many Christians do not necessarily consider the Psalms and Ecclesiastes to be divinely inspired, whereas the account of the creation in Genesis is generally considered to be divinely inspired. For this reason, the age of the earth, the fixity of species, and the special creation of man in God's image are especially threatened by radiocarbon dating, the expanse of geological time, principles of inheritance and natural selection, and most significantly, the evolution of man from other species in the animal kingdom.

Underlying each of these contradictions is the distinction between science and religion as two different modes of knowing. Religious knowledge can be based on faith, belief in the supernatural, revelation, and divine inspiration, whereas scientific knowledge values empirical observation and objective verifiable analysis as valid modes of describing the physical world. Though these two modes of knowing are fundamentally different approaches to the process of human enquiry, some feel that they need not necessarily conflict. In *Rock of Ages,* Stephen Jay Gould, claims that the two can peacefully coexist through the 'non-overlapping magisterial' or NOMA, which holds that scientific inquiry and religious faith deal with entirely different aspects of human understanding, and if approached thus, will not conflict (Gould, 1999). Yet another dimension must be recognized, as religious sentiments towards science vary depending on an individual's interpretation of religious texts. The most literal interpretations, of course, find the most conflict with science.

Thus interpretation of these two modes of knowing becomes a question of methodology. If the method of interpretation for a religious text is entirely subjective, then in this particular inquiry regarding science and religion, the only religious interpretations that apply are those that claim that the creation of life on earth in its various forms occurred at the hand of a supernatural being. Within this subset of the vast array of religious interpretations, there exist a number of variances and nuances ranging from Puritan Christianity to theistic Intelligent Design. The crucial distinction that these must have in common is a necessary disagreement with the role of genetic inheritance, mutation, drift, and natural selection as the primary controlling factors in the descent of various life forms, speciation, and the evolution of man from other orders of primates. These methods of religious interpretation instead cite a supernatural force as controlling the physical

world, thus creating the crucial differentiation between religious creationism and the scientific method of explaining evolutionary phenomena in the physical world. Though science alone strives to achieve objectivity, both modes of knowing are the product of human subjectivity, though the scientific method is designed to reduce and if at all possible, eliminate human subjectivity.

> "The peculiar notion that science utilizes pure and unbiased observation as the only and ultimate method for discovering nature's truth, operate as the foundational (and, I would argue, rather pernicious) myth of my profession. Scientists could not so approach the world even if we justly so desired—for, as the distinguished philosopher of science N. R. Hanson once remarked, 'the cloven hoofprint of theory' necessarily intrudes upon any scheme of observation. So must it be, and so should it be—for how could we ever discern a pattern, or see anything coherent, amid an infinitude of potential perceptions, unless we employed some theoretical expectation to guide or penetration of this plethora. Bias cannot be equated with the existence of a preference; rather, bias should be defined as our unwillingness to abandon these preferences (or at least to challenge them further and rigorously) when nature seems to say 'no' to our explicit searches and tests." (Gould, 2002, p. 34)

Gould continues, citing the necessarily element of human subjectivity even in the most objective of scientific enquiries, as it is required that the scientist discerns between useful knowledge and data collection and that which does not contribute toward some discovery or collection of relevant information.

> "Thoughtful scientists have always recognized both the philosophical necessity and the practical advantages of observations made to test theoretical preferences, rather than promiscuously recorded as random items of a mindless list. In one of my favorite 'great quotations,' Charles Darwin wrote to a close colleague about the myth of 'objective' recording: 'How odd it is that anyone should not see that all observation must be for or against some view if it is to be of any service." (Gould, 2002, p. 35)

The philosophical foundation for science as a discipline and the scientific method is rooted in the Empirical and Rational traditions. Sir Francis Bacon was among the first to establish a method of science which he describes in *Novum Organum*, a response to Aristotle's *Organum,* wherein Bacon sought to replace the Aristotelian emphasis on deductive reasoning with inductive reasoning based on empirical observation (Appleman, 2001, p. 258). The Baconian method was further developed by the natural philosophers, including John Herschel who emphasized the necessity of the *vera causa*[1], or causation, in *The Study of Natural Philosophy* (1830). Scottish empiricist philosopher, David Hume, further addressed scientific epistemology through induction. In *An Inquiry Concerning Human Understanding* (1828) Hume addresses the human tendency to hastily assume patterns of events to indicate causation, which cannot be proved conclusively simply through deductive or inductive reasoning, making it impossible for us to make truth-claims. Hume's criticism of the use of induction makes the critical distinction between a practical and logical necessity, and sets the foundation for scientific knowledge as never being put forth as ultimate truth, but as scientific theory, which is both verifiable and potentially falsifiable, and after a multitude of testing remains to be disproven. These fundamental principles of the scientific method would come into common use in the late 18th and early 19th centuries.

Some of the most prominent scientific discoveries of the late 18th and early 19th centuries were made by geologists. In the late 1700's, William Smith made the first observations leading to the discovery of the *index fossil concept*, a comparative dating technique that would be used by Smith's student and nephew, John Phillips, to estimate the earth's age at 96 million years. This was a radically different assertion than the estimates of Anglican clergyman Dr. John Lightfoot

[1] *Vera Causa*: Latin, "true cause."

in the 17th century, who had determined the creation as occurring in October of 4004 BCE, a date that Bishop John Ussher would later confirm. This would be one of the first grounds on which the majority of the scientific community would agree upon empirical 'knowledge' that would contradict a literal reading of the Book of Genesis. The turn of the century saw geologists and other natural scientists moving away from the concept of Catastrophism, and towards Uniformitarianism under the influence of geologist James Hutton and the developments of Charles Lyell. Of the natural historians, the Catastrophists believed that the Earth was formed by a rapidly occurring series of catastrophic events. The Uniformitarian geologists, led primarily by Hutton, believed that the Earth was created over millions of years, through a generally gradual natural processes. Still, Hutton did not venture far from the church, and maintained that science was the study of 'divine natural design.' Instead it was Lyell and Cuvier who took distinct steps away from the literal word of Genesis to establish science as an explanatory method. Lyell and Hutton saw the geological processes as primarily cyclical—one of sedimentation and uplift—rather than linear as Biblical scholars suggested.

Though Lyell, Hutton, and Cuvier were religious men, the establishment of their theories of the geological process signified a dramatic paradigmatic shift[2] in the scientific world, away from the search for understanding of divine creation, towards the exploration of the natural world, its forces and its principles. It was under the influence of the publications of Hutton and Lyell that geologist Charles Darwin adopted the Uniformitarian concept of geological time. Lyell's *Principles of Geology, Volumes 1 & 2*, were especially influential in guiding Darwin's experience on the H.M.S. Beagle, as he made the first observations pertaining to the awesome

[2] Karl Popper developed the use of the phrase 'paradigmatic shift' as it applies to the natural sciences, and the tendency for revolutions or great shifts in scientific thought to be initiated by leaps in scientific discovery, thus causing developments in science to move at a variable pace.

force of nature, and the vast expanses of time over which change occurs in the natural world, which were essential in the development of his theory of evolution by inheritance and 'natural selection.'

The most influential scientific development of the 19th century was the 1859 publication of Darwin's *On the Origin of Species by Means of Natural Selection.* Not only did the text challenge the fixity of species with the concept of speciation, but it also discussed inheritance and mutability of traits, as well as posited that man's origins could be found in the animal kingdom, a notion that contradicted the Biblical version of man being a special creation in God's image. Perhaps more significantly, many interpreted it as a challenge to the supremacy of God's rule over the animal kingdom. The publication drew upon the works of British demographer[3] Thomas Malthus and geologist Charles Lyell to suggest that populations could split, homogenize, or even diversify in their exhibition of phenotypes (and genotypes) based on the pressures of environmental conditions. Thus, one species could eventually produce a second species, and that the second group could be distinguished by their inability to produce fertile offspring with members of the first group. Darwin's publication of his theories on natural selection was prompted by the proposed publication of the less extensive theories of his contemporary, Alfred Russell Wallace. Though the text was received with interest not only by the scientific community, but also by the general public, there was much upset over Darwin's challenge to the fixity of species and the descent of man 'from a lower order.' Almost immediately, there were criticisms from the more learned members of the religious community, among whom theologian Charles Hodge even ventured so far as to accuse Darwin of denying the existence of God (and indeed Darwin was not a religious man).

[3] Thomas Malthus practiced what would now be called the study of 'political economy.'

