

ARTICLES

Three Why's: Religion and Science in School¹

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In this article, I argue the proposition that educators ought to be including a serious consideration of intelligent design as a counterexample to the scientific explanations of human origins. The article first distinguishes between three different ways people ask "why": the Scientific Why, the Ultimate Why, and the Teleological Why. Although science answers the first Why with a high degree of confidence, it does not answer the second or third Why at all. An exclusive focus on questions with empirical answers reduces the education experience, eliminating much of value from it, especially a sense of wonder at unanswerable questions.

The thesis of this article is that educators are making a mistake refusing to include a serious examination of intelligent design (ID), not as an alternative scientific explanation of human origins, but as a counterexample that includes some elements of a scientific explanation, but draws inferences beyond the data. It, thus, serves nicely to demonstrate the power of science in its domain, but also the limits of that domain.

I first make an uncontroversial distinction between three different meanings of the word, *why*. I then argue that at least a part of the civil strife over things like teaching of science in public schools is rooted in the fact that the conversation tends to conflate the three meanings in ways that ignore the differences. Finally, I argue that this strife is also rooted in a misunderstanding of the meaning and role of science in people's lives; individuals simultaneously underestimate its power and importance, and overestimate its domain.

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The narrow point of making this argument is that ID is an excellent counterexample of science, helping to point to what science is and is not by using ID to illustrate the difference between it as a perfectly plausible theory of why the world is the way it is and Darwin's theory about evolution as a scientific theory. The broader point is to argue that science and religion can indeed be understood to answer different kinds of questions in different domains, and that schools are good places to help children understand the difference between deductive scientific reasoning on the one hand and different, although perfectly valid inductive forms of reasoning on the other. This is not what ID advocates seek when they ask for ID to be taught as an alternative to Darwinian evolution, but it is an intellectually honest approach that might enhance science instruction. It also would help to correct a serious problem with education that is too strictly secular: In an effort to avoid controversy and/or offend people with different belief systems, people systematically avoid talking about things that really matter, to either adults or children.

There are two basic ways of asking why the world is the way it is: these are the "why" of science and the "why" of religion. The first *why* is answered with the use of physical evidence, the second *why* through the teachings of religious texts, faiths, and traditions. The second why, the religious why, is itself two quite different questions: (a) the why of ultimate or first causes (as opposed to direct ones) and (b) the why of ultimate ends or purposes. The first asks what power or process brought existence into being; the second asks for what reasons humanity is here. These are not unrelated; neither are they the same. I call these the *Science Why*, the *Ultimate Why*, and the *Teleological Why*.

INTELLIGENT DESIGN

Because this article argues that schools ought to be teaching ID along with, and in contrast to, Darwin's theory of descent with modification, a few words are in order about the version of ID under consideration here.

Whether as a strategy or as a sincere change of opinion, it is the case that ID is radically and fundamentally different from the position known as *young Earth creationism*. The latter view is a Biblical literalism that teaches that the Biblical Book of Genesis is historically true in all its details. It is the intellectual equivalent of the flat Earth theory, and held by relatively few (but significantly more than no) people of faith.

It was ID that Pope John Paul was referring to when he said that there is nothing in recognition of evolution that contradicts belief in the Bible (Truth cannot contradict truth, in his words) (Pope John Paul II, October 22, 1996). On this view of ID, the scientific evidence supporting the fact of evolution and the theory of descent with modification as the explanation of its working is clear:

evolution is recognized as a fact. This answer applies to the Science Why. For the religious believer, it is a matter of faith that the world and its workings were ordained and created by God, who designed the process of evolution. That latter belief is not a direct conclusion from the evidence, resting as much on inference as on evidence, so it is not science, but it is not foolish, either; there is no material evidence to contradict it any more than to support it.

The possibility for powerful science lessons while affirming both the power of science and the legitimacy of other ways of making sense of the world lies in the delineation between what parts of ID lead to testable hypotheses and what parts of the theory do not. This is critical and valid to do in a class discussion, as it points quite precisely to the features of the theory of evolution (TE) that differentiate the latter from the former and, at the same time, that makes the latter, but not the former, a scientific theory.

THE AMBIGUITY OF "THEORY"

It is important in thinking about this discussion in the school context to clarify the ambiguity of *theory*. On the one hand, theory is an educated guess, an informed and reasoned connection of a set of dots. Developing this kind of theory, in philosophy for example, is intellectually valid when it is done well. It is this meaning of *theory* to which ID supporters appeal when they argue that both ID and evolution should be taught side-by-side as two different theories about human origins.

