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Lynne Rudder Baker

God and Science in the Public Schools

Lynne Rudder Baker

Not so long ago, I thought that the controversy surrounding evolution and creationism in the public schools was dead. Was I ever wrong! Last August, the Kansas Board of Education created a firestorm by banning any mention of "macroevolution" from its recommended science curriculum and from its standardized tests. Although 304 local school boards in Kansas will make the final decision on the science curriculum, questions about evolution will not appear on the state-sponsored science tests.

Then, on March 11, 2000, *The New York Times* had a front-page report of a new survey showing that an "overwhelming majority of Americans think that creationism should be taught along with Darwin's theory of evolution in the public schools."¹ Although there was some unclarity about the definitions of 'creationism' and 'evolution,' fully 83% of Americans support teaching creationism in the public schools in some form—either as a scientific theory or as a religious belief. A still-impressive 30% believe that "creationism should be taught as a scientific theory, with or without evolution in the curriculum." Clearly, the controversy surrounding creationism and evolution is not dead.

Regardless of the opinions of the American population at large, scientists are largely united against the teaching of creationism and in favor of the teaching of evolution in the public schools. The swift response of the scientific community to the decision in Kansas attests to the scientific opposition to creationism. For example, on August 20, 1999, Bruce Alberts, President of the National Academy of Sciences issued statement that began:

We view the recent actions of the Kansas State Board of Education as an unfortunate setback for all those attempting to prepare our young people for a century in which science and technology will play and ever-increasing role. Evolution is not only universally accepted by scientists; it has also been accepted by the leaders of most of the world's religions.²

Educational leaders in Kansas were also outraged. The Chancellor of the University of Kansas, Robert E. Hemenway, wrote:

The Kansas Board of Education decided in August to impose upon the rest of us in the state its doubts about evolution, its aversion to

¹The poll was commissioned by The People for the American Way Foundation, a liberal civil rights group, and was carried out by DYG, Inc., a polling and research firm in Danbury, CT. A representative sample of 1,500 from all parts of society and all regions of the country were given extensive interviews. The margin of sampling error was plus or minus 2.6%.

²See website of the National Academy of Sciences, <http://national-academies.org/evolution>.

scientific explanations for the origins of the universe, and its disbelief in geological evidence for the age of the earth.³

The draft that was passed, according to Chancellor Hemenway, not only "eliminated evolution, as normally defined by biologists," [from the science curriculum]. It also eliminated "any references to the big-bang theory of the origin of the universe; and all references to the earth's being billions of years old."

The reaction to the Kansas decision by the international academic scientific community was indicated by two headlines: The August 26, 1999 issue of the respected British journal, *Nature*, had a headline in its correspondence section, "Kansas Makes a Monkey of Itself." And the August 20, 1999 issue of the equally respected journal *Science* trumpeted, "Kansas Dumps Darwin, Raises Alarm Across the United States."

Indeed there is evidence that the Kansas decision has already had an impact. Lawrence M. Krauss, chair of the physics department at Case Western Reserve University, wrote in November of 1999:

...[T]he Grace Dangberg Foundation, established in 1982 to improve history education, announced this year that it was developing a new textbook on the history of Kansas. The book was to begin with the fossil record of the inland sea that once covered the area. After the Kansas Board of Education deleted Darwin from its recommended science curriculum, the foundation said the book will start with the arrival of Native Americans, so as not to offend religious groups.⁴

"Even more telling," Krauss goes on, "a recent Gallup poll reported that 47 per cent of Americans persist in believing that the human species is no more than 10,000 years old, despite overwhelming scientific evidence to the contrary." He concludes that "scientists must become evangelists, reaching beyond the traditional borders of academe to rebut such nonsense...."⁵

The National Science Teachers Association issued a position statement on the teaching of evolution in 1997. It underscored that evolution is a unifying concept among sciences. "Scientific disciplines with a historical component, such as astronomy, geology, biology, and anthropology, cannot be taught with integrity if evolution is not emphasized."

³Robert E. Hemenway, "The Evolution of a Controversy in Kansas Shows Why Scientists Must Defend the Search for Truth," *The Chronicle of Higher Education*, Oct. 29, 1999. Chancellor Hemenway further notes that "most local school boards in Kansas proudly endorse the teaching and testing of evolution. In Lawrence, for example, the board voted unanimously, on the day after the state board acted, to continue the teaching of evolution."

⁴Lawrence M. Krauss, "An Article of Faith: Science and Religion Don't Mix," *The Chronicle of Higher Education*, Nov. 26, 1999, p. A88.

⁵Lawrence M. Krauss, "An Article of Faith: Science and Religion Don't Mix," *The Chronicle of Higher Education*, Nov. 26, 1999, p. A88.