Well aware of the implications of the publication of his theories on evolution by natural selection, Darwin waited 23 years after his return from the famous voyage on the HMS Beagle to publish his works, prompted at last by the potential of Wallace publishing his works before Darwin and receiving the majority of the credit for the idea, making Darwin a simple bulwark. The 1859 publication of *On the Origin of Species* received a surprisingly tumultuous response, not only from Darwin's scientific colleagues and predecessors, but also from society at large. The concept of evolution, or change over time, was more widely accepted by the general public than that of natural selection. From the scientific community, Darwin received mixed reactions on the basis of his use of the Herschelean Hypothesis Method. Herschel himself responded negatively to the publication, most likely on religious grounds, and in a letter to Lyell, Darwin wrote: "I have heard, by a round-about channel, that Herschel says my book 'is the law of higgledy-piggeldy.' What this exactly means I do not know, but it is evidently very contemptuous. If true this is a great blow and discouragement." (*Life and Letters*, 1859.) The most common criticism of Darwin's work was his use of induction, for though he made decent use of the Method of Hypothesis, the only end to which this could be done was that of discovery rather than that of proof, something that Darwin recognized as owing to the current lack of technology and information (Appleman, 1999, p. 260). Indeed, Darwin's theory of evolution would become more definitively supported with access to genetic evidence, as the mechanism of inheritance, genetic drift, and mutation, the technology for the discovery of which yet evaded the Victorian scientists. Due to Darwin's ill health, his colleague Thomas Huxley carried out the majority of the public defense of his work.

Roughly a century after Darwin's publication of the *Origin*, history of sciences scholar Thomas Kuhn initiated the usage of the phrase 'paradigmatic shift' to refer to the revolutions in scientific thought brought about by sudden developments in science and technology. Lyell and Hutton's groundbreaking publications on geological time and forces, as well as Malthus' publications on population and the concept of 'carrying capacity'[4], were just the kind of framework to induce the paradigmatic shift necessary for the development of Darwinian evolution. Because these shifts and the developments that they incur can often be swift and dramatic, the translation of such developments to the general public can often be arduous, and likened by Gould to 'birth-pangs.' In the history of the natural sciences, such events require a great deal of public adjustment, as former explanations and understandings of the natural world, such as religious worldviews, must either oppose, or find reconciliation with scientific discovery. Such was the case of the reception of Darwinian evolution in the early United States.

In the United States, much opposition was felt towards Darwin's theory of evolution, which is best understood as a product of the religious environment, especially in the Southern United States. In the early to mid-19th Century, evangelicalism distinguished itself as reactionary to social change and the corruption of popular culture. Among the primary components of evangelicalism was the notion that the literal word of the Bible should be applied to all aspects of life, and thus the movement has been characterized by the perceived threat of cultural modernity, and social movements or general change that contradicts literal Biblical interpretation. For this reason, the evangelical movement of the Southern United States became especially strong towards the end of the 19th Century, and through the 20th Century, in reaction to the

[4] A phrase of recent origin, though not used by Malthus, which embodies the essence of his contribution to science and the development of the concept of evolution by natural selection.

developments of the Industrial Revolution, and the cultural byproducts that accompanied the growth of large industrial cities.

Accompanying the massive Westward expansion that the US experienced in the 1800's, a market for geological land surveyors developed, which also translated into university positions in the natural sciences. With this transition, US 'natural philosophers' were shifted towards the natural sciences as a profession. With this increased focus on the sciences, the latest scientific developments, such as Darwin's evolutionary theory, moved into the public realm, and in some places was introduced into public education curricula. The evangelical response to scientific progress was positive when it was presented as technological progress, but negative when it contradicted the Bible. Evangelists felt threatened by Darwinian evolution not only because it denied the fixity of species, but primarily because of the implications of natural selection. In the coming century, evangelicals would even venture to use eugenics as an example of the negative outcomes of Darwinian evolution. This strong 'moral' reaction to the social implications of evolution was projected into the public sphere by evangelists attempting to influence public policy on the basis of their moral convictions. Thus the contention extended out of the private spheres of science and religion and into the public sphere of public policy.

SECTION 2: SEPARATION OF CHURCH AND STATE

'Separation of church and state' is a fundamental component of the United States federal interaction within the public sphere. To understand the true nature of secularism in the United States, it is necessary to overview the religious influences in the country's history. This ranges from the earliest schism in the Catholic Church to the emergence of the Evangelical reactionary movement in the American South. Only within this context can one begin to discuss the antievolutionary sentiment that arose in the early-20th Century South, which is crucial to an explanation of the phenomenon of creationism still being taught in federally funded schools in the 'Bible Belt' states.

The influences to the current notion of secularism in the United States can be traced as far back as the schism in the Roman Catholic Church that produced Protestantism. The influence of Martin Luther, and later of John Calvin, were essential in the formation of Protestantism, which sought a less traditional, more democratized version of Christianity, with a stronger focus on the individual's experience and conscience; something that didn't require the papal authority as a medium. This reduction of Catholic authority greatly influenced the early American republic, which would embrace democracy and distrust the authoritarian Catholic presence in Europe. The early republic had experienced subjection to the Anglican Church, and as a reaction sought to arrange a system of government that would not endorse or require the public funding of a particular Christian sect. The framers of the Constitution sought to establish a government that would act as a secular arbiter and not interfere with the liberties of the diverse array of Christian sects present in the early republic.

Prior to the American Revolution, the republic was subject to the authority of the Anglican Church, which was governmentally sanctioned and funded. Following the revolution, Thomas Jefferson personally oversaw the passage of a bill 'Establishing Religious Freedom' which remonstrates religious subjugation, stating that:

> "...The impious presumption of legislators and rulers, civil as well as ecclesiastical, who, being themselves but fallible and uninspired men, have assumed dominion over the faith of others, setting up their own opinions and modes of thinking as the only true and infallible, and as such endeavoring to impose them on others, hath established and maintained false religions over the greatest part of the world and through all time: That to compel a man to furnish contributions of money for the propagation of opinions which he disbelieves and abhors, is sinful and tyrannical..." (Jefferson, Bill Establishing Religious Freedom, 1779)

Because of the pervasive presence of the Anglican Church in early American government, it was particularly important to revolutionaries to eliminate this facet of the English influence. Thus, the original subtext of the First Amendment Establishment Clause was the freedom of the individual to practice whatever form of Christianity he pleased. Jefferson in particular saw one's faith as being a very private matter between 'a man and his god', and as a rationalist, personally chose a deistic approach which held that religion could be approached and understood through reason. For this reason, Jefferson even published his own interpretation of the Bible in which he eliminated the mention of all things beyond reason, including angels, the miracles, and the resurrection of Christ. The text approached Christianity as the ideal moral philosophy. Thus, in 1802, when Jefferson wrote those eternal words: 'a wall of separation' to a Baptist congregation that had complained of harassment by the Virginia State Legislature, he envisioned a state in which the realm of faith and a man's personal experience with Christianity was a private matter,

whereas the public realm of state and government would function independently, concerning itself only with those matters which pertained directly to the public, secular sphere.

The Age of Enlightenment and the French Revolution crucially influenced Thomas Jefferson's belief in the value of a secular state. The concept of the separation of public and private was especially important with the dawn of the 19th century, as the French sought to establish independence from the era of the *Ancien Regime*, which had been characterized by the monarchy of King Louis XVI and the French Roman Catholic Church. Upon the establishment of the National Constituent Assembly, actions were taken to make the church subservient to the government, as the church had previously held great influence over the policy of the French monarch. The influence of the Enlightenment and French Revolution on Jefferson's interpretation of the concept of separation of church and state was paramount, and led to a more salient interpretation of the Establishment Clause than the American Republic's original understanding of the First Amendment. The French adopted a stricter division of church and state, extending secularism beyond the government to the public sphere, implying public neutrality to private culture. This concept is embodied in the term *laicité*[5]. Today, the concept of *laicité* is prominent in French culture, where any display of religious identity is prohibited in schools, a controversy that closely parallels that of religion in American schools.

[5] The term *laicité* is originally derived from the Greek word λαϊκός meaning secular, and later the term *laity*, which refers to the populace exclusive of the Catholic clergy. The French government exercises laicité by separating itself from religious influence and affiliation, as well as allowing for the free exercise of religion so long as it does not interfere with the secular public sphere or extend its influence into policy. The essence of laicité is captured in the notion that state law is held above religious law, and that a citizen must separate his loyalties into that which is private (religion), and that which is public, or the duties of a citizen to his state and fellow citizens. This has engendered a deep conflict between the massive Islamic, and the nationalistic French secularists, as one of the fundamental tenets of Islam holds that no law is higher than the law of Islam.

