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Y-ORIGINS

# THE PROBLEM WITH HALF AN EYE



BIOLOGY REVEALS NATURALISM'S FAILURE TO ACCOUNT  
FOR "IRREDUCIBLY COMPLEX" ORGANS AND ORGANISMS

Looking down at Greenland from 32,000 feet on my trip from Rome to Seattle, I heard an unfamiliar noise in the aircraft that disturbed my slumber. Suddenly I began to wonder what would happen if one tiny part on the enormous Boeing 747 failed. Engines, hydraulics, air pressurization—all were complex systems that worked only when several interdependent parts functioned properly.

In vain I sought comfort in my airline pretzels, but comfort can never be found in low-fat foods. I kept thinking of all those dedicated employees (excuse me: “members of the Boeing family”) shown on the commercials who apparently love nothing more in life than a well-oiled 747 and who perpetually ponder my safety. But the nagging thought still popped into my head: “Just one faulty or missing part and I’d become the first bomb ever to be dropped on Greenland.”

In one sense, biological systems are like my Boeing 747: one missing or defective part and they won’t work. Here lies one of the major problems that Darwin himself was troubled about. How did highly complex, interdependent biological systems like the eye develop slowly over eons of time? They would never have worked until fully developed.

Let’s step back for a minute and think about all this.

Is naturalism (the belief that everything is the result of natural cause-and-effect) worthy of the confidence we place in it? Is the accumulation of small changes over millions of years able to account for life in all

the complexity we see around us? Instead of just assuming naturalism to be true, we should look at actual examples of living systems and check to see if Darwinian processes are adequate to explain how they came to be.

## GOING BEYOND DARWIN

The human eye is perhaps the best-known example of a complex system that couldn’t just pop up overnight. (“Say, Bill, what’s that thing growing on your face?” “I thought it was acne, but now that you mention it, I think can see out of it.”)

The objection raised by the complexity of the eye is not a new one. Darwin himself dealt with such objections in a special section of his work entitled “Organs of Extreme Perfection and Complication.”

Darwin (apparently not a reader of X-Men comics) agreed that a mutation causing a fully developed eye to suddenly appear would be tantamount to a miracle. So he argued that such complex systems must arise over a longer period of time through a gradual process, mutation upon mutation. He added that the eye might have developed in any number of ways, by which he was trying to convince us that even an eye far less developed than ours might still be a favorable mutation.

His explanation for the gradual development of such complex systems certainly had its critics, but by and large his ideas were embraced because they helped to explain a great deal of the observable

DARWIN ONCE STATED, "IF IT COULD BE DEMONSTRATED THAT ANY COMPLEX ORGAN EXISTED WHICH COULD NOT POSSIBLY HAVE BEEN FORMED BY NUMEROUS, SUCCESSIVE, SLIGHT MODIFICATIONS, MY THEORY WOULD ABSOLUTELY BREAK DOWN."

phenomena of our world. As the evolutionary movement grew, a great deal of evidence, at least at the macro level, was garnered in support of Darwin's ideas—evidence similar to what you were taught in your high school textbooks. Adaptability, survival of the fittest, and other Darwinian tenets are clearly principles demonstrable in nature. By the mid-twentieth century, Darwinism had gained widespread acceptance, but the various scientific disciplines were developing different ideas, visions, and interpretations of what evolution meant for their field of study. So the leaders of these fields organized a series of meetings to hammer out a coherent and unified theory of evolution. (I'm thinking they also did a little drinking.) The result was called the "evolutionary synthesis," also known as Neo-Darwinism.

In fairness to Charles Darwin, he never insisted that evolutionary processes happened completely apart from an intelligent Designer. But as the movement grew, those most vocal were clearly adherents of naturalistic evolution, leaving no place for the idea of a grand Designer. If it's a helpful metaphor, picture it like a political party that has some general consensus on issues but also includes a good bit of diversity. At times there can be impulses and movements within the party that dominate. That was the case with atheism within the evolutionary movement.

But as Dr. Michael Behe, associate professor of biochemistry at Lehigh University, notes in his book *Darwin's Black Box*, "One

branch of science was not invited to the meetings [that produced the evolutionary synthesis], and for good reason. It did not yet exist."<sup>1</sup> Behe is referring to his own field of study, biochemistry.

