Apologetics Series, Podcast #2b:
How to be an Atheist, part 2

# Introduction

For atheists to try to convince themselves, and others, that there is no higher power and that only matter exists, they have to claim that all of the complexities that we experience in life and which lead us towards a higher cause are, in fact, only illusions. Richard Dawkins famously said, “Biology is the study of complicated things that give the appearance of having been designed for a purpose.”

For atheists to claim that “nature explains itself”, they have to explain how there is no higher cause than material forces at work in the formation of life from non-life, higher lifeforms from lower lifeforms, and self-conscious humans from higher lifeforms.

Let us look at these three levels, to see if there is room to think that higher evolved from lower by purely natural causes. Again, we would still need a God as the source of existence, even if we could point to natural causes, but since atheists do not accept metaphysical arguments, we meet them on their own territory of science.

# Life from non-Life

Michael Denton remarks on the chasm between the living and the non-living:

We now know not only of the existence of a break between the living and non-living world, but also that it represents the most dramatic and fundamental of all the discontinuities of nature. Between a living cell and the most highly ordered non-biological system, such as a crystal or a snowflake, there is a chasm as vast and absolute as it is possible to conceive.

We know today that all living things have one or more cells as their basic component. In his day, Darwin and others thought of the cell as a blob of goo. We now know that the cell is far more complex than the most complex technology that man has ever developed. Certainly, man has not come even come close to producing something as “simple” as a bacterium.

The cell is a self-reproducing factory full of microscopic molecular machines that run carefully choreographed and efficient processes. To show how it is impossible for the order of the cell to arise merely by chance, let us consider the building block of the cell, the protein, and the database of the cell, DNA.

**Proteins** – there are thousands of protein types and they perform innumerable tasks in the cell, such as building cellular machines, delivering cellular material, catalysing cellular reactions, and processing genetic information. They are composed of a string of amino acids, typically 150 of them. There are 20 types of amino acids and each can be right-handed or left-handed. Specific proteins are *only* formed from left-handed amino acids and *only* when the 150 acids are of the right type and in the right sequence. The simplest known cell requires 482 different proteins composed of these specific sequences of left-handed amino acids.

Do proteins form “in the wild”, on their own, independently of the processes of the cell? No.

“Even if we had tons of amino acids in a puddle and started stirring it and striking it with lightning, the chances of us getting any functional protein would be 1 in 10164*.*[i](%22%20%5Cl%20%22sdendnote1sym)That number represents the proportion of functional, bonded amino acid sequences—the ones that turn into proteins—to total possible amino acid sequences. We have to hit that jackpot 482 times in short order to get some of the raw material for the simplest cell on Earth.”

Amino acids simply are not inclined to form proteins on their own. Proteins have to be assembled by a process. How does that process take place? Through the code in DNA.

1. **DNA** – deoxyribose nucleic acid is the genetic code of life forms, containing the instructions for the activities of the cell, among which is the assembly of proteins, a process called ‘protein synthesis.’ That process has two steps:
	1. **Transcription** – this is the process of copying the DNA information onto a strand of RNA (ribonucleic acid). There are four types of bases in DNA (A, C, G, T) which are arranged in a very specific order on the DNA’s double-helix structure; that arrangement is the genetic code of the organism. When transcription takes place, the exact portion of DNA to be copied is identified, the double-helix is unwound, the RNA is matched up with the part exposed, the copying is performed, and finally the RNA is trimmed and spliced back together, now containing the code from the given portion of DNA. This process requires 12 proteins.
	2. **Translation** **–** the RNA goes to a ribosome, a molecular machine that acts like a data processing unit. The ribosome splits into two, with the RNA binding to one side. The first section of the RNA contains a command for translation, which is read by another type of RNA. The reading of that command brings the other half of the ribosome back to begin the translation work. Translation involves summoning the amino acids of the target protein based on the DNA code contained in the RNA. The code is read by examining three DNA bases at a time (examples of DNA triplets would be sequences like TCT, AGA, CGT, and so on). *Based on the order alone of the triplets and not on a chemical reaction*, this or that amino acid is summoned. The acids are placed in a row on a peptide chain until the translation is finished. Then the chain is cut and the string of amino acids goes away, forming itself into the right protein. This process requires 106 proteins. The simplest known cell needs 562,000 bases of DNA to assemble the proteins.
2. **Mutual dependency** – the complexity of proteins and DNA is daunting enough, but their challenge to empiricists is exacerbated a thousandfold when we note that *proteins are involved in the protein-making process.* In Meyer’s words, this poses a ‘chicken and egg’ dilemma:
The cell needs proteins to process and express the information in DNA in order to build proteins. But the construction of DNA molecules (during the process of DNA replication) also requires proteins. So which came first, the chicken (nucleic acids) or the egg (proteins)? If proteins must have arisen first, then how did they do so, since all extant cells construct proteins from the assembly instructions in DNA

