

The Rules of Science

IN 1981, THE Arkansas state legislature passed a statute requiring "balanced treatment to creation-science and to evolution-science." Opponents sued in the local federal court to have the statute declared unconstitutional, and the stage was set for a very unequal contest.

The Arkansas statute was the work of unsophisticated activists who had no idea how to attract support from outside their own narrowly fundamentalist camp. As a result, they faced a powerful coalition of groups eager to defend both science and liberal religion against religious extremists. The coalition included not only the major associations of scientists and educators, but also the American Civil Liberties Union and an impressive array of individuals and organizations representing mainstream Christianity and Judaism.

The coalition also had the services of a first-class team of trial lawyers donated by one of America's biggest and best law firms. These specialists in "big-case" litigation knew how to select and

prepare religious and scientific leaders to give expert testimony that would establish creation-science as an absurdity unworthy of serious consideration. Orthodox science won the case by a light-year.

Judge William Overton's decision distilled the testimony of the expert witnesses, especially the Darwinist philosopher of science Michael Ruse, and provided a definition of "science" that made it quite clear why there can be no such thing as "creation-science." Judge Overton began by defining science as whatever is "accepted by the scientific community," meaning of course the *official* scientific community. That in itself wasn't very informative, but the judge went on to specify five essential characteristics of science:

- (1) It is guided by natural law;
- (2) It has to be explanatory by reference to natural law;
- (3) It is testable against the empirical world;
- (4) Its conclusions are tentative—that is, not necessarily the final word; and
- (5) It is falsifiable.

Creation-science does not meet these criteria, according to Judge Overton, because it appeals to the supernatural, and hence is not testable, falsifiable, or "explanatory by reference to natural law." As a typical illustration of the unscientific nature of creationist claims, the judge quoted the following statement by the creation-scientist Duane Gish:

We do not know how God created, what processes He used, for God used processes which are not now operating anywhere in the natural universe. This is why we refer to divine creation as Special Creation. We cannot discover by scientific investigation anything about the creative processes used by God.

At the same time, Judge Overton indignantly denied the creationist claim that "belief in a creator and acceptance of the scientific theory of evolution are mutually exclusive," describing this opinion as "offensive to the religious views of many."

Philosophers of science have found much fault with Judge Overton's definition, and have hinted that Ruse and the other experts got away with a philosophical snow job. These critics pointed out that

scientists are not in the least "tentative" about their basic commitments, including their commitment to evolution. In addition, scientists have often studied the effects of a phenomenon (such as gravity) which they could not explain by natural law. Finally, the critics observed that creation-science makes quite specific empirical claims (a young earth, a worldwide flood, special creation), which mainstream science has said are provably false. How can the same statements be both demonstrably false and unfalsifiable?

If the Ruse-Overton definition failed to satisfy the philosophers, however, it delighted the scientific establishment. The premier scientific journal *Science* was so enthusiastic that it reprinted the entire opinion as a major article. The opinion summed up the way many working scientists view their enterprise, which makes it a good starting point for discussing what science includes and excludes.

I am not interested in any claims that are based upon a literal reading of the Bible, nor do I understand the concept of creation as narrowly as Duane Gish does. If an omnipotent Creator exists He might have created things instantaneously in a single week or through gradual evolution over billions of years. He might have employed means wholly inaccessible to science, or mechanisms that are at least in part understandable through scientific investigation.

The essential point of creation has nothing to do with the timing or the mechanism the Creator chose to employ, but with the element of design or purpose. In the broadest sense, a "creationist" is simply a person who believes that the world (and especially mankind) was *designed*, and exists for a *purpose*. With the issue defined that way, the question becomes: Is mainstream science opposed to the possibility that the natural world was designed by a Creator for a purpose? If so, on what basis?

