

2. The Creationist Attack on Science and Secular Society

Daniel G. Blackburn

Introduction

In 1925, John Scopes was put on trial in Dayton, Tennessee, for mentioning the idea of evolution in a biology class that he taught at the local high school. The trial became a media circus, and gained national attention because of what it seemed to represent—a clash of science vs. fundamentalist religion, a conflict between local autonomy and national interests, and an intellectual battle between two great orators, Clarence Darrow and William Jennings Bryan. John Scopes was found guilty and fined, but the verdict was overturned on a technicality—an anticlimactic outcome to the historic conflict. Nevertheless, the trial has grown to mythic proportions, largely through misconceptions promoted by the fictionalized account in the play “Inherit the Wind” and three movie versions based on the play. Readers interested in an accurate historical account of the trial and surrounding events can find one in Larsen’s Pulitzer Prize-winning *Summer of the Gods*.¹

More than 80 years later, the Scopes trial continues to resonate in U.S. society, partly because the reasons for that conflict have never been resolved.² Legal challenges continue to be leveled against the teaching of evolution in the public schools.³ Such challenges are routinely defeated through the judicial system, only to rise again in some other guise or location. Moreover, the social and political movement now known as Creationism has changed and diversified.⁴ The movement’s tactics have grown more sophisticated, and its ambitions have expanded with its increase in political power.⁵ In fact, statements by leading right-wing Creationists have revealed that their goal is nothing less than state-sponsored religion—a right-wing Christian theocracy. Furthermore,

Creationism has grown into an international movement, through which fundamentalists of four major religions oppose the teachings and methods of science.⁶ The challenges to free and secular societies are explicit, and anyone who values intellectual freedom, religious freedom, and the separation of church and state should recognize the serious challenge that Creationism represents.

The goals of this review are threefold: (1) to outline the history, beliefs, and activities of the Creationist movement in the U.S.; (2) to explore Creationism's sociopolitical goals and the serious challenge Creationism represents to a free and secular society; and (3) to argue that the idea of a rigid dichotomy between science and religion unnecessarily divides the general public by forcing on them a difficult choice, one that works to the strategic disadvantage of secularism and freedom of thought.

A Brief History of Creationism

Definitive histories of the Creationist movement in the U.S. have been written by Ronald Numbers,⁷ and much of what follows is based on his accounts. In the late 1800s and early 1900s, evolution was accepted in scholarly circles by scientists and theologians alike.⁸ However, the general public in the U.S. increasingly realized that evolutionary principles and discoveries challenged biblical literalism. The earth's history was being dated in terms of many millions of years, and the evolutionary parade of life could not be reconciled with either the Mosaic creation stories or with a Noachian flood.⁹ The growth of the public school system exposed increasing numbers of students to these heretical evolutionary ideas, creating a political backlash. Consequently, during the 1920s, anti-evolution laws were debated by at least 20 U.S. state legislatures, four of which prohibited or condemned the teaching of evolution. Likewise, the increasingly popular "flood geology" provided explanations that were compatible with the Noachian deluge, and laid the groundwork for future decades of so-called "scientific Creationism."¹⁰

In response to the political controversy, the subject of evolution nearly disappeared from the high school textbooks until the post-Sputnik era. In the early 1960s, evolution was reintroduced as a centerpiece of biology education.¹¹ Its re-emergence led to two types of responses from the Creationists. One response was the publication of works that claimed a scientific basis for the Genesis stories, including the Great Flood. Their proponents labelled them "creation science" in hopes of gaining them greater intellectual respectability.¹² The other response was political and in the early 1980s resulted in legislative initiatives in 26 states to mandate "equal time" for Creation science.¹³ In general, the legislative initiatives were rebuffed by the judicial system on the grounds that

they violated the First Amendment's clause against state establishment of religion. However, these events paralleled a dramatic shift among practicing Christians toward beliefs that the earth was formed only a few thousand years ago. The shift is unprecedented and hard to account for on socioeconomic grounds.¹⁴