The discovery of DNA has made belief in abiogenesis ridiculous. All living things have DNA that is interpreted by the cell, in the way that a computer program is interpreted by a computer chip *that has been programmed by an intelligent mind.* Thus, *there could only be an intelligent mind behind DNA.*

# Evolutionary theory

I go to a lot of trouble in my book to show how Darwin’s theory of evolution attempts to do away with purpose and form in the biological world. In other words, he tries to reduce the production of lifeforms to mere chance and the differences between lifeforms to be merely accidental. Yes, I know, it is strange that Darwin writes a book to explain the origin of species when, fundamentally, he does not believe that there is any substantial difference between things.

This does not mean that God could not have implanted some ability into nature for it to produce new lifeforms; not at all! The Church is not against evolution, as such. At the same time, however, the more that nature is able to do, the more it might have the appearance of not needing to be designed. As it stands, we all know that Darwinian evolution is a favorite tool of the atheists to claim that we do not need God to explain anything. “Although atheism might have been logically tenable before Darwin,” writes Richard Dawkins, “Darwin made it possible to be an intellectually fulfilled atheist.”

But does Darwin’s theory even explain much?

## The evolutionary mechanism

Darwin observed that human breeders can produce a vast variety of species of animals through their careful breeding. They do this by isolating a population of the animal, a variety of dog for instance, and selecting for breeding only those dogs with certain characteristics, like large, floppy ears. Over time, they are able to develop a race of a certain new type of dog. This process is called *artificial selection.*

Darwin thought that nature might do something similar, i.e. that there might be embedded in natural law a certain automatic selection, by which nature would ‘select’ better animals and set lesser animals aside. This process, if it existed, would be called *natural selection.*

Darwin got his ideas about *how* nature might select from an Anglican minister, T. R. Malthus. Here is my explanation: (Realist Guide, p. 438)

Malthus held that human populations grow continually until they hit a certain threshold which matches the available supply of food. At that point, a competition ensues among humans, with some humans acquiring food and surviving, and others failing to get food and perishing.

Darwin took Malthus’s idea for human populations and applied it to all of nature. There are only a limited number of food resources available to plants and animals on this planet, and food resources cannot be shared. As such, there is constant competition among life forms to sustain and propagate life. In such a competition, the stronger and hardier win out and survive. Those who remain have been ‘selected’ by nature, in that nature, after randomly arranging life conditions, has then proceeded to eliminate life forms unable to survive in those conditions, while retaining those able to survive.

Thus, nature ‘selects’ just by providing conditions under which some animals survive, while others do not survive. Darwin hypothesized that a) those who survive are better; b) over time, animals gradually and progressively evolve because the better ones are surviving.

In Darwin’s time, there was great enthusiasm for his theory on the part of rationalists.

Plausible arguments had been developed to show that processes of water erosion, chemical combination, fossilization of animals, and movements of subterranean matter can reasonably account for the formation of the physical features of Earth. Plausible arguments were later developed to establish that gravity, heat, nuclear fission, and nuclear fusion can reasonably account for the formation of galaxies, stars, and planets.

So, many thought, there will also likely be a naturalistic explanation for the origin of the lifeforms of the biological world. The question was just to find that explanation. Many thought that Darwin had provided it. However, the biological science of his time was primitive. Now, we have much more information with which to evaluate his theory and also determine the extent of nature’s ability to innovate in the biological world.

Here is Michael Behe’s comment on this topic in *Darwin Devolves*, pp. 255-256:
“Darwin did not show that apparently purposeful systems could be built by natural selection acting on random variation. Rather, he just proposed that they might. His theory had yet to be tested at the profound depths of life. In fact, no one then even realized life had such depths. Darwin built a case with the best science available in the nineteenth century. The case was pretty strong for a few of his theory’s multiple aspects, including the descent of modern organisms from earlier ones. It was extremely weak for his proposed mechanism of evolution. A major reason for its weakness is that the science of Darwin’s day had no understanding of the molecular foundation of life.”

