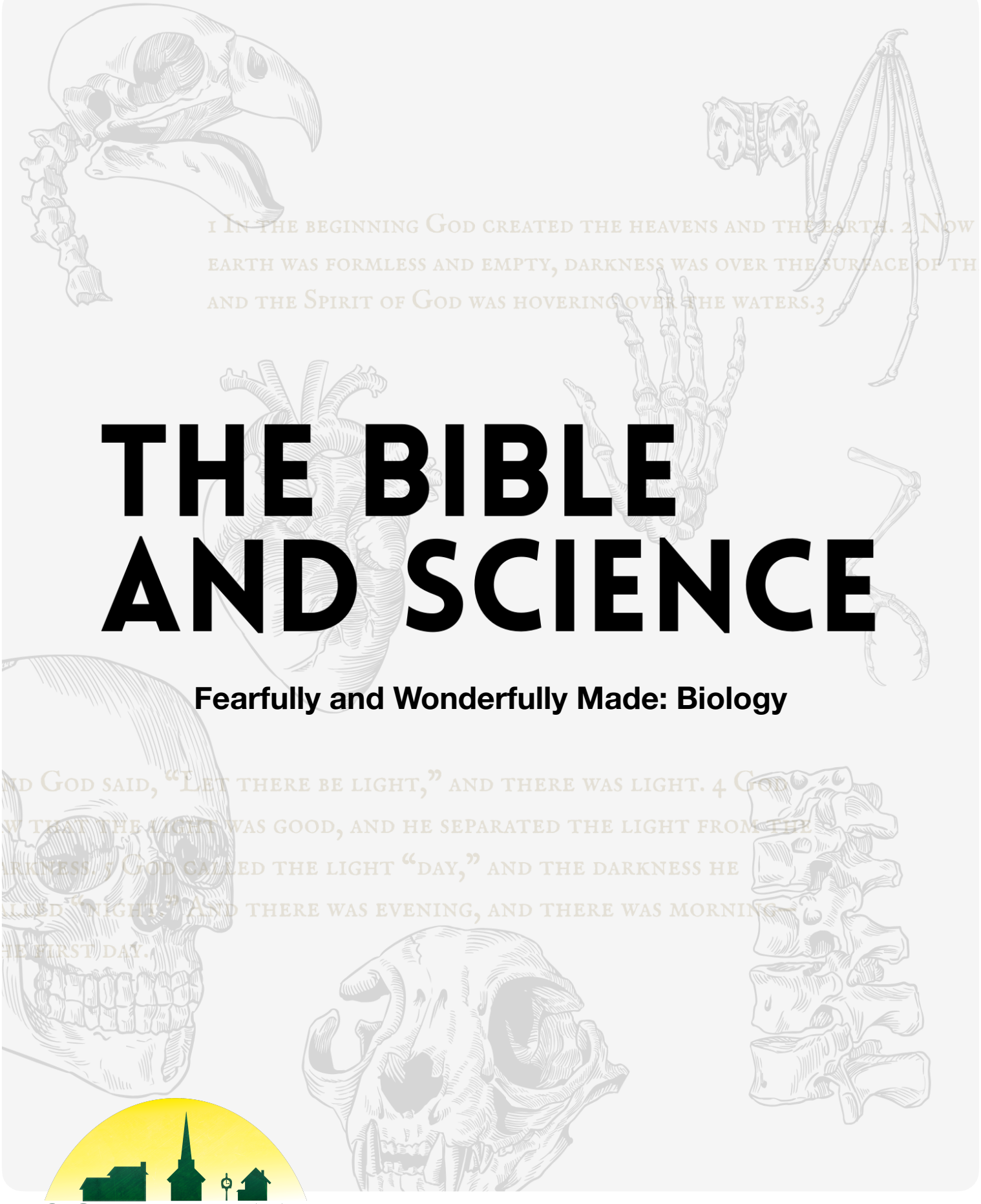

THE BIBLE AND SCIENCE

Fearfully and Wonderfully Made: Biology

COMMUNITY BIBLE CHURCH

Biology

Fearfully and Wonderfully Made: Biology

Biology is the study of living things. Like cosmology and geology, the dominant view of life and it's origin in the the field of biology is currently one dominated by naturalistic assumptions. The man who might rightly be dubbed the high priest of biological naturalism over the past few decades, Richard Dawkins, wrote in *The Blind Watchmaker* that "Biology is the study of complex things that give the appearance of having been designed for a purpose."[1] You can see here the naturalistic assumption on full display. While the intuition of design in living *systems* is undeniable, the key in that statement is the word "appearance". He's acknowledging what everyone intuitively knows but is suggesting that it is merely an appearance of design, an illusion.

For the naturalist, this apparent design we all see in living systems must have a *natural* explanation that does not involve *actual* design. The scientific explanation, the mechanism they propose is the mechanism of natural selection. According to Charles Darwin, natural selection is an undirected mechanism that can mimic the powers of a designing intelligence. According to them, natural selection selects for beneficial variations/mutations and, incrementally, it produces these complex structures with no guidance whatsoever.

Since Darwin, the bold proposal has been that there is no guiding hand, no actual design, no need for that hypothesis. Since they've concluded then that they've done away with the need for a designer, any talk of God becomes delusional. That is the title of Dawkins' subsequent book, *The God Delusion*. God's Word is clear that all life is from God and we are the result of his direct creative act. With the time we have today, I want to address from a scientific perspective the question, "Is there really evidence for design behind life or is the appearance of design merely an illusion?".

The Building Blocks of Life

There are two parts of evolutionary theory:

1. **Biological Evolution:** explain how you get from simple, pre-existing forms of life to more complex forms of life.

2. **Chemical Evolution:** explains how you get to the first cell.

The first category has gone through many iterations and is not without it's serious challenges in the years since it's core concept's introduction. Since that time we have discovered the incredible

---

[1] Richard Dawkins, *The Blind Watchmaker: Why the Evidence of Evolution Reveals a Universe Without Design* (New York: W. W. Norton, 1996), 1.