Judge Overton was persuaded that "creation" (in the general sense of design) is consistent with "evolution" in the scientific sense. In this he was mistaken, or rather, misled. When evolutionary biologists speak of "evolution," they are not referring to a process that either was or could have been guided by a supernatural Creator. They mean *naturalistic* evolution, a purely materialistic process that has no direction and reflects no conscious purpose. For example, here is how George Gaylord Simpson defined "the meaning of evolution":

Although many details remain to be worked out, it is already evident that all the objective phenomena of the history of life can be explained by purely naturalistic or, in a proper sense of the sometimes abused word, materialistic factors. They are readily explicable on the basis of differential reproduction in populations (the main factor in the modern conception of natural selection) and of the mainly random interplay of the known processes of heredity. . . . *Man is the result of a purposeless and natural process that did not have him in mind.* [Emphasis added.]

Because the scientific establishment has found it prudent to encourage a degree of confusion on this point, I should emphasize that Simpson's view was not some personal opinion extraneous to his scientific discipline. On the contrary, he was merely stating explicitly what Darwinists mean by "evolution." The same understanding is expressed in countless books and articles, and where it is not expressed it is pervasively implied. Make no mistake about it. In the Darwinist view, which is the official view of mainstream science, God had nothing to do with evolution.¹

Theistic or "guided" evolution has to be excluded as a possibility because Darwinists identify science with a philosophical doctrine known as *naturalism*.² Naturalism assumes the entire realm of nature to be a closed system of material causes and effects, which cannot be influenced by anything from "outside." Naturalism does

¹ A second passage from Simpson's *The Meaning of Evolution* clarifies the relationship between naturalism and atheism. Scientific naturalists are not necessarily opposed to "the existence of God," provided that God is defined as an unreachable First Cause and not as a Creator who takes an active role in nature or human affairs. In Simpson's words:

There is neither need nor excuse for postulation of nonmaterial intervention in the origin of life, the rise of man, or any other part of the long history of the material cosmos. Yet the origin of that cosmos and the causal principles of its history remain unexplained and inaccessible to science. Here is hidden the First Cause sought by theology and philosophy. The First Cause is not known and I suspect it will never be known to living man. We may, if we are so inclined, worship it in our own ways, but we certainly do not comprehend it.

² A variety of terms have been used in the literature to designate the philosophical position I call scientific naturalism. For present purposes, the following terms may all be considered equivalent: scientific naturalism, evolutionary naturalism, scientific materialism, and scientism. All these terms imply that scientific investigation is either the exclusive path to knowledge or at least by far the most reliable path, and that only natural or material phenomena are real. In other words, what science can't study is effectively unreal.

not explicitly deny the mere existence of God, but it does deny that a supernatural being could in any way influence natural events, such as evolution, or communicate with natural creatures like ourselves. *Scientific* naturalism makes the same point by starting with the assumption that science, which studies only the natural, is our only reliable path to knowledge. A God who can never do anything that makes a difference, and of whom we can have no reliable knowledge, is of no importance to us.

Naturalism is not something about which Darwinists can afford to be tentative, because their science is based upon it. As we have seen, the positive evidence that Darwinian evolution either can produce or has produced important biological innovations is nonexistent. Darwinists know that the mutation-selection mechanism can produce wings, eyes, and brains not because the mechanism can be observed to do anything of the kind, but because their guiding philosophy assures them that no other power is available to do the job. The absence from the cosmos of any Creator is therefore the essential starting point for Darwinism.

The first two elements of Judge Overton's definition express the commitment of science to naturalism. The remaining three elements state its commitment to *empiricism*. A good empiricist insists that conclusions be supported by observation or experiment, and is willing to discard even the most cherished doctrines if they do not fit the evidence. Naturalism and empiricism are often erroneously assumed to be very nearly the same thing, but they are not. In the case of Darwinism, these two foundational principles of science are in conflict.

The conflict arises because creation by Darwinist evolution is hardly more observable than supernatural creation by God. Natural selection exists, to be sure, but no one has evidence that it can accomplish anything remotely resembling the creative acts that Darwinists attribute to it. The fossil record on the whole testifies that whatever "evolution" might have been, it was not the process of gradual change in continuous lineages that Darwinism implies. As an explanation for modifications in populations, Darwinism is an empirical doctrine. As an explanation for how complex organisms came into existence in the first place, it is pure philosophy.