The 1990s brought a host of new initiatives, including legislation to mandate the teaching of evidence against evolution, and to require that evolution be taught with the disclaimer that it is not factual but “just a theory.”¹⁵ In Tennessee, teachers who failed to label evolution “a theory” were to be subject to termination. The Tennessee proposal showed a basic misunderstanding of how scientists use the word “theory”—as a synonym of “principle” or scientific “law.” Thus, the legislative proposal's goal was to require that evolution be treated in the schools as an uncorroborated hypothesis, but its very wording codified ignorance about scientific concepts. During the 1990s, Creationist beliefs were added to Republican Party platforms in a number of states. Local school districts removed or pasted together textbook pages that dealt with evolution, and beliefs about evolution became a battleground in many school board elections.¹⁶

The “Intelligent Design” (ID) movement is the latest manifestation of Creationism. Intelligent Design Creationists commonly stop short of publicly promoting biblical creation—hence its designations as “repackaged Creationism” and “Creationism's Trojan horse.”¹⁷ The central assumption of ID is that living organisms are far too complex to be products of evolution, and therefore that they must have been created in their present form by a Grand Designer.¹⁸ The nature and identity of the “designer(s)” commonly are left unstated, and in theory might be space aliens, time travelers, or mischievous demons. However, public statements and private documents of ID proponents and organizations leave no doubt that the “designer” they have in mind is the Christian deity.¹⁹ As Pennock²⁰ notes, in ID documents and websites, the term “Intelligent Designer” is widely considered to be “the politically correct term for God.”

A recent court case in Pennsylvania²¹ tested the constitutionality of a school district's requirement that Intelligent Design must be presented in the classroom.²² Teachers were required to read to science students a statement about ID and to recommend the Creationist textbook *Of Pandas and People*—a requirement with which the teachers refused to comply. The school district lost the case on the basis of its violation of the establishment clause of the constitution. In his memorandum opinion, Judge John E. Jones III wrote that Intelligent Design “is not science and cannot be adjudged a valid, accepted scientific theory as it has failed to publish in peer-reviewed journals, engage in research and testing, and gain acceptance in the scientific community.” Noting that “ID cannot uncouple

itself from its Creationist, and thus religious, antecedents,” he labelled the school district’s ID requirement “breathtaking inanity.”²³

The Creationist Spectrum, and Beyond

Far from a monolithic movement, Creationism includes a full spectrum of conflicting perspectives that grade into more conventional forms of theism.²⁴ One major distinction can be made according to beliefs about age of the earth and the universe. “Young-Earth Creationists” (YECs) believe that the earth’s age is measurable in thousands of years, a view taken from a literal reading of the Old Testament. They contrast with “Old-Earth Creationists,” who consider the earth to be millions of years old. Some YECs (such as the group known as the Missouri Lutherans) are geocentrists, who believe that the sun orbits the earth.²⁵ Others are “flat-earththers,” such as members of the International Flat Earth Society, a group that has its headquarters in Lancaster, California.²⁶ The beliefs of both groups reflect a traditional Hebrew cosmology, in which the earth was thought to be a disk floating on water, and the heavens were held up by a domelike firmament to which was attached the sun, moon, and stars.²⁷ This firmament separated the waters of the heavens from those of the earth, and the water poured through it at the time of Noah’s flood. Contemporary YECs claim that dinosaurs co-existed with humans in Edenic times, when all animals were herbivores; they became carnivorous when “sin” entered the world. Such ideas are promoted in children’s books—and in Creationist museums, such as the 27 million dollar Creation Museum that was recently opened in Petersburg, Kentucky.²⁸

“Old-Earth Creationists” agree on an ancient origin for the earth; however, they hold different views about whether the actual creation of life took six literal days or six longer time periods. Some who posit a six-day creation reconcile their views with the accepted age of the earth by invoking an ancient, pre-Adamic creation that was destroyed prior to the creation described in Genesis 2.²⁹

“Progressive Creationists” accept the existence of limited forms of evolution within basic types formed through special creation. Under their interpretation, members of (for example) the cat family (Felidae) could be accepted as having evolved from a specially created feline prototype.³⁰ These beliefs allow Progressive Creationists to accept the overwhelming evidence for microevolution (change within populations) as well as fossil evidence for modifications within particular groups. However, they invoke the deity for macroevolutionary events and for special creation of the ancestral prototypes. Although many proponents of these views accept the idea of an ancient earth, the influential George McCready Price (1870-1963) combined young-earth Creationism with limited forms of

progressive evolution.³¹ However, to strict Creationists of the traditional variety, acceptance of any form of evolution is anathema.