world within what was then thought to be the smallest component of life, the cell. As microbiologist Michael Behe has said, "Now the black box of the cell has been opened, and the infinitesimal world that stands revealed must be explained."[2]

Behe demonstrates through numerous examples the concept of *irreducible complexity*. He demonstrates in great detail the implausibility of gradual evolution of the complexity we find in living systems, complexity found in cellular structures like the cell membrane, the bacterial flagellum, and the blood clotting cascade. But that is all further down the line from an even bigger challenge facing the naturalist in explaining life from within that worldview.

This second category is trying to explain how you get from simple, non-living chemicals in the "primordial soup" to the first single-celled organism. It's a pretty big problem from the naturalist perspective. The naturalist has to grapple with whether or not there is any appearance of design in that first one-cell organism. If there is, he must ask if it can be explained away by some undirected mechanism, or whether it is better explained by actual design by an intelligent designer.

Back in Darwin's day, the 1860s and the few decades that followed the publication of his *On The Origin of Species*, scientists decided to extend Darwins thinking back further in time. Darwin started at the trunk and tried to explain how all the other branches on the tree arrive, but he didn't attempt to explain how life arose from non-living matter in the first place. In the years that followed the publishing of Darwin's theory, scientists attempted to explain the initial appearance of life through the process of chemical evolution. In those early days, scientists didn't think this would be a problem or that there was any appearance of design to explain because they thought the cell was a simple, homogeneous globule of plasm (protoplasm). With that model of the cell in mind, you can develop a theory of how the cell might arise by chance pretty easily.

By the late 1890s/1900s, scientists began to learn about proteins. They learned that proteins were large, complex molecules and that there were metabolic reactions between proteins and other molecules within the cell. As they learned about metabolism and all the complex relationships between the distinct parts of the cell, scientists began to realize that a simple explanation about a chance chemical reaction or two was not sufficient to explain how the first living cell might have arisen.

