

Science vs. Religion in the ID Debate

Lawrence M. Krauss

Religion and science are in collision again today, as they have been periodically in the past. In Afghanistan in 2001, the Taliban, then America's allies, blew up the monumental Buddha statues at Bamiyan. They destroyed those mammoth statues because they believed that their religion forbade the reproduction of human faces and bodies. The Taliban had nothing specific against Buddhism; they wanted to destroy *all* statues. This was a clear example of religion attacking science—in this case, archaeology—and human knowledge itself, inasmuch as these sculptures were amazing specimens of antiquity. What motivated this attack? In a word, *fear*.

Similar collisions between science and religion, based on fear, have taken place in the United States. Former House Majority Leader Tom DeLay—who has, amazingly, a degree in biology—once argued that the Columbine school shootings happened “because our school systems teach our children that they are nothing but glorified apes who have evolutionized out of some primordial mud.” That’s in the *Congressional Record*.

Meanwhile, public policy regarding Intelligent Design has been defined by people like President George W. Bush. Talking about evolution versus Intelligent Design, Bush recently declared that “Both sides ought to be properly taught so people can understand what the debate is about.” The sentence represents a clear misunderstanding, because it assumes that there are two “sides” and that there is a debate.

How the political context has changed in the last decade and a half! Here’s an amazing statement that a U.S. president made to the National Academy of Sciences in 1990: “Science, like any field of endeavor, relies on the freedom of inquiry. And one of the hallmarks of that freedom is objectivity. Now, more than ever, on issues ranging from climate change to AIDS research to genetic engineering to food additives, government relies on the

impartial perspective of science for guidance.” The speaker was President Bush—George Herbert Walker Bush, the father of the current president. Let’s compare that statement with that made by the office of the current president: “This administration looks at the facts and reviews the best available science based on what’s right for the American people.” I hope you caught that “subtle” shift from science as an aid to political evaluation to science as the *object* of political evaluation.

The Intelligent Design conflict unfolds against a background of desperate problems in education. Our public schools are not teaching science effectively. As a society, we should be spending our time and energy trying to teach science better in the classrooms, not worse. In this context, the argument over evolution versus Intelligent Design is a huge waste of time. Having to focus our energies on this attack on science keeps us from finding better ways to teach how remarkable science is in illuminating various aspects of our universe.

Consider some depressing statistics. In one recent study comparing students from twenty-one countries, U.S. twelfth graders performed far below the international average in math and science. In Japan, 66 percent of undergraduates go into science or engineering. In China, 59 percent do. What fraction of American undergraduates choose science or engineering? Only 32 percent. In a 2001 National Science Foundation (NSF) survey of scientific literacy, 53 percent of American adults were unaware that the last dinosaur died before the first human arose. Just 50 percent of American adults knew that the earth orbits the sun and takes a year to do it. When I first saw that finding, I thought there had been a trick question whose wording might have thrown respondents off track. So I went back to the original survey and looked at the question. It read: “The Earth orbits the sun and takes a year to do it. True or false?” That seems clear enough. And yet half of the American public got it wrong.

In 2001, 53 percent of adults knew that human beings as we know them today developed from earlier species of animals. At the time, that seemed a great triumph; it was the first time that more than 50 percent of adults reported knowing that fact. But it was a short-lived blip in the American consciousness. In one 2004 survey, 45 percent of American adults agreed that God created humans in their present form less than ten thousand years ago.

We face a vast problem in the public understanding of sci-

Lawrence M. Krauss is a theoretical physicist at Case Western University and a best-selling author and lecturer. His latest book is Hiding in the Mirror: The Mysterious Allure of Extra Dimensions, from Plato to String Theory and Beyond (Viking, 2005).

Intelligent Design after Dover

ence. One contributing factor has been journalism. Journalists are taught that there are always two sides to every story; so, when they do a science story—or any kind of story—they try to air “both sides.” Yet the very thing that makes science unique and wonderful is that, in most scientific controversies, one side is simply wrong. Science works *because it can prove things wrong*. If certain contentions do not hold up with experiment, we can just stop talking about them. So there is a fundamental tension between the way scientists work and the way journalists work, and this has complicated the reporting of science, particularly reporting about the conflict between evolution and Intelligent Design.

THE REAL TARGET

What is Intelligent Design, anyway? Examined closely, it doesn't amount to much more than simply *being opposed to evolution*. Why oppose evolution? Now, that's a more fundamental question, and when we study it closely, we recognize that evolution is a straw man. What people are challenging is science itself and the methods by which it investigates the universe.