Americans have a different notion of the separation of the public and the private spheres, and unlike the French, religion is a prominent factor in American politics and often serves as the moral foundation for public policy. Some attribute this to the fact that the U.S. never experienced the debilitating religious wars that the majority of Europe did, thus leading American liberalism to be more accommodating to multiculturalism, and more specifically, religion (Dionne, 2005). Jefferson, on the other hand, made such a point of keeping his faith sequestered away in his private life, that he was often accused by his political adversaries and by the press of atheism. Jefferson so strongly believed in the separation of a man's public and private life that he stated in his Bill for Establishing Religious Freedom "that to compel a man to furnish contributions of money for the propagation of opinions which he disbelieves and abhors, is sinful and tyrannical..." In context, this quote refers to a man's right to refrain from the funding of a church, even if it is his own, not only for fear that it may propagate opinions that are not his own, but also with the reasoning that the religion and government should be two distinct aspects of the human experience, and that the marriage of the two inevitably corrupts the other. The same values and reasoning apply to the use of public tax dollars in the funding of public education, as it is a form of indoctrination. One may assume that few men would 'abhor' a basic education, and surely there are exceptions, but Jefferson firmly believed in the dangers of a non-secular state, and would respect religious freedom while, as an Enlightenment rationalist, still arguing for a secular education.

Since the ratification of the U.S. Constitution and Bill of Rights, some adjustment has occurred in our interpretation of these liberties, as demonstrated by the amendments, and time has seen a general shift away from the revolutionary emphasis on negative liberties, towards one including

an array of positive liberties and social liberalism. Our national *zeitgeist* of defiant individualism has additionally developed a notion of individual righteousness. Thus the American 'national idea' has developed into the acceptance of multicultural identity in the public sphere, yet where the government is held to a different standard; expected to account for cultural diversity while maintaining a secular presence. American secularism thereby protects individual liberties while promoting cultural rights. "Yes, liberalism has always included a strong strain of secularism, a proper wariness about the abuses of religious authority, and a particular fear of the Catholic Church. 'Rationalism' was seen as the enemy of 'obscurantism,' 'reason' the antithesis of 'faith.' The separation of church and state was an important liberal victory for freedom of conscience—even if it is forgotten, that disestablishment was a cause pursued with passion by devout believers loyal to denominations that found themselves in the minority." (EJ Dionne, Jr., 2005, p.1) Dionne's interpretation of the role of faith in the American political environment is indicative of the U.S.'s unique liberal democracy, wherein the citizen is entitled to the expression of their private identity in the public sphere, yet the government must remain secular, while respecting individual and cultural rights, and acting to some degree as a disinterested procedural republic.

SECTION 3: CREATION/EVOLUTION CONTROVERSY IN US PUBLIC EDUCATION

The United States saw little publicity of Darwin's theories on evolution, save for the efforts of Asa Gray to publish and reconcile the *Origin* with Protestantism. The evangelical movement in the U.S. was particularly unreceptive to Darwin's science, and saw it as yet another social corruption thrown in the way of humanity's path to 'perfection.' The Protestant reaction to massive social change occurring around the dawning of the 20th century culminated in evangelical movement in the Southern United States. Many Evangelical Churches blamed social problems on the decline of church attendance, which was then attributed to the prevalence of scientific materialism. Of course, control over education and science curriculum became the crux of the debate. It is for this reason that anti-evolution conflicts first started to appear in the Southern states in the 1920s. The American Civil Liberties Union (ACLU) was quick to respond to Tennessee's anti-evolution legislation, recognizing it as being in violation of the Establishment Clause of the First Amendment (Nelkin, 1982, p. 31). According to Dorothy Nelkin's 1982 publication on the origin of the conflict, "Evolution was not their only target. The revolt against science also included attempts to prescribe by law that pi should be changed from 3.1416 to 3.000, partly because it was simple to use, party because the Bible described Solomon's vase as three times as far around as across." Here it becomes apparent that the debate is not one of scientific knowledge, but of political power: of control over public education and curricula.

With the publication of Darwin's *Origin of Species* in the 19th century, as well as the spread of other ideas that contradicted the Bible, the American public began to react by passing legislation

to prohibit the teaching of certain facets of science, though primarily evolution, in the public classroom. Tennessee farmer John Washington Butler (for whom the Butler Act is named) often is quoted as saying: "No I did not know anything about evolution when I introduced it [the act]. I'd read in the papers that boys and girls were coming home from school and telling their fathers and mothers that the Bible was all nonsense." Butler was so moved by the fear that his own children could be turned to atheism by exposure to evolutionary theories, that in 1922 he ran for a seat in the Tennessee House of Representatives on the platform of the preservation of Christian morals, and prevention of the allocation of tax-payers' dollars to fund the education of their children in matters that the local public did not approve of. When the 1925 Butler Act was passed in Tennessee, 15 US States had already passed laws against the teaching of evolution in public schools, many through the influence of anti-evolutionist William Jennings Bryan. Before the bill was passed by the Senate on March 10th, one opposing senator attempted to amend the bill to include a clause to "...prohibit the teaching that the earth is round..." though his sarcasm was not appreciated, and the bill passed 24-6.

The American Civil Liberties Union offered then, as it does now, to test, as a violation of the First Amendment Establishment Clause, any case in which creationism is used in public school curricula, and emphasized this offer upon the passing of the Butler Act. In Dayton, Tennessee, George Rappelyea, a modernist Methodist brought attention to the ACLU's offer at the local drugstore, pitching it to the town as an opportunity for business and publicity. The offer was accepted by John T. Scopes, a high school football coach who had substitute-taught a science course, after being convinced of the cause by town leaders in Dayton. In truth, the trial was essentially manufactured for the publicity to bolster the town's economy, which had atrophied

due to the population decreasing by over a third since the 1890's. In court, however, the ACLU claimed that the issue was one of the violation of the First Amendment. For the prosecution, however, the issue was not the validity of the scientific theory, but rather the social implications of what was a commonly held misperception of evolution as a 'monism[6].' The textbook in question, Hunter's Civic Biology, was written by eugenics researcher Charles Davenport, and contained a passage discussing methods to prevent the interbreeding of "such lowly and degenerate races" as the mentally infirm. Accusations ensued of evolution supporting such ideas as eugenics, communism, and fascism. The ACLU originally volunteered attorneys Arthur Garfield Hays and Dudley Field Malone, but the task was later adopted by renowned attorney Clarence Darrow. Lead prosecutor William Jennings Bryant seized upon the opportunity to recognize Darrow's successful defense of two teen murderers by the following statement:

> "...Terrible crime was inherent in his organism, and it came from some ancestor ... Is any blame attached because somebody took Nietzsche's philosophy seriously and fashioned his life upon it? ... It is hardly fair to hang a 19–year–old boy for the philosophy that was taught him at the university."

After the original argument that anti-evolutionary legislation was in violation of the First Amendment failed to gain any traction with the court, Darrow changed his tactic to argue that evolution needn't necessarily be contradictory to the Biblical tradition. On July 21, 1925, in Rhea Country Courthouse, Justice John T. Ralston found Scopes guilty of unlawfully teaching evolution, refusing to accept Darrow's arguments. Darrow attempted to have the case appealed to a higher court, and the court set aside the appeal on the technicality that the judge was errant in deciding the fine, a decision that should have been made by the jury. There has since been

[6] Monism is the metaphysical notion that a single unifying principle or group of principles can be universally applied as an explanatory method for understanding reality.

much speculation about whether or not the precedent would have been altered if the case had been allowed to advance to the Supreme Court.

At the time of the decision on Scopes, evangelical-inspired antievolutionary legislation was in place in Oklahoma, Florida, Tennessee, and Georgia. Directly ensuing the trial, 18 bills would be introduced in 14 states, and in overall in the 1920's, 37 bills would be introduced in 20 states, though it must be noted that many of these never made it out of committee hearings. Following the Scopes trial, the evangelical crusade against evolution was temporarily pacified, and later distracted by the depression and then World War II. In the meantime, many Southern, especially rural areas banned evolution from textbooks and curricula, and according to Zabilka, a rift developed between fundamentalists and non-fundamentalists. Non-fundamentalists formed the post WWII Evangelical movement headed by Billy Graham, Carl F.H. Henry and others who made attempts, as Asa Gray had made less than a century earlier, to reconcile science, and in particular the biological sciences, to Evangelical Protestantism.