There is no longer a debate among scientists over whether evolution has taken place. There is considerable debate about how evolution has taken place: the processes and mechanisms producing change, and what has happened during the history of the universe. Scientists often disagree about their explanations. In any science, disagreements are subject to rules of evaluation. Errors and false conclusions are confronted by experiment and observation, and evolution, as in any aspect of science, is continually open to and subject to experimentation and questioning.⁶

Putting these reactions to the decision of the Kansas Board of Education from the scientific community together with the recent survey showing majority support for teaching creationism, it is clear that the controversy surrounding the teaching of evolution and creationism in the public schools is far from over. Although some in the secular academy may scoff at what they take to be the “know-nothingism” of the American public on creationism, there are sophisticated arguments on the creationism side of the ledger, as we shall see. Moreover, this controversy raises important questions in the philosophy of science, as well as questions about public education in a democracy: How should we respect each other’s deepest beliefs while still promoting responsible education? Who should control public education? The controversy surrounding creationism is the occasion for raising these questions, which deserve serious consideration, regardless of one’s stance on creationism.

Terms: ‘Evolution’ and ‘Creationism’

Let me pause for a moment to say something about the terms ‘evolution’ and ‘creationism.’ Since these terms are used in various ways, I want to specify how I’ll be using them. The quotations just given indicate that scientists use the term ‘evolution’ to characterize several theses—specifically, that the earth is billions of years old; that life did not appear suddenly; that many different kinds of organisms have come into being and become extinct; and that these processes can be understood without reference to a Creator or any kind of Intelligent Designer guiding them. So, I’ll use the term ‘evolution’ for the unifying concept that entails the following theses:

1. The earth is billions of years old.
2. Life did not appear suddenly.
3. The kinds of organisms have changed over eons.
4. Living things have common ancestors from which they have diverged.
5. The mechanisms of “descent with modification” (Darwin’s term) can be understood without reference to a Creator.

⁶“Teaching About Evolution and the Nature of Science.” Appendix C. See website of the National Academy of Sciences. <http://national-academies.org/evolution>.

There are many disagreements among evolutionists: Does evolution occur by “punctuated equilibrium”? Does natural selection (plus random mutation) account for all evolutionary change? Scientists on both sides of such questions, however, share commitment to the reality of evolution.⁷ As Theodosius Dobzhansky put it, “Nothing in biology makes sense except in light of evolution.” Disagreements on mechanisms and other matters are all internal to the consensus on these five theses.

The term ‘creationism,’ I think, is somewhat trickier. There are many differences among creationists—as there are among evolutionists. For example, there are the “young-earthers,” who take the universe to be created by God less than 10,000 years ago; they read Genesis literally and give the Bible priority over science in matters of empirical fact. Other creationists are “old-earthers,” who take the universe to be created by God perhaps eons ago. What creationists have in common is the view that any account of the origins of the universe and of life must involve reference to a Creator or an Intelligent Designer.⁸

So, I’ll use ‘evolution’ for a view entailing the five theses; and I’ll use ‘creationism’ for a view entailing that any correct account of origins will appeal to a supernatural being. As accounts of origins, I take evolution and creationism to be at least *prima facie* competitors.

Two Arguments

We have seen enough to suggest that the overwhelming consensus within the scientific community is that the universe—galaxies, stars, planets, and life forms—has evolved, and hence that evolution (understood as the five theses) is true. Now here are a pair of simple arguments supporting the teaching of evolution but not creationism:

An Argument for Teaching Evolution:

- a. If there’s an overwhelming scientific consensus that evolution is true, then evolution should be taught in science classes as the truth (in the same sense that chemistry and the other natural sciences are taught as the truth).
- b. There’s an overwhelming scientific consensus that evolution is true.
- ∴c. Evolution should be taught in science classes as the truth.

An Argument Against Teaching Creationism:

- d. No explanation that appeals to a supernatural being should be taught in science classes at all.
- e. Creationism is an explanation that appeals to a supernatural being.
- ∴f. Creationism should not be taught in science classes at all.

⁷Theodosius Dobzhansky, *The American Biology Teacher* (1973). Quoted in the National Association of Biology Teachers’ Statement on Teaching Evolution. “Teaching About Evolution and the Nature of Science,” Appendix C. See website of the National Academy of Sciences, <http://national-academies.org/evolution>.

⁸It is this feature that has led the courts to rule that creation science is inherently a religious idea [Edward v. Aguillard 482 U.S. 578 (1987)]. I’ll return to the legal issues later.

End of story. Both arguments are obviously valid, and their premises plausible. So, evolution should be taught in science classes as the truth, and creationism should not be taught in science classes at all.

Well, not quite. Creationists may well take issue with the first premise of each argument. For example, they may agree that there's an overwhelming scientific consensus that evolution is true, but disagree that if there's an overwhelming scientific consensus that evolution is true, then evolution should be taught in science classes as the truth (in the same sense that chemistry and the other natural sciences are taught as the truth). Similarly, they may agree that creationism is an explanation that appeals to a supernatural being, without agreeing that explanations that appeal to supernatural beings should not be taught in science classes.

Indeed, I know of two such creationist strategies that would take just these positions. The first creationist strategy is based on a view of the nature of science; the second creationist strategy is based on a view of how public education should be controlled.

Creationist Strategy I: The Nature of Science

First, consider a creationist strategy based on a view of the nature of science. Phillip Johnson, a law professor at Berkeley, has articulated a position—he calls it the 'intelligent-design theory'—which would deny both first premises. He argues that inherent in science is a commitment to naturalism (an idea that I'll discuss in a moment), and that naturalism is a bias that blinds us to relevant alternatives.

