

DESIGN

I found a dimpled spider, fat and white,
On a white heal-all, holding up a moth
Like a white piece of rigid satin cloth—
Assorted characters of death and blight
Mixed ready to begin the morning right,
Like the ingredients of a witches' broth—
A snow-drop spider, a flower like a froth,
And dead wings carried like a paper kite.

What had that flower to do with being white,
The wayside blue and innocent heal-all?
What brought the kindred spider to that height,
Then steered the white moth thither in the night?
What but design of darkness to appall?—
If design govern in a thing so small.

ON A BIRD SINGING IN ITS SLEEP

A bird half wakened in the lunar noon
Sang halfway through its little inborn tune.
Partly because it sang but once all night
And that from no especial bush's height;
Partly because it sang ventriloquist
And had the inspiration to desist
Almost before the prick of hostile ears,
It ventured less in peril than appears.
It could not have come down to us so far
Through the interstices of things ajar
On the long bead chain of repeated birth
To be a bird while we are men on earth
If singing out of sleep and dream that way
Had made it much more easily a prey.

Robert Frost

Complete Poems of Robert Frost, Holt, Rinehart and Winston, 1949

Evolution or Design?

Gale Rhodes

Looking at the exquisite fit of an enzyme to its substrate, and the highly precise interactions of catalytic groups that make the enzyme selective and efficient, you might wonder if such a beautiful machine could come about by random mutation and natural selection. Would it not be easier to believe that such fine machines are engineered by some intelligent being? In like manner, the convergence, in the first of Frost's poems above, of a white spider and a white moth on a rare white heal-all (a flower that is more commonly blue), might appear at first to be more than coincidence. Is some dark design at work, bringing these three matching creatures together in a macabre dance?

If you like poetry, and if you find evolution interesting, then Robert Frost's poetry is a must. Judging from Frost's other writings, like the second poem above, he had a keen understanding of the principles of evolution, as well as how outward appearances in nature might lead one to question evolution and wonder if an intelligent designer is at work in our world. The notion that seemingly risky behavior, like brief song at night, would not persist if it made the singer easy prey and less likely to produce offspring makes sound evolutionary reasoning.

Of course, evolution by natural selection provides a rational, testable explanation for the convergence featured in the first poem. White moths that tend to feed on white flowers will be hidden from view, will suffer less predation than non-camouflaged moths, and will leave more offspring carrying their inherited whiteness. The same is true for spiders, because camouflage hides them not only from their prey and makes them more successful predators, it also protects them from their own predators (hummingbirds get most of their protein by eating spiders, and they use spider webs, along with moss and plant bud scales, in building their nests). Mutation provides the variation, and selection eliminates the less fit, providing a natural way to understand such events. But you might also say at first glance that the idea of design could also explain the observations that led to Frost's poem. The question is, does design explain anything?

Intelligent design, or ID, is the idea that life did not evolve to its observed level of complexity and intricacy, but instead was intelligently designed. Proponents of this idea are intentionally vague about the designer, in order to avoid having their ideas rejected in court as being efforts to inject religious beliefs into science teaching. To give public credence to their ideas, ID proponents work hard to draw scientists into debating evidence in favor of or against ID. We can debate the soundness of scien-

tific theories in the light of evidence, that is, in the light of science's findings about nature. But we cannot debate the truth of propositions like intelligent design, because unlike scientific theories, ID does not allow us to make any predication, and to conduct experiments to see if the idea makes correct predictions. If we enter debates about evidence, we are conceding that ID is a testable theory, and if it were, it certainly SHOULD be taught as science. But ID is not a testable theory. If the world is the product of intelligent design, then there is a designer, the existence of whom poses the same intractable problems as does the existence, or non-existence (equally impossible to prove) of God.

Arguments on both sides of such a debate, those aimed at proving the existence of intelligent design, or those arguments formulated by scientists aiming to disprove it, simply do not hold water. On the one hand, proponents of ID use specific examples of intricate and partially understood molecular function (such as the molecular motors of muscle fibers, flagella that propel microbes, and proton-driven enzymes that make ATP) to say that life at the molecular level is "irreducibly complex" and thus that it must have been designed. Setting aside the obvious nonsense of the notion that intelligence could design something irreducibly complex, intricacy does not prove design.