We are going to take a look at the scientific evidence to see what explanatory power Darwin’s theory has, in these two areas:

1. **Common descent** – is there evidence that higher life forms descend or derive from lower lifeforms?
2. **Random mutation and natural selection** – is there evidence that the Darwinian mechanism for biological innovation is able to account for the diversity of lifeform that we see around us?

## Evidence for common descent

There is certain evidence for common descent, which is a plus for Darwin’s theory.

1. **morphology:** all mammals have the same basic body type, e.g. they have seven cervical vertebrae. We are able to classify all body types in the animal kingdom into 36 phyla.
2. **fossil record:** it shows a progression from less complex to more complex. Initially, there are only plants, then simple animals appear, followed by more complex animals, until man appears last in the animal record. The first animals to appear are invertebrates, then vertebrate fish, then reptiles, then birds, then non-placental mammals, then placental mammals, then man.
3. **DNA analysis:** all living things—plants and animals—have DNA encoded in them, and the coding is more similar according to the closeness of the plants and animals in the hierarchy of complexity.

**Example of #3:** When proteins were sequenced for the first time, in the last 1950s and early 1960s, the following results were observed:

Proteins that did the same job were similar yet different between species, but became more different as the biological distance between the species increased. For example, a small protein called cytochrome c, which helps produce energy in the cell, was determined to be identical in humans and chimpanzees in all 104 of its amino-acid positions. Between humans and dogs there were 11 differences. Between us and tuna, 21. Between people and moths, almost a third of the total positions differed. Between humans and yeast, almost half.

**Q:** Does this evidence for common descent mean that Darwinian evolution is true?

**A:** Not necessarily. If, in fact, all living things are related, and higher lifeforms come from lower lifeforms, that does not mean that the higher must come from the lower by a process of random mutation and natural selection. There are many other processes that could cause new species of life to come from already existing species. God, for instance, could certainly make new animals from old animals. And, in theory, other intelligent agents, such as angels, could design new animals. In other words, the similarities that we observe in the animal kingdom could be evidence of a *common design* of an intelligent agent.

If this were the case, new animals would be said to descend from the others only in the sense that the genetic material of the old animals was modified to make new animals. It would be like saying that a certain advanced form of technology, such as a smartphone, is a descendant of a more primitive form of technology, such as the first desktop computers.

To see whether Darwinian evolution can account for the commonality between animals, we have to see whether the cause that Darwin proposes—random mutation and natural selection—is sufficient to cause more complex lifeforms to come from simpler ones.

## Evidence against random mutation and natural selection

In theory, random mutation and natural selection could account for the totality of the differences spanning between microbes and man. In practice, it seems that the Darwinian mechanism can only account for very small, accidental changes in living things. Darwin recognized that many assumptions had to be made about nature for his mechanism to have the explanatory power necessary to account for the great diversity that we see in the things around us. At the time that he made those assumptions, they had not been tested by science, and so his theory was at least *plausible.* Today, however, we have more than enough evidence to conclude that some of his major assumptions were completely false. Let us consider the assumptions and contrast them with the evidence of science.

### Assumption 1: Gradualness

**Assumption:** The biological world is a continuum wherein only little differences separate individual lifeforms one from another. It is only when populations are isolated that they are able to accumulate differences that will separate them from the rest of the biological world and so become new species, genera, and so on.

**Testing:** this assumption can be tested by inspecting nature. If the assumption is true, we would expect to find a great fluidity in biological lifeforms, such that it is easy to change them in small ways that bring in new functions and so accumulate those small changes that they eventually develop into vastly different lifeforms. We would also expect them to be composed of interchangeable parts, such that if one part is substituted for another, the plant or animal still functions. We would further expect to find great continuity in the fossil record, with there being smooth and gradual changes throughout the history of life.

**Evidence 1:** irreducible complexity

Instead of finding a great plasticity among things in the biological world, we rather find a great rigidity, such that lifeforms are quite sensitive to any changes. The notion of irreducible complexity highlights this fact. It exists whenever some organ or function of a plant or animal has multiple interacting parts and the removal of any part causes the system to effectively cease functioning.

Almost everything that we find in the biological world is irreducibly complex, both at the macro level and the micro level. Lifeforms are not gooey, amorphous stuff that can be shaped and reshaped willy-nilly. Rather, they are very delicate and intricate constructions wherein all of the parts have to be in place for them to function.