Proponents of Intelligent Design³² (ID) may adopt any of a range of views on history and age of life on earth, but commonly they are OECs. Intelligent Design Creationists (IDCs) hold differing beliefs about the efficacy and scope of evolution.³³ However, they are united by the belief that natural processes cannot account for the history and diversity of life. Most who have been publicly identified with the ID movement accept a form of God-directed evolution.³⁴ If their perspective were simply theological, it would not be controversial. However, the movement masks its religious underpinnings, motives, and goals in order to have its theological views taught in science classrooms as fact. Because proponents of ID commonly allow for an earth of great antiquity and accept the existence of evolution, more traditional Creationists oppose their views.

One further perspective to be recognized is a widespread view that can be termed “theistic evolution.” Because its adherents accept evolution, they are not “Creationists” under common use of that term. Such individuals believe that the evolutionary process was the means by which God effected life’s creation,³⁵ although they differ in the extent to which they believe the deity intervened in the process. Theistic evolution is a doctrine implicitly or explicitly supported by mainstream churches. It has had strong adherents among scientists, particularly from the 1860s through the first three decades of the 20th century.³⁶

Methodological materialism is intrinsic to science. Therefore, competent professional scientists can hold a diversity of personal religious views while formulating their scientific explanations solely in terms of natural phenomena and causes. Among several reasons that Creationism (in its several manifestations) is not science are the following: that it invokes supernatural causes as direct explanations of natural phenomena in the context of scientific teaching and research; that it fails to deal in falsifiable (disprovable) hypotheses; and that it begins with conclusions for which it seeks confirmatory evidence.³⁷ In contrast, scientific methodology seeks only to disprove (falsify) hypotheses. As Gould³⁸ stated “[t]he fundamentalists, by ‘knowing’ the answers before they start [examining evolution], and then forcing nature into the straitjacket of their discredited preconceptions, lie outside the domain of science—or of any honest intellectual inquiry.”

The Assault on Knowledge and Rationality

The content of Creationist beliefs has been documented and analyzed in numerous books and scholarly papers by scientists, philosophers, and historians.³⁹ Creationism’s claims have repeatedly been shown to be intellectually vacuous, and

its tactics, ethically indefensible. To the many scientists (including the present author) who have had their words distorted in order to discredit evolution, it appears that no deception is too base, as long as it serves the Creationist cause. Outlined below are ways in which Creationism conflicts with knowledge and methodologies of scholarly inquiry.

Life Sciences

To understand the seriousness of the Creationist attack requires an appreciation of the important position evolution occupies in modern biology. Evolution is central to the life sciences, the overarching framework that makes biology a coherent discipline, rather than a collection of miscellaneous facts about obscure organisms.⁴⁰ Most everything we have learned about biology relates either to mechanisms or to manifestations of evolution. Thus, as often noted in the life sciences literature, without evolution, information from the entire spectrum of biological disciplines would make little or no sense. Among the biological disciplines that rely on the principles of evolution are anatomy, physiology, immunology, developmental biology, biochemistry, genetics, molecular biology, cell biology, neuroscience, botany, zoology, microbiology, systematics, ethology, and ecology. The list encompasses all of the life sciences, including disciplines that at one time seemed to bear little relationship to evolution.

