A Theological Position Paper on Evolution

Brian Watson

Introduction

The Bible indicates that God's activities in creation and providence are clearly revealed in nature. Paul writes that God's "invisible attributes, namely his eternal power and divine nature, have been clearly perceived, ever since the creation of the world, in the things that have been made," and because of this, all human beings "are without excuse" for their sin (Rom. 1:20).[1] According to David, "The heavens declare the glory of God, and the sky above proclaims his handiwork (Ps. 19:1). Jesus told his disciples not to fear, because not even a sparrow dies apart from God's activity in the world (Matt. 10:29). The overall witness of the Bible is that the world provides evidence for God and his works.

The neo-Darwinian theory of evolution presents a significant challenge to the biblical witness.[2] If all of life has indeed evolved from a common ancestor through the impersonal force of natural selection acting upon unguided genetic mutations, there would be profound implications that call into question several areas of theology, including the nature of God, creation, providence, revelation, anthropology, hamartiology, and soteriology. If this theory were true, one might doubt that the Bible is true, or that there is such a thing as general revelation. One might doubt God's sovereignty, or try to limit the sense in which God created and is sustaining the universe. If this theory were true, one might doubt that there was a first man named Adam who fell into sin. If there is no original sin, that might make us wonder about the nature of salvation. It is easy to see how Darwinism might threaten Christian theism.

In order to provide better understanding of the evidence for and against evolution, I will compare and contrast two recent works. The first book is *Why Evolution Is True*, by Jerry Coyne, a professor of Department of Ecology and Evolution at the University of Chicago. The second book is *Darwin's Doubt* by Stephen Meyer, a philosopher of science and the director of the Center for Science and Culture at the Discovery Institute. After providing a summary of both of these books, I will evaluate the arguments of Coyne and Meyer and discuss why this argument matters for Christians.

[1] All Scripture references are taken from the English Standard Version.

[2] Darwinism is the theory that all current species have evolved from a common ancestor through the process of natural selection acting on variability within species. When Darwin wrote *On the Origin of Species* in 1859, he did not know what produced such variability. In the twentieth century, and continuing into the twenty-first century, scientists have learned a great deal about genes. This information was combined or synthesized with Darwin's theory of evolution to produce what is known as neo-Darwinism, the theory that natural selection acts upon genetic mutations. When people speak of Darwinism today, they often mean neo-Darwinism, though the two are often used synonymously. One of the problems of evolution, as we shall see, is that is often unclear what is meant by that word. It can mean anything from change over time, to small-scale changes in a species, to an all-encompassing theory of the evolution of all of life from a common ancestor.

The Case for Evolution

In the preface to his book, Coyne acknowledges that some critics of evolution state the this theory is in crisis. "But evolution is far more than a 'theory,' let alone a theory in crisis. Evolution is a fact. And far from casting doubt on Darwinism, the evidence gathered by scientists over the past century and a half supports it completely, showing that evolution happened, and that it happened largely as Darwin proposed, through the workings of natural selection."[3] He believes that the battle between evolutionists and creationists is "part of a wider war, a war between rationality and superstition."[4] In hopes of winning the battle, Coyne seeks to present "the main lines of evidence for evolution" in his book. "I offer it in the hope that people everywhere may share my wonder at the sheer explanatory power of Darwinian evolution, and may face its implications without fear."[5]

In the introduction to his book, Coyne clearly indicates the religious implications of (neo-Darwinian) evolution. "While many religious people have found a way to accommodate evolution with their spiritual beliefs, no such reconciliation is possible if one adheres to the literal truth of a special creation." For Coyne, evolution replaces revelation. "Evolution gives us the true account of our origins, replacing the myths that satisfied us for thousands of years." Throughout, Coyne asserts that the theory of evolution is fact. Yet some religious people fail to accept "the plain scientific fact of evolution" even though there exists "incontrovertible evidence for evolution's truth."[6] It is clear to see that Coyne's agenda extends beyond mere science.

In the first chapter, Coyne establishes "the modern theory of evolution." "Life on earth evolved gradually beginning with one primitive species—perhaps a self-replicating molecule—that lived more than 3.5 billion years ago; it then branched out over time, throwing off many new and diverse species; and the mechanism for most (but not all) of evolutionary change is natural selection."[7] This theory of evolution consists of six key components: evolution, gradualism, speciation, common ancestry, natural selection, and nonselective mechanisms of evolution.

Evolution means that a species changes genetically over time. Modern species of animals and plants descended from ancient, extinct species, and these changes are based on alterations in DNA. Gradualism means that evolutionary changes in species take place gradually over many generations. Large-scale changes in a species (such as the addition of teeth or limbs) do not take place in one or even a few generations, but over long periods of time. Speciation refers to the "splitting" of a branch of Darwin's tree of life into distinct branches. To understand this process, imagine two similar species that now exist. According to the modern theory of evolution, at one point in time, there was a common ancestor to both species. Yet genetic mutations occurred, producing two distinct species. (One species is thought to be distinct from another when the two cannot interbreed successfully.) "It stands to reason that if the history of life forms a tree, with all species originating from a single trunk, then one can find a common origin for every pair of

[3] Jerry A. Coyne, *Why Evolution Is True* (New York: Penguin, 2009), xiii-xiv.
[4] Ibid., xiii.
[5] Ibid., xiv.
[6] Ibid., xviii, xv, xviii.
[7] Ibid., 3.

