

# The Process of Scientific Inquiry as It Relates to the Creation/Evolution Controversy: I. A Serious Social Problem

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## ABSTRACT

We describe how the increased level of religiosity in the United States is correlated with the resistance to the teaching of evolution and argue that this is a social, rather than scientific, issue. Our goal is to foster teachers' understanding of the philosophy of biology and encourage them to proactively deal with creationism at all levels, not just in the biology classroom.

**Key Words:** Nature of science; philosophy; evolution; inquiry; evidence.

## ○ Introduction to the Series

The conflicts between science and religion, faith and evolution, medicine and morality are in the news regularly. Senator Marco Rubio (Republican, Florida) thinks that the Earth was made in seven days (Saenz, 2012), and Representative Paul Broun Jr. (Republican, Georgia) rants that evolution, embryology, and the big bang theory are “lies straight from the pit of hell” (Pearce, 2012). We are all too familiar with such comments and aware of many of the issues and arguments on both sides of the creation/evolution controversy. Much has been written about both sides of the argument that need not be repeated here. However, various polls over a period of 30 years have confirmed that somewhere between 40% and 51% of Americans believe that “God created human beings pretty much in their present form within the last 10,000 years” (National Center for Science Education [NCSE], 2013). Science education does not seem to be very effective, nor to be making much progress.

Here, we begin a series of papers designed to accomplish several different, but related, goals. First, we hope to show that the increased level of religiosity in the United States is correlated with the resistance to the teaching of evolution, and that this is a serious social, rather than scientific, issue. Second, we will discuss the process of science (scientific philosophy without all the philosophical jargon, which just bores most readers; Reichenbach, 1951, p. 3) and show that “where knowledge has changed,” scientists can disagree and still

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discuss concepts while appealing to the evidence (Allchin, 2013). We will consider the limits of data and induction, presenting some of the creative ways in which theories evolve and are ultimately judged. Third, we propose to stop presenting the “evidence for evolution” (Allchin, 2013) and stress evolution's explanatory power. We will construct the theory of evolution along the lines of the atomic theory and show that natural selection is not “Darwin's theory” but one of the foundational laws within the theory of evolution. Finally, we will consider the social context in which creationism thrives and give practical examples of how to deal with the most recent attempt to introduce creationism under the wedge of “intelligent design” (Forrest & Gross, 2004).

## ○ Introduction

You have doubtless already engaged with students, parents, and, even more unfortunately, administrators over issues of academic freedom in relation to the creation/evolution controversy and related issues such as human sexuality in health classes, global warming, and so on. You are already experts in teaching techniques, but the conflict ranges far outside the classroom. Discussions with parents, letters to newspapers, presentations to local clubs, volunteer work, political action groups, and more are all avenues that need to be traveled. A clear understanding of creationist (and other fundamentalist) ideas and their sources, precise definitions of terms, and an understanding of how science really works and the limits of both science and theology (and religion as it is actually practiced) are necessary in order to challenge creationist ideas in the public forum and win the “battle” (Ham, 1987) of ideas.

But how to be assertive without being offensive? We need to understand their motives, which are far more complex than just a belief in the truth of Genesis or a lack of knowledge (Alters & Alters, 2001; Forrest & Gross, 2004; Allchin, 2013). In order to engage creationists on a level playing field, we must understand our own standards of knowledge and require them to do the same.

We hope that this series of papers will not only help teachers understand the serious social issue and increase their understanding of the philosophy of biology, but also prepare them to proactively deal with creationism at all levels, not just in the classroom.

## ○ The Current Situation

Even though creationism, under the pseudonym “intelligent design,” received a resounding defeat at the famous 2005 trial in Dover, Pennsylvania, the perennial challenge to evolution by fundamentalist Christians and sundry conservatives is still in full swing.

In 2008, Louisiana passed the “Revised Statutes 17:285.1” in their Science Education Act. Under the camouflage of developing critical thinking, “an open discussion of scientific theories being studied, including, but not limited to, evolution, origins of life, [etc.]” is now state policy (NCSE, 2013).

