Chapter 13

Is Intelligent Design Science?

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THE PRECEDING CHAPTERS of this book have attacked the scientific basis for intelligent-design creationism. Some readers may therefore infer that our dispute with the advocates of intelligent design is purely scientific; that intelligent design is a legitimate scientific theory on a par, say, with evolution; and that it is just an alternate way of attacking the problem of origins. Indeed, we risk legitimizing intelligent design simply by engaging it.

Let us make clear, then, that we do not consider intelligent design to be a legitimate scientific endeavor. Intelligent design is not bad science like cold fusion or wrong science like the Lamarckian inheritance of acquired characteristics, although it probably lies farther along the same continuum. Criticizing it gives it no more scientific legitimacy than criticizing astrology—no more than the magazine *Skeptical Inquirer* gives to quack medicine when it exposes such practices as phony.

Looking for the footprints of the deity is not necessarily unscientific. What is unscientific is to decide ahead of time on the answer and search for God with the determination to come up with a positive result. That is precisely what William Dembski, Michael Behe, and other ID advocates seem to be attempting. Knowing the answer in advance and being immune to contradictory evidence are typical of pseudoscience.

Perhaps we should be hesitant to use a label such as pseudoscience or crank science; after all, such terms are no longer favored among philosophers

of science. It has become increasingly clear (Laudan 1988) that there is no clean way of separating scientific claims from nonscientific just by applying principles like falsifiability or methodological naturalism. Additionally, labeling a rival idea as pseudoscientific may well replace real argument with a political attempt to deny it legitimacy.

Nevertheless, we argue that pseudoscience can be a useful term. If the intelligent-design advocates advertise themselves as doing science, even when their practices are far from the customary intellectual conduct of mainstream science, we can and should suspect that intelligent design is not legitimately science. This suspicion is not a substitute for the detailed scientific critiques offered in the preceding chapters. Nevertheless, exploring whether the label *pseudoscience* applies may help us better understand what is wrong with intelligent design.

Before rendering judgment on intelligent design, however, let us examine some pseudosciences and see what they have in common and why we call them pseudosciences.

Some Features of Pseudoscience

DENIAL OF ESTABLISHED SCIENTIFIC FACT

Homeopathy provides a good example of a pseudoscience that denies known facts. Specifically, homeopathic "physicians" start with a chemical compound that is thought to cure a disease, dissolve that compound in water, and then repeatedly dilute it many times until there are, at most, just a few molecules of the original compound in the solution. Indeed, the water contains impurities in many times the concentration of the "medication."

Homeopaths are aware of the dilution problem and rely on an ad hoc hypothesis: the water remembers what has been put into it. How? Jacques Benveniste, a French medical doctor, says vaguely that some sort of electromagnetic radiation stays in the water (Lawren 1992, Friedlander 1995). He has, however, not measured this radiation and has apparently forgotten that electromagnetic radiation travels at the speed of light and would be gone from his solution in a few nanoseconds, at most.

Young-earth creationists claim that the earth is approximately 10,000 years old. When presented with fossil evidence to the contrary, some propose that God put the fossils into the earth for a reason that we do not know. By proposing such an ad hoc hypothesis, they make it impossible to measure the age of the earth: it is 10,000 years by fiat.

In the same way, former astronomer Hugh Ross (1998) accepts the Hebrew Bible's claim that people lived for 900 years around the time of Noah

and postulates that God created the Vela supernova specifically to bathe the earth in cosmic rays, cause genetically programmed cell death, and shorten our life spans to a mere 120 years. Ross's hypothesis—for that is all it is—would be more convincing if cosmic rays accounted for most of the radiation on our gonads, but they do not (Young 2000). Background radiation due to radioactive minerals in the environment contributes more than half that radiation. Even before the Vela supernova, there was plenty of radiation to initiate programmed cell death.

What are regarded as established facts may turn out to be wrong. But we need very strong reasons to suspect a major mistake. Ad hoc scenarios such as Beneviste's are not enough.