twigs (existing species) by tracing each twig back through its branches until they intersect at the branch they have in common."[8]

The fourth element of this theory of evolution is common ancestry, which means all species can ultimately be traced back to a common ancestor. Coyne claims that this tracing can be discovered through DNA sequencing and an examination of the fossil record. The fifth element is natural selection. "Selection is both revolutionary and disturbing for the same reason: it explains apparent design in nature by a purely materialistic process that doesn't require creation or guidance by supernatural forces."[9] Natural selection occurs when individuals within a species have good genes that enable them to procreate, while other individuals with bad genes are not able to procreate as much and eventually die out. Nature "selects" the more fit animals (those that procreate and pass on their genes to an abundant number of descendants) and weeds out the less fit animals (those that produce fewer descendants). The sixth and final element of the modern theory of evolution is evolutionary change caused by non-selective processes. This refers to random, non-adaptive, relatively minor changes such as those caused by genetic drift.

Coyne realizes that some people think evolution is "only a theory," so he explains that in the world of science, a theory is a set of propositions that seek to make sense of facts. For any given theory to be considered scientific, it must be testable and capable of making predictions that can be verified. If a theory bears up under testing, if its predictions are verified, if enough evidence accumulates in support of the theory, and if no decisive evidence against the theory exists, it is considered fact. However, this does not mean that today's "factual" theory will not be falsified in the future. Coyne even admits that "it is possible that despite thousands of observations that support Darwinism, new data might show it to be wrong."[10]

Coyne's major lines of evidence come from the fossil record, vestigial traits, the geographical distribution of those fossils, homology (the similarity of different species), genetics, and evolution visible today. Fossils are essential evidence for macroevolution.[11] Fossils develop when the remains of an animal or plant end up in sediment on the bottom of a body of water, usually a lake or an ocean, and the hard parts of that animal or plant (soft parts are rarely fossilized) are replaced by dissolved minerals, so that a cast of the creature is left. Of the millions of species that have ever lived (estimates range widely from 17 million to 4 billion), there remain only about 250,000 fossilized species, which constitutes "only 0.1 percent to 1 percent of all species—hardly a good sample of the history of life!"[12] These fossils are then dated by using radioisotopes, which decay gradually into other elements. The time of the decay is measured in

---

[8] Ibid., 7.
[9] Ibid., 10-11.
[10] Ibid., 16.
[11] Macroevolution refers to large-scale evolutionary changes, such as emergence of new species and new body plans. Microevolution refers to small evolutionary changes, usually within a species. The distinction between these types of evolution is significant, though often blurred by proponents of neo-Darwinism., who assume that microevolution inevitably leads to macroevolution. As Coyne explains, "as far as we can see, macroevolution is simply microevolution extended over a long period of time" (Ibid., 236 n. 5).
[12] Ibid., 22.

terms of half life, the time it takes for half of that isotope to decay. The ages, locations, and types of fossils are used as evidence to support the theory of evolution.

If Darwin's theory is correct, then in the fossil record, one should find simpler creatures in the earliest strata, with more complex species appearing later in time. "Later species should have traits that make them look like the descendants of earlier ones." The first organisms, simple bacteria, appear in sediments that are 3.5 billion years old (the earth is 4.6 billion years old, according to radiometric dating). Simple multicellular organisms such as sponges arose 600 million years ago. Four-legged animals emerged 400 million years ago, followed by amphibians 350 million years ago, amphibians 100 million years later, then birds about 200 million years ago. "Humans are newcomers on the scene—our lineage branches off from that of other primates only about 7 million years ago." Coyne boldly declares, "No theory of special creation, or *any* theory other than evolution can explain these patterns." By examining changes in a species over time in the fossil record, gradual evolution can be observed. For example, changes in the trilobite, an early arthropod that belongs to the same phylum as insects and crustaceans, are gradual within a three-million-year window of time. "The fossil record gives no evidence for the creationist prediction that all species appear suddenly and then remain unchanged."[13]

From the observance of gradual, small changes, evolutionary scientists infer large-scale changes. When scientists find two fossils that appear somewhat similar and separated by a vast period of time, they predict that they will one day find a transitional form, a "missing link," that will prove that the one species evolved into the other.[14] Evolutionary scientists predicted that a transitional form between fish and amphibians would be found, and such a species, *Tiktaalik roseae*, was discovered in 2004. Prior to this discovery, it was observed that 390 million years ago, the only vertebrates in existence were fish. Thirty million years later, however, there appear in the fossil record tetrapods, four-footed vertebrates that lived on land. Somewhere in that 30-million-year gap of time, transitional forms—perhaps fish that have some features common to amphibians—must have existed. Fossils of *Tiktaalik roseae* were found on an island in the Arctic Ocean, north of Canada. These fossils are about 375 million years old, what one would expect of a transitional form. These creatures were fish that also had features common to amphibians, including a neck, eyes and nostrils on the top of the head, and sturdy bones. Coyne presents similar evidence for transitional forms between reptiles and birds and land mammals and whales.