To add insult to injury, Louisiana plans to use public school funds to pay tuition and certain fees for 1200 of 6600 spaces at private Christian schools known to teach creationism. Not to be left out of science bashing, Tennessee, famous for the Scopes trial, passed a law in April 2012 that encourages teachers in the state public schools to present the “scientific strengths and scientific weaknesses” of topics that arouse “debate and disputation” such as “biological evolution, the chemical origins of life,” and others (NCSE, 2013).

Clearly, these are subterfuges to once again introduce a dialogue on creationism and intimidate teachers to shy away from any discussion of evolution. One can only wonder what teachers, especially in small towns where community pressure may be great, will discuss as an alternative explanation to evolution. However, this could work in favor of science education if teachers who understand and support evolution would take up the challenge and discuss creationism (Simón, 2013). Any student who objects to the lesson should be treated with respect and allowed to present to the class their evidence and explanations for biological phenomena. If we let creationists defend creationism in their own words, they will have little to say. We know our stuff – data and logic will prevail.

Before proceeding, it should be stated that all of modern science deals with change. There’s cosmological, biological, and geological evolution. Fundamentalists of all three monotheistic Western religions oppose modern science. As evidence, we could point out the paucity of Nobel Prize winners in scientific fields coming out of Islamic theocratic countries. However, religious resistance is not restricted to Western monotheism, but is common to religious fundamentalism of all kinds. In India, in 2007, Hindu fundamentalists of the powerful Bharatiya Janata Party were instrumental in getting the Supreme Court to halt construction of a canal between India and Sri Lanka, claiming that the area to be dredged was made by Shri (Lord) Rama, a Hindu demigod (Naqvi, 2007).

In the United States, at present, attacks on evolution are primarily by fundamentalist Christians. However, not all attacks are by overtly religious groups. In the 1990s, a number of state Republican Party platforms included planks related to the teaching of “creation science,” with seven state platforms in 1996 containing such planks (Paterson & Rossow, 1999). Obviously, the Republican Party does not strictly adhere to the “establishment clause” in the first amendment. Religious “think tanks” such as The Discovery Institute have provided creationists with advice and literature, such as the textbook *Of Pandas and People*.

Two important questions present themselves. First, it would be instructive to analyze the reasons for the attacks, and second how to deal with them.

Religious fundamentalists don’t attack all scientific theories, such as the atomic theory, and they don’t shy away from technology. (We will discuss the difference between science and technology, and their interrelationship, in future articles.) Indeed, they embrace all of the fruits of modern science and technology (plant and animal breeding, medicine, electronics, etc.), yet reject most of the science on which these technologies are based. There seems to be something unique or particular about biological evolution that offends them (not that geological and cosmological evolution totally escape their wrath). What could this be?

One way to answer this question is to go directly to the source. In an outstanding video called “In the Beginning” by Randall Balmer (1995), Pastor Paul Linstrom of the Christian Liberty Academy, Arlington Heights, Illinois, is interviewed. In a lecture to the student body, he said,

If evolution happened, then a tremendous amount of death occurred before man evolved. But if death preceded man and was not a result of Adam’s sin, then sin is a fiction. If sin is a fiction, then we have no need of a savior.

He feels that evolution contradicts his religion. Does he really believe this? Is he really taking his religion (or at least Bible stories) so literally that a biological explanation for life can contradict a theological concept? He says so, and there are many who do take the Bible stories as absolute truth.

The preoccupation with moral order seems to be one powerful reason why creationists attack science and focus a particular virulence on evolution (Allchin, 2013). Near the end of the video, Professor Balmer, in his concluding remarks, says, “Over two centuries into our history, we Americans are only now beginning to understand the complexities of living in a pluralistic culture where voices on all sides demand a hearing.” Different groups of people have different standards of morality, and this can be a destabilizing influence to a group (WASPs) who have had their say for so long. Throughout much of the modern history (1492–present) of North America, white Christian males have been in control. These Christians have often been fundamentalists (Kehoe, 1983; Numbers, 1992). Could it be that they do not want others to be heard or are afraid that their monopoly view will be infected? They seem to fear a loss of “social solidarity”: they feel more secure when all members of their group are similar and “anyone too different becomes a threat to stability and so tends to be gotten rid of physically or psychologically” (Hargrove, 1986). Imagine how well it goes over at the supper table when children tell their parents they are related to jelly fish! The fear of becoming an “outsider” is a powerful motivator to reject evolution, no matter how much data their teacher has just fed them that day at school. Food from the table tastes better than food for thought.