If Johnson is right, then he has grounds for rejecting premise (a) ("If there's an overwhelming scientific consensus that evolution is true, then evolution should be taught in science classes as the truth [in the same sense that chemistry and the other natural sciences are taught as the truth]"). If the overwhelming scientific consensus is based on a bias, then there is no reason to think that the scientific consensus should be taught as the truth. And if he is right, then he also has grounds for rejecting premise (d) ("No explanation that appeals to a supernatural being should be taught in science classes at all"). Any explanation that appeals to a supernatural being is not naturalistic; but if naturalism is a mere bias, so what? We should not rule out nonnaturalistic explanations on the basis of a bias.

So, if Johnson is right that science is committed to naturalism and that naturalism is a pernicious bias, he has good reason to reject the conclusions of the two arguments. He has good reason to reject the conclusion that evolution should be taught as truth in science classes, and to reject the conclusion that creationism should not be taught at all. But is he right?

First, what does Johnson mean by 'naturalism'? Johnson begins his book, *Reason in the Balance*, by characterizing naturalism as a metaphysical assumption: "the doctrine that nature is all there is," and he goes on to claim that nat-

ural science is “based on naturalism.”⁹ The only content that Johnson gives to the doctrine that “nature is all there is” is atheism. Naturalists, he says, are those who “assume that God exists only as an idea in the minds of religious believers.” And: “If naturalism is true, then humankind created God—not the other way around.”¹⁰ If naturalism is the assumption that God exists only as an idea in the mind of religious believers, then it is pretty clear that natural science is *not* based on naturalism. It is absurd to suppose that science, which is totally silent on the question of God, is based on the assumption that God exists only as an idea in the mind of religious believers. So, this metaphysical naturalism—whether it is a bias or not—is not an underpinning of science.

But there is another kind of naturalism, *methodological* naturalism, that Johnson discusses in his Appendix. “A methodological naturalist,” he says, “defines science as the search for the best naturalistic theories,”¹¹ where a naturalistic theory abjures supernatural causes.¹² This amounts to saying that methodological naturalism is the view that no naturalistic explanation can appeal to God or to any supernatural phenomena. In this sense of methodological naturalism, I would agree with Johnson, science is committed to naturalism. But is methodological naturalism just a bias in science? Is it a bias to exclude supernatural explanations from science?

Surely not. If the methodological naturalism that is a hallmark of science were a mere bias, the explosion of scientific knowledge from the 16th and 17th centuries on would be totally inexplicable. The proof of the pudding is in the eating, and the sciences are unparalleled as generators of knowledge of the natural world. It makes little sense to say that scientists have misunderstood their own enterprise, that they should count as scientific explanations those that appeal to a supernatural being. It makes little sense to rebuke such a successful practice for having the character that it has. What counts as a scientific explanation is determined by science. So, taking methodological naturalism as the view that no explanation that appeals to a Creator or an Intelligent Designer is a scientific explanation, Johnson’s charge that methodological naturalism is a *bias* in science is off the mark. As long as science classes teach *science*, creationism—or anything else that appeals to supernatural explanations—will not be taught.

Scientific explanations—explanations put forward on the basis of scientific consideration—are fully naturalistic, and have no place for appeal to a supernatural agent. It does not follow from this, however, that *all* correct explanations are scientific explanations. We must distinguish between scientific

⁹Phillip E. Johnson, *Reason in the Balance: The Case Against Naturalism in Science, Law, and Education* (Downers Grove, IL: Intervarsity Press, 1995): 7,8.

¹⁰*Reason in the Balance*, pp. 7,8.

¹¹*Reason in the Balance*, p. 208.

¹²“A theory would not be naturalistic if it left something (such as the existence of genetic information or consciousness) to be explained by a supernatural cause.” *Reason in the Balance*, p. 208.

claims—claims made from *within* science—and claims made *about* science. One important claim about science (one that I reject) is that science is the arbiter of all knowable truth, that there is nothing to be known beyond what science delivers. Call this claim 'scientism.'

(Scientism) Science is the arbiter of all knowable truth.

If scientism were correct, then from the commitment of science to methodological naturalism, it would follow that all correct explanations (not just scientific explanations) are naturalistic. That stance would rule out, a priori, any explanation that appealed to God. This, I think, would be a bias. But this does not follow from the methodological naturalism of science; it follows only with the addition of the metaphysical, extra-scientific thesis of scientism. Scientism is like a closure principle—"and that's all there is." If we reject scientism, as I think that we should, then from the fact that all scientific explanations are naturalistic, it does not follow that all legitimate explanations are naturalistic. So, exclusion of God from the science classroom is not necessarily exclusion of God elsewhere—for example, where we are trying to give a metaphysical account of why there is something rather than nothing at all. This latter question—Why is there anything rather than nothing at all?—is not a scientific question and will not be susceptible to a scientific explanation. But unless we are scientific, we may think that there is some explanation—albeit not a scientific one. Again, however, questions not susceptible of scientific answers do not belong in a science class.