Years ago, my state of Ohio was one of the first to experience a concerted attack on science standards. A local group called Science Excellence for All Ohioans—an amazing name, given that the group was associated with televangelist James Dobson—accused in its pro-Intelligent Design literature: “Science standards use a little-known rule to censor the evidence of design. The rule, which is usually unstated, is often referred to as methodological naturalism.” We have a different name for it where I come from. It's called the scientific method. Advocates of creationism and Intelligent Design ultimately stand opposed to the scientific method, because the scientific method is based on the assumption that natural effects have natural causes and that human beings can try to understand those causes. Obviously, that's incompatible with their particular theological view of reality—and that is the heart of the problem.

The Discovery Institute, based in Seattle, is the driving force behind the media and political campaign against evolution. It used to be called the Center for the Renewal of Science and Culture, but that was a very emotionally charged name, so they changed it. When I first started to debate its representatives, I thought they might be just a group of misinformed but well-meaning people. That is not the case. The people at the Discovery Institute know exactly what they're doing; they are well educated in media relations, very well funded, and will do and say whatever it takes to advance their agenda.

What is their agenda? Fortunately, they put it on the Internet.

“Because our technological society is based on science, our future depends on teaching our children the best science we can. . . .”

The “Wedge Strategy” was an internal planning document posted on the Center for the Renewal of Science and Culture's Web site in the late 1990s. Shortly after evolution advocates discovered it in 1999, it was removed. (It can still be read today at www.antievolution.org/features/wedge.html.) The “Wedge Strategy” criticizes evolution as being scientifically suspect but moves quickly to a deeper preconception: “The proposition that human beings are created in the image of God is one of the bedrock principles on which Western civilization was

built. This cardinal idea came under wholesale attack, drawing on the discoveries of modern science.” So, science is the villain.

The document continues: “The Discovery Institute Center for the Renewal of Science and Culture seeks nothing less than the overthrow of materialism and its cultural legacies.” That's the core point, and, in its way, it is much like the motivation that drove the Taliban—a view that materialism is intrinsically bad, that it has bad cultural legacies, and that everything bad in our society in some sense can be shown to result from science, which is seen as atheistic. Of course, science is not inherently atheistic. The existence of God simply isn't a scientifically testable proposition.

In 2002, the Ohio Board of Education was developing a new science curriculum, and there was a statewide controversy over whether to include Intelligent Design. Biologist Ken Miller and I debated two members of the Discovery Institute before the Board of Education and an audience of about two thousand in Columbus, Ohio. Stephen Meyer, director of the Center for the Renewal of Science and Culture and a vice president of the Discovery Institute, made a bold rhetorical move that turned out to be the first appearance of a clever new theme in ID's marketing campaign: teaching the controversy.

Everyone expected Meyer to get up and say, “We want ID to be taught in schools.” Instead he declared, “You know what? We're not dogmatic. We want to compromise. Let's just teach the controversy.” This was brilliant strategy. Meyer implied that there *is* a controversy, which there isn't, and that there are grounds for compromise, which is also not true. Positioning the issue this way automatically gave him the upper hand.

When the Board of Education finished the new science standards, we saw how effective Meyer's teach-the-controversy strategy had been. Science advocates were congratulating themselves on a victory—for the first time in seventy years, the word *evolution* actually appeared in Ohio's science curriculum related to biology. But tacked on at the very end of the science standards was a phrase that required students to learn “how scientists continue to investigate and critically analyze aspects of evolutionary theory.”

Now, there's nothing inherently wrong with that statement. The problem is that it was in the wrong place. A statement like that should appear at the beginning of the science curriculum and say something like, "Students should learn how scientists are continuing to investigate and critically analyze all scientific theories." After all, that's the way science works. Putting the statement so late in the document, where it pertained only to the science standards concerning evolution, had the effect of making evolution seem suspect. I and others so argued at the time, but the consensus seemed to be, "Nah, don't worry about it."

In short order, we learned that we should have worried about it. After the standards were approved, the Board of Education's curriculum committee produced a curriculum based on them. As we feared, instead of producing a lesson plan that showed how students were critically analyzing evolutionary theory, the committee produced a lesson plan *critical* of evolutionary theory. It was so badly flawed that the president of the National Academy of Sciences protested, as did many other individuals and groups. I knew where we stood when I heard that one of the members of the board was asked why she had paid so little heed to the president of the NAS, and she replied, "I've never heard of the National Academy of Sciences. I thought it was some lobbying group." The proposed curriculum passed, and, though one of the committees that had drafted it denied that it was "a mandate to teach intelligent design," the Discovery Institute immediately proclaimed victory *for the principle of teaching the controversy*.