Coyne also shows that animals often possess vestigial traits. Examples include the ostrich, which has vestiges of wings that no longer fly, rodents that have vestigial eyes that no longer see, and whales that have vestigial limbs and pelvic bones. These vestiges are taken to be traces of evolutionary history. In addition to vestigial limbs or organs, there is also the existence of vestigial genes, or "dead" genes, "genes that once were useful but are no longer intact or expressed."[15] Though Coyne does not use the term "junk DNA," this is what he is referring to:

---

[13] Ibid., 25, 28, 29 (original emphasis), 32.

[14] It should be noted that when scientists speak of predictions based on the theory of evolution, they are not referring to future events, but future scientific discoveries. In the case of fossils, scientists predict future discoveries of past events.

[15] Coyne, *Why Evolution Is True*, 67.

genes that no longer produce their "normal" function of making proteins. Coyne also claims that the development of embryos is proof of evolution (embryos, while developing in the womb, appear to resemble their supposed ancestors, therefore reenacting their evolutionary history).

"Bad" or imperfect design is also evidence of evolution: "Perfect design would truly be the sign of a skilled and intelligent designer. *Imperfect* design is the mark of evolution; in fact, it's precisely what we *expect* from evolution." Examples of imperfect design, according to Coyne, include the human male's urethra, which runs through the middle of the prostate gland, and the human female's giving birth through the pelvis, "a painful and inefficient process that, before modern medicine, killed appreciable numbers of mothers and babies."[16]

Other lines of evidence for evolution include the geographic distribution of species that one would expect if the modern theory of evolution were true. "The biographic evidence for evolution is now so powerful that I have never seen a creationist book, article, or lecture that has tried to refute it." Coyne claims that the fossil record, combined with our knowledge of how continents, glaciers, and land bridges have all shifted over time, supports evolutionary theory. "If evolution happened, species living in one area should be the descendants of earlier species that lived in the same place. So if we dig into the shallow layers of rocks in a given area, we should find fossils that resemble the organisms treading that ground today."[17] That is precisely what scientists have discovered. Also, animal and plant life on islands tends to be different from life on the mainland because those islands have a relative lack competitors and predators, and natural selection is driven by competition and predation.

The theory of evolution depends upon adaptation, which requires three things: variability within a population of species (some difference of traits), a genetic basis for variations (heritability), and the effect that variation has on producing offspring. Genetic mutations that result in a variation that help produce more offspring will be chosen by natural selection, while traits that inhibit mating will be weeded out. Adaptations accrue gradually, so that each beneficial trait is passed onto subsequent generations, which outbreed the creatures lacking the beneficial trait. Creatures with the beneficial trait may then have their own genetic mutations that positively affect breeding, and are passed on to future generations. It is important to understand evolution favors not those who live long, but those who live long enough to breed abundantly. "Given how natural selection works, it shouldn't produce adaptations that help an individual survive without promoting reproduction." These "adaptations always increase the fitness of the *individual*, not necessarily of the group or the species."[18]

Scientists are able to view evolution occurring in the present in their own labs. Such evolution is often seen in microbes such as bacteria. Bacteria can mutate in order to survive on new food sources, or to resist antibiotics. These changes are microevolutionary, of course, as Coyne admits. "Given the gradual pace of evolution, it's unreasonable to expect to see selection transforming one 'type' of plant or animal into another—so-called *macroevolution*—within a

[16] Ibid., 81 (original emphasis), 85.
[17] Ibid., 88, 96.
[18] Ibid, 121 (original emphasis).

lifetime."[19] Still, Coyne insists that we know that macroevolution happens because of the evidence found in the fossil record.

In the midst of laying out the case for neo-Darwinian evolution, Coyne wonders if natural selection acting upon genetic mutations could actually produce all the biological complexity we see today. "We know of no other natural process that can build a complex adaptation. The most commonly suggested alternative takes us into the realm of the supernatural." However, Coyne is not willing to consider the supernatural, for that is not a scientific task. Rather, he suggests that scientists must think of ways that all of biological life *could* have evolved, even if we do not know *that* it has evolved in such a way. This is particularly true in understanding how complex structures at the cellular level have developed. "Understanding the evolution of complex biochemical features and pathways is not . . . easy, since they leave no trace in the fossil record. Their evolution must be reconstructed in more speculative ways."[20]

Coyne also examines how the act of sex drives evolution, often through male competition to mate with females. Since females can only be pregnant so often (one pregnancy lasts a certain amount of time) and males can procreate many times with little cost to them, females are in the position of being very choosy over which mate they will accept. It is female choice that drives sex selection. Coyne admits that the very act of sex "is in fact one of evolution's greatest mysteries" and he ponders why sex has not been replaced by parthenogenesis (the development of an organism from an unfertilized egg). Yet he never seriously considers that sex could be the gift of a beneficent creator. Instead, he would rather imagine that females possess a gene that can identify healthy male mates, though there is no evidence to back this claim.[21]

Coyne also discusses how new species arise. Species are "evolutionary accidents," often arising as one population becomes geographically separated from another.[22] This is known as the theory of geographic speciation. As populations split, mutations occur, natural selection culls the beneficially mutated organisms from those that have deleterious mutations, and these populations eventually become new species. Coyne believes that even if this happened rarely, there would be enough time in 3.5 billion years for there to be 100 million species living today (the actual number is only 10 million). In a study of fruit flies, it was estimated that "[g]enetic barriers between groups became strong enough to completely prevent interbreeding after about 2.7 million years of divergence."[23] That is how long it takes from one species to diverge from another.