In the 1920s, a Soviet biochemist named Alexander Ivanovich Oparin proposed a more complex theory of chemical evolution. His theory recognized the need to build more complex structures within the cell through intermediate steps beginning with simple chemicals, the addition of an

---

[2] Behe, Michael J., *Darwin's Black Box: The Biochemical Challenge to Evolution* (New York: Free Press, 1996), 22.

energy source to initiate a chemical reaction resulting in amino acids. He envisioned the amino acids then linking together to form chains and eventually things like proteins. As the proteins then formed enclosures, the proteins that could best hold in nutrients would survive and propagate themselves. At the end of that multi-step process, you would have a living cell. This theory is pretty close to what is still taught in biology classes today.

In 1953, Stanley Miller constructed an experiment to test Oparin's theory. Miller placed gasses in a vessel and provided a spark as the energy source. Then he waited for the byproducts to collect in a trap at the bottom of the experiment. After a few days, he was able to detect two or three of the amino acids that form proteins. The scientific community and the press heralded this as a breakthrough in understanding the origin of life. Miller was able to simulate getting from simple atmospheric gases to amino acids, the building blocks of life.

There were several problems with Miller's experiment. First, the "atmospheric gases" Miller supplied for his experiment were not very likely present in what they thought the early earth atmosphere would have been like. In fact, they believed that the gasses that would have been present were more neutral or even slightly oxidizing, which would prevent the forming of amino acids. But that was a minor problem by comparison.

The more significant problem was getting from amino acids to proteins. In order to form proteins, you have to have the amino acids lined up in a very particular order. When the amino acids line up in the right way, they exert forces on one another that cause the chain to fold up into a specific shape. The shape a protein takes then allows it to carry out a very specific function. Miller's experiment produced some amino acids but he had no idea how they would line up correctly.

What Is Life?

This leads to another very important question. If we are trying to explain the origin of life in terms of biology, we have to define what exactly life is. For what are we trying to give an explanation? To begin the discussion of what life is, we have to talk about proteins. Proteins are an essential building block of life on Earth. They are kind of like specialized tools that exist inside of every living cell. And like tools in my toolbox at home, they all perform a specialized function that is related to their shape. I have a hammer that I use to pound in fasteners to the material I'm working with. I have a saw with sharp teeth on it to cut through material when I need it to have a specific length or fit. I have a drill and a case of different drill bits to drive other kinds of fasteners to join pieces of material together.

In much the same way, proteins are all specialized tools that perform specific kinds of work in the cell, and the kind of work they perform is directly connected to the shape of the protein. One

of the first things we discovered about proteins is that they all have a complex, 3-dimensional shape. So, if we're going to understand and explain life, one of the first things we have to account for is the complex 3-dimensional structure of proteins and their specificity (their specialized function).

In the last century, Scientists have learned how proteins come by their complex 3-dimensional shape. Remember earlier, that we talked about how amino acids link together in chains to form proteins, and if they link together in just the right way, in the right order, they will fold in on one another to form a specific kind of protein. If they are linked together in just any random order, the folding will not occur and you simply have a limp chain of amino acids that cannot perform any function at all.

Because this is true, we say that proteins have a property called *sequence specificity*. If something has sequence specificity, that means that the function of the whole depends on the sequence of the parts. You use something with this same property of sequence specificity every single day. We call it language. Grammar, sentences, and words are things with sequence specificity. Hopefully, the words you're reading on this page make sense because they are arranged meaningfully in relation to all the other words on this page and together perform the function of conveying information that you use to derive the meaning of the ideas being discussed in this class.

Proteins are very much like words. You have an amino acids "alphabet" which, depending on how they are arranged, may form meaningful functions or, if not arranged in just the right sequences, float around unable to perform any function. In language, if you arrange the letters correctly, they perform a communication function. If you arrange the amino acids correctly, they will perform a protein function. The function of the whole depends on the sequence of the parts.