Behe's field did not begin until later in the century, after the advent of the electron microscope. Yet biochemistry is perhaps the most critical of all the disciplines for this study, because it analyzes life at the cellular level and observes the molecular foundations of living organisms. If naturalistic evolution is indeed true, and if life can develop wholly apart from outside intelligence, then it must be demonstrated to be operating at the molecular level. The new findings of Behe and other microbiologists assert that it cannot.

## BETTER MOUSETRAPS

Behe's book *Darwin's Black Box* has stirred up quite a few conflicts in the academic community. *Darwin's Black Box* (very readable, considering the subject matter is microbiology) has a straightforward thesis. Darwin once stated, "If it could be demonstrated that any complex organ existed which could not possibly have been formed by numerous, successive, slight modifica-

tions, my theory would absolutely break down."<sup>2</sup> Behe's book, in essence, says, "OK, Charles, take a look at these!" and goes on to cite a handful of examples of what he calls irreducible complexity.

What is irreducible complexity? First, remember that Darwin stated that his theory stood on the belief that organisms develop by successive mutations or developments ("developments" sounds more politically correct than "mutations") slowly over time. In order to do that, each intermediate state (say, a half-developed eye) must be shown to be of some benefit to the organism. A species is going to progress in the world of natural selection for a few million years with a half-developed eye only if such an eye serves some purpose for the organism. Make sense? (I'm thinking there must be a Far Side cartoon somewhere in all this.)

But, as Behe observed, certain systems in the body can't function unless all of their components are fully developed. This is the phenomenon he calls irreducible complexity. If one part is missing or inoperative, the entire system fails to function.

Behe uses a mousetrap as a nonliving example of irreducible complexity. Five basic

parts of the trap must work together in order for it to catch mice: (1) a flat wooden platform; (2) a spring thingy; (3) a sensitive catch that releases when pressure is applied; (4) a metal bar that connects to the catch and holds the hammer back; and (5) the hammer that serves as the instrument of death and cruelty for our harmless mouse. A mousetrap needs each of these parts to kill mice. Each part works interdependently, and so a partially constructed mousetrap serves no function and is worthless.

Behe's book focuses on a handful of examples, though he states that any biology book contains dozens of them. One of the examples he cites is the microscopic bacterial flagellum, which the bacterium uses as a miniature whiplike rotary motor to propel itself. The flagellum is a swimming device that works similar to a rotary propeller. It is described by Behe like this:

Just picture an outboard motor on a boat and you get a pretty good picture of how the flagellum functions, only the flagellum is far more incredible. The flagellum's propeller is long and whip-like, made out of a protein called flagellin. This is attached to a drive shaft by hook protein, which acts as a universal joint, allowing the propeller and drive shaft to rotate freely. Several types of protein act as bushing material (like washer/donut) to allow the drive shaft to penetrate the bacterial wall (like the side of a boat) and attach to a rotary



motor. ... Not only that but the propeller can stop spinning within a quarter turn and instantly start spinning the other direction at 10,000 rpms.<sup>3</sup>

The flagellum's molecular motor requires 50 proteins, all working in synchrony, to function. Like the partially constructed mousetrap, the flagellum would be worthless and perish unless all 50 proteins were fully developed.

While not wanting this article to turn into a science textbook, let me say that you simply have to see this construct to believe it and to appreciate what Behe is trying to describe. It becomes almost unimaginable to think of the flagellum developing on an increment-by-random-increment basis.

Another example Behe cites is what he calls "the intracellular transport system" found within cells. The magnified cell in Darwin's day looked something like an opaque pancake jellyfish with a fuzzy-looking dark spot in the center called the nucleus. It all looked so simple. Only recently, under powerful magnification, have the mysteries of the cell begun to be unveiled.