Three years after the Scopes trial, Arkansas passed legislation to prohibit the teaching of evolution in any public school; secondary and post-secondary. This was not overturned until the mid-1960s when secretary to the Arkansas Education Association, Forrest Rozzell called for it to be challenged. The challenge was accepted by a high school biology teacher, Susan Epperson, who personally taught a theistic interpretation of scientific evolution. In the Arkansas State Supreme Court, Justice Abe Fortas delivered the unanimous opinion of the court, reversing the Arkansas state law, stating that "Plainly, the law is contrary to the mandate of the First, and in violation of the Fourteenth, Amendment to the Constitution." (Epperson v. Arkansas, 393 U.S.

97) In the coming years, a number of cases would be taken up to challenge the latest creationist tactic, which was the term 'creation sciences' as a Trojan horse for creationism in the science classroom.[7]

With the failure of 'creation science' legislation by the late 1980s, creationists were forced to look for another way to prevent evolution from being taught in public schools. Miraculously, the Discovery Institute was founded in 1990 in Seattle, Washington, by Seattle politician Bruce Chapman, antifeminist[8]/antievolutionist George Gilder, and natural historian and theologian Stephen C. Meyer. The Discovery Foundation is a non-profit educational organization which receives its funding through private donations. The group was originally founded as a branch of the Hudson Institute, another Christian 'think-tank' based in Indianapolis. The Discovery Institute is recognized by its strong opposition to evolution, and what it (errantly) calls 'scientific materialism.' Scientific materialism has become a pejorative term for naturalism, and what creationists misperceive to be the rationalist, *materialism* of science, a worldview that creationists fear is being propagated through the guise of secularism. These creationists oppose both rationalism and materialism on the grounds that neither allows room for supernatural explanations for natural phenomena. The term *scientific materialism* has been popularized by the Discovery Institute and other proponents of creationism, despite its misinterpretation of

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[7] The following cases are listed on the National Center for Science Education website as crucial decisions in the history of the evolution/creationism conflict in public education: 1981, in *Segraves v. State of California,* State Supreme Court, // 1982, in *McLean v. Arkansas Board of Education*, U.S. Federal Court, // 1987, in *Edwards v. Aguillard*, the U.S. Supreme Court, // 1990, in *Webster v. New Lenox School District*, the Seventh Circuit Court of Appeals // 1997, in *Freiler v. Tangipahoa Parish Board of Education*, the United States District Court for the Eastern District of Louisiana, // 2000, District Court Judge Bernard E. Borene dismissed the case of *Rodney LeVake v Independent School District 656, et al.* (Order Granting Defendants' Motion for Summary Judgment and Memorandum, Court File Nr. CX-99-793, District Court for the Third Judicial District of the State of Minnesota [2000]).

[8] Gilder is the author of four anti-feminist books: *Sexual Suicide*, *Naked Nomads*, *Visible Man*, and *Men and Marriage.*

established language in the disciplines of philosophy and science. Because of legal precedent and Constitutional law, the Discovery Institute has been forced to play within the rules of secularism and rationalism in their policy extensions, and has attempted to do so with the initiation of the Intelligent Design movement.

According to the mission statement of the Discovery Institute, the concept of Intelligent Design holds "...that certain features of the universe and of living things are best explained by an intelligent cause, not an undirected process such as natural selection." Proponents of Intelligent Design generally tend to believe in change over time, but believe that the *irreducible complexity* of life's many organisms lends proof to the notion that life as it exists on earth is too complex to have been created by the forces of nature in the form of natural selection, and that instead, the complex organisms on earth were necessarily created by an intelligent being. Intelligent Design does not seek to reinstate the fixity of species, but rather to reanalyze the mechanisms that allow for speciation and the origin of life.[9]

The intent of the development of the Intelligent Design movement is best described in a document, referred to by the Discovery Institute as the *Wedge Document*[10], a strategic outline that was inadvertently leaked to the public, and was the subsequent cause of much embarrassment for the program, disproving their non-denominational claims. In this document, the purpose of the *Wedge Strategy* is described in the first paragraph as, "To defeat scientific materialism and its destructive moral, cultural, and political legacies; to replace materialistic

[9] Because Intelligent Design is still an underdeveloped theory, as stated by the Discovery Institute, there is no certain unifying statement to define the concept, and so the above definition is a summation of all that I have read.

[10] The complete text of the Wedge Document is included in the Appendix.

explanations with the theistic understanding that nature and human beings are created by God." More specifically, the Wedge Strategy is intended to win over a portion of liberal Christians and Christian scientists (the majority of whom are physicist) who would not otherwise be inclined to have evolution removed from science curricula.

The Discovery Institute has since abandoned the use of the term *Wedge Strategy*. This is specified by William Dembski's October 2002 address: "...the Wedge metaphor has outlived its usefulness. Indeed, with ID critics like Barbara Forrest and Paul Gross writing books like *Evolution and the Wedge of Intelligent Design: The Trojan Horse Strategy*, the wedge metaphor has even become a liability." (Dembski, Keynote Address at *RAPID* Conference, 25 October 2002) Since the release of the *Wedge Document*, the strategy of the Discovery Institute has changed to what it calls the 'Teach the Controversy' campaign, wherein educators are encouraged to tell students that evolution is 'only a theory' and that Intelligent Design offers a comparable explanation of life on earth. President George W. Bush has aligned himself with the 'Teach the Controversy' campaign, despite criticism that suggests that the campaign is not only aligned with a particular religious group, but also entirely non-secular and therefore unconstitutional. Bush is quoted as stating,

> "Both sides ought to be properly taught—so people can understand what the debate is about.—Part of education is to expose people to different schools of thought. You're asking me whether or not people ought to be exposed to different ideas, and the answer is yes." (Baker, Slevin, Washington Post 2005)

The primary concern of the scientific community regarding the 'Teach the Controversy' campaign is that this discussion of 'the controversy' is intended to occur in the science

classroom. From a secular perspective, the controversy is not a scientific matter but a cultural matter, a science classroom is not the proper forum to discuss this political clash. Because 'Teach the Controversy' refers specifically to Intelligent Design, it must be asked whether or not Intelligent Design is indeed a scientific theory, and if it is, whether or not it is tested and verifiable to the degree that evolution and natural selection are. Because the fundamental tenet of Intelligent Design is the existence of a supernatural force that manipulates and coerces events in the physical world, it is neither verifiable nor falsifiable in science or in philosophy, and therefore cannot and should not be considered science. Furthermore, because Intelligent Design is predicated on a supernatural foundation, whether or not it is exclusively Christian, thereby making it necessarily unscientific, and furthermore non-secular, thus making it unconstitutional as a component of public education biology curricula.

Despite the appeal of Intelligent Design as a supernatural theory, it comes nowhere near to being an accredited scientific theory. This is the crucial problem with the 'Teach the Controversy' campaign, which would open doors to conservative states to teach both evolution and creation (in the form of Intelligent Design) as equally valid scientific theories, and which would force science teachers to present an unscientific creation theory that has just as much of a place in a Science classroom as the creation theory of the *Flying Spaghetti Monster*[11] faith. The Flying Spaghetti Monster a parody religion, founded in 2005 by student Bobby Henderson in response to the decision of the Kansas State Board of Education to teach Intelligent Design as an alternative scientific theory in the biological sciences. Though most accept this religion as a political device, it is philosophically no more or less valid than any other creation theory that is

[11] More information regarding Bobby Henderson and Flying Spaghetti Monsterism, including the response from the Kansas State Board of Education, can be found at: http://www.venganza.org.

not based upon empirical evidence, and relies on a supernatural explanation for events in the physical world. The point demonstrated by this parallel is that a supernatural explanation for secular phenomena differs entirely from the components required of a scientific theory.