UNTESTABLE HYPOTHESES

Invoking an ad hoc hypothesis to explain a result you did not expect is not necessarily bad science. When a certain nuclear disintegration did not appear to obey the law of conservation of energy, the physicist Wolfgang Pauli postulated the existence of a new particle—the neutrino. Pauli's postulate was not the end of the argument, however; it was the beginning. He calculated the properties of the neutrino and thereby allowed scientists to search for such a particle. A particle with the required properties was found approximately two decades later. If it not been found or had had the wrong properties, scientists would have had to seek another solution to the problem.

Pauli's hypothesis gave a plausible explanation of why the energy seemed not to be conserved. But more important, it was very specific and could be tested. Contrast that with Benveniste's hypothesis, which gives no idea of the properties of the radiation, how it got into the water, why it stays around, or how to detect it.

A hypothesis has to be testable, or else it is useless as a scientific tool. Both confirming and disconfirming evidence weigh in, although neither can be wholly conclusive (Bunge 1996, 180–83). Nevertheless, a good test has to risk failure, and a good scientist recognizes failure.

A theory that explains everything also explains nothing, because it cannot be tested. For example, an astrologer might say that a person who is born with Mars in his house should be aggressive. If the astrologer sees a submissive person who was also born with Mars in his house, he says, "That sometimes happens; he felt the strength of Mars inside him, could not handle it, and retreated into himself" (Dean 1986–87). In other words, a person born with Mars in his house will be either aggressive or submissive. Astrologers who always manufacture excuses to protect their theories from failure are not practicing science (Perakh 2002b).

TRIES TO "PROVE THAT"

A pseudoscientist tries to prove *that* something is true; a good scientist tries to find out *whether* it is true. This distinction is important. If we attack a problem, certain of the answer, then we will find that answer, whether it is right or not. Benveniste found a positive result when he performed certain tests; but when his procedure was tightened up by an international visiting committee, the positive result disappeared.

William Dembski (1998d) forfeits his credibility as a scientist, or ought to, when he says, "As Christians, we know" (14). Sorry, but we don't know. What Dembski ought to say is "As Christians, we hypothesize," and then go out and test his hypothesis. Instead, he seems to have the answer and therefore only pretends to be searching for it. The fact that others, non-Christians, claim to have different answers ought to give Dembski pause, but it apparently does not.

EVERYONE IS WRONG BUT US

Pseudoscientists seem to think that everyone is wrong but them. Indeed, they may dare you to prove them wrong, little realizing that the burden of proof is usually on the person who makes the claim. Often they imply a conspiracy among their opponents to silence them. Many pseudoscientists make grandiose claims and think they are misunderstood geniuses; they compare themselves to Galileo, a man persecuted by the Church for his scientific discoveries (Friedlander 1995). Behe (1996) claims that his thesis of irreducible complexity "must be ranked as one of the greatest achievements in the history of science. The discovery rivals those of Newton and Einstein, Lavoisier and Schrödinger, Pasteur, and Darwin" (233). Dembski (1991), at the beginning of his career, had already compared himself to Kant and Copernicus and now claims (1999, 2002b) he has discovered a new law of thermodynamics. The philosopher Rob Koons compares Dembski to Newton (Dembski 1999, jacket blurb).

Why is the burden of proof on the claimant? Largely for practical reasons. Most scientists have no time to evaluate every unsupported claim that passes their way. They may miss some important ideas, like continental drift, but they will more likely miss a lot more bad science and pseudoscience. If you want to get scientists' attention, you have to provide something concrete, supported by evidence: something they can evaluate rigorously.

Additionally, it is often hard to prove the negative of a statement. Until humans landed on the moon, we could not have disproved the old maxim, "The moon is made of green cheese." Instead, we had to ask the proponents of that theory to provide evidence of their claim. Since they could not, we

did not accept it. But neither did we make an all-out effort to prove that the moon was not made of green cheese. It was simply not worth our while, and we would have been hard-pressed to find an argument that would have convinced the true believers.