So, to explain life, you have to explain proteins. There are three key features of proteins:

1. Shapes perform functions
2. Folded chains form the shapes
3. Precise amino acids sequencing determines folding (and function)

That last feature presents the most significant question when it comes to explaining the origin of life. From where does the order, the sequencing of amino acids come? We have learned that this comes from a molecule in the cell called DNA. DNA is a molecule that encodes instructions. It carries a digital code along the spine of the molecule that directs the cell in how to arrange those amino acids. In 1957, a few years after Crick and Watson discovered the double helix structure of DNA, Francis Crick suggested the hypothesis that the chemical bases found on the sugar and

phosphate backbone of DNA function just like alphabetic characters in language or like ones and zeros in a computer code. His hypothesis was confirmed by a series of experiments over the course of about five years.

This discovery was truly revolutionary in the field of biology. We've been talking about the search to discover how proteins are formed and Crick had discovered the answer. That *information* carried by DNA directs the synthesis of proteins in the cell. The answer to the question of how proteins arise with their hand-in-glove shapes formed by their perfectly arranged amino acids is that they are built according to the *instructions* provided to the cell by it's DNA.

Pause and consider that. There is actually a molecule in the cell that directs the cell and the microscopic machinery therein to construct the exact tools it will need to build the structures required to maintain the life of the cell. From the perspective of the naturalist, while this solves the mystery of how proteins arise, it introduces an even bigger, and perhaps more troubling mystery. Who put the message inside the DNA?

The living cell, the smallest unit of life, of which you have trillions in your body right now, is carrying out the process you just observed constantly at phenomenally rapid rates as you sit in this class: the transcribing of the genetic message, the translation of it into a protein, and the folding of the protein so that it can carry out it's specific function. The idea that this kind of production facility lives within each cell in your body is itself cause for wonder. But when you consider the information management system at it's heart, we are reminded of the words of the Psalmist,

> For you created my inmost being;
> you knit me together in my mother's womb.
> I praise you because I am fearfully and wonderfully made;
> your works are wonderful,
> I know that full well. (Psalm 139:13–14, NIV)

Life Requires Specified Information

In mathematics, there is a concept known as Shannon's *Theory of Mathematical Information*. In 1948, Claude Shannon formalized this abstract concept in which information and probability were inversely related. He said that information is about the reduction of uncertainty. In biology, we're not merely talking about the reduction of uncertainty. If you were here for the Cosmology section, you may remember the illustration of Mt. Rushmore in which we noted that the shapes of the rocks around the U.S. Presidents' faces were just as unlikely as the shapes forming the

faces, but that the significance of the rock shapes forming the faces is that they convey a recognizable pattern. This is the same concept.

The information inside of DNA is not just complex. It is specified and complex. The information inside DNA performs a function. It tells the cell how to arrange the amino acids to build a protein. As we attempt to define life, we come to the conclusion that information is at the heart of life. The fundamental mystery in life, from a naturalistic perspective, is the origin of specified, functional information.

At the beginning of this topic we noted that scientists such as Richard Dawkins view their work in biology as studying things that appear to be designed but are not actually designed. When scientist first began to use the idea of evolution to explain the origin of life, they didn't foresee a big challenge because they didn't even understand the appearance of design. They thought of the cell as a very simple, homogenous blob. But now we have learned that every living cell has an exquisite appearance of design, containing digital code to use as instructions.

Scientifically, the question then before us is whether this striking appearance of design been explained away by any undirected process?

What Are The Odds?

DNA is very familiar to us in the 21st century. We refer to it being used to solve crimes and unlock treatments to diseases. It's easy to brush over the fact that what we're talking about is a molecule at the root of living things that carries information, machine code critical to the building and sustaining of living things. From where did that information come? That is a question that remains unanswered from a naturalist's perspective.

There are basically two ways they have attempted to find an answer to this mystery. The first is to explain the presence of information using chance as the mechanism. The problem with using chance as a means to achieve a meaningful arrangement was demonstrated in several ways during our survey of cosmology. It may be illustrated in a very close analogy to the mystery of information in DNA by merely drawing out letter tiles from a word game like Scrabble at random to see if you can produce a sentence. You can intuit very quickly with this experiment that chance alone is not a very effective mechanism.