## ○ Causes of Faith: Religiosity

Why does religion persist to such an extent in the modern world? Religiosity may be selected for. It may be that the benefit to the individual (comfort, placebo effect, power, etc.) far outweighs the detrimental effect on society, so it has not been selected out of the human

mind (Dawkins, 2006). It may also be a byproduct of how the mind works. Science-denying in adults may be innate and a byproduct of early brain development:

Our minds are naturally inclined to a creationist view.... Children cannot conceive of an animal, let alone humans, as a product of constant change.... Therefore, when we misapply the property of one natural kind to another, we are thinking unnaturally.... If we continue to believe it is true, then our thinking has become supernatural. (Hood, 2009)

Hood believes that religion will be with us a long time, maybe indefinitely, for “rationality and supernatural beliefs can coexist in the same individual [and] supersense lingers in the back of our minds” (Hood, 2009). Creationists may be with us for a long time, but why so many in the United States, and what can the scientific community do about it?

The United States is one of the most religious First World nations, with 92% of the population responding “yes” to the question, “Do you believe in God?” By contrast, belief is much lower in other First World countries, such as Sweden (23%), Norway (34%), and France (38%) (Coyné, 2012). A study by Paul (2009) of 17 prosperous First World democracies using 25 indices of social well-being showed that the United States was last in 14 of 25, and above average in only 5. The United States performed so poorly in so many respects that its cumulative score placed it as an outlier so dysfunctional in relation to the other advanced democracies that some researchers have described it as “sick” (Paul, 2009). Solt et al. (2011) demonstrated that income inequality would appear to drive religiosity, concluding

that inequality has a powerful positive effect on the religiosity of all members of society regardless of income and so lend support to the understanding provided by the theory of relative power: religion may serve as a comfort to the poor as deprivation theory suggests, but it is also and more importantly a means of social control for the rich.

Coyné (2012) suggested that greater belief in God – and, hence, more opposition to evolution – may be a product of dysfunctional societies; creationism in America, then, may be a symptom of religion, but religion in the modern world may itself be a symptom of unhealthy societies. In addition to income inequality, one need only look at the rise of the “Moral Majority,” the failure of Reagan’s “war on drugs,” the deadlocked Congress, and so on, to appreciate some of the social and political stresses in our society. If Coyné’s (2012) thesis is correct in positing that dysfunctional societies increase in religiosity, then religious attacks on evolution are indeed a scapegoat. They are an attempt to cover a far more serious issue than science conflicting with theology.

## ○ Solution: A Time for Social Change

“Ultimately, the best strategy to make Americans more receptive to evolution might require loosening the grip of religion on our country” (Coyné, 2012). Solt et al. (2011) have shown that income inequality is positively and significantly correlated with religiosity.

An improving economy will help strengthen the middle class, but the economic and political changes are far outside the science classroom. However, scientists are also citizens and have political muscle through Internet media and science organizations that lobby – and we have our vote. When the Democrats left the word *God* out of their platform at the 2012 Democratic National Convention, the Republicans made a fuss, and guess what – *God* appeared! It’s a sad state of affairs that no one could be elected president of the United States today who is not a person of faith. It has become almost a badge of honor in this society to say that someone running for public office is a “person of faith.” This is the last criterion on which we should want to judge our elected officials. How about knowledge, a grasp of the data, unbiased reason under stress?

It may seem impossible to decrease the level of religiosity, but many European countries have shown a decrease in a belief in God and have better societies (based on a large number of measures) and stable economies. It has happened elsewhere, but it won’t be easy here. Religion is, in reality, a form of totalitarian thought, and theology “was born as a defensive maneuver” (Smith, 1979). Although creationists are attacking science education, they are really defending their worldview.

If we wish to examine some area of knowledge or some practice, we will need to investigate what its aims are, the methods employed to achieve those means, the extent to which those aims have been attained, and the factors and forces that determine their development (Chalmers, 1982). These standards can be applied to *any* system, from “honor killing” of raped women in Islamic theocracies to rape counseling. Anything can be studied. Religion should not be immune to such analysis (Harris, 2004, 2010). The results of such studies should be used to guide our legislatures in enacting laws rather than using religious faith. We need to be more active in writing (by e-mail, blogs, Facebook, etc.) to our politicians. This applies directly to the teaching of evolution.