### BEHE DESCRIBES THE IRREDUCIBLE COMPLEXITY FOUND IN THE CELL THIS WAY:

Plant and animal cells are divided into many discrete compartments; supplies including enzymes and proteins, have to be shipped between these compart-

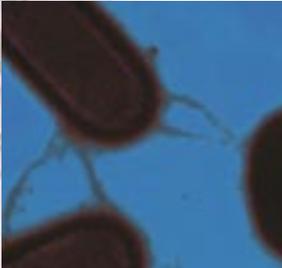
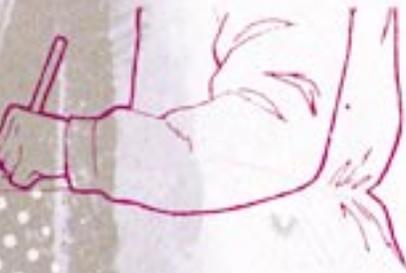
ments. You have to have little molecular trucks, which have motors attached to them. You have to have a little highway for them travel along. You have to identify which components go into which truck, so there is a signal attached to the protein. The truck has to know where it's going and each truck has a key that will fit only the lock of its particular cellular destination. Other proteins act as loading docks, opening the truck and letting the contents into the destination compartment.<sup>4</sup>

Molecular biologist Michael Denton uses a similar metaphor to describe the cell's complexity:

To grasp the reality of life as it has been revealed by molecular biology, we must magnify a cell a thousand million times

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UNIVERSITY OF CHICAGO DEPARTMENT OF ECOLOGY AND EVOLUTION



until it is twenty kilometers in diameter and resembles a giant airship large enough to cover a great city like London or New York. What we would then see would be an object of unparalleled complexity and adaptive design.

On the surface of the cell we would see millions of openings, like the port holes of a vast space ship, opening and closing to allow a continual stream of materials to flow in and out. If we were to enter one of these openings we would find ourselves in a world of supreme technology and bewildering complexity.<sup>5</sup>

But, again, it is not simply complexity; it is irreducible complexity. Going back to Behe's illustration of the mousetrap, everything must be in place for the system to work. Missing just one component, the whole system is worthless. Therefore, it is difficult to understand how it could possibly have developed gradually over time.

## DARWINIAN DOUBTERS, UNITE

Even staunch evolutionists are bewildered by the lack of evidence for Darwin's theory of gradual macroevolution. Paleontologist Niles Eldredge states:

No wonder paleontologists shied away from evolution for so long. It never seems to happen. Assiduous collecting up cliff faces yields ... the very occasional slight accumulation of change—over millions of years, at a rate too slow to account for all the prodigious change that has occurred during evolutionary history. ... Evolution cannot forever be going

on somewhere else. Yet that's how the fossil record has struck many a forlorn paleontologist looking to learn something about evolution.<sup>6</sup>

Biologists Mae-Wan Ho and Peter Saunders make the following indictment:

It is now approximately half a century since the neo-Darwinian synthesis was formulated. A great deal of research has been carried on within the paradigm it defines. Yet the success of the theory are limited to the minutia of evolution, such as the adaptive change in coloration of moths, while it has remarkably little to say on the questions which interest us most, such as how there came to be moths in the first place.<sup>7</sup>

Jerry Coyne of the department of ecology and evolution at the University of Chicago has recently said, "We conclude—unexpectedly—that there is little evidence for the neo-Darwinian view; its theoretical foundations and the experimental evidence supporting it are weak."<sup>8</sup>

## WHAT'S THE USE OF HALF AN EYE?

In the other corner of this heavyweight bout, naturalism's adherents seem to be scrambling to propose ways that these irreducibly complex systems could have been beneficial to the organism in an intermediate state of development. Ken Miller of Brown University, for example, has taken issue with Behe's mousetrap metaphor and has suggested, "Take away the spring and you could have a keychain ... the catch of the mousetrap could be used as fish hook."<sup>9</sup> Miller is suggesting that the different parts

could actually serve other functions, different from their final function, as the organism evolves.

Behe seems unfazed by the critique, as there appears to be silence coming from the opposite camp on what those “other purposes” might have been for the individual parts that make up a feature like the flagellum. Furthermore, in the recent book *The Case for a Creator*, Behe answers criticisms by saying, “Even if each component of the mousetrap could theoretically have a useful function prior to its assembly into the mousetrap. You’d still have the problem of how the mousetrap becomes assembled.”