The problem technically is one of combinatorials. That is, when trying to achieve a meaningful sequence or combination of settings, your possibilities grow exponentially with each place you need to fill with a new bit of information (i.e. the combination lock illustration used in the

cosmology section). In our example with the letters, we filled in 8 places. That means the possibilities of coming up with a meaningful sequence is 26^8. That is a huge number of possibilities. In any linguistic system, the functional possibilities are a very small fraction of all the total possibilities. That is the problem presented by DNA and proteins. That is why explaining the presence of information in life using chance is very difficult. No scientist today thinks that chance is a suitable explanation for the origin of information in biology.

Not Necessarily

Because the likelihood of amino acids forming useful proteins by chance is essentially zero, the second way that scientists have attempted to solve this mystery is to explain the presence of information using necessity (laws of nature) as the mechanism. In the theory of evolution, scientists rely on a mechanism called natural selection. Variation and selection (not the same as molecules to man evolution) is something we observe in creation. This is how we see traits passed on from parent to offspring and trends of characteristics in populations both of people and animals. When a generation inherits a trait that aids in its survival and flourishing, the trait is more likely to be passed on to its progeny. Scientists say the trait is "selected" naturally and passed on.

Since the odds of life arising by chance are so small, some scientists have taken that concept of natural selection and attempted to apply it to the origin of life itself, at the prebiotic level. The idea is that desirable combinations were selected for step by step, making incredibly improbably events much more probably. The problem with this strategy is that it essentially begs the question.

Natural selection is something that happens with living systems that are self replicating. It depends on *differential reproduction*. The concept does not transfer to non-living systems that do not already have a mechanism for replicating the information previously found to be beneficial to the system. The proposed solution requires the thing attempting to be explained in order to solve the problem of how the thing arose in the first place.

A third idea that scientists have pursued in order to solve this mystery combines the ideas of chance and necessity. In 1969, a biophysicist named Dean Kenyon wrote a book called *Biochemical Predestination* in which he suggested that there are forces of attraction between the individual parts of a protein that would cause them to arrange themselves in a certain way to produce the information we recognize in those arrangements. His idea was based on known properties of some chemicals with highly ordered structures that are the result of forces of attraction between the various elements in the chemicals. For example, salt crystals result from

the positive and negative charges in sodium and chloride reacting and forming a structure. If you put the ions in solution and let the water evaporate, a highly repetitive structure will result.

By 1985, Kenyon had rejected his original premise and begun speaking at conferences about why he had rejected his own idea. He had concluded that the origin of proteins was not really the crux of the problem. The problem was the origin of information in DNA. He realized that there was no way for forces of self-organization explain the arrangement of the characters that make up the digital code. The reason this will not work is that the sugars and phosphates that make up the spine of DNA have the exact same forces of attraction to the message bearing axis of the bases but there is no force of attraction between the bases to explain their arrangement in any particular sequence. In other words, the only natural force of attraction to speak of is in the medium, not the message bearing layer itself. The forces of attraction do not govern the sequencing.

The conclusion we're left with is that DNA is a true message system that is not governed by physics or chemistry. Undirected natural processes do not produce large amounts of specified complexity—information—starting from chemical precursors. We've looked at three different types of undirected processes: chance, necessity, and a combination of the two. Scientists are increasingly beginning to see that there is no naturalistic explanation for the origin of the information required to build the first life. Rather, in all of our experience, messages come from minds. Therefore, the most reasonable inference to make when we encounter a message is that its source was a mind. To answer the question we posed at the beginning of this class, when we look at life, the reason we think that it appears designed is because it actually *is* designed.

Once again, as in the other subjects we've considered in this series, the scientific study of the world around us brings us back to what God has already told us in His Word. He is the author of life on Earth. The presence of our Creator should be obvious to us when we look at what he has created.

> For since the creation of the world God's invisible qualities—his eternal power and divine nature—have been clearly seen, being understood from what has been made, so that people are without excuse. (Romans 1:20)