If empiricism were the primary value at stake, Darwinism would long ago have been limited to microevolution, where it would have

no important theological or philosophical implications. Such a limitation would not imply acceptance of creationism, even in the least restrictive definition of that term. What it *would* imply is that the scientific establishment after 1859 was carried away by enthusiasm, and thought it had proved an entire creation story when it had only filled in some minor details. If Darwinists accepted the primacy of empiricism, they could still hope eventually to find a naturalistic explanation for everything, but for now they would have to admit that they have made a big mistake.

That admission has not come, because empiricism is *not* the primary value at stake. The more important priority is to maintain the naturalistic worldview and with it the prestige of "science" as the source of all important knowledge. Without Darwinism, scientific naturalism would have no creation story. A retreat on a matter of this importance would be catastrophic for the Darwinist establishment, and it would open the door to all sorts of false prophets and mountebanks (at least as naturalists see them) who would try to fill the gap.

To prevent such a catastrophe, defenders of naturalism must enforce rules of procedure for science that preclude opposing points of view. With that accomplished, the next critical step is to treat "science" as equivalent to truth and non-science as equivalent to fantasy. The conclusions of science can then be misleadingly portrayed as refuting arguments that were in fact disqualified from consideration at the outset. As long as scientific naturalists make the rules, critics who demand positive evidence for Darwinism need not be taken seriously. They do not understand "how science works."

I am not implying that scientific naturalists do any of this with an intent to deceive. On the contrary, they are as a rule so steeped in naturalistic assumptions that they are blind to the arbitrary elements in their thinking. For example, examine carefully the following passage from *The Dreams of Reason*, a book about scientific reasoning, by Heinz Pagels:

So powerful is [the scientific-experimental] method that virtually everything scientists know about the natural world comes from it. What they find is that the architecture of the universe is indeed built according to invisible universal rules, what I call the cosmic code—

the building code of the Demiurge.³ Examples of this universal building code are the quantum and relativity theory, the laws of chemical combination and molecular structure, the rules that govern protein synthesis and how organisms are made, to name but a few. Scientists in discovering this code are deciphering the Demiurge's hidden message, the tricks he used in creating the universe. No human mind could have arranged for any message so flawlessly coherent, so strangely imaginative, and sometimes downright bizarre. It must be the work of an Alien Intelligence!

... Whether God is the message, wrote the message, or whether it wrote itself is unimportant in our lives. We can safely drop the traditional idea of the Demiurge, for there is no scientific evidence for a Creator of the natural world, no evidence for a will or purpose that goes beyond the known laws of nature. Even the evidence of life on earth, which promoted the compelling "argument from design" for a Creator, can be accounted for by evolution. [Pagels refers his readers to books by Dawkins and Gould for the evidence.] So we have a message without a sender.

The first paragraph of that passage tells us that the presence of intelligent design in the cosmos is so obvious that even an atheist like Pagels cannot help noticing it, and rhapsodizing about it, dubbing the Creator "the Demiurge." The second paragraph offhandedly remarks that there is no scientific evidence for a Creator. What makes the passage a good illustration of the scientific naturalist mentality is that Pagels assumes all the critical points. What seemed to be evidence of a Creator turned out to be no evidence at all, because scientific evidence for something that goes beyond the laws of nature would be a contradiction in terms. On the other hand, evidence of "evolution" (which may mean no more than microevolution plus the existence of natural relationships) automatically excludes the possibility of design. Naturalistic philosophy controls his mind so completely that Pagels can stare straight at evidence of intelligent design, describe it as such, and still not see it.