I suspect that Johnson's insistence that methodological naturalism is a bias in science, and his efforts to "reform" science by changing its character, stem from a (perhaps unacknowledged) belief in scientism. If all correct and complete explanations are scientific explanations, and if scientific explanations are naturalistic, then all correct and complete explanations are naturalistic—and there is no room for any appeal to God in any correct explanation whatever. Again, this is valid but unsound. For without the extra premise of scientism, we may reject the view that all correct and complete explanations are scientific explanations.

To sum up: Science is not committed to the nonexistence of God, as it would be if it were based on metaphysical naturalism. Science is committed to naturalistic explanations. Science does not count any explanation that appeals to God or to supernatural phenomena as a scientific explanation (thus, it is committed to methodological naturalism). But methodological naturalism is no bias: it is in the nature of science. And unless one conjoins methodological naturalism with scientism, nothing at all follows about the nonexistence of God. So, methodological naturalism (but not scientism) is part of science, and given the success of science, it is idle to charge that science should be something other than what it is. So, for all that Johnson has said, I think that the conclusions of the Argument for Teaching Evolution and the Argument Against Teaching Creationism stand.

Creationist Strategy II: The Purpose of Public Education

Now consider the second creationist strategy for denying both the first premise of the Argument for Teaching Evolution and the first premise of the Argument Against Teaching Creationism. This second creationist strategy is based on a conception of fairness. Alvin Plantinga, a Professor of Philosophy at Notre Dame University, has articulated this position.¹³ Plantinga begins by noting that people have what John Rawls has called 'comprehensive' beliefs. Comprehensive beliefs are religious or quasi-religious beliefs that are of enormous importance to their holders, among the most important things in their lives.

Plantinga has a "contract" view of public schools. Because citizens cannot train their children individually, they hire teachers to instruct them. Parents want their children to be educated into their own comprehensive beliefs. Since there is a great diversity of comprehensive beliefs, none can be taught as the "sober truth," to use Plantinga's term. (A teacher obviously cannot teach a conflicting set of comprehensive beliefs as the truth; and it would be unfair to choose among them.) In light of this situation, Plantinga takes there to be a basic right:

(Basic Right) Each of the citizens party to the contract has the right not to have comprehensive beliefs taught to her children that contradict her own comprehensive beliefs.

Suppose, says Plantinga, that a Native American Indian tribe believed that God specially created human beings a hundred miles from their village. Plantinga takes it as obvious that it would be unfair for the local public school to teach any account of human origins that denies this one.

That it would be unfair for the local public school to teach any account of human origins that denies that God created humans one hundred miles from the village is not obvious to me. Why is it to Plantinga? The unfairness follows from Plantinga's idea of an implicit contract between tax-payers and the public schools. By the principle of the Basic Right mentioned above, any segment of the tax-paying population has a right not to have their children taught anything that would deny its comprehensive beliefs. Even if we think that certain comprehensive beliefs are irrational, those who have such beliefs have the right not to have their children taught as "settled truth" any beliefs incompatible with their comprehensive beliefs.

Applying this lesson to the teaching of evolution, Plantinga says that where a substantial segment of the population has comprehensive beliefs that are incompatible with evolution, parents have the right not to have their children taught evolution as the settled truth. (Similarly, it would be unfair to teach creationism as the settled truth.)

¹³Alvin Plantinga, "Creation and Evolution: A Modest Proposal," delivered at the meeting of the Society for the Philosophy of Education, Dec. 1998. I am grateful for his permission to use the so-far unpublished paper. Hereafter, I'll put page numbers of the manuscript in parentheses in the text.

Plantinga anticipates the objection that empirical facts should be settled by science and invites consideration of this claim, which I'll call 'the science principle':¹⁴

(Science Principle) The right way to answer questions of empirical fact—for example, questions about the origin of life, the age of the earth, whether human beings have evolved from earlier forms of life—is by way of science, or scientific method. (p. 10)

He notes, rightly, that the Science Principle itself is not a matter of empirical fact and goes on to say that some who are party to the contract with the schools have comprehensive beliefs that include the denial of the Science Principle. In Plantinga's opinion, belief in the Science Principle has the same status as the belief that the way to ascertain empirical fact is to consult Scripture. Plantinga concludes: "It would be unfair to teach comprehensive beliefs that entailed the denial of [the Science Principle]; but by the same token, it would also be unfair to teach [the Science Principle]." (p.11)

So, Plantinga holds, neither evolution nor creationism should be taught in public schools as the truth if some segment of parents holds comprehensive beliefs incompatible with either. If public schools cannot risk offending anybody's comprehensive beliefs, how are they to teach anything at all?

Plantinga answers that we should teach things—evolution and creationism—conditionally. Here's the general picture: Each person has an epistemic base, with respect to which proposed beliefs are to be evaluated. A person's epistemic base includes her current beliefs, an index of degree of belief, beliefs about how to learn about the world and how to conduct inquiry, beliefs about conditions under which to change beliefs, and comprehensive beliefs. Parents want their children to be taught what is in accord with their own epistemic bases.