OTHER FEATURES OF PSEUDOSCIENCE

Distinguishing pseudoscience from wrong science is not always cut and dried, although an honest person who practices wrong science will usually admit error when error is proved. Soviet scientist Boris Deryagin, for example, thought that he had discovered a polymerized form of water, which he called polywater (Levi 1973, Friedlander 1995). Many others thought that they had detected polywater, too, before evidence against its existence began to accumulate. When the evidence proved that the polywater was, in essence, a solution of glass (silicon dioxide) in water, Deryagin conceded his error. A pseudoscientist would not have done so; the pseudoscientist rarely, if ever, admits error but finds some way to patch up the theory. This is not to say that science is always right. Rather, wrong science is correctable, whereas pseudoscience is not.

Finally, pseudoscientists often use made-up terms and vague concepts that hide their lack of intellectual substance.

Methodological Naturalism

Advocates of intelligent design respond by claiming that "official" science unjustifiably views as legitimate objects of its inquiry only whatever is natural and rejects out of hand everything supernatural, leaving no place for intelligent design (Johnson 1993, 1998; Behe 1996; Dembski 1999; Wells 2000). Such an attitude supposedly stems from the dogmatic philosophical presuppositions of the scientific establishment and is claimed to be an obstacle to free inquiry.

Methodological naturalism has indeed been a feature of science, but only as a practical matter and not as a fundamental principle. Methodological naturalism has so far worked and enabled science to achieve great success. In fact, however, science differentiates only between known and unknown, or between explained and unexplained, not between natural and supernatural. Every phenomenon that can be studied using methods of inquiry based on evidence is legitimate in science.

As an example of how science can legitimately approach a problem regardless of its possible supernatural implications, let us consider the affair of the Bible codes.

The Bible Codes

In 1994, the peer-reviewed journal *Statistical Science* printed an article by Doron Witztum, Eliyahu Rips, and Yoav Rosenberg (WRR) claiming discovery of a meaningful code hidden in the Hebrew text of Genesis. WRR defined an *equidistant letter sequence* (ELS) as a meaningful word that can be formed in a text by sequentially extracting letters separated by equal intervals, or skips. For example, look at the title of this section. Ignoring spaces, we write it as THEBIBLECODES. The first, fifth, and ninth letters of that string form an ELS (with a skip of 4) for the word TIC. WRR noted that Genesis contains a large number of ELS's. Their claim is true. The same, though, is equally true of any sufficiently long text in any language. With a suitable computer program, thousands of ELS's with various skips can be instantly identified in every text—in the Manhattan phone book as well as in the Bible.

Although WRR did not mention intelligent design, the problem they faced was very similar to examples discussed by ID advocates (Behe 1996; Dembski 1998a, 1998d, 1999, 2002b): they wanted to determine whether the ELS's in Genesis could be attributed to chance or whether design had to be inferred (see chapter 9 in this book).

WRR conducted a computerized statistical experiment. They compiled a list of famous rabbis who lived between early medieval times and the eighteenth century. Their computer program located ELS's that spell the appellations of those rabbis, with various skips, as well as ELS's that spell the dates of birth and/or death of the same rabbis. (In Hebrew, dates are expressed by letters of the alphabet.) They estimated the statistically averaged distance within the text between the ELS's for the appellations and for the dates of birth and/or death of the same rabbis. Then their program created one million permuted lists of appellations and dates; the appellations for individual rabbis and their dates became mismatched in these permuted lists.

WRR calculated the statistically averaged distance between ELS's for appellations and dates for all the permuted lists and compared those distances with the distances in the original list. They concluded that the ELS's for the appellations and for the dates of the same rabbis in the text of Genesis are situated statistically much closer to each other than the distances between ELS's for appellations and dates if found for different rabbis. They estimated that the probability of such an "unusually close proximity" happening by chance did not exceed 1 in 62,000.

Since the rabbis in question all lived much later than Genesis was written, the unusual proximity of the encoded rabbis' names to their encoded dates of birth or death means the text's author must have known the future. In other words, WRR's article alleged scientific proof of a miracle.

If we believe the ID advocates, the scientific establishment, represented by the editorial board of *Statistical Science*, should have rejected WRR's paper out of hand because it dealt with the supernatural. On the contrary, they published WRR's paper, although the referees had expressed serious doubts about WRR's statistical procedure.