The "will of the Creator" is a concept generally acknowledged to

³ "Demiurge" is a term derived from Greek philosophy and the Gnostic heresy of early Christianity. The Gnostics considered matter to be evil and thought God would not have created it, and so they attributed the material world to the Demiurge, an inferior deity which they sometimes identified with the God of the Old Testament.

be outside the ken of natural science altogether. To a clear understanding, that means that science cannot tell us whether there is or is not a transcendent will or purpose that goes beyond the laws of nature. To a scientific naturalist, however, "outside of science" means outside of *reality*.

That is why scientific naturalists can in good conscience say at one moment that they do not deal with God or religion, and then in the next breath make sweeping pronouncements about the purposelessness of the cosmos. What other, people understand as the limitations of science become twisted into limitations upon reality, because to scientific naturalists the notion that there could be a reality outside of science is literally unthinkable.

This way of thinking is encouraged by the way science employs paradigms as organizing concepts in guiding research. According to the famous model of Thomas Kuhn, the progress of science is much like Gould and Eldredge's theory of evolution by punctuated equilibrium. Periods of stasis, Kuhn's "normal science," are punctuated by revolutions in the form of "paradigm shifts," where one way of thinking about the subject is replaced by another. Like other philosophical theories, Kuhn's model has to be applied with caution. But whatever its limitations as a description of science generally, it provides an illuminating picture of the methodology of Darwinism.

The most important of Kuhn's concepts is the *paradigm*, which is not a mere theory or hypothesis but a way of looking at the world that is influenced by cultural prejudice as well as by scientific observation and experience. According to Kuhn, "An apparently arbitrary element, compounded of personal and historical accident, is always a formative ingredient of the beliefs espoused by a given scientific community at a given time." Scientists, like the rest of us, view reality through the mist of ideas and assumptions that make up the paradigm.

When a paradigm becomes established, it serves as the grand organizing principal for scientific research. This means that it defines the questions that need to be answered and the facts that need to be assembled. While the paradigm remains effectively unchanged, "normal science" proceeds to work out its theoretical and practical implications and to solve the "puzzles" created by facts that do not seem to fit the paradigm's explanations. Science can

make great progress during these periods, because scientists share a common understanding of what they are trying to do and how they should be trying to do it, and they are not distracted by uncertainty over fundamental assumptions. According to Kuhn:

Closely examined, whether historically or in the contemporary laboratory, [normal science] seems an attempt to force nature into the preformed and relatively inflexible box that the paradigm supplies. No part of the aim of normal science is to call forth new sorts of phenomena; *indeed those that will not fit the box are often not seen at all*. Nor do scientists aim to invent new theories, and they are often intolerant of the theories invented by others. Instead, normal-scientific research is directed to the articulation of those phenomena and theories that the paradigm already supplies. [Emphasis added.]

Some puzzles prove recalcitrant to solution and gradually "anomalies" build up. These do not threaten the dominance of the paradigm as long as research proceeds satisfactorily in other respects. Even a relatively inadequate paradigm can define a field of science and set an agenda for research, and it may take a long time for scientists to become convinced that some important problems will never be solved within the concepts of the existing paradigm. As Kuhn describes it, however, the intense commitment to the paradigm produces both the success of normal science and an inevitable crisis:

Normal science, the activity in which most scientists inevitably spend almost all their time, is predicated on the assumption that the scientific community knows what the world is like. Much of the success of the enterprise derives from the community's willingness to defend that assumption, if necessary at considerable cost. Normal science, for example, often suppresses fundamental novelties because they are necessarily subversive of its basic commitments. Nevertheless, so long as those commitments retain an element of the arbitrary, the very nature of normal research ensures that novelty shall not be suppressed for very long.

Eventually, it becomes impossible to deny that there are problems which cannot be solved within the accepted way of looking at things. At this point a state of "crisis" is reached, and the field seems threatened by a pervasive confusion and chaos. The crisis is resolved

by the emergence of a new paradigm, and normal science can proceed once again with confidence.