Science also has an epistemic base. The epistemic base of science does not include the belief that there is a God. To teach something—say, evolution—conditionally, is to teach that given a particular epistemic base—namely, the epistemic base of science—evolution is the most likely hypothesis. The claim that evolution is the best hypothesis with respect to the epistemic base of science should not conflict with anybody's comprehensive beliefs. Similarly for creationism: Given the epistemic base of fundamentalists, the claim that God specially created human beings is the most likely hypothesis. What the public schools in fairness cannot do, says Plantinga, is to teach that one or another epistemic base is the correct one. Plantinga concludes that both evolution and creationism should be taught in the public schools, but conditionally.

Despite its boldness and novelty, Plantinga's argument leaves me unconvinced. I'll just enumerate the reasons why.

¹⁴Alvin Plantinga labels this principle '(PC)' without saying what 'PC' stands for. Perhaps he is mischievously using 'PC' for 'Politically Correct.' It's good to remember that sometimes what is "politically correct" is correct *simpliciter*.

1. Most obviously, if Plantinga's view were taken seriously, public education would dissolve into total chaos. There are simply too many different kinds of comprehensive beliefs to teach what follows from all of them conditionally. Locally, we have a Wiccan community, whose comprehensive beliefs include views about witches. School districts in California have students from scores of different ethnic and linguistic communities. It would be absurd for the public schools to put the comprehensive beliefs of each of these communities on a par with science.

2. More important, on Plantinga's recommendation, no teaching about the natural world that might offend anyone's comprehensive beliefs could be taught as "the sober truth." Potentially offensive teaching about the natural world could only be taught conditionally, with respect to one or another epistemic base. Such a recommendation would result in teaching nothing about the natural world. With respect to a Ptolemaic epistemic base, the most likely hypothesis is that the sun revolves around the earth. With respect to a Copernican epistemic base, the most likely hypothesis is that the earth revolves around the sun. We can't say which is true without saying which is the correct epistemic base. But Plantinga would forbid judgments as to the correct epistemic base.

This consideration shows, I think, that Plantinga's proposal is self-defeating. Based on the putative right of parents not to have their children taught anything that conflicts with their comprehensive beliefs and the desire of parents to have their children taught what is in accord with their own epistemic base, the proposal ends up forbidding any teaching about the natural world as settled truth. Yet, I doubt that it is in accord with any parent's epistemic base that nothing at all should be taught to their children as settled truth about the natural world.

3. Plantinga's argument misconstrues the epistemic situation. Plantinga considers the objection that, when it comes to matters of empirical fact, "scientific consensus trumps comprehensive belief." (p. 8) He points out that scientific consensus has changed over the years, and there is no reason to think that current opinion is unrevisable. Of course, he is right about this, and it is an important point about science that should be taught to children. But the fact that scientific opinion changes in no way impugns the view that scientific consensus trumps comprehensive belief. It is one of the great strengths of science that it does change. It changes because it is self-correcting. The fact that comprehensive beliefs are not self-correcting in the way that science is should count against (not for) deferring to comprehensive beliefs on matters of empirical fact.

According to Plantinga, when it comes to deciding empirical truth, a principle that appeals to Scripture is on an epistemic par with a principle that appeals to science. Recall his discussion of the Science Principle:

(Science Principle) The right way to answer questions of empirical fact—for example, questions about the origin of life, the age of the

earth, whether human beings have evolved from earlier forms of life—is by way of science, or scientific method.

Let me formulate a similar principle that appeals not to science, but to Scripture. Call it the 'Scripture principle':

(Scripture Principle) The right way to answer questions of empirical fact—for example, questions about the origin of life, the age of the earth, whether human beings have evolved from earlier forms of life—is by way of Holy Scripture.

But the Science Principle and the Scripture Principle are not on a par. For example, the Bible says: "The sun stood still."¹⁵ This seems to imply that the sun goes around the earth. So, anyone who takes an "inerrancy" or literalist position on the Bible should have "the sun goes around the earth" as one of her comprehensive beliefs. But as empirical evidence has mounted since the 16th century, denial of the view that the sun goes around the earth has triumphed. Certainly, public schools need not respect the geocentric view and fail to teach the heliocentric view as true—whether the geocentric view is among someone's comprehensive beliefs or not.

The reason that the Science Principle and the Scripture Principle are not on a par is that only the Science Principle allows the empirical facts to be settled by empirical evidence. As evidence mounts, empirical facts become more settled. The Scripture Principle simply forecloses on empirical evidence. Given the Scripture Principle, there is no evidence to be gathered, because the empirical facts are settled independently of any empirical investigation. It seems to me that the Science Principle is epistemically superior to the Scripture Principle. A principle that implies that empirical evidence is relevant to ascertaining an empirical fact like the age of the universe is epistemically superior to a principle that implies that empirical evidence is irrelevant to ascertaining such empirical facts. So, I think that there are both epistemic and historical reasons to prefer the Science Principle to the Scripture Principle.

But this should be no threat to anyone's faith. Suppose that someone S believes that Christianity is true; and suppose that S believes that the truth of Christianity implies that the earth is less than 10,000 years old. Now suppose that S learns in school that the view that the earth is less than 10,000 years old has been falsified by science. What is S to do? Here are her choices: (a) Ignore science as a threat to her religion; (b) Distinguish between two kinds of truth, and say that the scientific truth is that the earth is billions of years old, but that the religious truth is that the earth is less than 10,000 years old; (c) Give up her religion; (d) Conclude that she made an error in supposing that the truth of Christianity implies that the earth is less than 10,000 years old.