However, *theory* has a different meaning when it is used as a term of art and modified by *scientific*. There is a critical difference between *theory* and *scientific theory* that ID advocates ignore and seek to obscure with their rhetoric about evolution being "just one theory." All theories purport to be explanatory; only scientific theories are predictive in a way that allows for verification. That is, a scientific theory is one that connects the dots of known phenomenon in a manner that allows one to make testable predictions about as-yet unobserved phenomena. It is this that elevates evolution from being just a theory to being a scientific theory, and that distinguishes it from ID. TE and ID are not just different theories about human origins; they are different *kinds* of theories.

THE SCIENCE WHY

There are two important points to make about the Science Why: (a) it is extremely powerful in its domain, and (a) its domain is strictly limited. Science answers questions about the physical world with a great deal of specificity and confidence. However, it cannot tell individuals how they should live their lives; it cannot tell

them how they should live together; it can not legitimately make any moral or metaphysical claims.

Moral, metaphysical, and spiritual claims can be intellectually interesting, but they are not scientific claims, nor can they be. On the one hand, there is no physical evidence of a nonphysical world; on the other hand, the absence of evidence is not, and cannot be, taken as the evidence of absence.

Note that this position does not reduce the idea of divinity to a "God of the Gaps," suggesting that the role of religion is to offer mythological answers for questions science has not yet answered, where much rides on that *yet*. When one posits that religion is the domain of answering questions that science has not answered yet, the presumption is that this is a temporary condition, that all questions religion now answers are relevantly something like the question, "Where does thunder come from?"

Many questions that people cannot yet answer are, indeed, like the question of thunder once was. The source of loud noises from the sky was once a mystery, and people sought reasonable explanations. Often these explanations had to do with the activities of gods. Over time, the study of physical phenomena gave a different kind of answer to the question, a scientific one.

However, some questions that religions answers are not relevantly like the question of thunder: Should society use atomic energy to make bombs? To make energy? Having made the bombs, should people use them? Against whom? Under what conditions? These are not scientific questions, precisely in the sense that no matter how much data people collect, and no matter how accurate the data are, the questioners do not get any closer to answering the question. Such questions are of ultimate and metaphysical meaning. In this domain, science has nothing to say. Not, note, nothing to say yet, but nothing to say, as a matter of what science is: the study of the physical world.

The practice of science is rooted in a methodological materialism and is an endeavor to explain the physical world. The glory of science is not that it is omnipotent, but that, within its domain, it is extremely powerful. There remain, however, many questions that science is not able to answer: methodological materialism cannot tell society how to use the power of the atom; whether space exploration is a justified expense, all things considered; or how to deal with quality of life and dignity of persons issues. However, this should not count against it. Nonetheless, they are questions that one must ask. Arguably, the questions that science cannot answer are more important than the ones that it can answer.

For science to be taught well in schools requires that teachers understand and convey to their students what science is and what it is not. In too many cases, neither part of the task is well done. It is old news that science education winds up being about answers, although science is about questions. Science is not the periodic table of the elements, but the process by which that insight into the consistency of the physical world was worked out and perceived. Teaching science as a catalog

of what humanity does know misses the point; where people know the answers, they are no longer doing science. Good science educators know this, so I do not want to pretend that there is anything new or profound here.

However, the reality in schools is different. In most schools, in most classes, especially in elementary school, where it is mostly taught by nonspecialists who usually do not have a secure foundation in science knowledge, let alone method, science is taught as a body of knowledge, not a system of inquiry. The problem is not that science educators do not know what science is and how it should be taught; the problem is that, too often, it is not taught that way.

THE ULTIMATE WHY

Why is humanity here, in the sense of how did everything get started? In the end, this question is about what happened before the Big Bang, or what caused the Big Bang. This is the point at which physical laws break down; it is the beginning of time, and the physical world did not exist prior to this moment (of creation?). God is as good an answer as any (Jastrow, 2000); it is just not a scientific answer. It is an answer that is defended by induction, by inference, not just by evidence; although it must not be contradicted by the available evidence. What inferential reasoning in the metaphysical domain gains in scope, it loses in warrant. The reverse is true for science.

This second sense of why comes from exactly the same desire for understanding that motivates the first why; it is the desire to understand the world around one—its source and the design of operation. Science, as is explored shortly, explains why robins' eggs produce robins. Science does not explain, however, why robins' eggs produce anything at all, or why they produce robins instead of elves. This point will be expanded on in the discussion of wonder, but here note that science, committed as it is to methodological materialism, must ignore much of what humans want to know about their existence and about existence in general. Belief in God—a belief in the spiritual—is not a scientific hypothesis, but consideration of such questions in a serious and rigorous matter is not without intellectual credibility. And such questions of ultimate origins seem to be important for people, even if they cannot answer them scientifically.