One influential definition of science which Kuhn's model challenged was the "falsifiability" criterion of the philosopher Karl Popper, which reappeared nonetheless as an element in Judge Overton's definition. Popper thought that a theory or hypothesis was scientific only to the extent that it was in principle capable of being shown to be false through empirical testing. The problem with this criterion is that it is impossible to test every important scientific proposition in isolation. Background assumptions have to be made so that detailed statements can be tested. The paradigm is made up of the background assumptions that define the current scientific worldview.

A paradigm is not merely a hypothesis, which can be discarded if it fails a single experimental test; it is a way of looking at the world, or some part of it, and scientists understand even the anomalies in its terms. According to Kuhn, anomalies by themselves never falsify a paradigm, because its defenders can resort to *ad hoc* hypotheses to accommodate any potentially disconfirming evidence. A paradigm rules until it is replaced with another paradigm, because "To reject one paradigm without substituting another is to reject science itself." The rule against "negative argumentation" which the National Academy of Sciences invoked in the Supreme Court case was an application of this logic.

When a new paradigm emerges it does more than explain the anomalies: it reorients the scientific perspective so strongly that the former anomalies may seem no longer to be mere facts but virtual tautologies, statements of situations that could not conceivably have been otherwise. It is therefore not as exceptional as it may have appeared that distinguished scientists have praised Darwin's theory as a profound tautology, or declared it to be a logically self-evident proposition requiring no empirical confirmation. A tautology or logical inevitability is precisely what the theory appears to them to be: it describes a situation that could not conceivably have been otherwise. From this perspective, "disconfirming" evidence is profoundly uninteresting.

Kuhn described experimental evidence showing that ordinary people tend to see what they have been trained to see, and fail to see what they know ought not to be present. The finest scientists are no

exception; on the contrary, because they are dependent upon inferences and upon observations that are difficult to make, they are particularly prone to paradigm-influenced misperception.

Kuhn cited examples of visible celestial phenomena that were not "seen" until the new astronomical paradigm of Copernicus legitimated their existence. If Kuhn had chosen evolutionary biology as a case study, he would have risked being denounced as a creationist. As we saw in Chapter Four, the pervasive pattern of stasis in the fossil record long went unrecognized because to Darwinists it was not worth describing in print. The problem of tunnel vision is not something that can be expected to go away as science becomes more sophisticated. On the contrary, as essential funding is brought more and more under centralized governmental control, researchers have no alternative but to concentrate upon the agenda set by the paradigm.

A new paradigm does not merely propose different answers to the questions scientists have been asking, or explain the facts differently; it suggests entirely different questions and different factual possibilities. For this reason, opposing paradigms are to a certain extent "incommensurable," in the sense that their respective adherents find it difficult to communicate intelligibly with each other. Kuhn's insight in this respect is particularly true when the paradigm is not a specific scientific theory but a broad philosophical outlook.

To cite an example from my personal experience, it is pointless to try to engage a scientific naturalist in a discussion about whether the neo-Darwinist theory of evolution is *true*. The reply is likely to be that neo-Darwinism is the best scientific explanation we have, and that *means* it is our closest approximation to the truth. Naturalists will usually concede that any theory can be improved, and that our understanding of naturalistic evolution may one day be much greater than it is now. To question whether naturalistic evolution itself is "true," on the other hand, is to talk nonsense. Naturalistic evolution is the only conceivable explanation for life, and so the fact that life exists proves it to be true.

It is easy to see why scientific naturalism is an attractive philosophy for scientists. It gives science a virtual monopoly on the production of knowledge, and it assures scientists that no important questions are in principle beyond scientific investigation. The im-

portant question, however, is whether this philosophical viewpoint is merely an understandable professional prejudice or whether it is *the* objectively valid way of understanding the world. That is the real issue behind the push to make naturalistic evolution a fundamental tenet of society, to which everyone must be converted.

If scientific naturalism is to occupy a dominant cultural position, it must do more than provide information about the physical universe. It must draw out the spiritual and ethical implications of its creation story. In short, evolution must become a religion. We shall see in the following chapters how this has been accomplished.