It seems to me that the last choice is the obvious one to make. We are prone

¹⁵Joshua 10:13. "And the sun stood still....The sun stayed in the midst of heaven, and did not hasten to go down for about a whole day."

to error; indeed, it is part of Christian belief that we are prone to error. So, it is no surprise that Christians make errors about what their beliefs imply. (Recall that some devout Christians took the Bible to support abolition of slavery, and that other equally devout Christians took the Bible to support the institution of slavery. So, obviously somebody was making an error about what Christianity implies.) Indeed, Galileo himself appealed to Augustine just along these lines. Galileo quotes from Augustine's *De genesi ad litteram*: "When they are able, from reliable evidence, to prove some fact of physical science, we shall show that it is not contrary to our Scripture. But when they produce from any of their books a theory contrary to the Catholic faith, either we shall have some ability to demonstrate that it is absolutely false, or at least we shall hold it so without any shadow of a doubt."¹⁶ In short, I do not think that Christians need to protect their faith by holding a dubious epistemic principle like the Scripture Principle. The Science Principle is no threat.

There is an historical point to be made here too. It used to be thought that the geocentric view was essential to Christian faith. However, Christians found that they could live without that view. Although the core of Christian faith remains stable, what Christians take that core to imply changes over time. When beliefs are empirically disconfirmed—such as the belief that the earth is less than 10,000 years old or that the number of species is fixed—it seems to me reasonable for Christians to think that they were wrong to think that those beliefs are part of the Christian faith. They are no more essential than was the view that the sun revolved around the earth. Perhaps Galileo got it right when he (supposedly) said, "Though Scripture cannot err, its expounders and interpreters are liable to err in many ways...when they base themselves always on the literal meaning of the words."¹⁷

4. Plantinga speaks as if the right not to have their comprehensive beliefs contradicted in school belongs to parents alone. (e.g., p. 11) If there is such a right, it belongs to all tax-payers. All tax-payers, not just parents of public school children, are party to the contract (if that's the right model). The public schools (on any adequate model) are a societal affair, not just a parental affair. Otherwise, it would be unfair to tax those who did not have children in the public schools. Everyone in the society has an interest in having a well-educated citizenry that can sustain a democracy, that can maintain a complex technological society, and that respects the rights of others.

In fact, however, Plantinga's contract model between tax-payers and schools, with its basic right of parents not to have their children taught comprehensive beliefs that conflict with those of the parents, is not the right model. If there were such a contract, it would derive from a general contract and a general basic right of citizens not to have their comprehensive beliefs

¹⁶Augustine, *De genesi ad litteram*, 1.21.41. I am grateful to Gareth B. Matthews, who read a draft of this paper and supplied me with this quotation.

¹⁷Quoted by Lawrence M. Krauss in "An Article of Faith: Science and Religion Don't Mix," *The Chronicle of Higher Education*, November 26, 1999, p. A88.

denied. There obviously is, and can be, no such right. Using tax-money for electric chairs offends many tax-payers' comprehensive beliefs; but such tax-payers have no basic right to have their comprehensive beliefs honored. If their comprehensive beliefs are offended, their only recourse is to try to affect the political process.

5. Finally, Plantinga's position violates settled legal opinion on issues of separation of church and state. Since Plantinga advocates teaching evolution and creationism on the same basis, I suspect that he is not impressed with the "wall of separation" between church and state that Jefferson wanted the 1st Amendment to build. Plantinga is doubtlessly aware that the Federal courts have repeatedly struck down laws designed to put Creationism on a par with evolution; nevertheless, since the Constitutional issues seem pretty well settled, there are formidable Constitutional obstacles to carrying out Plantinga's recommendation. Here is a quick review of some of the important decisions.¹⁸

a. In *Epperson v. Arkansas* in 1968, the U.S. Supreme Court struck down an Arkansas law that prohibited the teaching of evolution. It did so on the grounds that the U.S. Constitution does not permit states to tailor what is taught to any particular religious sect.

b. In *Segraves v. California* in 1981, Segraves had challenged the anti-dogmatism policy of the California State Board of Education's *Science Framework* on the grounds that discussion of evolution in the classroom violated his and his children's free exercise of religion. The U.S. Supreme Court held that the anti-dogmatism policy did accommodate Segrave's views sufficiently inasmuch as it emphasized that scientific explanations focus on the "how," not the "ultimate cause," and provided that speculative statements concerning origins should be presented conditionally, not dogmatically. [In 1989 this policy was expanded to cover all areas of science, not just the teaching of evolution.]

Plantinga mentioned this case when he argued that both evolution and creationism should be taught conditionally. I doubt that Plantinga's position is what the Court had in mind. For one thing, what the Court said should be presented conditionally are speculative statements concerning origins, not the substance of "descent with modification." For another thing, the courts have ruled that it is unconstitutional to teach creationism at all in public schools.

c. In *McLean v. Arkansas Board of Education* in 1982, a federal court ruled that so-called "creation-science" is not a science, and struck down a "balanced treatment" statute that required the public schools to give balanced treatment to "creation-science" and "evolution-science."

d. In *Edwards v. Aguillard* in 1987, the U.S. Supreme Court struck down as unconstitutional a Louisiana statute that prohibited teaching of evolution in public schools, unless "creation science" was also taught. The Court found that the act impermissibly endorses religion since the very term 'creation science' implies that a supernatural being created humankind.