For example, in the early decades of the 20th century, information about transmission (Mendelian) genetics seemed to be difficult to reconcile with natural selection. However, by the “Modern Synthesis” of the 1940s, genetics not only was seen as compatible with natural selection, it was recognized as the key to understanding how evolution works.⁴¹ Likewise, molecular genetics was developed in the 1970s with limited reference to evolutionary phenomena, yet evolution is now central to the discipline. Evolutionary principles account for genetic diversity as well as commonalities, and explain otherwise inexplicable phenomena such as “junk DNA” and “fossil genes” that have lost their functions evolutionarily.⁴²

To disregard evolution is to discount nearly everything of significance that we have learned in biology. In fact, to do so can be a life-or-death matter, since ignoring evolution would rob us of the powerful explanatory power of evolutionary principles in human medicine.⁴³ To cite one of many examples: had medical professionals been familiar with the rapid effects of natural selection, perhaps we would not have so quickly selected for resistant microbial strains through indiscriminate use of weak doses of antibiotics. Evolutionary principles also help explain such medical phenomena as sickle cell anemia, lactose intolerance, fever, and schizophrenia.

Physical Sciences

For Creationism to be correct, not only would the precepts and methods of biology have to be fundamentally wrong, but those of other scientific disciplines would have to be incorrect as well. Chemistry and physics provide well-established analytical procedures by which we can determine the age of fossils and the rocks in which they are found; such procedures are based on known rates of isotope decay and element replacement. Young-earth Creationism would require basic laws of chemistry and physics to be invalid, and would require that the methods of these fields falsely lead scientists to infer that the world is much older than the ~6000 years that Archbishop James Ussher calculated in 1654. Geology has allowed us to reconstruct the history of our planet over the past 4 billion years, and has documented the natural forces and phenomena that have produced mountains, canyons, lakes, oceans, and drifting continents. Against the vast scientific evidence accumulated from the Renaissance, through the Scientific Revolution, to the present, lie the claims of YECs, who believe that major geological features resulted from recent biblical events. As an example, Creationists insist that everything from fossil organisms to the Grand Canyon resulted from Noah's flood. Their claims are now disseminated through the U.S. National Parks Service.⁴⁴

The field of astronomy offers another example. Astronomy has revealed that our sun is one of countless stars in the Milky Way galaxy, which in turn is one of countless galaxies in a universe far more vast than our imaginations can ever contemplate. Against the information provided by several centuries of telescopes trained on the skies from Copernicus and Galileo onward are the claims of geocentrists, flat-earthers, and others with minds limited by dogma. In May 2007, a massive stellar explosion was visible on earth, representing the largest supernova recorded in human history. It resulted from the explosion of an enormous star designated SN 2006gy in the galaxy NGC 1260, over 240 million light years away.⁴⁵ The explosion that produced it occurred towards the beginning of our earth's Triassic period, back before the earliest dinosaurs, birds, and mammals. Young-earth Creationists who claim the universe to be no older than a few thousand years must assume that this explosion never occurred, and that light rays that fool us into thinking that it had occurred were created in position as if they had traveled more than 99.99% of the distance toward our planet. YECs would have us ignore the evidence of our senses and the products of our intellects in favor of unquestioning acceptance of ancient cosmologies of pre-scientific peoples.

Social Sciences and Humanities

Creationist claims also are incompatible with knowledge gained from the humanities and social sciences. For example, the field of anthropology has much to say about the prehistory of our species, and about hominid ancestors dating as far back as 7 million years ago. Using the tools of molecular genetics, anthropologists and biologists are reconstructing the peopling of the globe over the past 100,000 years.⁴⁶ Likewise, studies in comparative linguistics have allowed reconstruction of the evolution of languages and their spread around the globe during this same time period.⁴⁷ Needless to say, neither the Mosaic account of Babel nor a post-Noachian diaspora have been corroborated. The fields of history and archaeology have yielded challenging insights into events and ancient cultures mentioned in biblical accounts.⁴⁸ The field of psychology has provided great insight into the nature of gender differences, including those that are fully consistent with evolutionary principles and predictions.⁴⁹ Likewise, the interdisciplinary field of neuroscience has provided insight into the nature of consciousness, “free will,” and the biological basis of religious belief,⁵⁰ while allowing detailed reconstruction of the deep evolutionary history of the components of the human brain—features widely shared with other mammals.