In other words, since Darwin, we have closely investigated living things to a level of detail unimaginable in Darwin’s time. If Darwin’s assumption about living things was correct, then we would have found that natural laws are very favourable to the production of functional parts in plants and animals. Nature would be so designed that new functions would easily be produced by plants and animals doing their thing and interacting with their environment. The only way that this could be true is if living things were quite simple and the production of a function would take place by basic chemical combinations or raw forces. What we have rather found is that lifeforms are extremely delicate and unimaginably complex. And nature is just not designed to automatically produce complex new forms of life, in the way that unintelligent bees, for instance, are designed to automatically form colonies, construct complex hives, produce wax and honey, and so on.

An example will be helpful to illustrate what I am saying. Say you go to a casino and play roulette. When you play, you know that every spin of the roulette wheel will turn up a number. Every spin, we could say, will be functional in that it will yield a number and not yield a null result. Now, nature would be like this for evolution if every variation of a lifeform would yield some function. Isolate a group of mockingbirds on an island, have them undergo “selection pressures” which cause them to change, and new functions start to appear.

What we have found is that the biological world is not like this. On the contrary, it is like a roulette wheel wherein the vast majority of the slots have no number at all. Thus, the most common outcome when you spin the wheel is that you get a null result. This is precisely what we find in nature when we try to change the genomes of lifeforms. The vast majority of the time, there is either no change of function or death results to the lifeform. Only on vanishingly rare occasions is there any improvement to the organism.

**Evidence 2:** the fossil record

While the fossil record shows great evidence of a progression from less complex to more complex, in a single direction, it also shows that the progression has happened abruptly, not gradually. There are huge gaps of complexity between one layer and another in the fossil record.

*Example:* the Cambrian explosion. The most famous example of this is the so-called Cambrian explosion. After hundreds of millions of years seeing only very basic sea sponges in the fossil record, suddenly a vast array of complex animals with completely new body plans appear at the beginning of what is classified as the Cambrian period. The appearance is so sudden that it looks like a pulse to the geologists, an instantaneous interjection of life. Almost all of the animal phyla that we know of today appeared at that time.

Darwin predicted that the fossil record would manifest a bottom-up tree of life, with more specific taxonomical groupings appearing first and slowly increasing—groupings like species, genera, and families—and then over time, a differentiation of the more universal categories, such as orders, phyla and kingdoms. But the fossil record shows the opposite of this, especially in the Cambrian explosion. All of a sudden, vastly different body plans—vastly different phyla, a very generic taxonomical category—appear without any preparatory species, genera, families, classes, and so on of those phyla.

**Evidence 3:** fixation in species

Plants and animals do not allow for unlimited change. They have fixed boundaries beyond which they cannot be pushed. Here is some of the evidence cited by Augros and Stanciu:[[1]](#footnote-1)

Between 1800 and 1878, crossbreeding increased the sugar content of sugar beets from 6 percent to 17 percent. But fifty years of subsequent experiments produced no further increases. All experienced breeders recognize the constraints. Luther Burbank: “I know from my experience that I can develop a plum half an inch long or one two and a half inches long, with every possible length in between, but I am willing to admit that it is hopeless to try to get a plum the size of a small pea, or one as big as a grapefruit.”

*Saturation Mutagenesis:* this is a method of experimentation by which one seeks to explore the complete limits of a species for genetic modification. These experiments indicate that animals simply cannot sustain any major changes, a fact that leads us to be sceptical about the very possibility of macroevolution with biological species as we know them.

Here I quote from *The Realist Guide*, pp. 465-466:

Two German geneticists, starting in 1979, executed ‘saturation mutagenesis’ experiments on fruit flies. What this means is that they isolated ‘the small subset of genes that specifically regulate embryonic development’[[2]](#footnote-2) and mutated one or more of those genes in different fruit fly embryos until eventually they had mutated all of them. Most of the mutants ‘perished as deformed larvae long before achieving reproductive age’. Others survived and had major changes, but all such changes were deleterious—some fruit flies had no eyes, others had legs growing out of their heads, and still others had wings deformed in such a way that they could not fly. None of them turned into a new species with greater functionality.

But, as Meyer points out, we should not expect new and better animals to develop from introducing random mutations into the embryonic development. The reason is that the egg to embryo process is delicate and complex, with every part needing to be in its proper place, at the right time, performing its assigned function, for the result to be correct. If you introduce changes at one stage and do not compensate for that change at the other stages, then you will ruin the entire process. The only way to make a beneficial change would be to accompany that change with corresponding changes at every stage. Evolution cannot do this, though, since it works by gradual changes, which is the same as saying that it works by single changes.