¹⁸See website of the National Academy of Sciences, <http://national-academies.org/evolution>. Appendix A, "Six Significant Court Decisions Regarding Evolution and Creationism Issues."

e. In *Webster v. New Lennox School District* in 1990, the Seventh Circuit Court of Appeals held that a school district could prohibit a teacher from teaching creation science. Since teaching "creation science" is a form of religious advocacy, the teacher's right to free speech was not violated by prohibiting him from teaching "creation science."

f. In *Peloza v. Capistrano Unified School District* in 1994, the Ninth Circuit Court of Appeals held that a school district's requirement that evolution be taught in biology classes did not violate a teacher's right to free exercise of religion. The Court rejected the teacher's definition of a "religion" of "evolutionism" and ruled that the district had simply required a teacher to teach a scientific theory in a biology class.

This is an impressive array of cases, all pointing in the same direction: Evolution is a part of science and is permissibly taught in the public schools; creationism is a religious view and is not permissibly taught in the public schools. I doubt that Plantinga and other advocates of teaching creationism in the schools are convinced by these cases. After all, the courts are part of the secular establishment. But so, then, it seems to me is the First Amendment.

Nevertheless, it is noteworthy that while my position conforms to what I take to be the Constitutional situation—that it is Constitutional to teach evolution and unconstitutional to teach creationism—the arguments supporting my position make no appeal to law or to Constitutional issues generally. I defend the first premises of both the Argument for Teaching Evolution and the Argument Against Teaching Creationism by appeal to the nature of science (its explanations are perforce naturalistic). The undeniable success of science, based on methodological naturalism, makes it good policy to teach evolution and not creationism in public schools.¹⁹

For all these reasons, Plantinga's argument, which would result in denial of the first premises of both the Argument for Teaching Evolution and the Argument Against Teaching Creationism, seems to me to fail. Hence, pending further counterarguments, I take the Argument for Teaching Evolution and the Argument Against Teaching Creationism to establish their conclusions.

I conclude that evolution should be taught in science classes as the truth, and that creationism should not be. But to teach anything in science classes as the truth is to teach it as the product of our best scientific thinking. It is not to teach it as unrevisable; settled scientific consensus has a way of becoming unsettled. But evolution is revisable only on the basis of further scientific research. And given the power and scope of evolutionary theory, it would take a major scientific revolution to dislodge evolution. Evolutionary theory seems to be as settled as, say, Newtonian physics before Einstein. In short, students should be taught as true theories on which there is settled scientific consensus;

¹⁹I say this despite evidence that a persistent majority of Americans would disagree. For example, according to a 1993 Gallup poll, 58% of Americans favor teaching creationism in the public schools, and only 11% hold to naturalistic evolution. Karl W. Giberson and Donald A. Yerxa, "Darwin Comes to America," *Books and Culture*, Nov/Dec. 1999, p. 33.

but they should also be taught that scientific claims, no matter how well confirmed at one time, are always revisable in light of further scientific research. This is a strength, not a weakness, of science.

Evolution, a great unifying concept that generates many research programs in many scientific disciplines, is revisable in light of further scientific research, and should be taught as the truth in science classes. By contrast, Creationism, sterile as a generator of scientific research programs, is not revisable in light of further scientific research, and should not be taught in science classes at all.

Theism and Evolution

Is one who comes to the conclusion that evolution should be taught and that creationism should not be taught ipso facto hostile to the claims of Christianity or Judaism or Islam? Not at all.

Many writers on both the creationist side and the evolutionist side insist that evolution and theism are incompatible. For example, Phillip Johnson will brook no accommodation. Taking methodological naturalism as the view that science is "the search for the best naturalistic theories," Johnson states flatly, "Methodological naturalism in science is only superficially reconcilable with theism in religion. When methodological naturalism is understood profoundly, theism becomes intellectually untenable."²⁰ Likewise, on the other side, both Richard Dawkins and Daniel Dennett are well-known for their view that evolution, properly understood, implies atheism.²¹ Although I cannot take up these arguments here, I do want to suggest a strategy for reconciliation of evolution (as entailing the five theses) with belief in God.

Can a theist—a believer in God—consistently accept the five theses that I associated with evolution? Many, if not most, theists would have no trouble with the first four. That the earth is not billions of years old, that life did not appear suddenly, that the kinds of organisms have changed over eons, and that living things have common ancestors from which they have diverged are just not in the realm of matters of faith. Indeed, they seem clearly within the purview of science. The fifth thesis associated with evolution, however, may be a sticking point. If the mechanisms of "descent with modification" can be understood without reference to a Creator, then isn't it superfluous to suppose that there is a Creator?