Methodology and Epistemology

Not only is Creationism inconsistent with a vast corpus of factual knowledge, it also is incompatible with the methods through which knowledge is obtained. Science deals in testable and tested propositions. Any scientific statement must be able to be disproved (falsified), and in order to be accepted, it must survive rigorous attempts to disprove it.⁵¹ By contrast, religious and political dogmas begin with the presumption of validity, and consider attempts to question them as heretical and forbidden. When such dogmas are challenged, they can be enforced through the full power of the state—to the detriment of freedom of thought, expression, and investigation.

Why Evolution?

In light of the above, Creationists’ particular focus on biological evolution may not be immediately evident. This focus cannot be attributed solely to conflict with biblical creation accounts. After all, these same accounts conflict with much that is known and taught in the fields of geology, physics, astronomy, archeology, history, and other fields. We do not see legislative initiatives to prohibit the teaching of heliocentrism, continental drift, or the nature of stars, nor do school board members agitate for the teaching of the Firmament Model, or for the Tower of Babel theory of languages.⁵² The focus on evolution also cannot be

attributed solely to difficulty in understanding the concept itself. Science leads us to believe facts far more difficult to comprehend and believe: that each of us developed from a single microscopic cell; that human beings are made of the same elements as are found in rocks, dirt, and trees; that physical objects are composed of invisible particles whose existence at any given place and time is a matter of probability; and that the earth's sun is a medium-sized star among countless trillions in a limitless universe.

Evolution may be a special target of Creationist ire because it holds that humans resulted from natural, mechanistic processes, and that they share a common ancestry with other animals. Just as the Copernican revolution showed that the earth is not the center of the universe, Darwinian evolution seemingly deposed humankind (in the public mind) from an exalted position as the pinnacle and endpoint of a goal-directed creation.⁵³ It also came to imply that human behaviors, and even human morality and altruism, have naturalistic origins and pre-human antecedents.⁵⁴ However, evidence supports a more insidious explanation for the Creationist focus—that the attack on evolution is a useful tactic in an ambitious sociopolitical agenda. Recent Creationist writings and private documents are explicit about the tactic of using evolution to divide the U.S. public for political motives.⁵⁵

In sum, although the subject of evolution draws special opposition, Creationism is far more than an attack on a single specialty within biology. For Creationism to be true, most of what we have learned from the natural sciences, and much that we have learned in the humanities and social sciences, would have to be untrue. Thus Creationism implicitly is an assault on knowledge and on rationality, and a movement with explicit political motives and goals.

The Attack on Secularism

The Politics of Creationism

Creationism is a sociopolitical movement that actively seeks to replace knowledge gained over the course of many centuries with an extremist form of religion. Although the U.S. has been a bastion of Creationism for over a century, the movement has become worldwide in scope. Islamic and Hindu versions are gaining increasing support.⁵⁶ Throughout the history of the Creationist movement, one overarching objective has been limiting the dissemination and acceptance of ideas of biological evolution. For most of the 20th century, the subject of evolution was downplayed or ignored in public school textbooks and curricula in the U.S., through local control of school curricula and legislative initiatives launched at state and local levels.

Whether for these or other reasons, the U.S. populace remains woefully ignorant of the basic outlines of evolutionary processes and events and the overwhelming evidence for their validity. Far from being a tiny fringe minority, individuals who accept the precepts of Young-Earth Creationism make up a plurality of the U.S. adult population. In a poll conducted by Princeton Survey Research Associates International,⁵⁷ 48% of the respondents agreed with the statement “God created humans pretty much in the present form at one time within the last 10,000 years or so.” (Among evangelical Protestants, the figure was 73%.) Of all the respondents, 30% supported a God-directed evolution, and 13% said that evolution was not directed by a deity. These results are consistent with similar surveys dating back to the early 1980s.⁵⁸