Because science strives to remain objective and avoid a priori assumptions, no scientific theory or even law is considered a fact, due to the empirical skepticism that tells us that even the law of gravity is not absolutely known, and that it is not absolutely impossible that we could one day be surprised by some exception to the law. Intelligent Design, on the other hand, begins with an absolute, a priori assumption that is not empirically observable or testable, and then seeks to build a scientific basis for this theory. This ultimate subjectivity is exactly what the scientific method and science as a discipline are both designed to avoid, because of the inherent tendency for such assumptions to yield a fallacy. It is for this reason that United States Justices have outlawed the teaching of Intelligent Design in the public science curriculum, as the a priori assumption of a supernatural being is quite obviously a product of the evangelical base of the Discovery Institute. One of the foremost writers on Intelligent Design, Stephen C. Meyer of the Discovery Institute released a discussion paper titled, *The Scientific Status of Intelligent Design: The Methodological Equivalence of Naturalistic and Non-Naturalistic Origins Theories* during which he states:

> "This may seem all very pointless, but that in a way is just the point. As Laudan has argued, the question whether a theory is scientific is really a red herring. What we want to know is not whether a theory is scientific but whether a theory is true or false, well confirmed or not, worthy of our belief or not. One can not decide the truth of a theory or the warrant for believing a theory to be true by applying a set of abstract criteria that purport to tell in advance how all good scientific theories are constructed or what they will in general look like." (Meyer, 2005)

By this account, science aside, the value of a theory is whether or not it is true, 'well-confirmed,' and worthy of belief. First, a theory that is neither falsifiable nor verifiable cannot be determined as true or false. Secondly, 'well-confirmed' is entirely vague, but the majority of experts on issues of biology would agree that evolution by natural selection is well-confirmed, whereas the peer-reviewed academic or scientific defenses of Intelligent Design remain to be seen in publication. Finally, Meyer attempts to pin the debate as one that is either worthy or not worthy of belief. The rhetoric of 'belief' invokes the foundationalist/anti-foundationalist debate, requiring that justification of a belief requires that it either be true, or based on values that are justified, making the argument circular, which finally supports Meyers statement that this does in fact seem all very pointless. If his statement is indeed indicative of the position of the Intelligent Design movement, then Intelligent Design is by definition not appropriate for the science classroom.

If, however, Intelligent Design still wishes to pursue the title of 'scientific theory,' then we must assess it as such, as well as the implications of presenting it as a scientific theory equal to that of evolution in the public biology classroom. In response to the Intelligent Design movement and the opinion that both concepts should be taught in the science classroom, the National Science Teachers Association (NSTA) has released the following statement to clarify the common misconception of what it means to be a *scientific theory*:

> "Science is a method of explaining the natural world. It assumes that anything that can be observed or measured is amenable to scientific investigation. Science also assumes that the universe operates according to regularities that can be discovered

> and understood through scientific investigations.[12] The testing of various explanations of natural phenomena for their consistency with empirical data is an essential part of the methodology of science. Explanations that are not consistent with empirical evidence or cannot be tested empirically are not a part of science. As a result, explanations of natural phenomena that are not based on evidence but on myths, personal beliefs, religious values, and superstitions are not scientific. Furthermore, because science is limited to explaining natural phenomena through the use of empirical evidence, it cannot provide religious or ultimate explanations." (NSTA Position Statement: *The Teaching of Evolution*, 2003.)

The Discovery Institute saw its first opportunity to test the legality of Intelligent Design in the fall of 2005, in Dover, Pennsylvania. *Kitzmiller v. Dover Area School District* was the first court case in which a local board of education has been tried for the curricular imposition of Intelligent Design as an alternative to the scientific theory of evolution. The ACLU filed the case on December 14th, 2004, when eleven parents of the Dover School District objected to a decision by the local school board to include a disclaimer in science textbooks that would misleadingly present Intelligent Design as a theory of equal scientific validity to evolution. The prosecution team was led by the Pennsylvania ACLU, Americans United for Separation of Church and State, and Pepper Hamilton. The defense was represented by the Thomas Moore Law Center; whose motto is "Defending the Religious Freedom of Christians."[13]

The conflict first arose in the Summer of 2004 when Dover school board members were in the process of reviewing a new biology textbook which the chair of the curriculum committee, Bill Buckingham, refused to support, stating that the book was, "laced with Darwinism" and that, "its inexcusable to teach from a book that says man descended from apes and monkeys." (Chapman p. 55) Buckingham and the president of the school board, Alan Bonsell, continued to pursue a

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[12] Hume's 'Treatise on Human Nature' (1739-40) Published posthumously by Bobbs-Merrill Co., c1955 in Indianapolis.

[13] The choice of the Thomas Moore Law Center as the defense was a curious move in the case of the supposedly non-denominational Intelligent Design movement.

creationist agenda until the tactic was altered to instead promote Intelligent Design, and the two requested that *Of Pandas and People*[14] be introduced to add some balance to the science curriculum. When this was voted-down, Buckingham discreetly asked his church for donations to purchase 60 copies of *Of Pandas and People,* which were later donated anonymously to the school by Allan Bonsell's father.[15] The Dover Board of Education compromised, deciding that as of January of 2005, students in 9th grade biology classes would be read the following disclaimer:

> "The Pennsylvania Academic Standards require students to learn about Darwin's theory of evolution and eventually to take a standardized test of which evolution is a part. Because Darwin's Theory is a theory, it is still being tested as new evidence is discovered. The Theory is not a fact. Gaps in the Theory exist for which there is no evidence. A theory is defined as a well-tested explanation that unifies a broad range of observations. Intelligent design is an explanation of the origin of life that differs from Darwin's view. The reference book, *Of Pandas and People,* is available for students to see if they would like to explore this view in an effort to gain an understanding of what intelligent design actually involves. As is true with any theory, students are encouraged to keep an open mind. The school leaves the discussion of the origins of life to individual students and their families. As a standards-driven district, class instruction focuses upon preparing students to achieve proficiency on standards-based assessments." (Justice Jones, 2005)

On December 20 2005, the Bush-appointed Justice Jones submitted his opinion, stating "The overwhelming evidence at trial established that ID is a religious view, a mere re-labeling of creationism, and not a scientific theory." (Justice Jones, 2005) This decision is not only significant for the citizens of Dover, Pennsylvania, but will most likely be a concrete precedent in matters of Intelligent Design and public education, due largely to the defendants' Christian

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[14] An Intelligent Design textbook by Percival Davis and Dean H. Kenyon, and published by the Foundation for Thought and Ethics, a group whose purpose was stated as "promoting and publishing textbooks presenting a *Christian* perspective," according to its Internal Revenue Service tax exemption submission.

[15] Both Bonsell and Buckingham lied under oath regarding the transaction, though Buckingham later admitted to this, and both he and school board member Heather Geesey, who also lied regarding the transaction, still face the possible charge of perjury, as stated by Justice Jones in his opinion: "It is so ironic that several of these individuals who so staunchly and proudly touted their religious convictions in public, would time and again lie to cover their tracks and disguise the real purpose behind the ID policy."

affiliations and their representation by the Thomas More Law Center, but more importantly because of the unscientific nature of a supernatural theory of the origin of species. Despite its origins in the Christian Discovery Institute, the Intelligent Design movement was intended to be entirely vague on the subject of the 'intelligent designer,' taking great care not to give the public any reason to think that this anonymous 'intelligent designer' was in fact the Christian God. Unfortunately for the Discovery Institute, the combination of the Wedge Document and the Dover trials did exactly this, marking Intelligent Design as a predominantly Christian movement having little if anything to do with science.

The public attention brought to the situation surrounding *Kitzmiller v. Dover Area School District* has opened discussion, not only of Intelligent Design, but also of the magnitude to which locally elected individuals can influence public education. The primary concern surrounding this particular case is the degree to which Bill Buckingham was in fact unqualified for the very influential position that he was holding. As a biblical literalist and former police officer, it would seem entirely inapproriate that Buckingham had been given the directorship over the development of the public education curriculum. Surprisingly enough, and certainly it was to the Dover populace, which swiftly voted Buckingham out of office following the filing of the suit, Buckingham had taken it upon himself to make uninformed decisions as to the legitimacy of the scientific method, and had attempted to impose his personal religious beliefs on an entire school district. On the other hand, this situation is the perfect example of the function and power of local democratic election, which compels the citizen to ask himself whether or not a majority-rule decision of the *demos* is always what is best for society, or whether such important decisions

as curricular content should be left to specialists in education and in the particular academic fields in question.

