

The Blind Watchmaker: Why the Evidence of Evolution Reveals a World Without Design

By Richard Dawkins

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Reviewed by Geoff Gilpin

It's often said that the best argument for the existence of God is the "argument by design." The most famous presentation of this argument appeared in a book called *Natural Theology* by the eighteenth century theologian William Paley. It goes like this:

Suppose you are walking along a trail in the woods. You encounter a stone. Where did the stone come from? Natural causes, probably, nothing that couldn't be explained by the usual laws of geology. Now suppose you encounter a pocket watch by the side of the trail. Where did the watch come from? Obviously, another hiker must have dropped it. A watch is simply too complex to appear by itself. There must have been an intelligent designer, a watchmaker, to create such an object. Now, a human being is far more complex than a watch. What are the chances that a human being would appear unassisted through natural causes? The incredible complexity of the human being would never have arisen by chance. There must have been an intelligent designer. Ergo, God exists.

Richard Dawkins – who bears the imposing title of Charles Simonyi Chair of Public Understanding of Science at Oxford University – is an unabashed evolutionist who does not accept the argument from design.

"All appearances to the contrary, the only watchmaker in nature is the blind forces of physics, albeit deployed in a very special way. ... Natural selection, the blind, unconscious, automatic process which Darwin discovered, and which we know is the explanation for the existence and apparent purposefulness of all life, has no purpose in mind. ... It has no vision, no foresight, no sight at all. If it can be said to play the role of watchmaker in nature, it is the *blind* watchmaker."

Curiously, Dawkins admires Paley's book. He begins his demolition of the argument from design by showing just how right Paley was about the improbability of life arising by chance. He ups the ante by offering an example that goes way beyond Paley's pocket watch.

The hearing of bats might shake the resolve of an atheist. Most species of bats have little if any eyesight, which wouldn't help much in the nighttime world where they hunt and feed. Without eyes, a bat must fly at top speed through an environment of stationary and moving obstacles, locate a single target such as a buzzing fly, and unerringly home in on its prey.

Bats accomplish these feats using "echolocation," a technology very much like the sonar of a submarine. By screeching, a bat emits bursts of ultrasound which bounce off targets and return to the bat's ears. A cruising bat may send out ten pulses of ultrasound a second, enough to tell if there's a potential target in range but not enough to pinpoint the target's position. When a target is detected, a bat can increase the resolution of its ultrasound scan by increasing the frequency of shrieks to hundreds of pulses per second.

To successfully navigate and hunt, a bat (or evolution or the "intelligent designer" of bats) has to solve a number of problems. For instance, a bat hunting a fly must be able to detect extremely faint echoes of sound bouncing off a tiny insect far away. Some bats have ears nearly as large as their heads, cone-shaped receptors that can scoop up the weakest sounds. To hear any sound at all, however, a bat must yell very loud, which creates the potential problem of damaging its sensitive ears. As a solution, some bats use a "send/receive" mechanism, which shuts off their hearing at just the right moment. The bat's yell produces muscle contractions that detach the bones of the inner ear from the bat's nervous system. As soon as the yell stops, the muscles loosen and hearing is restored. Some species of bats can toggle their hearing off and on fifty times per second in perfect synch with their bursts of ultrasound. Other bat technologies include a form of "doppler radar" that lets them judge the velocity of a target by comparing the frequency of an echo with the frequency of the original shriek.

As Dawkins points out, the human engineers who invented radar and sonar during World War II had to solve exactly the same problems that bats have. Furthermore, the humans came up with exactly the same solutions. Submarine commanders and fighter pilots use the same technologies – frequency variation, send/receive switching, doppler, and many others – that bats use for navigation and hunting.

The first scientists to investigate bat perception were zoologists David Griffin and Robert Galambos. Ironically, they did their pioneering research just as military engineers were starting to catch up with bats. Griffin relates a story about a conference where he and his colleague got a very startled reaction from a fellow scientist.

“... he seized Galambos by the shoulders and shook him while complaining that we could not possibly mean such an outrageous suggestion. Radar and sonar were still highly classified developments in military technology, and the notion that bats might do anything even remotely analogous to the latest triumphs of electronic engineering struck people as not only implausible but emotionally repugnant.”

Many people today – especially religious fundamentalists – have the same reaction to evolution. The textbooks of “scientific creationism” are filled with examples like bat sonar, all designed to show the improbability of living organisms arising by chance. As Dawkins points out, these modern variations on Paley’s pocket watch miss the point.

For one thing, complex life forms don’t just appear by the side of the road like Paley’s fortuitous watch. Modern mammals – bats, humans, and their warm-blooded kin – are the result of 56 million years worth of evolutionary change. Our mammalian ancestors who inherited the planet from the dinosaurs were much simpler creatures. As the aeons rolled by, the process of natural selection favored more and more complex animals... and here we are.

Some creationists admit that natural selection occurs, but argue that human results would be no more likely than rearranging pieces of metal at random and coming up with a Boeing 747. Again, Dawkins admits the improbability, but points out how creationists misconstrue natural selection.

For one thing, although randomness plays a role in evolution, it operates within strict constraints. There are no King-Kong sized gorillas or day-glow trees with snakes for limbs. Such things don't occur because nature can't support them. (Literally, in the case of King Kong. If such a beast appeared by magic, the poor thing would collapse under its own weight and die quickly.) The necessity of natural law prunes lots of branches off the tree of evolution, improving the odds of unlikely results like us.

Also, evolution is a cumulative process. Nature doesn't have to start over with each new generation. If natural selection introduces a beneficial feature — bigger ears in bats, for instances — future offspring will inherit the advantage. A species that survives collects more and more beneficial adaptations. Eventually, the odds that a final adaptation will tip the scales and produce something extremely complex, like a human being, are quite good.

Late in the book, Dawkins addresses the question of how it all began. Many people are familiar with experiments that demonstrate how life may have started in the primeval ocean. Scientists can create a fair simulation of the primitive earth and its atmosphere in the laboratory. By introducing electric sparks that simulate lightning, they produce amino acids, complex molecules that are forerunners of DNA.

In a chapter called "Origins and Miracles," Dawkins offers a fascinating alternative to this scenario. He suggests that a form of inorganic "life" based on crystal structures appeared in the early days of the planet. Under the right circumstances, crystals can exhibit some of the crucial properties we associate with life. They can produce copies of themselves that adapt over time in a process resembling natural selection. Dawkins suggests that carbon-based molecules (the basis of organic life) became embedded with the "evolving"

crystals, making more complex structures possible. It turned out that the organic molecules were much better at reproduction and adaptation than the underlying crystal matrix. At some point, the inorganic crystals were no longer necessary. They disappeared from the matrix and life thereafter was purely organic.

Evolution is a complicated topic, and Dawkins doesn't shy away from the difficulties. Some of his topics – like the constructive properties of DNA – are heavy going and may require multiple readings. Fortunately, as Oxford dons go, Dawkins is thoroughly entertaining. His gentle humor may remind the reader of Lewis Carroll.

The Blind Watchmaker is a long, detailed, and eloquent rebuttal to the argument from design. Creationists who wish to resurrect Paley's watch have a lot of explaining to do.