THE TELEOLOGICAL WHY

The third why, like the second, is connected to religious beliefs, but not quite so directly. The why of ultimate causes is religious root and branch; if one answers that question at all (other than with a shrug), one answers it in terms of religion and a spiritual realm. Even assuming that humanity one day finds scientific answers to

questions regarding the state of things prior to the Big Bang and/or its cause, that would not rule out that the events were designed and planned by a First Cause, whether it be "God" or the "Flying Spaghetti Monster," (which, functionally speaking, would just be another of the thousand names of God). On the other hand, the teleological why can be answered from other perspectives than religious ones. For example, secular humanism defines one's purpose as realizing the dignity of one's humanity. The telos of humanity can be argued, without appeal to any divine purpose, as the attainment of its *arête*.

The question of people's ends is another example of a nonscientific question that is important to ask.

The distinction between these different meanings of *why* is important to keep in mind when discussing the teaching of evolution, which answers only the Science Why. The claim is that the other two are, in principle, unanswerable in any final, unequivocal way, but they are no less important for us to consider.

ID AND SCIENCE EDUCATION

Those who support the teaching of evolution often say that science class is not the place to discuss ID. On its face, the reason for this position seems obvious: ID is not science. The problem is that although this answer is true as far as it goes, it may not go far enough. Critically examining ID as an example of not-science may be an excellent way to understand the difference between science and other ways of knowing, and that seems a worthwhile goal for a science course.

A skilled and knowledgeable science teacher could compare ID and Darwinian evolution as a case study of what science is and, equally significantly, what science is not: what sort of evidence led Darwin and Wallace to the theory that life develops through the process of descent with modification (that is, what body of facts and evidence were they seeking to explain in a coherent and systematic way)? Specifically, an examination of the two different theories would show how one generates specific and testable hypotheses, which are in turn used to modify the theory as these hypotheses are either confirmed or disconfirmed, something ID can not do except where it is in congruence with scientific explanations. This examination, alone, might go far to reduce the confusion created by ID advocates' claim that Darwinian evolution is just a theory. The only way to respond to this fatuous statement is to demonstrate exactly what a scientific theory is, and how ID is not one.

Darwinian evolution is a wonderful example of how scientific theory works, and it is also a nice example of what science more generally is, because so much is still unknown and/or uncertain in the field. Questions, not answers, would be at the heart of such a science course. Lines of descent keep changing, new findings keep confirming or altering understandings of human origins, and even the precise working of descent with modification is uncertain.

I am suggesting that the proper teaching of science ought to begin with, and periodically return to, the understanding that science is not about ultimate or metaphysical questions. More to the point, science is technically not concerned with claims about truth; it is concerned with clarity about ideas supported by physical evidence; it is designed to confirm or disconfirm predictions, and thus to validate or invalidate the theories that led to the predictions, but that is a very different thing from claiming the theories are true. Teaching a good course in science requires a certain amount of teaching the philosophy of science, or at least an understanding thereof.

To think of teaching science only as an effort to disperse widely the answers that science has found to questions about the material world is to make a mistake with two consequences. In the first place, society winds up with high school (and college) graduates who fail to understand that science is an activity, not a body of knowledge; it is a process of inquiry, not a deference to received wisdom. In the second place, and as a consequence, society winds up with a citizenry who think that religious faith is in conflict with scientific inquiry. On rare occasions, this is true; it is not possible to reconcile scientific inquiry with young Earth creationism or the Flat Earth Society, but most faith is not unreasoning; it is more often the suspension of disbelief, but a suspension only in the absence of evidence to the contrary.

ON WONDER

Much of this following section is based on the work of Tom Green's "On Wonder and the Roots of Motivation," (1971) which, in turn, was influenced by G. K. Chesterton's marvelous "The Ethics of Elfland" (1959/1990).

Science is a powerful way of understanding the world in its physicality, but it does not address the sense of wonder that the world can create in people. Indeed, a problem with science is that its methodological materialism can obscure questions that it can not answer. More radically, the fact that science provides such compelling natural explanations rooted in the evidence of the physical world can obscure its inability to explain, fully, even physical events. This is where we meet Green's (1971) work on wonder.

Consider that genetics explains the biology of sexual reproduction resulting in robins producing eggs from which robins, in turn, come. This explanation is no small accomplishment. However, as Green (1971) points out, science does not really explain why robins so reliably come from robins' eggs. As Green puts it:

It is true that if there be a robin's egg, there must be a robin. But there is no necessity which leads from the egg to a bird in flight. The egg may as well produce an enchanted prince, a gnome, or a charmed monkey. We may cease to wonder at the fact that robin's eggs produce robins because it happens with such frequency and because we think we understand the explanation, but even if it happened every minute—as I think it does—it would, for all that, remain a marvel.