From another set of surveys, supported by the National Science Foundation, Miller and Pennock⁵⁹ report weak support in the U.S. for the idea of human evolution, support that has declined from 45% to 40% between 1985 and 2005. The 2005 survey revealed that 28% of the respondents believed that humans lived at the same time as dinosaurs, with another 22% indicating that they were not sure (only 51% disagreed with the statement—and one might wonder how many of those disbelieved in dinosaurs). Such poll results might be understandable had they come from a population under control of a theocratic regime, or from a Third World nation where books are scarce and higher education is a luxury. In fact, the U.S. is extraordinarily anomalous among developed nations. In a group of 34 countries primarily from Europe and Asia, the U.S. ranked next to last in acceptance of evolution; only Turkey ranked lower.⁶⁰ Whatever its causes, the widespread disbelief in evolution in the U.S. offers fertile ground for Creationist attempts to limit its presentation in the public schools.

On the political front, Creationism has grown into a well-financed and powerful movement. Its supporters extend to the highest reaches of the U.S. government. Among those sympathetic to Creationist goals have been two of the last four U.S. Presidents, many state governors and state and federal legislators, and at least two justices of the Supreme Court.⁶¹ With evangelical religion having gained significant control over one of the two national political parties,⁶² we may soon see a time when a Creationist pledge is expected of contenders for political office, just as dutiful pledges of religious belief are now implicitly required of serious candidates for Congress and the U.S. presidency.

Discovery Institute

One major supporter of the Intelligent Design movement is the Discovery Institute (DI), an association with an annual budget in excess of 4.2 million dollars.⁶³ DI pronouncements deny explicit religious motives and affiliations,

and claim that Intelligent Design is a legitimate scientific principle. However, a *New York Times* investigation reported that most of the Institute's fellows are fundamentalist or evangelical Christians, and most of its financial support comes from organizations whose mission statements include explicit religious goals.⁶⁴ The *Times* investigation reported that \$3.6 million in fellowships had yielded 50 books on ID, along with numerous articles and two television documentaries. Recently, the DI has hired the public relations firm that launched the negative "Swift Boat" television commercials against the Democratic candidate for the U.S. Presidency in the 2004 elections.⁶⁵

The Discovery Institute's famous "Wedge Document," leaked to the Internet in 1999,⁶⁶ states that the DI's goal is "to reverse the stifling dominance of the materialist worldview," and "to replace it with a science consonant with Christian and theistic convictions." The manifesto proclaims that DI "seeks nothing less than the overthrow of materialism and its cultural legacies..." and "to replace materialistic explanations with the theistic understanding that nature and human beings are created by God." Because science deals only in materialistic explanations, such objectives are entirely antithetical to science. The Wedge Document also outlined a "Strategic Plan" whose goals included making ID "the dominant perspective in science," something that would "permeate our religious, cultural, moral and political life." Clearly, the Institute does not intend to contribute to the growth of scientific knowledge, but rather to advance a reactionary political and religious agenda.

Thus, the goals of the contemporary Creationist movement in the U.S. are not limited to questions over the teaching of evolution. The explicit goals are far more broad and insidious: to supplant science with religious dogma in the public schools, and to displace secularism with religion in the political realm. To people unfamiliar with science, and who operate under the misconception that evolution is scientifically controversial, "Intelligent Design" may seem quite attractive as a (purportedly) scientific principle that supports religion. Consequently, if the claims of ID can be made to appear legitimate (not a difficult proposition to those who think that dinosaurs once cavorted with human children), then it may appear unfair that it is not taught in the public schools. Under the circumstances, the issue easily devolves into one of local vs. state or federal control of the school curriculum.

Implications

It is important to consider what would ensue if the teaching of ID or other forms of Creationism were to be mandated in the public schools through government intervention. Of course it is not illegal for individual teachers to teach Creationism

at present, nor is it illegal for evolution to be ignored, distorted, or discounted in science classrooms. As other commentators on these issues have noted, the teaching of bad science is not itself unconstitutional.