A number of experts analyzed WRR's procedure and found that it suffered from a number of irregularities. Gradually, specialists in statistics and related fields came to an overwhelming consensus that WRR's data were unreliable. *Statistical Science* published a paper that decisively showed WRR's methodology to be contrary to the requirements of scientific rigor; hence, their results could not be trusted (McKay et al. 1999). Additional critiques of WRR's work appeared elsewhere (Simon 1998; Perakh 1998–2000, 2000; Hasofer 1998; Ingermanson 1999; Cohen 2000).

The results claimed by WRR were rejected not because the object of their study violated methodological naturalism but because of the faults in their procedure. If WRR's data had been statistically sound, then there would have been sufficient reason to consider a nonchance origin of the code in Genesis. Further, once chance is dismissed as the cause of the "close proximity," all sorts of alternative explanations become legitimate alternatives for a scientific discourse. Among possible alternative inferences, for example, are time travel, psychic prediction of the future, and extraterrestrials as the authors of Genesis (Raël 1986) as well as, yes, inferring the existence of a disembodied intelligent designer.

If WRR's data were statistically sound, scientists would include the inference to intelligent design as one among many possibly legitimate explanations. No naturalistic philosophical predispositions would prevent the inference to the supernatural. Scientists rejected such an inference only because WRR's data were found unsatisfactory, for both statistical (McKay et al. 1999) and extrastatistical (Perakh 2000) reasons. An inference to the supernatural has not yet been accepted in any other case either—again only because no *evidence* for such superhuman intelligent design has been demonstrated. Until such evidence is unearthed, the supernatural will not become a part of genuine science.

Science is neither based on methodological naturalism nor restrained by it, and likewise it is not restrained by any other metaphysical principle. It is restrained by one and only one requirement: it requires evidence.

Genuine Science versus Dembski's Z-Factors

Regarding the question of whether intelligent design is genuine science or pseudoscience, it also seems relevant to review the concept that Dembski

(2002b) calls Z-factors. He defines these as "some entity, process or stuff outside the known universe [which] . . . purports to solve some problem of general interest and importance" (87). Dembski defines the *inflationary fallacy* as estimating the probability of an event based not only on reliable knowledge but also on an arbitrary additional hypothesis, which he calls a Z-factor. A Z-factor is an unjustified excursion beyond the available knowledge (in Dembski's terms *inflation of probabilistic resources*), which can be used to estimate the probability of an event.

Dembski discusses four Z-factors: the bubble universes of Alan Guth's (1997) inflationary cosmology, the many worlds of Hugh Everett's (1957) interpretation of quantum mechanics, the self-reproducing black holes of Lee Smolin's (1997) cosmological natural selection, and the possible worlds of David Lewis's (1986) extreme modal realist metaphysics. These four concepts postulate the existence of many (so far undetected) universes besides our own. They offer different assumptions regarding the origin of the multiple universes and their putative properties. None has a direct empirical basis, but their authors have proposed arguments in favor of their plausibility, and each of these hypotheses has a certain explanatory potential regarding the structure and the history of our universe.

The available knowledge about the structure and history of the universe is insufficient to choose among the hypotheses by Guth, Smolin, Everett, and Lewis. Dembski therefore calls all four concepts Z-factors. The four Z-factors in question are indeed speculative, but that is not the issue in this chapter. We are, rather, interested in some of the arguments Dembski suggests against the inflationary fallacy.

In Dembski's (2002b) view, "Each of the four Z-factors considered here possesses explanatory power in the sense that each explains certain relevant data and thereby solves some problem of general interest and importance" (90). He continues, however, to say that possessing explanatory power is not sufficient for accepting a theory. What is also necessary is independent evidence in favor of that theory: "Independent evidence is by definition evidence that helps establish a claim apart from any appeal to the claim's explanatory power. . . . It is a necessary constraint on theory construction so that theory construction does not degenerate into total free-play of the mind" (90).

As an example, Dembski discusses a hypothetical gnome theory of friction: "suitably formulated, the gnome theory of friction can explain how objects move across surfaces just as accurately as current physical theories. So, why do we not take the gnome theory of friction seriously? One reason . . . is the absence of independent evidence for gnomes" (91).