It is often said that people believe that their moral system is derived from religion (Godfrey, 1983; Alters & Alters, 2001). Fundamentalist Christians assume that the Bible provides moral directives, and for nearly two millennia, people have mined the Bible to justify any behavior. However, you can find a passage in the Bible to justify anything (as people have done). The Bible says everything and, therefore, says nothing. It may be instructive, in sociology classes in high schools, to discuss how moral systems in societies without a Bible have developed and presently function.

However, fundamentalist Christians would not like such a discussion. There will, of course, be resistance. To them, evolution is godless and therefore evil, and in their distorted view, Satan originated evolution (Morris, 1975) and evolution is responsible for any aspect of modern society they do not like (La Haye, 1975; Ham, 2002). “Evolution is an anti-God religion” and by extension leads to atheism and immorality (Ham, 1987). Evolutionists are atheists and bad people. Don’t underestimate the connotative power of words in the creation/evolution controversy.

As educators, we must continuously strive to encourage our students to justify their decisions on the basis of reason and data, not faith and tradition. That’s easy to say and hard to do with the present “teach to the test” mentality of “No Child Left Behind” or “Race to the Top.” Real gains will be made when we can teach our students, the leaders of the future, how to change society, because the creation/evolution debate is more than a conflict between religion and science.

It is a social issue, unfortunately a “culture war,” where one side advocates a return to the society of the Middle Ages and the other to real equality and well-being.

The American Humanist Association is promoting the visibility of humanists as positive role models (Morain & Morain, 1998). Local groups of atheists, free thinkers, humanists, gays, and others are beginning to take an active role in the community. We have seen booths at fairs, food drives, city-wide Halloween parties, and other places where such groups are visible. They give out popcorn or collect clothing for the needy. Fundamentalists feel that such people are “less than moral” and try to portray them as evil because they are godless atheists (a redundant phrase they often use). More booths of scientists giving out candy or running a blood drive might help change their minds. Packages of supplies delivered to disaster areas with “Freethinker” or “Humanist” or “Gay” or “Local Science Club” in prominent letters on the side are a powerful social image. We need to be more visible and socially active. For fear of a confrontation in the classroom, we have avoided the issue far too long, while creationists have been active in attacking evolution. They have used their faith to attack science education. It is time to discuss the validity of faith in the classroom, in politics, and in society.

“What exists?” is a question of *metaphysics*, and “How does one know it?” is a question of *epistemology* (Smith, 1989). Many students and members of society believe that “what exists” is a world governed by purpose and final cause (*teleology*) and that the purpose comes from a god who has given them prior characteristics or essences (*essentialism*). They feel that humans have a special place in nature and that the “emphasis on designed creations of the deity” provides a theological reinforcement to their belief in creationism and the rejection of evolution (Rudolph & Stewart, 1998). Peoples’ beliefs about the nature of the universe (metaphysics) are much stronger than data or a lack of it. We must introduce *some* philosophy into the science curriculum in order to encourage students to begin to question their metaphysical beliefs, or at least make them justify them as being scientific or not (spiritual, religious).

Our goal is to show teachers that all of the sciences, especially the “historical sciences” such as evolutionary biology, geology, physical anthropology, and cosmology, are not like physics (the classic model of what science should be), and that science is a lot more flexible and creative, and a lot less certain (Brown, 2014), than was once thought. “Students’ existing conceptions about evolution are more reasonably understood as a product of their contemporary intellectual environment” (Rudolph & Stewart, 1998). Unfortunately, this environment is one of too many prepackaged demonstrations, memorized definitions, too little knowledge about what scientists really do, and how society influences science and visa versa. However,

Introducing philosophy and history of science in the curriculum of future teachers might be helpful to give them a feel for the way science works, and for the relationship between theory and evidence in scientific practice. (Blancke et al., 2011)

By introducing the nature of science in small but unified packages, we hope to reach the “reluctant” reader of whole books on philosophy. We feel that introducing students to the creative, flexible, and probable nature of science can change their metaphysical beliefs more efficiently than just having them memorize more data.

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