Since the Dover decision, several groups have examined the Ohio lesson plan and standards and felt that they are illegal for the same reason the judge in Dover determined that the Dover board statement did not respect separation of church and state. I am very pleased to report that we were able to mobilize following Dover, and we convinced the Ohio Board of Education to remove both the offensive statement in the standards and the defective lesson plans. We hope that this reflects a new, positive national trend.

TACKLING THE HARD QUESTIONS

Policy makers deal with an enormous range of issues—not just political and economic, but philosophical, too. If an ID controversy erupts in your area, you need to be prepared for the questions policy makers will put to you, as they have to me and other evolution advocates. Philosophical questions seem hardest on the surface, and policy makers will ask these in all sincerity. I think they're valid questions. "Is science without God incomplete?" "Is science without God immoral?" "Is there evidence for design?" But these questions do not motivate changing the nature of high-school science teaching.

The marketing campaign for Intelligent Design in this country has been well run and strategically ingenious. It's designed to exploit revered American values, including: open-mindedness ("Look, we've got to just keep an open mind. We can't have this closed, dogmatic view of evolution."); honesty ("Let's talk about the fact that there are some people who don't believe in evolution."); and fairness ("We should just allow different people to express their views in classrooms.")

Particularly in its appeal to American intuitions about fairness, ID advocates' public-relations campaign genuinely has won the day. When ID advocates put forward these ideas, most people say, "Why not?" In responding to this strategy, it's not enough for defenders of evolution to talk about the science. I think the argument we have to present—and what we need to help policy makers to realize—is that the ID strategy is in fact closed-minded, dishonest, and unfair.

There are many ways we can point out that the ID strategy is closed-minded. One simple argument demonstrates that ID is based on the presumptions that science is immoral because it doesn't make reference to God; therefore, evolution is immoral, because it doesn't explicitly mention God either; therefore, evolution must be wrong. That's closed-minded on its face. After all, the essence of open-mindedness is forcing your beliefs to conform to the evidence of observations, not forcing observations to conform to your beliefs. The ID strategy demands precisely the latter.

Demonstrating that the ID strategy is dishonest requires a somewhat longer argument. The dishonesty of ID lies in its proponents pointing to a controversy when there really is no controversy. A friend of mine did an informal survey of more than ten million articles in major science journals during the past twelve years. Searching for the key word *evolution* pulled up 115,000 articles, most pertaining to biological evolution. Searching for *Intelligent Design* yielded eighty-eight articles. All but eleven of those were in engineering journals, where, of course, we hope there is discussion of intelligent design! Of the eleven articles, eight were critical of the scientific basis for Intelligent Design theory and the remaining three turned out to be articles in conference proceedings, not peer-reviewed research journals. So that's the extent of the "controversy" in the scientific literature. There is none.

When I raise this point in debate, ID advocates say, "Well, the reason it's not in the scientific literature is that scientists are closed-minded, and they won't let us get the stuff into the literature." I usually respond by challenging any opponent to prove that he or she has had more articles rejected by scientific journals than I have. So far, no one has risen to that challenge! ID advocates' next defense is to say, "Okay, we do what Darwin did. We don't publish in journals. We produce books." Now, I'll grant that Darwin exerted much of his influence through his books, but he made the *Proceedings of the Royal Society* also!

Still, let's look into the honesty of the claim that an Intelligent Design "controversy" is alive and well in the world of books. One day in October 2005, I conducted my own informal survey of non-peer-reviewed books. Searching Amazon.com for the keyword *evolution* brought up 21,822 hits, both of books and articles. I scanned the list—I can't claim to have done a serious, detailed study—and most titles appeared to pertain to the topic of biological evolution. When I searched for "Intelligent Design," I got 635 hits. About half of the titles were related to engineering. So about three hundred titles had to do with Intelligent Design related to the issue of evolution. And half of *those* were critical of Intelligent Design, leaving about 150 books and articles. Just for fun, I searched for the expression "alien abduction." I got 165

Intelligent Design after Dover

hits, which suggests that if public schools need to teach a “controversy,” we might just as well teach about alien abduction.

But dishonesty is not the end of it. The ID strategy is also unfair in a very particular way. Consider how real-world science gets done. Suppose you have a novel scientific claim. You do some research on it, either theoretical or experimental, which you then attempt to publish. You submit an article to journals, and the journals send it out to idiots called peer reviewers, and those idiots tell you why you’re wrong, and then you have to fight with them and tell them why they’re idiots, and it goes on and on. If you’re lucky, you get published. What happens next? If your work is interesting, other people will begin to look at it and do follow-up research. If it’s really interesting, you’ll build a scientific consensus, which may take ten, twenty, thirty, or forty years. Only then does your work get mentioned in high-school textbooks. In my own field of physics, the material in today’s textbooks is easily thirty to forty years out of date—as it should be, because that’s how science works.