This situation leads to the ‘great Darwinian paradox’: animals do not tolerate mutations at the beginning of their development, but that is the only time that they can be changed substantially; they do tolerate mutations after they have developed, but such mutations can only induce minor changes. The empirical evidence, then, seems to clearly indicate that large-scale, macroevolution is impossible.

### Assumption 2: Competition

**Assumption:** There is a ruthless competition for resources of food, water, and living space among plants and animals. This competition drives stronger lifeforms to develop survival strategies that make them evolve while weaker lifeforms die out.

**Testing:** this assumption can be analysed by observing all of the animals and plants in a general area to investigate their use of the resources of space, air, water, food, sunlight, and so on. These field studies had not been done in the time of Darwin, who was simply working on the assumptions that Malthus had made about human populations and was applying those assumptions to populations in nature.

**Evidence:** nature not in a state of fierce competition. Instead of competition in nature, there is rather cooperation. Nature is not “red in tooth and claw”, but rather replete with harmonious co-existence.

If we define competition as “whenever two or more individuals or groups ‘strive together’ for something in short supply”[[3]](#footnote-3), we find that nature employs many strategies to *prevent* competition:

* geographical isolation of species that could eliminate each other;
* the division of lifeforms living in the same habitat into different ecological niches, that is, different diets, different periods of activity, different changes introduced into the environment, and so on: “among the most thoroughly documented principles in the science of ecology is the dictum that two species never occupy the same niche”;
* mutual sharing of resources—space, light, water and food—so that as many as possible can survive, rather than the pursuit of mutual elimination;
* periodic migration of birds, fish, mammals, and insects to avoid competition;
* sequential flowering of plants to avoid competition in attracting pollinators;
* even predators are kind to their prey by never eliminating its species and also maintaining with it a dynamic equilibrium;
* symbiotic relationships between animals such that two species have a mutual interdependence: this interdependence is even found between the whole of the plant kingdom, which produces oxygen needed by animals, and that of the animal kingdom, which produces carbon dioxide needed by plants.

In short, population is regulated internally by the plants and animals themselves. It is not regulated from the outside by a fierce competition between them. Nor are they at war with their environment.

### Assumption 3: Evolution

**Assumption:** The random mutations that occur in genetic code, that are then preserved by natural selection, are advantageous to their organisms.

**Testing:** to assess this assumption, it is necessary to investigate concrete cases of evolution, wherein we know that changes have been made in the genetic code of a given species, we can specify those random mutations down to the very amino acids that have been changed, and we can judge the overall impact that those changes have had on the animal’s functionality.

**Evidence:** Darwin assumed that some random mutations could provide a survival advantage for plants and animals and also that the survival advantage would come from enhanced functionality in the plants and animals. Modern scientific studies have shown that the first assumption was correct, but the second one was false. Some random mutations do provide a survival advantage. However, they do this by *breaking* function in the genome, not by enhancing function. In other words, almost all random mutations that provide a survival advantage are the result of a *de*volution, not an *e*volution.

The amazing but in retrospect unsurprising fact established by the diligent work of many investigators in laboratory evolution over decades is that the great majority of even beneficial positively selected mutations damage an organism’s genetic information—either degrading or outright destroying functional coded elements.[[4]](#footnote-4)

In other words, when random mutation provides a benefit to a plant or animal, it almost always does so by *damaging* its genetic material. Just as throwing cargo overboard can sometimes make for the survival of the crew, so too, in the world of life, the destruction of certain functions has sometimes provided lifeforms with a survival advantage. When it does, natural selection then steps in to conserve the damaged genetic material. The plants or animals with certain debilitated functions are the ones that survive.

Once the devolution takes place, there is no getting the good genes back again. You throw the cargo overboard in order to obtain a temporary advantage, but you have to suffer the long-term consequences: there is no way to retrieve the cargo.