However, if the teaching of evolution were to be made illegal, or if “equal time” for Creationism were to be required in the classroom, the government would be obligated to enforce the laws against those teachers and school administrators unwilling to comply. Public schools could be swept of qualified teachers and administrators, as willingness to teach “Creation science” becomes a requirement for employment and school accreditation. Teachers who refuse to compromise their principles and intellectual freedom would likely lose their jobs or leave the profession; others would stand on principle even if it meant prosecution. Court cases could abound, as the full weight of the law was brought to bear, and those educators thought to be in violation could face arrest, trial, and imprisonment. No reason exists to suppose that efforts to control the teaching of evolution would be confined to the high school level. Science faculty at state universities, which are indirectly controlled by state legislatures, could also be subject to prosecution. Private colleges and universities also could be affected, given their reliance on state and federal funds, grants, and sponsored loans to students.

The above scenario may seem implausible, but we are now dangerously close to seeing it actualized. If widespread efforts to legislate what is taught in science classrooms were to succeed, the judicial system would be required to uphold all laws not found to be unconstitutional. Given the close votes in key court cases, a continued shift in the judiciary (an explicit goal of the radical right) could bring to bear the full power of the state—to investigate, arrest, prosecute, fine, and imprison—against teachers and scholars. Viewed in this context, Creationism can be seen as the vanguard of a theocratic movement, and its attack on public school curricula part of an explicit assault on secular society, free inquiry, and academic freedom. Creationism arguably represents the most public manifestation of a broad-based and well-financed effort to replace secular society with a theocratic state.⁶⁷ Clearly, in this political conflict, the stakes are very high.

Simplistic Dichotomies and Political Polarization

As discussed above, Creationist goals are much more ambitious than simply discrediting a particular academic discipline. Evolution, however, offers a visible target because of its perceived incompatibility with fundamentalist religious beliefs. Some incompatibilities are undeniable; after all, a literal reading of Genesis cannot be reconciled with what we know about the history of life and the origins of our species. Nevertheless, theists who take a more scholarly

approach to biblical writings have historically had little difficulty reconciling their religion with their knowledge of science. Indeed, during the past 150 years, many religious establishments in the U.S., England, and Europe have readily accommodated the facts and principles of evolution.⁶⁸ Biologists and philosophers of science also have ranged widely in their personal beliefs about religion, from devout Christians through professed atheists and agnostics.⁶⁹

The perennial issue of whether “science” and “religion” are in conflict is not resolvable in any global sense, because the answer depends so strongly on the specific facts and beliefs under consideration. Facile assurances that science and religion are easy to reconcile⁷⁰ tend to be intellectually unsatisfying, and fail to recognize areas of undeniable disagreement. Nevertheless, the 19th century metaphor of “warfare” between science and religion⁷¹ has long since given way to nuanced perspectives that are based on more careful, and less ideological, readings of history. Such perspectives recognize that over the centuries, “science” and “religion” have not been static entities nor mutually exclusive enterprises; that science and religion have had complex and changing relationships; and that much of science was developed with religious motives and with the support of religious institutions.⁷² Thus, conflicts and areas of consensus between science and religion turn out to be manifestations of particular cultures at particular points in history.

The diversity of views of individual scientists and theists and the complex historical relationship between science and religion argue against viewing these two human enterprises as intrinsically and diametrically opposed. Furthermore, strident attacks on religion from the scientific camp⁷³ risk alienating sympathetic theists by conflating their views with extreme forms of religiosity. They thereby tend to force on the general public a choice between two polar extremes that most are reluctant and ill-equipped to make. Significantly, this is the same choice that Creationists have promoted, and for good reason. With the percentage of atheists and agnostics numbering in the single digits according to U.S. surveys, such a draconian choice is one from which Creationism stands most to benefit. Both principle and pragmatism therefore argue for mutual tolerance between the institutions of science and religion, and much more is to be gained by cooperation and respectful discourse than conflict.

In sum, the above analysis argues that Creationist attacks are more than an attempt to force the teaching of religion as science; they are part of a broad assault on rationality and on secular institutions. All individuals who value freedom of thought, freedom of religion, and the separation of church and state (theists and non-theists alike) have every reason to resist this dangerous intrusion of religion into the public sphere, for the sake of secular society and its institutions.