SECTION 4: MULTICULTURALISM AND PUBLIC EDUCATION

It is crucial not to dismiss *Kitzmiller v. Dover Area School District* simply as a test of the scientific integrity of Intelligent Design when the implications of the matter reach deep into the heart of liberal democratic citizenship and multiculturalism. The true nature of the conflict is not a disagreement among scientists, but a struggle in the politics of recognition that challenges our notion of citizenship and the role of the individual's private culture in the interactions between the citizen and the secular governmental institution. As citizens, Americans agree to relinquish certain rights to the governing system in exchange for positive liberties. Among the positive liberties are the primary goods that a liberal democracy is expected to provide for its populace. In Amy Gutmann's introduction to *Multiculturalism*, these primary goods are listed as "income, health care, education, religious freedom, freedom of conscience, speech, press, and association, due process, the right to vote, and the right to hold public office." (Taylor, 1994, p. 4) In exchange for these rights, the citizen must agree to a 'neutral' foundation of secularism on the part of these governmental institutions, and as the basis for interactions that occur within the public sphere. As stated by Gutmann:

> "An important strand of contemporary liberalism ... suggests that our lack of identification with institutions that serve public purposes, the impersonality of public institutions is the price that citizens should be willing to pay for living in a society that treats us all as equals, regardless of our particular ethnic, religious, racial or sexual identities." (Taylor, 1994, p.4)

However, another perspective would include cultural autonomy and preservation as a fundamental primary good, on which the government must protect as one of the foremost negative liberties of US citizens. For this reason, the problem arises where some citizens are

forced to make greater compromises than others, because the 'neutral' secular foundation is still a subjective worldview, and may conflict more with some individual's identities than others'. Then the question must be posed of whether the liberal democracy should approach citizens as equals under the law, or whether it should adopt a position of recognizing the individual influence upon each citizen in deciding how policy should adapt to inherent inequality.

Michael Walzer likens the first universalistic approach to liberalism to the current notion of 'separation of church and state' where the government views religion as residing purely in the private realm, and therefore generally does not acknowledge religious variances in the application of policy. Walzer characterizes the second type of liberalism as "...a state committed to the survival and flourishing of a particular nation, culture, or religion, or of a (limited) set of nations, cultures, and religions—so long as the basic rights of citizens who have different commitments or no such commitments at all are protected." (Taylor, 1994, p. 99) Gutmann summarizes the three basic tenets for Walzer's second strand of liberalism as:

1) the basic rights of all citizens—including freedom of speech, thought, religion, and association—must be protected,
2) no one is manipulated (and of course not coerced) into accepting the cultural values that are represented by public institutions, and
3) the public officials and institutions that make cultural choices are democratically accountable, not only in principle but also in practice.

In a homogenous nation-state, it is not difficult to justify the designation of certain national values, including the preservation of national culture. In a markedly heterogeneous state, however, the survival of individual cultures and individual identities can no-longer be a value propagated by the state through the establishment of national cultural values. Instead, the state

must attempt to create 'equal opportunity' and protection under the law, and in the same way that the homogenous state espoused set cultural values to preserve the national identity, the heterogeneous state must espouse cultural relativism, diversity, and tolerance. In the United States, this objective has become apparent in public education, as locally elected school boards are encouraged to tailor the curricula to best fit their local cultural niche, within constitutional limits, and subject to public review.

Local control over public education has been an integral component of states' rights ever since the Civil War when Abraham Lincoln granted curricular control to the rejoined Confederate States, though the federal government maintained a commitment to the assistance in funding of public schools. For this reason, public education is beholden to the Federal Constitution, and importantly, the Establishment Clause of the First Amendment to the Constitution. Thus, as extensions of the US Government, all federally funded public schools must act as secular institutions. Still, state school boards and locally elected school district board members have the authority to make curricular decisions. The implications of such a system are noticed in court cases such as *Kitzmiller v. Dover Area School District*, as locally elected board members may exert their own influence over curricular interpretation, and often aren't academically qualified to make qualitative judgments of the validity of different curricular components. Still, the process is more democratic even if it sacrifices the academic rigor and adherence to a discipline, such as biology.

The localization of curricular control is a more democratic form of multicultural liberalism, whereby local groups can incorporate their own cultural identity into the public curriculum. If a

local minority feels that the Establishment clause is violated by the curricular impositions of the community, the ACLU will lobby to reverse the decision. This version of liberal democracy is aligned with Walzer's second version of liberalism, so long as the curricular content is presented as somewhat subjective, and students are not manipulated or coerced into admitting or believing that the particular paradigm presented is a truth. It is also necessary that the school be held accountable for its curriculum, and the right of the student or resident of a particular school district petition within the school system or to a court of law to challenge the legality of the material. On the other hand, a nationally endorsed system of basic curricular content would be more closely tied to Walzer's first version of liberalism, which does not require the educational institution to account for multiculturalism as a way of presupposing equality of access and opportunity. National academic standards would necessarily be entirely secular and more concerned with adherence to the disciplines. National academic standards would not take into account the private identity of the individual, emphasizing equality by not allowing for special recognition of a particular culture or interest group.

Multicultural power struggles over the content of public education curricula have caused some to question the justification for biological evolution, and other non-religious concepts to be propagated at the expense of tax-paying citizens. Thus, the establishment of secular academic standards requires a justification of what material is to be included. Curricular theory can be divided into two modes of justification. The first is what Gutmann calls the 'essentialists' who believe in a more traditional Western notion of the essential components of a liberal education. In opposition to this mode of thought are those who argue for a more modern interpretation of Western social and intellectual history and culture, through a 'deconstructionist' interpretation of

the importance of non-traditional influences such as women and non-Western culture (Gutmann, *Multiculturalism*, p. 13) According to Gutmann, however,

> "Taken seriously, on its own terms, the deconstructionist defense of a more multicultural curriculum itself appears as an assertion of political power in the name of the exploited and oppressed, rather than as an intellectually defenseable reform." (Taylor, 1994, p. 20)

Though these theories are intended to apply at the post-secondary education level, the same theories of justification can be used to consider the traditional secondary education curriculum. The multicultural perspective on curriculum, when applied to the natural sciences, poses a threat to the integrity of public education. Because the hard sciences are intentionally objective and not subjective, it would be quite the task to 'deconstruct' science to incorporate a multicultural perspective. One of the main complaints against essentialist education in public schools is that in addition to potentially disagreeing with an individual's beliefs, the US has laws establishing education as compulsory until a certain age. The positive liberty of education, however, is necessarily secular, lest it violate the First Amendment, and the willingness of the citizen to participate in a secular public sphere is implicit in the social contract of citizenry in the United States. Compulsory secular education is one of the keystones of liberal democracy as it effectively reduces class stratification, prepares the citizen for interaction within the public socio-political sphere, and prepares the US labor force to act competitively on a global scale.

Upon establishing the value inherent in a secular liberal education, we must now extend this to the natural sciences and to evolutionary biology. In evaluating the role of evolutionary science in the United States, it is necessary to look at the US's most commonly held justification for the

role of public education: pragmatism. Curricular theory often addresses two components of a balanced curriculum: practical skill-building, and the exploration of the basic foundations of the sciences, humanities, and social sciences. In regard to biology curricula, antievolutionists will often inquire as to the necessity of evolution in a public education. In response, a secular liberal education general includes a survey of the most common disciplines; government, history, English, social studies, technology, mathematics, physics, biology, and chemistry. One justification for an education in these subjects is the numerous practical applications of the basic skills acquired in an introductory understanding of these disciplines. Furthermore, it is necessary that young people are exposed to the wide range of professions available in each of the above fields. Without a basic education in biology, for example, the number of high school students deciding to go into medicine would decline sharply due to the lack of exposure. Evolution is further justified as being an essential component of biology, as it is one of the greatest unifying concepts within the discipline, effectively explaining and describing biological processes. By definition, biology is the study of life, and no study of living organisms would be complete without a description of the mechanisms and natural forces that have not only created life as we witness it today, but also explain biological diversity and genetics.

The importance of evolution in the biological sciences, however, is not a simple matter of science. Rather, it has become a matter of curricular dispute due to its implications for literal interpretations of creationist faiths. The crucial question then becomes whether or not the government is in violation of citizens' individual rights and negative liberties when their children are required to attend a school whose curriculum is subversive to the family or child's beliefs. The primary reason that creationists have lost traction on the issue of evolution and creation is

their failure to approach the issue as one of individual rights, but instead many have made efforts to impose creationism upon the public curricula in the form of a supernatural replacement for scientific explanation. The progressive overruling of anti-evolution legislation in the forms of creationism, creation 'science,' and Intelligent Design, are evidence of the increasingly secular interpretation of the role of public schools. This is no comfort for people of faith who fear the corruption of their children's minds due to a secular 'materialistic' education.