Even if we disregard Dembski's dubious assertion that the gnome theory

can explain friction as well as current physical theories, we can agree with him that a plausible theory has to offer explanatory power (otherwise, it is not useful) and be supported by independent evidence (otherwise, it would "degenerate into total free-play of the mind" [90]). Do intelligent-design theories—in particular, Dembski's—provide explanatory power? Are they supported by independent evidence? We suggest that the answers are unequivocally no.

ID theory claims that we can establish design by some rational procedure, whose principal features are encapsulated in Dembski's explanatory filter. Detailed analyses of the explanatory filter may be found in chapter 8 of this book and elsewhere (Chiprout 2003; Elsberry 1999, 2000; Fitelson et al. 1999; Perakh 2001b, 2002a, 2003; Wilkins and Elsberry 2001; Elsberry and Shallit 2002). Here, we are interested only in answering the questions about explanatory power and independent evidence.

Does intelligent-design theory provide explanatory power? If so, it must provide information about the details of the design and, to this end, about the nature of the designer. ID theory, however, deliberately avoids the answers to this question. Advocates of intelligent design (Dembski 1999) insist that their theory is not tied to any concept of a designer but just provides a means to distinguish among chance, regularity, and design as the causal antecedents of the event in question.

The designer in the intelligent-design theory looks like another Z-factor. Indeed, Dembski's concept is based on a much more egregious inflationary fallacy than those of his four offenders. Guth (1997) and Smolin (1997) at least suggest ideas in regard to the features, properties, and behavior of their Z-factors. By contrast, Dembski deliberately leaves beyond consideration the attributes of the Z-factor in his own theory. Moreover, Guth and Smolin have suggested certain ideas for indirect tests of their Z-factors, while the advocates of intelligent design propose nothing even close to an empirical test.

In fact, the intelligent-design theory does not have explanatory power. To simply state that an event is due to intelligent design explains nothing because the term *designer* has no defined meaning in the theory and the modes of the designer's activities remain mysterious and unexplained. Indeed, both Behe (1996) and Dembski (1998a, 2002b) refuse to even speculate on the attributes of the designer, whose existence can supposedly be asserted using the design inference (Dembski 1998a, 1999, 2002b). Hence, while Dembski has stated the necessity of explanatory power for any useful theory, he forgets about that requirement when turning to his own theory.

Advocates of intelligent design usually refuse to discuss the nature of the alleged designer. They try to deflect criticism of their refusal by citing examples

in which design is inferred despite the lack of knowledge about the designer. For example, Dembski asks, Is the design inference legitimate in the case of Stonehenge? We all agree that it is. He says, however, that nothing is known about the designer in that case either. On the contrary, as regards Stonehenge and similar cases, we infer a well-known type of a designer: a human designer. We attribute the creation of Stonehenge to a human designer precisely because we know so much about the features of human design and see those features in the object observed.

In another example, Dembski (2002b) refers to a book by Del Ratzsch (2001). Ratzsch suggests imagining that an expedition to some planet of the solar system finds a bulldozer standing in a field. Obviously, we conclude that the bulldozer was designed rather than that it happened to exist by sheer chance. Dembski insists, however, that we infer a designer without any knowledge about the designer and his characteristics. Why cannot the same attitude be applied to a mysterious designer in his design theory?

The fallacy of such an argument is evident. A bulldozer on an alien planet has features that testify not only to certain characteristics of its supposed designer but also to the possible use for which it was designed. The bulldozer has treads evidently designed for motion, a seat evidently designed to accommodate a creature anatomically similar to earthly humans, pedals evidently designed for feet similar to those of earthly humans, and many other features providing good ideas about what kind of a designer must be responsible for the observed object and what use it was intended for. Additionally, we have prior experience of bulldozers and know that they are artifacts.

In Ratzsch's terms, a bulldozer displays an obvious *artifactuality*. In Niall Shanks and Karl Joplin's (1999) terms, the bulldozer is "antecedently recognizable as an artifact" (269). It is precisely because we know so much about both bulldozers and the humans who design them that we would infer design if a bulldozer were found on Mars. Moreover, the design inference in the case of that bulldozer will be made without any reference to Dembski's explanatory filter, which is utterly useless for inferring design in the hypothetical case under discussion.