After writing a chapter about the origins of human beings, Coyne concludes with some reflections about evolution. He boldly claims that "every fact that has something to do with evolution confirms its truth." "Despite a million chances to be wrong, evolution always comes up

---

[19] Ibid., 133.
[20] Ibid., 136, 138.
[21] Ibid., 155, 163. Coyne event admits that there are only two studies that provide evidence that females choose males with better genes. Moreover, "a fair number of studies have found *no* association between mate preference and the genetic quality of offspring" (Ibid., 166).
[22] Ibid., 176.
[23] Ibid., 182.

right. That is as close as we can get to a scientific truth."[24] He admits there are still mysteries left to solve, such as the cause of the Cambrian "explosion" of life. The issue of the explosion of new life in the Cambrian era leads us to the second book under examination, Stephen Meyer's *Darwin's Doubt*.

The Case against Evolution and for Intelligent Design

In *Darwin's Doubt*, Meyer seeks to challenge the Darwinian theory of evolution by addressing "Darwin's most significant doubt," the "Cambrian explosion," in which new animal life forms appear in the fossil record without "evolutionary precursors."[25] As stated above, Darwin's theory stated that all of life descended from a common ancestor. Therefore, all subsequent life that evolved from this common ancestor would branch out of a common root, from a narrow "trunk" of a tree of life. If this theory were fact, one would expect to see a few, very old, simple fossilized organisms, followed by diverse, complex, newer fossils.[26] The relatively few, simple organisms would gradually evolve to possess a greater variety of unique features and body plans.

Yet the fossil record does not bear this out. Very few fossils exist from before the Cambrian era (541 to 485.4 million years ago). Then, in the Cambrian era, "many new and anatomically sophisticated creatures appeared suddenly in the sedimentary layers of the geologic column without any evidence of simpler ancestral forms in the earlier layers below."[27] Most of this "explosion" occurred in a 6-million-year window of time. These new creatures belong to different taxonomic categories known as phyla.[28] It seems as though new, complex forms of life suddenly emerged, rather than gradually evolved. Then, and only later, is there evidence of smaller-scale variations within taxonomic groups. This evidence is contrary to Darwin's theory of gradual evolution.

In scientific experience, large-scale mutations are always harmful to the creature, leading to dysfunction and death, not fitness. Therefore, only small-scale mutations would be beneficial. Darwin realized that this was a problem, as did one of his contemporaries, Louis Agassiz, the foremost paleontologist at the time. "Agassiz concluded that the fossil record, particularly the record of the explosion of Cambrian animal life, posed an insuperable difficulty for Darwin's theory."[29] In Darwin's own words, "To the question why we do not find rich fossiliferous deposits belonging to these assumed earliest periods prior to the Cambrian system, I can give no

---

[24] Ibid., 222, 223.
[25] Stephen C. Meyer, *Darwin's Doubt: The Explosive Origin of Animal Life and the Case for Intelligent Design* (New York: HarperOne, 2013), xii.
[26] For a visualization of this "tree," see the nineteenth-century evolutionary biologist Ernst Haeckel's depiction: http://www.biologydirect.com/content/6/1/33/figure/F6?highres=y (accessed November 29, 2013). This image appears in Meyer, *Darwin's Doubt*, 4.
[27] Meyer, *Darwin's Doubt*, 7.
[28] "During this explosion of fauna, representatives of about twenty of the roughly twenty-six total phyla present in the known fossil record made their first appearance on earth" (Ibid., 31).
[29] Ibid., 8.

satisfactory answer."[30] Darwin hoped that the fossil record was incomplete, and that future discoveries of transitional forms would support his theory.

However, major fossil discoveries since Darwin's time have not vindicated his theory. Charles Doolittle Walcott's discovery of the Burgess Shale in British Columbia in the early twentieth century led to the collection of more than 65,000 specimens of fossils. These fossils demonstrate the amazing variety of life that first emerged in the Cambrian era. Many of these organisms had new body plans not found in earlier strata of fossils, which suggested that these creatures suddenly emerged, with no apparent ancestors to be found. Walcott, who favored Darwin's theory, suggested what is known as the "artifact hypothesis." He postulated that Precambrian fossils existed but these artifacts were not yet found.

Yet these fossils still have yet to be found. Oil companies developed new drilling technologies in the middle of the twentieth century which allowed them to drill deeper into sedimentary rock. "As geologists evaluated the contents of these drill cores, they did not find Walcott's predicted Precambrian fossils." Others suggested that since Precambrian creatures were likely soft-bodied, they would not be fossilized. This theory was refuted by a large fossil discovery in southern China at the end of the twentieth century. The Maotianshan Shale, discovered in 1984, yielded a number of fossilized remains of soft-bodied animals. Scientists found Precambrian microscopic sponge embryos, yet they did not discover fossils of more complex organisms that could be ancestors of the Cambrian animals. "That well-developed, clearly ancestral animal forms were not preserved, when tiny sponge embryos were, strongly indicates that such forms were simply not present in the Precambrian layers." What little Precambrian fossils we have are of a few different types of organisms that "bear no clear relationship to any of the organisms that appear in the Cambrian explosion (or thereafter)." The roughly 40 to 50 million years that separate these Precambrian fossils from the Cambrian fossils "does not constitute anything like enough time to build the necessary anatomical novelties that arise in the Cambrian and Ediacaran periods."[31]