Because the United States Government is decidedly secular, the special treatment of any particular interest group is generally frowned upon when it comes at the expense of others' similar rights, and for this reason, the voucher system of supplementing parents' support of their children to attend private schools (usually for religious reasons) has been a heavily debated subject.[16] Of course, a collective public school is the most cost-effective and efficient method of federally sponsored education. To avoid this conflict, some school districts have simply allowed students to choose not to attend the biology lecture on evolution. However, a person of faith cannot complain about the social contract of secular citizenry in which they are engaged. Though some may feel that this special recognition would increase equality in results, it is the equality in treatment and method with which the government is most concerned with complying. The US

[16] Because most states require that children attend school until the age of 16, and not every parent has the resources available to provide home schooling, policy has been introduced in Milwaukee, Cleveland, and Florida, allowing for tax rebates for parents who home school, and for vouchers to be cut from the state education budgets to pay for students to attend private schools, about 85% of which are religious schools. Some might see this as a reasonable way around potential accusations that the state is infringing upon religious freedom. Others see as it the diversion of public tax-dollars to fund religious education. According to the National Education Association (NEA), "Americans want consistent standards for students. Where vouchers are in place, a two-tiered system has been set up that holds students in public and private schools to different standards." Furthermore, the NEA states that, "Vouchers were not designed to help low-income children. Milton Friedman, the 'grandfather' of vouchers, dismissed the notion that vouchers could help low-income families, saying "...it is essential that no conditions be attached to the acceptance of vouchers that interfere with the freedom of private enterprises to experiment. A pure voucher system would only encourage economic, racial, ethnic, and religious stratification in our society. To a large degree, America's success has been built on our ability to unify our diverse populations."

theory of secularism doesn't require, like some nations, that the individual leave the private aspects of his identity, such as religion, in the private sphere. Instead, our version of secularism pertains more to the government and limitations on federal institutions. Therefore, a student has every right to discuss his or her personal belief of creationism in the public classroom, but the teacher, as a representative of the public sector, is required to maintain a secular position. Thus, in keeping with the U.S. Constitution, any institution of public education must thereby remain strictly secular, and not entertain faith-based theories in the science curricula.

CONCLUSION

The legacy of controversy over creationism and evolution in public education is a manifestation of the application of the concept of separation of church and state to culturally vibrant and diverse populace, indicating our continuing dedication to a public sphere wherein the citizen is welcome to bring his cultural identity, but where the government, by definition of being secular, must remain impartial. Because the United States is such a heterogeneous state, our concept of equality has come to mean fairness of process as opposed to fairness of results, which would imply an unfair process. This has been a troublesome concept for citizens who do not embrace the secular presence of governmental institutions, including that of education. For religious fundamentalists, the threat of a secular education corrupting the mind of their children is seen as a violation of the promises of negative liberty. However, the secular curriculum is implicit within the secular institution, which again is implicit within a secular government. Because thoroughly fair multiculturalism is impossible to create in public curricula, the government must abstain from adhering to or furthering a particular faith, and therefore does not push secularism on the citizen, but rather offers a rational approach to science curricula, and a multicultural approach to social studies. For the sake of liberal education, science curricula in the United States will never, under this constitution, include *justified* mention of supernatural explanations for natural phenomena. If the biological sciences are to be taught in a thorough and nuanced manner, the curricula must include the unifying concept of evolution by inheritance, genetic mutation and natural selection. Because science, by definition, makes no universal truth claims, the teaching of scientific concepts is not an unlawful imposition of a materialistic monism, but rather the sharing of a useful and widely accepted method of rationally describing natural processes.

APPENDIX

The following document is available in the public domain, and copies have recently been posted on the Discovery Institute's website, at www.discovery.org:

THE WEDGE STRATEGY

CENTER FOR THE RENEWAL OF SCIENCE & CULTURE

INTRODUCTION

The proposition that human beings are created in the image of God is one of the bedrock principles on which Western civilization was built. Its influence can be detected in most, if not all, of the West's greatest achievements, including representative democracy, human rights, free enterprise, and progress in the arts and sciences.

Yet a little over a century ago, this cardinal idea came under wholesale attack by intellectuals drawing on the discoveries of modern science. Debunking the traditional conceptions of both God and man, thinkers such as Charles Darwin, Karl Marx, and Sigmund Freud portrayed humans not as moral and spiritual beings, but as animals or machines who inhabited a universe ruled by purely impersonal forces and whose behavior and very thoughts were dictated by the unbending forces of biology, chemistry, and environment. This materialistic conception of reality eventually infected virtually every area of our culture, from politics and economics to literature and art

The cultural consequences of this triumph of materialism were devastating. Materialists denied the existence of objective moral standards, claiming that environment dictates our behavior and beliefs. Such moral relativism was uncritically adopted by much of the social sciences, and it still undergirds much of modern economics, political science, psychology and sociology.

Materialists also undermined personal responsibility by asserting that human thoughts and behaviors are dictated by our biology and environment. The results can be seen in modern approaches to criminal justice, product liability, and welfare. In the materialist scheme of things, everyone is a victim and no one can be held accountable for his or her actions.

Finally, materialism spawned a virulent strain of utopianism. Thinking they could engineer the perfect society through the application of scientific knowledge, materialist reformers advocated coercive government programs that falsely promised to create heaven on earth.

Discovery Institute's Center for the Renewal of Science and Culture seeks nothing less than the overthrow of materialism and its cultural legacies. Bringing together leading scholars from the natural sciences and those from the humanities and social sciences, the Center explores how new developments in biology, physics and cognitive science raise serious doubts about scientific materialism and have re-opened the case for a broadly theistic understanding of nature. The Center awards fellowships for original research, holds conferences, and briefs policymakers about the opportunities for life after materialism.

The Center is directed by Discovery Senior Fellow Dr. Stephen Meyer. An Associate Professor of Philosophy at Whitworth College, Dr. Meyer holds a Ph.D. in the History and Philosophy of Science from Cambridge University. He formerly worked as a geophysicist for the Atlantic Richfield Company.

THE WEDGE STRATEGY

Phase I.

- **Scientific Research, Writing & Publicity**

Phase II.

- **Publicity & Opinion-making**

Phase III.

- **Cultural Confrontation & Renewal**

THE WEDGE PROJECTS

Phase I. Scientific Research, Writing & Publication

- Individual Research Fellowship Program
- Paleontology Research program (Dr. Paul Chien et al.)
- Molecular Biology Research Program (Dr. Douglas Axe et al.)

Phase II. Publicity & Opinion-making

- Book Publicity
- Opinion-Maker Conferences
- Apologetics Seminars
- Teacher Training Program
- Op-ed Fellow
- PBS (or other TV) Co-production
- Publicity Materials / Publications

Phase III. Cultural Confrontation & Renewal

- Academic and Scientific Challenge Conferences
- Potential Legal Action for Teacher Training
- Research Fellowship Program: shift to social sciences and humanities

FIVE YEAR STRATEGIC PLAN SUMMARY

The social consequences of materialism have been devastating. As symptoms, those consequences are certainly worth treating. However, we are convinced that in order to defeat materialism, we must cut it off at its source. That source is scientific materialism. This is precisely our strategy. If we view the predominant materialistic science as a giant tree, our strategy is intended to function as a "wedge" that, while relatively small, can split the trunk when applied at its weakest points. The very beginning of this strategy, the "thin edge of the wedge," was Phillip Johnson's critique of Darwinism begun in 1991 in Darwinism on Trial, and continued in Reason in the Balance and Defeatng Darwinism by Opening Minds. Michael Behe's highly successful Darwin's Black Box followed Johnson's work. We are building on this momentum, broadening the wedge with a positive scientific alternative to materialistic scientific theories, which has come to be called the theory of intelligent design (ID). Design theory promises to reverse the stifling dominance of the materialist worldview, and to replace it with a science consonant with Christian and theistic convictions.

The Wedge strategy can be divided into three distinct but interdependent phases, which are roughly but not strictly chronological. We believe that, with adequate support, we can accomplish many of the objectives of Phases I and II in the next five years (1999-2003), and begin Phase III (See "Goals/ Five Year Objectives/Activities").

Phase I: Research, Writing and Publication

Phase II: Publicity and Opinion-making

Phase III: Cultural Confrontation and Renewal

Phase I is the essential component of everything that comes afterward. Without solid scholarship, research and argument, the project would be just another attempt to indoctrinate instead of persuade. A lesson we have learned from the history of science is that it is unnecessary to outnumber the opposing establishment. Scientific revolutions are usually staged by an initially small and relatively young group of scientists who are not blinded by the prevailing prejudices and who are able to do creative work at the pressure points, that is, on those critical issues upon which whole systems of thought hinge. So, in Phase I we are supporting vital witting and research at the sites most likely to crack the materialist edifice.