Intelligent Design advocates want to skip all the intermediate steps. They want to take their theory straight into high-school textbooks. *And that’s not fair.* ID advocates are unwilling to play by the same rules as scientists. If they believe ID is a scientific theory, they should welcome the requirement that they go through all the steps that other scientists have to go through before their work makes it way into textbooks.

We’ve shown, then, that the ID strategy is closed-minded, dishonest, and unfair. But there’s another issue we need to explain to policy makers—and to journalists, as I mentioned above—and that’s that conventional American intuitions about fairness are simply out of place in genuine scientific debate. Science itself is not fair—and that very fact may be science’s greatest legacy. In science, not all ideas *are* treated equally. The geocentric view is not treated equally today, because we know the sun *doesn’t* go around the earth. Science’s power lies precisely in its ability to prove false things to be false.

At this point, policy makers might ask, “But what about the fact that at least half of the American public doesn’t believe in evolution?” Public opinion about evolution is actually far more discouraging than that. In a June 2005 Harris Poll, 54 percent of respondents said they disbelieved in evolution. Only 38 percent accepted it. Asked what they *do* believe about human origins, only 22 percent of respondents said human beings evolved from earlier species. In contrast, 64 percent said human beings were created directly by God, and 10 percent said they believed in Intelligent Design. According to this survey, *three quarters of Americans reject the theory of evolution.* Asked what should be taught in public schools, a mere 12 percent of respondents said that only evolution should be taught. Twice as many, 23 percent, thought only creationism should be taught. Most of the rest, 55 percent in fact, thought creationism, evolution, and ID should be taught—on grounds of fairness, of course. So how can we respond when a policy maker cites this sort of data and says, “Look, why not teach all three?”

Let’s look back at one of the statistics I cited earlier. Only 50 percent of American adults know that the earth orbits the sun

and takes a year to do it. Therefore, if we’re doing things democratically and fairly, should we not therefore teach geocentric cosmology in physics classes? The point that seems to be lost on many people—and the point that ID advocates hope will *stay* lost—is that *the purpose of education is not to validate ignorance; it’s to overcome it.* If we’re doing a crummy job of teaching science in America—and we are—then we need to do a better job in teaching many different kinds of science, including evolutionary biology. Far from watering it down or teaching a nonexistent controversy, we need to teach it *better.*

If your opponents concede all the arguments above, they may still contend that, even if ID is a straw man, there can still be benefit in teaching it. If teachers present ID theory and show why it’s garbage, students can learn something about critical thinking. This is not an irrational argument, by the way. But why teach critical thinking by attacking a straw man in the science classroom when *real* scientific controversies are plentiful? In physics, there are huge debates about the nature of gravity and the validity of quantum mechanics. In biology, there are important debates about the nature of random mutation and natural selection and the importance of one versus the other in driving evolution. These are real controversies, any one of them with a literature far larger than the “literature” on Intelligent Design.

The last, most desperate resort of the ID advocate is to demand to know why we care so much about textbook stickers, a few sentences read before class, or whatever the next ID initiative may turn out to be. For some, it’s an issue of church-state separation, but that’s not my bottom line. To me, the crucial point is that, whenever teachers are made to soft-pedal evolution or teach a controversy that isn’t there, *we are forcing teachers to lie.* The minute we force teachers to lie in one place, we make it easier to force them to lie in others. That kind of blurring of truth may be the greatest threat to our democracy. I don’t view religion as the greatest threat to our democracy. I view lying and misinformation as the greatest threat to our democracy.

THE REAL CASE FOR SCIENCE EDUCATION

The universe as it really is is a profoundly remarkable place. Science education should awaken American students to that fact. We also need to get the point across that science is not a threat to a moral world. Quite the contrary, science has an ethos based on honesty, open-mindedness, creativity, egalitarianism, and full disclosure. If those things were realized as thoroughly in the rest of the world as they already are in science, the world would be a better place.

The ultimate reason why we have to teach science and teach it right is because *science works.* Because our technological society is based on science, our future depends on teaching our children the best science we can in order to prepare them to compete economically and to face the real changes of the dangerous world of the twenty-first century. By “dangerous,” I don’t refer to terrorism. I refer to the impending consequences of what humanity has spent the last couple of centuries doing to nature. The only way our children will be able to address *real* issues like those is to understand them. **ff**