Fossils, though, are not the only evidence used to support Darwin's theory of evolution. Evolutionary biologists also appeal to homology, the similarity in anatomy and in DNA sequences found in different species of animals. By studying the molecules and genes of animals, biologists are able to reconstruct the supposed evolution of various species. However, there are problems: (1) the rates of molecular evolution vary depending upon which molecule is being studied; and (2) the speed of the supposed evolution depends on knowing that two species diverged from a common ancestor, when that divergence happened, and the genetic difference between the two species today. Yet only that third element can be known with certainty. Evolutionary biologists end up assuming the very thing they are trying to prove.

Genetic studies fare no better. The evolutionary trees produced by studying the supposed evolution of genes also result in conflicting branching patterns. Referring to a 2010 study

---

[30] Charles Darwin, *On the Origin of Species by Means of Natural Selection* (1859; repr. Cambridge, MA: HArvard University Press, 1964), 308, quoted in Meyer, *Darwin's Doubt*, 23.
[31] Ibid., 55, 68, 82, 88.

performed by biologist Michael Syvanen, Meyer writes, "Syvanen's study compared two thousand genes in six animals spanning phyla as diverse as chordates, echinoderms, arthropods, and nematodes. His analysis yielded no consistent tree-like pattern."[32] However, "evolutionary evangelists" like Coyne and Richard Dawkins speak as if all the scientific evidence produces one "perfect family tree."[33] According to Meyers, "the statements of Dawkins, Coyne, and many others about all the evidence (molecular and anatomical) supporting a single, unambiguous animal tree are manifestly false."[34]

That the fossil record does not support Darwin's theory is a problem, as is the presence of conflicting trees based on various molecular and genetic studies. A greater problem is found in the improbability of a genetic mutation producing new information that would lead to the building of new body plans. If a reptile evolved into a bird, at some point wings would need to be formed, and these wings consist of particular cell types, which would consist of various proteins, which are the building blocks of cells. The information that leads to the production of those proteins is found in DNA. So, an animal's genes would have to mutate to produce new code that would result in the production of new proteins. As Meyer observes, "to build a new form of life from a simpler preexisting form requires new information." Darwin knew nothing of DNA, but genetic information discovered in the twentieth century was used to produce the "New Synthesis" or "neo-Darwinism."[35] It was then believed that small-scale changes in an animal's DNA would eventually lead to large-scale evolutionary changes, such as the emergence of wings. While in theory this may be possible, the question is whether it is plausible.

Meyer demonstrates how amazingly complex DNA is. It is essentially written code, much like a language, consisting of base pairs of nucleotides that use four different "letters" or bases. A single-celled organism has between 318,000 and 562,000 base pairs of DNA. A fruit fly (*Drosophila melanogaster*) has 140 million base pairs. The addition of more nucleotides is equivalent to the addition of information, which is specified information, for only the right combination of nucleotide bases will result in the production of proteins.

The structure of DNA was discovered in 1953 by Francis Crick and James Watson. In the second half of the twentieth century, some mathematicians and scientists started to calculate the chance of a genetic mutation producing one protein. In the early 1960s, Murray Eden, a professor of engineering and computer science at MIT, calculated that the chance of arranging amino acids (each consisting of three nucleotide bases) to produce one average-length protein (consisting of about 250 amino acids) was 10^{325} (1 followed by 325 zeros). Over twenty years later, Robert Sauer, a molecular biologist at MIT, calculated on the basis of mutagenesis experiments (he tampered with the DNA of fruit flies to produce mutations) that "the ratio of functional to nonfunctional amino-acid sequences at about 1 to 10^{63} for a short protein of 92 amino acids in length." To put that into perspective, consider that there are only 10^{65} atoms in the Milky Way.

---

[32] Ibid., 120.
[33] Dawkins says that in this video clip: http://www.youtube.com/watch?v=TjxZ6MrBl9E (accessed November 29, 2013).
[34] Meyer, *Darwin's Doubt*, 124.
[35] Ibid., 155, 158.

Therefore, the chance of a genetic mutation producing one small protein is "roughly equal to the probability of a blind spaceman finding a single marked atom by chance among all the atoms in the Milky Way galaxy."[36] Moreover, most genetic changes, ones that result in a change of just one amino acid, often result in proteins that lose function, and these would be weeded out by natural selection. More recent studies have shown that the probability of a mutation producing a sequence of 150 amino acids that could fold to produce a stable protein is 1 in 10^{74}. However, a stable protein is not necessarily a functional one. The chance of a mutation producing a functional protein of 150 amino acids is 1 in 10^{77}, or "one chance in one hundred thousand, trillion, trillion, trillion, trillion, trillion, trillion."[37] Longer proteins consist of over 400 amino acids that are precisely sequenced, so that the probability of a mutation leading to a longer protein is exponentially more improbable.