Phase II. The pnmary purpose of Phase II is to prepare the popular reception of our ideas. The best and truest research can languish unread and unused unless it is properly publicized. For this reason we seek to cultivate and convince influential individuals in pnnt and broadcast media, as well as think tank leaders, scientists and academics, congressional staff, talk show hosts, college and seminary presidents and faculty, future talent and potential academic allies. Because of his long tenure in politics, journalism and public policy, Discovery President Bruce Chapman brings to the project rare knowledge and acquaintance of key op-ed writers, journalists, and political leaders. This combination of scientific and scholarly expertise and media and political connections makes the Wedge unique, and also prevents it from being "merely academic." Other activities include production of a PBS documentary on intelligent design and its implications, and popular op-ed publishing. Alongside a focus on influential opinion-makers, we also seek to build up a popular base of support among our natural constituency, namely, Chnstians. We will do this primarily through apologetics seminars. We intend these to encourage and equip believers with new scientific evidence's that support the faith, as well as to "popularize" our ideas in the broader culture.

Phase III. Once our research and writing have had time to mature, and the public prepared for the reception of design theory, we will move toward direct confrontation with the advocates of materialist science through challenge conferences in significant academic settings. We will also pursue possible legal assistance in response to resistance to the integration of design theory into public school science curricula. The attention, publicity, and influence of design theory should draw scientific materialists into open debate with design theorists, and we will be ready. With an added emphasis to the social sciences and humanities, we will begin to address the specific social consequences of materialism and the Darwinist theory that supports it in the sciences.

GOALS

Governing Goals

- To defeat scientific materialism and its destructive moral, cultural and political legacies.
- To replace materialistic explanations with the theistic understanding that nature and hurnan beings are created by God.

Five Year Goals

- To see intelligent design theory as an accepted alternative in the sciences and scientific research being done from the perspective of design theory.
- To see the beginning of the influence of design theory in spheres other than natural science.
- To see major new debates in education, life issues, legal and personal responsibility pushed to the front of the national agenda.

Twenty Year Goals

- To see intelligent design theory as the dominant perspective in science.
- To see design theory application in specific fields, including molecular biology, biochemistry, paleontology, physics and cosmology in the natural sciences, psychology,

ethics, politics, theology and philosophy in the humanities; to see its influence in the fine arts.

- To see design theory permeate our religious, cultural, moral and political life.

FIVE YEAR OBJECTIVES

1. A major public debate between design theorists and Darwinists (by 2003)

2. Thirty published books on design and its cultural implications (sex, gender issues, medicine, law, and religion)

3. One hundred scientific, academic and technical articles by our fellows

4. Significant coverage in national media:
   - Cover story on major news magazine such as Time or Newsweek
   - PBS show such as Nova treating design theory fairly
   - Regular press coverage on developments in design theory
   - Favorable op-ed pieces and columns on the design movement by 3rd party media

5. Spiritual & cultural renewal:
   - Mainline renewal movements begin to appropriate insights from design theory, and to repudiate theologies influenced by materialism
   - Major Christian denomination(s) defend(s) traditional doctrine of creation & repudiate(s)
   - Darwinism Seminaries increasingly recognize & repudiate naturalistic presuppositions
   - Positive uptake in public opinion polls on issues such as sexuality, abortion and belief in God

6. Ten states begin to rectify ideological imbalance in their science curricula & include design theory

7. Scientific achievements:
   - An active design movement in Israel, the UK and other influential countries outside the US
   - Ten CRSC Fellows teaching at major universities
   - Two universities where design theory has become the dominant view
   - Design becomes a key concept in the social sciences Legal reform movements base legislative proposals on design theory

ACTVITIES

(1) Research Fellowship Program (for writing and publishing)

(2) Front line research funding at the "pressure points" (e.g., Daul Chien's Chengjiang Cambrian Fossil Find in paleontology, and Doug Axe's research laboratory in molecular biology)

(3) Teacher training

(4) Academic Conferences

(5) Opinion-maker Events & Conferences

(6) Alliance-building, recruitment of future scientists and leaders, and strategic partnerships with think tanks, social advocacy groups, educational organizations and institutions, churches, religious groups, foundations and media outlets

(7) Apologetics seminars and public speaking

(8) Op-ed and popular writing

(9) Documentaries and other media productions

(10) Academic debates

(11) Fund Raising and Development

(12) General Administrative support

THE WEDGE STRATEGY PROGRESS SUMMARY

Books

William Dembski and Paul Nelson, two CRSC Fellows, will very soon have books published by major secular university publishers, Cambridge University Press and The University of Chicago Press, respectively. (One critiques Darwinian materialism; the other offers a powerful alternative.)

Nelson's book, On Common Descent, is the seventeenth book in the prestigious University of Chicago "Evolutionary Monographs" series and the first to critique neo-Dacwinism. Dembski's book, The Design Inference, was back-ordered in June, two months prior to its release date.

These books follow hard on the heals of Michael Behe's Darwin's Black Box (The Free Press) which is now in paperback after nine print runs in hard cover. So far it has been translated into six foreign languages. The success of his book has led to other secular publishers such as McGraw Hill requesting future titles from us. This is a breakthrough.

InterVarsity will publish our large anthology, Mere Creation (based upon the Mere Creation conference) this fall, and Zondervan is publishing Maker of Heaven and Earth: Three Views of the Creation-Evolution Contoversy, edited by fellows John Mark Reynolds and J.P. Moreland.

McGraw Hill solicited an expedited proposal from Meyer, Dembski and Nelson on their book Uncommmon Descent. Finally, Discovery Fellow Ed Larson has won the Pulitzer Prize for Summer for the Gods, his retelling of the Scopes Trial, and InterVarsity has just published his co-authored attack on assisted suicide, A Different Death.

Academic Articles

Our fellows recently have been featured or published articles in major scientific and academic journals in The Proceedings to the National Academy of Sciences, Nature, The Scientist, The American Biology Teacher, Biochemical and Biophysical Research Communications, Biochemirtry, Philosophy and Biology, Faith & Philosophy, American Philosophical Quarterly, Rhetoric & Public Affairs, Analysis, Book & Culture, Ethics & Medicine, Zygon, Perspectives on Science and the Christian Faith, Religious Studies, Christian Scholars' Review, The Southern Journal of Philosophy, and the Journal of Psychology and Theology. Many more such articles are now in press or awaiting review at major secular journals as a result of our first round of research fellowships. Our own journal, Origins & Design, continues to feature scholarly contributions from CRSC Fellows and other scientists.

Television and Radio Appearances

During 1997 our fellows appeared on numerous radio programs (both Christian and secular) and five nationally televised programs, TechnoPolitics, Hardball with Chris Matthews, Inside the Law, Freedom

Speaks, and Firing Line. The special edition of TechnoPolitics that we produced with PBS in November elicited such an unprecedented audience response that the producer Neil Freeman decided to air a second episode from the "out takes." His enthusiasm for our intellectual agenda helped stimulate a special edition of William F. Buckley's Firing Line, featuring Phillip Johnson and two of our fellows, Michael Behe and David Berlinski. At Ed Atsinger's invitation, Phil Johnson and Steve Meyer addressed Salem Communications' Talk Show Host conference in Dallas last November. As a result, Phil and Steve have been interviewed several times on Salem talk shows across the country. For example, in July Steve Meyer and Mike Behe were interviewed for two hours on the nationally broadcast radio show Janet Parshall's America. Canadian Public Radio (CBC) recently featured Steve Meyer on their Tapestry program. The episode, "God & the Scientists," has aired all across Canada. And in April, William Craig debated Oxford atheist Peter Atkins in Atlanta before a large audience (moderated by William F. Buckley), which was broadcast live via satellite link, local radio, and internet "webcast."

Newspaper and Magazine Articles

The Firing Line debate generated positive press coverage for our movement in, of all places, The New York Times, as well as a column by Bill Buckley. In addition, our fellows have published recent articles & op-eds in both the secular and Christian press, including, for example, The Wall Street Journal, The New York Times, The Washington Times, National Review, Commentary, Touchstone, The Detroit News, The Boston Review, The Seattle Post-Intelligenter, Christianity Toady, Cosmic Pursuits and World. An op-ed piece by Jonathan Wells and Steve Meyer is awaiting publication in the Washington Post. Their article criticizes the National Academy of Science book Teaching about Evolution for its selective and ideological presentation of scientific evidence. Similar articles are in the works.

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