Degrading machinery can be useful for some purposes—perhaps because its function is unneeded at the time, and so the scrapped machine doesn’t waste energy; or because in changed circumstances the product the machine made is now detrimental; or some other reason. But natural selection can’t build a coherent new system.[[5]](#footnote-5)

Natural selection preserves the degradation, and it cannot reconstruct the missing function. The reason is that natural selection is blind. As mentioned above, natural ‘selection’ is a mere metaphor; there is no actual selection taking place. If there were, the selector could note that damaged animals might have a temporary survival advantage, but retaining them in the population would not be good in the long run. Since natural selection is blind—since it is simply a term saying that those who survive in nature are the ones more apt to survive—it “will favor the increase in the number of organisms that do better in their environment for any reason, regardless of the basis of the variation”.[[6]](#footnote-6)

What scientists have learned, then, through a more detailed knowledge of the molecular basis of life, is that the little variation that we are able to observe in nature as being caused by random mutation and natural selection—the appearance of new species and genera—is actually the result of loss of function and so devolution, reduces the possibility of any further change by restricting the variability of the genome, and provides no explanation for any notable feature of the biological world.

*Example*: the polar bear is able to survive in the Arctic, because it is a brown bear with broken genes.

[The polar bear is] a variety of brown bear that “evolved” to survive in arctic cold (in fact, it can hybridize with Alaskan brown bears). How did it do that? Behe shows that genes for regulating fat and for metabolizing cholesterol became broken or blunted, and this had a side effect of keeping the bears warm in cold climates, changing their coat color, while permitting them to survive on fatty diets of seals. Darwin’s mechanism did not create anything new; it broke things, but in the case of the polar bear, it worked out.[[7]](#footnote-7)

# Conclusion

Once we realize that all living things run on a coded language, and also that they are chock full of irreducibly complex features, we understand that no gradualistic process can account for their diversification. To get new plants and animals, you are going to have to rewrite DNA code. You are going to use some of the modules and code that is already there, but you are going to have to rewrite the program to serve the goal of the new lifeform, which is one and the same as the formality of the new plant/animal coming into existence. There is no question of changing one line of code every five years for a million years in order to produce a new lifeform. Coded languages just don’t work that way.

Even Richard Dawkins cannot point to any real examples of macroevolution, as I point out:[[8]](#footnote-8)

Richard Dawkins thinks that evolution is able to go all the way to the top, producing new phyla, new kingdoms, and new domains. When I was reading through the 450 pages of his The Greatest Show on Earth, I kept waiting for the showstopping argument to appear, that ‘sheer weight of evidence’ which ‘totally, and utterly, sledgehammeringly, overwhelmingly strongly supports the conclusion that evolution is true’. I knew that if such evidence existed in any way, shape, or form, Dawkins would lay it out on the table.

By and large, however, the table was not set with any empirical evidence for macro-evolution and was only decorated with evidence for micro-evolution: lizards from one island getting larger heads, a greater bite force, and a different diet after being transported to another island; certain bacteria, over tens of thousands of generations in a laboratory, adapting to assimilate glucose and citrate, becoming much larger than bacteria not adapting to do so; guppies in ponds with predators losing spots over time and hence becoming less visible to those predators, while guppies in ponds without predators becoming more colourful/visible over time.⁶⁹ Whenever larger changes came up, Dawkins had to shift to speculations, metaphors, and his rigged computer programs. In the end, he just expects us to ‘take his word for it’ that macroevolution is a fact, since he cannot prove it to us.

In the end, in order to explain the diversity of life on this planet, random mutations in DNA are not nearly sufficient. We need an adequate cause. Such a cause is an immensely intelligent agent. Unlike some atheist’s claims, nature clearly does not explain itself.

**Note:** we have not even spoken about the fact of human self-consciousness, which is something spiritual and beyond mere material bodies. Darwin’s theory has no way to explain the existence of a spiritual reality.

1. *The New Biology: Discovering the Wisdom of Nature* (Boston and London: New Science Library, 1987), p. 159. [↑](#footnote-ref-1)
2. This and the succeeding quotations within the quotation are taken from Stephen Meyer, *Darwin’s Doubt* (New York: HarperOne, 2013), pp. 256-262. [↑](#footnote-ref-2)
3. *The New Biology*, pp. 91, 93. [↑](#footnote-ref-3)
4. *Darwin Devolves*, p. 183. [↑](#footnote-ref-4)
5. *Ibid*., p. 201. [↑](#footnote-ref-5)
6. *Ibid.*, p. 203. [↑](#footnote-ref-6)
7. https://evolutionnews.org/2019/07/behe-vindicated-again-goldfish-are-broken-carp/ [↑](#footnote-ref-7)
8. *The Realist Guide*, p. 467. [↑](#footnote-ref-8)