First, if scientism were correct—where scientism is the view that science is the arbiter of all knowledge—then given that science needs no reference to a

²⁰Phillip E. Johnson, *Reason in the Balance: The Case Against Naturalism in Science, Law and Education* (Downer's Grove IL: Intervarsity Press, 1995). I was impressed by Johnson's rather blatant political agenda in this book. From the premise that God is real, he reads straight-off a number of conclusions: that (1) homosexuals should be denied rights; (2) there should be no abortions; (3) people should conform to stereotypical gender roles. Needless to say, these consequences do not follow from robust theism, without tendentious, auxiliary premises.

²¹See Richard Dawkins, *The Blind Watchmaker* (London: Longmans, 1986), and Daniel C. Dennett, *Darwin's Dangerous Idea* (New York: Simon and Schuster, 1995).

Creator, it would follow that there is no Creator. But as I have said, we should reject scientism, and without scientism, no such thing follows. To say, as the fifth thesis says, that “the mechanisms of evolution may be understood without appeal to a Creator or Designer” entails only that scientific explanations of natural processes do not require reference to anything supernatural. Without the addition of scientism, it does not entail that there is no Creator or Designer. But that’s no surprise since, as we have seen, science is committed to methodological naturalism.

This shows that it is *logically* consistent to believe in evolution (as entailing the five theses) and to believe in God. All one has to do is to reject scientism—the view that science is the arbiter of all knowable truth. There remains the objection, however, that logical consistency is not enough. Since belief in evolution entails that the mechanisms of evolution may be understood without appeal to a Creator or Designer, we have no motivation to invoke a Creator or Designer. The objection here is that belief in God is redundant. This is a situation, says the objector, begging for application of Ockham’s Razor.

This is an important objection, and I want to answer it. I tend to agree with the objection that if one just grafted on to evolution a belief in a Creator, application of Ockham’s Razor may well be appropriate. But I think that the objection misunderstands our epistemic situation. It is a mistake to think that an evolutionarily-inclined theist is faced with the following choice: Should I reject evolution, or should I reject God, or should I add belief in God onto my belief in evolution? Given only these options, an evolutionist’s belief in God does begin to look gratuitous. But this is not the choice. We need to harmonize *all* our beliefs together, not just two of our beliefs—belief in evolution and belief in God. Given all a person’s beliefs, including belief in evolution, belief in God may be central. And its centrality may have nothing to do with science at all.

As I have emphasized throughout, science (with its methodological naturalism) will give us no reason to believe in God. Therefore, I would not look for any scientific reason to believe in God. The motivation to believe in God comes from elsewhere. Some just find themselves with a deep belief, that Plantinga calls “properly basic.” Some have experiences that they can’t help interpreting as encountering God. Some may find that belief in God makes maximal sense of their experience. Some are convinced by metaphysical arguments—the ontological arguments and the cosmological arguments for the existence of God. Reasons for belief in God stemming from any of these sources are “extra-scientific”—but not thereby irrational. Similarly, reasons for one’s political, moral and aesthetic beliefs are also extra-scientific, without being irrational.

From the fact that the scientific method is paradigmatically rational, it does not follow that it is the only rational procedure. So, I am not proposing that theists just graft belief in God onto evolution. Rather, I am suggesting that theists have reasons for their beliefs that have nothing to do with any commit-

ment to evolution. Evolution without scientism gives one reason neither to believe nor to disbelieve in God. (Indeed, it seems to me that the problem of evil is a much greater threat to theism than is evolution.) With belief in God already in place independently of one's belief in evolution, there is no call for Ockham's Razor—especially if belief in God is so central to one's cognitive structure that its removal would disrupt the whole.

I am suggesting that there is a natural world susceptible to complete understanding by science. Either this natural world exhausts reality (as atheists think), or it is only a proper part of reality (as theists think). If the natural world is only a proper part of reality, then certain truths about reality as a whole may be invisible to science. For example, the proposition that Jesus was the Son of God, even if it is true, is not one that any science could countenance. Such a proposition is not a part of any science, nor could it ever be a part of any science. But unless one is scientistic and believes that all (knowable) truth is scientific truth, one must look for other grounds for believing or disbelieving such propositions. Christians, of course, think that they have other grounds. Maybe they do, and maybe they don't. But science (as opposed to scientism) must be silent on the matter. My suggestion to Christians is to give science its due—which is dominion over understanding the natural world—but not to think that science is the only source of truth.

Conclusion

I've argued that evolution (as entailing the five theses) should be taught in science classes as the truth, and that creationism should not be taught in science classes at all. I also offered an accommodationist proposal to show that it is intellectually respectable to believe both in God and in evolution. If these arguments are correct, then from the fact that creationism should not be taught in science classes at all, it does not follow that there is no Creator or that any kind of theism is false. But theism or belief in a Creator is clearly a matter of religion (as the Federal courts have repeatedly held) and has no place in a science classroom.

A final word on the Kansas Board of Education. It is my strong hunch that the next school board will rescind this decision. Even if no one gives a thought to philosophical arguments about the nature of science or the purpose of public education, too much is at stake for the children of Kansas for the decision to stand. Parents, whatever their comprehensive beliefs, want what they think is best for their children. And most tax-payers recognize that children would be at a great competitive disadvantage if denied a standard science education that includes the teaching of evolution. The political process, I hope, will restore mandatory teaching of evolution to the science curriculum in Kansas.²²

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