Given these probabilities, evolutionary biologists often assume that complex genetic information already existed, and that sections of this information were somehow copied or repositioned to form new genes. This type of speculation ignores the emergence of specified information, but it also does not take into account the improbability of rearranging already existing genetic information to produce more specified complexity. [15] Meyer provides the reader with a helpful analogy:

> Overall, what evolutionary biologists have in mind is something like trying to produce a new book by copying the pages of an existing book (gene duplication, lateral gene transfer, and transfer of mobile genetic elements), rearranging blocks of text on each page (exon shuffling, retropositioning, and gene fusion), making random spelling changes to words in each block of text (point mutations), and then randomly rearranging the new pages. Clearly, such random rearrangements and changes will have no realistic chance of generating a literary masterpiece, let alone a coherent read.[38]

Specified complexity is one term that intelligent design (ID) advocates such as Meyer use to communicate that information must be ordered in a precise way for it to be productive. Another term used by ID advocates is irreducible complexity. Irreducible complexity refers to a "single system composed of several well-matched, interacting parts that contribute to the basic function, wherein the removal of any one of the parts causes the system to effectively cease functioning."[39] Meyer states that "complex biological systems" consist of tens or hundreds of independent and necessary parts. "Any system that depends for its function on the coordinated

---

[36] Ibid., 180, 183.
[37] Ibid., 200. Proteins have three levels of structure: the primary structure consists of chains of amino acids (polypeptides); the secondary structure consists of coiled or folded chains of amino acids; the tertiary structure consists of a number of those protein folds that form into a three-dimensional structure.
[15] According to William A. Dembski, "An event exhibits specified complexity if it is contingent and therefore not necessary, if it is complex and therefore not readily reproducible by chance, and if it is specified in the sense of exhibiting an independently given pattern" ("Intelligent Design: A Brief Introduction," in *Evidence for God*, ed. William A. Dembski and Michael R. Licona [Grand Rapids, MI: Baker Books, 2010], 105).
[38] Ibid., 219.
[39] Michael J. Behe, *Darwin's Black Box* (New York: Free Press, 1996), 39.

action of many parts could not be changed gradually without losing function. But in the neo-Darwinian scheme of things, natural selection acts to preserve only functional advantages."[40] In other words, a mutation is much more likely to degrade information and hamper function, not introduce or enhance information and improve function. Natural selection would not preserve animals that had systems that did not function.

Earlier, it was stated that the chance of producing one functional protein was highly improbable. The probability of coordinated mutations, even just two of them, to produce new genes and proteins—and new, integrated biological systems—is also highly improbable and would require vast amounts of time. For example, scientists have discovered that it would take 216 million years to generate only two coordinated mutations in the line of hominids. (Hominids belong to the family of primates known as Hominidae, which includes humans, gorillas, orangutans, and chimpanzees.) Yet humans and chimps have only been around for 6 million years. Therefore, "the neo-Darwinian mechanism does not have the capacity to generate even two coordinated mutations in the time available for human evolution."[41]

Meyer shows that organisms require much more than mutations in genes that code for proteins. Regions in DNA that do not code for proteins "control and regulate the timing of the expression of the protein-coding regions of the genome."[42] The regulation of genes is controlled by the developmental gene regulatory network, which resembles a "genetic circuit." Other circuits that we know of are obviously the result of human intelligence, not blind, unguided, mechanical processes. In light of the complexity of DNA, as well as the complexity of these circuits, unguided evolution is implausible.

Apparently, animals require more information than that found in DNA. The development of animals requires epigenetic information, information not found in genes. The unique shape and arrangement of body parts is determined by epigenetic information, the subject of recent scientific studies. This information is found in the inner structure of cells, the structure of cell membranes, and even the sugar molecules on the surface of these membranes. (Genetic information produces proteins and RNA molecules, not sugars.) Once again, such complexity is highly improbable if the neo-Darwinian theory of evolution is true. To put it more strongly, the theory of evolution cannot account for such information.

Meyer discusses other theories of evolution, such as punctuated evolution (which states that large-scale changes came in relatively short bursts of time, followed by long periods of little evolution), various models of self organization (which state that somehow cells have organized themselves, something that assumes preexisting information), and neutral or nonadaptive evolution (in which natural selection plays a small role, so that neutral or deleterious mutations are allowed to accrue, and then somehow result in large-scale evolution). Each of these other theories are weighed and found wanting because they cannot account for specified information.

---

[40] Meyer, *Darwin's Doubt*, 232.
[41] Ibid., 248.
[42] Ibid., 265.

Finally, Meyer introduces the concept of ID. Given the specified and irreducible complexity found in biology, it is logical to assume that some intelligence is behind all of life. This conclusion is logical because whenever we observe specified and irreducible complexity (in language, in computer codes, in machinery), it is the result of intelligence. Chemicals cannot organize themselves into DNA any more than ink and paper can organize themselves into a book, or pixels could organize themselves into this essay.

Determining the origins of life requires using abductive reasoning, or inference to the best explanation. This mode of reasoning is used to adjudicate competing hypotheses, to see which one best explains the evidence. This method is used by police detectives as well as historical scientists. Historical scientists should "cite causes that are known from our uniform experience to have the power to produce the effect in question." A conclusive inference is generated when there is only one known cause that can produce the effect or evidence. "Logically, if a postulated cause is known to be a *necessary* condition or cause of a given event or effect, then historical scientists can validly infer that condition or cause from the presence of the effect."[43] Meyer reasons that the complexity found in animals, particularly the explosion of new life in the Cambria era, requires intelligence. Furthermore, evolutionary explanations, which by their nature exclude intelligence, do not have the power to explain the complexity and diversity of life. Meyers concludes, "since we know of no 'presently acting' materialistic cause that also generates large amounts of specified information (especially in a digital or alphabetic form [such as what we find in DNA]), only intelligent design meets the causal adequacy requirement of a historical scientific explanation."[44] Meyer also demonstrates that this conclusion is no less scientific that the theory of evolution.