Whether a thing is wonderful has less to do with its infrequency than with its contingency. The truth that robins' eggs produce robins is related to the fact that they always do; but the marvel of it is that though they always do, they need not ever. (197)

In this essay, Green (1971) reminds the reader that sometimes the proper response to some encounter with the world is not to wonder why the world is as it is (curiosity), but to wonder at the way it is. Science tends to focus a great deal on the curiosity aspect of wonder, but little on the awe aspect. Schools thus focus on some very important aspects of reality, both physical and social, but they also miss—one might even say, avoid—much of importance. Science effectively satisfies curiosity, but it can, precisely because of its power in this regard, blunt one's sense of wonder at the world while it simultaneously obscures the importance of the questions that it does not ask because it cannot answer them.

Distinguishing clearly between scientific questions and answers, on the one hand, and other kinds of questions and answers, on the other hand, will not satisfy the fringes of this debate, neither the fundamentalist Christians nor the fundamentalist materialists. However, there is a middle ground in this discussion that can be inhabited by people who are inclined to believe the evidence of science while attempting to reconcile those teachings with their religious faith. If the debate is cast as between science and religion, too many believers feel the secular culture threatens their faith.

Since the time of Darwin, religious fundamentalists have said that the scientific worldview and the religious one, or at least the Biblical one, are irreconcilable. Meanwhile, millions of believers, scientists included in that group, have reconciled them. Today, many materialist fundamentalists (Dawkins 2006; Dennett 2006; Hitchens 2007) have accepted the premise of the religious fundamentalists and claim to prove that God does not exist (not, of course, restricting themselves to verifiable hypotheses and physical evidence only).

One must listen respectfully to those citizens who believe that the Bible can serve as a natural science text. Respect does not, however, prevent one from pointing out the evidence that they are wrong in those beliefs. In fact, true respect for the views of another, and respect for that other person, requires that one does not just ignore those beliefs with which one disagrees, but that one engages in dispute with those who hold them where such beliefs have impact on the civic spaces of society (Kunzman 2006). All people are entitled to their opinion, but they are not entitled to their own facts. Science class is about science; it is based on interpreting the physical evidence provided by the physical world. This means that science teachers are ethically required to present evolution as a scientific fact (that Darwinian evolution is a theory has to do with explaining the process, not its justifying its existence). This teaching must be done with respect to those

whose religious commitments forbids them to believe the evidence that leads to an evolutionary understanding of the origins of life, but it must still be done.

THE SCIENCE PART OF THE PROBLEM

Scientists reasonably assume, in particular and more broadly those interested in preventing theocracy, that much of the onus for the current state of affairs lies with those who, from a narrow and uninformed point of view, oppose scientific inquiry into human origins. For such people, evidence is not an essential part of knowing the truth; the truth comes to them from the Bible. Nothing in this article will be persuasive to those who do not take evidence seriously.

However, there is at least as much difference between young Earth creationism (true Biblical literalism) and ID as there is between ID and Darwinian evolution—perhaps even more so. Although ID suggests that evolution happens under the guidance of an intelligence, it does not deny that evolution has, in fact, happened and is happening. It is an attempt to reconcile faith and science understanding, and that is something that educators, perhaps, should support, unless they truly believe, with the religious fundamentalists, that it is not possible to both be a person of faith and believe in science.

If science could reconnect with the sense of wonder and at the same time affirm its proper boundaries, affording the respect due other ways of seeking knowledge while practicing in its own domain at its best, perhaps public space, even schools, could become safe for both science and faith.

CONSIDERING CONCERNS

I now briefly anticipate two serious objections to what I propose in the previous sections. The first concern has to do with the inequality of power relations around the establishment of Christianity as a state religion. The second concern has to do with the question of whether the typical teacher is capable of explicating the nature of science with respect to other forms of knowing. To address this latter question first and briefly, this concern is likely justified, but avoiding the subject matter does not seem to be quite the right solution. The proper solution, if this is really a problem, is to improve teacher preparation to do a better job of science instruction.

The first question is more difficult. The Republican Party today has become a political arm of the religious right, and in many aspects of American life seeks to establish what might be thought of as a soft theocracy. There is no denying that trying to present an accurate account of the ways that science and religion relate to each other will be difficult in the present political climate.

However, society has gotten to this point while it has been seeking to maintain a strict wall of separation between church and state, and the trends, considering the recent Supreme Court appointments, are not good. The suggestion in this article is that by honestly addressing, rather than by either ignoring or exaggerating, the commonalities or the differences between the two ways of considering the world, children's (and adults'?) understanding and sense of wonder might both be enhanced.

NOTE

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