Surprised at the sudden maelstrom caused by his book, Behe defends his position in *The Boston Review*. “The rotary nature of the flagellum has been recognized for about 25 years. During that time not a single paper has been published in the biochemical literature even attempting to show how such a machine might have developed by natural selection.”

Behe understates the issue. James Shapiro, a biochemist at the University of Chicago, wrote, “There are no detailed Darwinian accounts for the evolution of any fundamental biochemical or cellular system, only a variety of wishful speculations.”

*Darwin’s Black Box* is a scientific book, not a theological one, but Behe has elsewhere made explicit what is implicit in his writing. In a recent interview, Behe had this to say on the implications of his research and the issue of irreducible complexity at the molecular level: “The world is too complicated in all its parts and interconnections to be due to chance alone. . . . The more one

learns of biochemistry the more unbelievable it becomes unless there is some type of organizing principle—an architect for believers.”<sup>10</sup>

## EXTREME PERFECTION AND COMPLICATION, INDEED

We began this article by mentioning the objection of the human eye as it was raised and addressed by Darwin. For most people coming to grips with the implications of naturalistic evolution, complex structures like the human eye are not simply a hard pill to swallow but rather a chicken bone stuck in the throat. Intuitively, we struggle to imagine how such a structure could slowly develop over time and what use a half-developed eye would serve.

A careful reading of Darwin’s explanation in “Organs of Extreme Perfection and Complication” reveals that he never answers the problem. He states that a seeing mechanism could have developed in any number of ways, but he doesn’t explain what might have led to the initial mutation. Perhaps if someone had called him on the carpet in the mid-nineteenth century, we could have been spared this rather circuitous journey.

You can stay at the macro level of broad generalities in evolutionary theory, but demonstrating the exact mechanics of how such things can develop without the aid of an outside intelligence is like a loan that sooner or later comes due. A century and a half after *Origin of Species*, microbiology was left with ugly task of trying to balance the budget. It couldn’t. *Darwin’s Black Box* and other recent books out of microbiology are simply the final accounting.

In light of these new discoveries in microbiology, and the failure of Darwinian theory to account for the irreducible complexity of life's processes, it seems reasonable to think that we should be looking beyond the bounds of naturalism for explanations about how we got here, who we are, and why we exist.

20/20

Charles Darwin once admitted, "The eye to this day gives me a cold shudder."<sup>11</sup> He had good reason to feel that way. The eye is a complex structure that seems to add value to an organism only when it is complete. Could natural processes have produced such an organ?

### DID YOU KNOW? EACH HUMAN EYE ...

- has over 100 million rods
- handles 1.5 million simultaneous messages
- moves 100,000 times each day
- has automatic focusing
- has six million cones
- can distinguish among seven million colors<sup>12</sup>

## NOTES

1. Michael Behe, *Darwin's Black Box* (New York: Free Press, 2003), 24.
2. Charles Darwin, *Origin of Species* (New York: Bantam Books, 1999), 158.
3. Quoted in Lee Strobel, *The Case for a Creator* (Grand Rapids, MI: Zondervan, 2004), 204.
4. Quoted in *ibid.*, 208.
5. Michael Denton, *Evolution: A Theory in Crisis* (Chevy Chase, MD, Adler & Adler, 1986), 328.
6. Niles Eldredge, *Reinventing Darwin* (New York: Wiley, 1995), 95.
7. M. H. Ho and P. T. Sanders, "Beyond Neo-Darwinism: An Epigenetic Approach to Evolution," *Journal of Theoretical Biology* 78 (1979): 589.
8. H. A. Orr and J. A. Coyne, "The Genetics of Adaptation: A Reassessment," *American Naturalist* 140 (1992): 726.
9. Ken Miller, *Finding Darwin's God* (New York: Cliff Street, 1999), 145.
10. Quoted in Strobel, 217.
11. Charles Darwin (1860) in letter to Asa Gray, F. Darwin, ed., *The Life and Letters of Charles Darwin, vol. 2* (London: John Murray, 1888), 273.
12. Hugh Davson, *Physiology of the Eye, 5th ed* (New York: McGraw Hill, 1991).