Evaluation

The theories of evolution and ID are attempts to make sense of various facts present in the world. They are stories that try to give shape and meaning to scientific data. Among the prominent facts are the fossil record, homologous features of various animals (similar body structures, similarities in DNA), and the complexity of DNA and molecular structures. The stories of evolution as well as ID, or, more specifically, Christian theism, are attempts at explaining reality. Jerry Coyne says that evolution is "not a grand philosophical scheme about the meaning of life."[45] Yet at the beginning of his book, he favorably quotes atheist Michael Shermer, who claims that evolution matters because science matters and, "Science matters because it is the story of our age, an epic saga about who we are, where we came from, and where we are going."[46] Evolutionary theory ends up constructing a worldview that competes with Christianity.

---

[43] Ibid., 349, 351 (original emphasis).
[44] Ibid., 361.
[45] Coyne, *Why Evolution Is True*, 225.
[46] Michael Shermer, *Why Darwin Matters* (New York: Owl Books, 2006, 161), quoted in Coyne, *Why Evolution is True,* xv.

The attempt to construct a different worldview is demonstrated when Coyne writes of evolution in a quasi-religious way: "Learning about evolution can transforms us in a deep way."[47] Natural selection becomes something of a god substitute. Throughout the book, natural selection is personified. It "makes each species," "can create intricate adaptations," and has "bequeathed a brain" to us. Yet, Coyne also states that natural selection does not truly act. Rather, it is an impersonal process. "There is no will involved, no conscious striving."[48]

At a distance, the story of evolution can be rather impressive, particularly the geographical distribution of certain fossils and the similarity between certain animals. Yet, when one looks at the details, there are many problems. Meyer rightly points out the fact that the fossil record does not square with Darwin's theory. This is evident in the Cambrian explosion. The greater problem is the improbability of new genes that produce functional proteins being created through random mutations. The probability is close to zero. Yet more information than just protein-coding genes is necessary to create new body plans of animals. Even Coyne admits, "Natural selection can act only by changing what already exists. It can't produce new traits out of thin air."[49] Coyne does not attempt to explain how biological life emerged in the first place. He simply punts the issue to scientists who study abiogenesis.[50] Yet if evolution is going to be the "epic saga about who we are, where we came from, and where we are going," it must tell us the origins of life. Coyne speaks about "the amazing derivation of life's staggering diversity from a single naked replicating molecule," yet he does not tell us how that molecule appeared, or how he knows there was such a molecule.[51] Throughout his book, he continually makes such unsupported assertions.

There are two other important problems that emerge in Coyne's book, though he does not seem to be aware of them. At one point, he discusses the sense of smell controlled by olfactory receptor (OR) genes. These genes produce OR proteins, which are located in cells that line the tissues of the nose. "Different odors contain different combinations of molecules, and each combination stimulates a different group of cells. The cells send signals to the brain, which integrates and decodes the different signals." In explaining how these cells evolved in mice, he claims that OR genes diverged from each other in the process of duplication, "with each gene's products binding to a different odor molecule. A different type of cell evolved for each of the thousand OR genes. And at the same time, the brain became rewired to combine the signals from the various kinds of cells to create the sensations of different odors."[52] This description is beyond belief. There are three independent things involved here: the odor-producing molecule, the OR genes/cells, and the brain. How did the OR genes and the brain evolve independently to produce an accurate understanding of an odor-producing molecule? Who or what hardwired the brain?

---

[47] Coyne, *Why Evolution Is True*, xv.
[48] Ibid., 94, 116, 233, 117.
[49] Ibid., 54.
[50] Ibid., 236 n. 5.
[51] Ibid., 233.
[52] Ibid., 70.

The second problem also involves the brain. Coyne says that natural selection has given us a "brain complex enough to comprehend the laws that govern the universe."[53] He also indicates that we have free will[54] and the ability to create "our own purposes, meaning, and morality."[55] The problem for Coyne and other evolutionists is that if everything has evolved, so have our brains. If our brains have survived, they have done so not to know absolute truth, but to help us survive. Absolute truth may, in some cases, help us to survive, but evolution certainly would not guarantee our ability to ascertain what is true.