The bulldozer example is irrelevant for many other reasons as well. A bulldozer is not a living organism that can reproduce, develop, or evolve spontaneously. Indeed, the design inference is controversial only with respect to biological entities. When we see a bulldozer or a poem, there is no controversy; we unequivocally attribute them to design because of our extensive knowledge about such objects and the human designers who create them. In contrast to bulldozers and poems, organisms are not designed but inherit genes from their forebears. A bulldozer is designed by an engineer and built by la-

borers according to the engineer's design. Dembski and his colleagues seem peculiarly blind to the obvious difference between artifacts and organisms.

We know nothing whatsoever about the alleged disembodied designer of the intelligent-design theory or about what that designer's creations should look like. The case is therefore very different from bulldozers and poems. A reference to such a designer lacks explanatory power.

According to Dembski, an even more important requirement for a theory is independent evidence supporting that theory. Strangely, he and his colleagues in the intelligent-design enterprise forget about the criterion of independent evidence as soon as they turn to their own theories. Where is independent evidence supporting the intelligent-design theory? There is none. The absence of explanatory power and of independent evidence, according to Dembski's own criteria, signifies the degeneration of the theory into a "total free-play of the mind," which Dembski seems to disapprove of for all theories except his own. Despite their substantial financial resources, the advocates of intelligent design have so far failed to come up with a real scientific research program and indulge instead in philosophical or theological discourses and political maneuvering (Forrest 2001).

Dembski views explanatory power as a category independent of evidence. Indeed, the gnome theory of friction, in his view, can provide explanatory power despite lack of evidence for the existence of gnomes. Explanatory power without evidence is, however, meaningless. The gnome theory of friction does not plausibly explain friction precisely because there is no evidence of the gnomes' existence. The gnome theory is pure speculation and has no explanatory power. Explanatory power is meaningful only if it is based on facts and evidence. To say that friction is caused by gnomes is to explain nothing because we have no knowledge about what kind of a behavior those postulated gnomes may have. In fact, a theory has plausible explanatory power only if it is also supported by evidence.

Dembski's intelligent designer is just another Z-factor. His separation of explanatory power from evidence is contrived; it is no more than the "free-play of the mind," a mote that he finds in the eyes of others.

But Is It Pseudoscience?

To decide whether intelligent design is science, we have to first realize that the existence or nonexistence of God is a fact. Whether we can find out anything about this fact is problematic, but if we are going to do so, we have to deal with facts and evidence. Only an objective evaluation based on evidence is apt to find God's putative footprints in the natural world. Faith, in this

context, is a blind alley because it stifles rigorous investigation; indeed, if we accept Michael Behe's concept of irreducible complexity, we might as well throw in the towel and not even try to understand the evolution of the flagellum (see chapter 6 in this book).

Unlike young-earth creationists, the intelligent-design neocreationists do not usually deny scientific fact; rather, they work their theories around or into what is already known. Their hypothesis—that God might have left behind evidence of his creation—is not indefensible, unless we are willing to rule out theism from the beginning. As we have seen, however, scientists' commitment to methodological naturalism does not mean they need such an a priori assumption.

On the other hand, although they are sometimes coy about the identity of their intelligent agent, the neocreationists plainly try to prove *that*, not find out *whether*—a clear feature of pseudoscience. Additionally, they say everyone is wrong but them and compare themselves with, say, Copernicus, Newton, and Boltzmann. They often imply a conspiracy among their opponents to exclude religion or God from science, another common feature of pseudoscience.

Of the criteria we consider relevant to the issue, the advocates of intelligent design pass on only two: they do not usually deny known facts (although sometimes they do), and their hypothesis that the universe may have been designed is not indefensible. Where it counts—assuming the answer, implying conspiracy, inflating the importance of their alleged breakthroughs, and lacking evidence—their work has enough features to be recognized as pseudoscience.

Intelligent design is the argument from design in new clothing. Advocates of intelligent design, such as Dembski, claim to look for evidence of design, but they simply estimate probabilities and use them to eliminate chance or necessity. They ignore other alternatives and have no positive criterion for identifying a designer; their combination of low probability (often miscalculated) with a dubiously defined and often misused concept of specification provides no real evidence.

It is not scientific.

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