On the other hand, scientists try, with equal futility, to disprove ID with examples of biological structure that appear poorly designed. For example, as a consequence of the evolution and development of the human eye, the light detectors in our eyes point toward the back of the head, and are less sensitive than they would be if more intelligently designed. Would an intelligent designer make such a contraption? "Obviously" not, say scientists. But the ID proponent simply argues that the designer is smarter than we are, and has a reason—beyond our understanding, of course—for what looks like sub-optimal design.

Some former scientists claim that revelations of the complexity of life at the molecular level drove them to accept intelligent design as a viable theory. My personal introduction to life's molecular level produced exactly the opposite effect on my beliefs. As I began to learn and understand more about the molecular basis of mutation, and the effects of mutation on molecular function, I found that evidence for random variation, selection, and resulting evolution is stronger and clearer in molecular matters than at any other level. But whether the molecular level points for or against ID is simply a matter of opinion. Or perhaps it has to do with imagination. Even though I know I will never fathom nature's complexity completely, I can easily imagine, based on what I do know, that the mechanisms I see at the molecular level could arise by random variation and natural selection. Apparently

some others cannot. Neither side has a convincing argument, but I see the acceptance of intelligent design as primarily a failure of rational imagination.

Either way, pro or con, rational evidence cannot support or refute an untestable idea like ID. In addition, an untestable idea cannot further our understanding, or guide us in asking questions to learn more about the world around us. Intellectually, the answer "ID" to the question of life's origins, is no more helpful than answering a child's, "Why?" by saying, "Because."

When we are confronted with demands to consider an irrational belief, debating its truth is not the appropriate response. First, we should argue that untestable beliefs are of no use. They may be comforting, but they do not advance understanding, and they do not increase our control over our circumstances, like our ability to combat deadly diseases. Next, to better understand ideas like ID, we should ask what motivates the belief. Why do proponents want to propagate the belief, especially given that the idea does not advance our understanding of nature one bit? I believe that the proponents of ID are not trying to advance our understanding at all. They are trying to manipulate public opinion, the design of educational curricula, and decisions on research funding, all on the basis of their own religious, political, and moral beliefs. In vital areas of research and education, they are trying to undermine and replace open-mindedness and rationality with their own ideology. In none of the world's countries is this effort more dogged than in the United States, where fundamentalist movements have joined forces with political movements to try to discredit sound science if its findings challenge fundamentalist beliefs.

Rational analysis of nature leads to discoveries that make certain people uncomfortable. Science's findings are sometimes at odds with certain interpretations of religious texts, and so these findings undermine the authority of the texts. If science contradicts what religion teaches about the physical world, some might fear that it undermines the authority of their religion in the spiritual and moral realms (although science does not give us appropriate evidence for establishing belief in these realms). One reaction of these threatened folks is to try to undermine science, by proposing more acceptable—but like ID, irrational—ideas about nature, and demanding that they be given equal billing with rational thinking.

So scientists should avoid debates on the truth of intelligent design. Instead, they should show that the idea is not scientific, and not a basis for understanding the world around us. And they should continue fighting to devote science teaching to science, which is nothing more than rational thought, applied collectively and exhaustively to the natural world. Untestable ideas have no place in science classes,

except as examples of what is not scientific. In fact, science teachers might well use ID as an example when they talk about what science is and is not, often the topic that begins a science course.

The hallmark of an untestable idea is that it really does not matter if it is true or not. There are no observable consequences of an idea that cannot be tested. So in many respects, it really does not matter if the world is the result of design. If it were designed, it was certainly designed to look as if it evolved, and to evolve from its present state, because evolution of such fast growers as microbes and insects is directly observable. So understanding the world, whatever its ultimate origin, means understanding evolution. And by whatever mechanisms our world came to be, it is still full of hungry people, sick people, finite resources, and limited capacity to absorb our wastes. So either way, we need to understand the world well enough to design preventions and cures for disease, to expand food production, to reduce our demands on resources, and to clean up our messes. Whether the world evolved or came off an assembly line, we must understand it in order to preserve it, and that means understanding evolution and how to use it to help us. The idea of intelligent design does not help us understand our world, nor can it guide us in changing it for the better.