This conundrum is one that evolutionists cannot afford to ignore. Charles Darwin himself acknowledged this possibility towards the end of his life. In a letter written the year before he died, he wrote, "The horrid doubt always arises whether the convictions of man's mind, which has developed from the mind of the lower animals, are of any value or at all trustworthy. Would anyone trust the conviction of a monkey's mind, if there are any convictions in such a mind?"[56]

It seems that the arguments of Coyne and others are intentionally misleading. They speak as if all scientists agree upon the details of macroevolution, but this is simply not the case. According to Meyer (and proven by his numerous citations), "Evolutionary biologists will acknowledge problems to each other in scientific settings that they will deny or minimize in public, lest they aid and abet the dread 'creationists' and others they see as advancing the cause of unreason."[57] By hiding significant evidence, evolutionists are being dishonest, whether they are intentionally or unintentionally being so. Another dishonesty is the way Coyne repeatedly speaks of evolution as fact. This statement is true if evolution means "change over time," or if it means microevolution, such as small changes observed in various species. Yet if Coyne means that full-blown neo-Darwinian macroevolution is a fact, he is committing the fallacy of equivocation. "The fallacy of equivocation is the fallacy of speaking out of both sides of your mouth," writes William Dembski.[58] In some senses of the word, evolution is fact (changes over time have taken place), but not in others. There can be no doubt that this equivocation is intentionally misleading. In the end, Coyne's arguments fail and rather than calling into question the veracity of the Bible, he reveals his own lack of intellectual integrity.

Though Coyne's arguments fail, and his writing clearly shows his atheistic bias, he brings up a significant issue that ID does not address adequately. He discusses many evidences of "bad design" in nature.[59] This objection to design is not uncommon. This objection states that if God (or some other intelligence) created us, why do we have imperfections? Without the biblical story of creation, fall, redemption, and restoration, it is difficult to account for such imperfection.

---

[53] Ibid., 233.
[54] "There is no reason, then, to see ourselves as marionettes dancing on the strings of evolution. Yes, certain parts of our behavior may be genetically encoded, instilled by natural selection. . . . But genes aren't destiny" (Ibid., 230).
[55] Ibid., 231.
[56] From a letter to W. Graham (July 3, 1881), in *The Autobiography of Charles Darwin and Selected Letters* (1892; repr., New York: Dover, 1958), quoted in James W. Sire, *The Universe Next Door: A Basic Worldview Catalog*, 5th ed. (Downers Grove, IL: IVP Academic, 2009), 103-104.
[57] Meyer, *Darwin's Doubt*, 97.
[58] William A. Dembski, *Intelligent Design: The Bridge between Science and Theology* (Downers Grove, IL: InterVarsity Press, 1999), 115.
[59] See Coyne, *Why Evolution Is True*, 81-85.

Since all of creation is in a fallen state, the Christian would predict that there are evidences of imperfection in biology. Earlier, Coyne was quoted as wondering why a creator would have women give birth through the pelvis, because such a process is painful and can lead to death. Yet God told Eve, right after sin entered the world, "I will surely multiply your pain in childbearing; in pain you shall bring forth children" (Gen. 3:16). Paul tells us that creation was subject to futility and groans for the day when it will be set free from its "bondage to corruption" (Rom. 8:29-22). While the Bible does not speak in scientific terms, this bondage must include what appears to be imperfect design. These "flaws" in nature do not disprove Christianity; if anything, they serve as evidence for the fallen state of humanity.

However, ID does not frame its arguments in light of the Bible. It states that some intelligence created and designed life, but it does not identify the God of the Bible as the Designer. I suppose one cannot scientifically prove that God exists and that he has created everything, and ID seeks to be a scientific discipline. Christians should think of ID as a useful tool that can be used in apologetics, not a theological movement.

As tool, ID has produced positive results. One prediction made by ID advocates is that "junk DNA," parts of the genome thought to be functionless, would be discovered not to be junk. In 2012, the ENCODE (Encyclopedia of DNA Elements) project revealed that at least 80 percent of the human genome performs significant biological functions. "Other research in genomics has shown that, overall, the non-coding regions of the genome function much like the operating system of a computer. Indeed, the noncoding regions of the genome direct the timing and regulate the expression of the data modules or coding regions of the genome, in addition to possessing myriad other functions."[60] This discovery is further evidence of work of God.

Science has its limits. Though it is useful, it cannot solve every mystery. Coyne relies on massive amounts of speculation, assuming that events happened over the course of millions years without any hard evidence to support his claims. Meyer (a Christian) admits that he does not know how, scientifically, the designing intelligence created life. Though the Bible does not speak in scientific terms (such as how God created DNA and epigenetic information), it is God's revelation to humanity. It tells us what we could never learn on our own. It tells us that God made everything at his command, for his purposes. No amount of science or speculation can ever tell us why we exist, or give us hope the way the gospel does. Science cannot tell us who we are or why we die. Science cannot save us. Still, Christians should study science to learn more about the world God made, to develop medicine and technology that benefits humanity, and to defend the faith against specious claims made by scoffers like Coyne.

[60] Meyer, *Darwin's Doubt*, 401.

Bibliography

Behe, Michael J. *Darwin's Black Box*. New York: Free Press, 1996.

Coyne, Jerry A. *Why Evolution Is True*. New York: Penguin Books, 2009.

Dembski, William A. *Intelligent Design: The Bridge Between Science and Technology*. Downers Grove, IL: InterVarsity Press, 1999.

———————. "Intelligent Design: A Brief Introduction." In *Evidence for God*. Ed. William A. Dembski and Michael R Licona. Grand Rapids, MI: Baker, 2010.

Meyer, Stephen C. *Darwin's Doubt: The Explosive Origin of Animal Life and the Case for Intelligent Design*. New York: HarperOne, 2013.

Sire, James W. *The Universe Next Door: A Basic Worldview Catalog*. 5th ed. Downers Grove, IL: IVP Academic, 2009.