ENDNOTES

1. Edward J. Larsen, *Summer of the Gods: The Scopes Trial and America's Continuing Debate over Science and Religion* (New York: Basic Books, 1997).
2. Ronald L. Numbers, *Darwinism Comes to America* (Cambridge, MA: Harvard University Press, 1998).
3. Eugenie C. Scott, "Anti-evolutionism and Creationism in the United States," *Annual Review of Anthropology* 26 (1997): 263-289; see Numbers, 1998; Randy Olson, *Flock of Dodos* (Documentary Educational Resources: Boston, MA, 2006), documentary film.
4. Numbers, *From Scientific Creationism to Intelligent Design* (Cambridge, MA: Harvard University Press, 2006); Scott, "Creationism, Ideology, and Science," *Annals of the New York Academy of Sciences* 775 (1996): 505-522; see also Scott, 1997; Scott, *Evolution vs. Creationism* (Berkeley, CA: University of California Press, 2004).
5. Barbara Forrest and Paul R. Gross, *Creationism's Trojan Horse: The Wedge of Intelligent Design* (New York: Oxford University Press, 2004).
6. Simon Coleman and Leslie Carlin, eds., *The Cultures of Creationism: Anti-Evolution in English-Speaking Countries* (Burlington, VT: Ashgate Publishing, 2004); Ümit Sayin and Aykut Kence, "Islamic Scientific Creationism: A New Challenge in Turkey," *Resources of the National Center for Science Education* 19 (6) (1999): 18-20, 25-29.
7. Numbers, *The Creationists: The Evolution of Scientific Creationism* (Berkeley, CA: University of California Press, 1992); see also Numbers, 2006; Raymond A. Eve and Francis B. Harrold, *The Creationist Movement in Modern America* (Boston: Twayne Publishers, 1990); see also Scott, 1997.
8. Peter J. Bowler, *Reconciling Science and Religion: The Debate in Early 20th Century Britain* (Chicago: University of Chicago Press, 2001); James R. Moore, *The Post-Darwinian Controversies* (Cambridge, MA: Cambridge University Press, 1981).
9. Charles C. Gillispie, *Genesis and Geology: The Impact of Scientific Discoveries upon Religious Beliefs in the Decades before Darwin* (New York: Harper and Row, 1956).
10. See Numbers, 1992.
11. Ibid.
12. See Numbers, 1998.
13. Scott, "The Struggle for the Schools," *Natural History* 103 (7) (1994): 10-13. The "equal time" mandate reportedly was opposed by some supporters of Creationism in Oklahoma because it would have required the teaching of evolution, a subject not being taught at that time. See Numbers, 1998.
14. Otis Dudley Duncan and Claudia Geist. The creationists: how many, who, and where? Reports of the National Center for Science Education 24 (5) (2004): 26-33.; also see Numbers, 1998.

15. See Scott, 1997.
16. See Numbers, 1998.
17. See Forrest and Gross, 2004.
18. Michael Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution* (New York: Free Press, 1996).
19. E.g., Forrest and Gross, 2004; Olson, 2006; Jon D. Miller and Robert T. Pennock, this volume (2008).
20. Pennock, *Tower of Babel: The Evidence against the New Creationism* (Cambridge, MA: MIT Press, 1999).
21. *Kitzmiller et al. v. Dover Area School District, et al.*, Case No. 04cv2688. All documents of the court case are available at the National Center for Science Education website, "Evolution, Education, and the Law": <http://www2.ncseweb.org/wp/>.
They are also available online at the ACLU website: <http://www.aclupa.org/legal/legaldocket/intelligentdesigncase/>.
22. See Olson, 2006; Miller and Pennock, 2008.
23. *Kitzmiller v. Dover*.
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25. See Numbers, 1998; Scott, 1999.
26. Scott, 1997.
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30. Numbers, 1992; Scott, 1997.
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32. Parallel grammatical usage would suggest that such proponents be called "Intelligent Design-ers." However, the individuals described would deny implications of the noun, and some of their opponents, the adjective. Hence the term "Intelligent Design Creationists," which is both accurate and descriptive.
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