

**Issues From Science That  
Point To And Require A  
Creator God:**

**Including**

**16 Fatal Roadblocks That Make A Natural  
Origin Of Life Impossible**

**And**

**Six Limitations On The Effectiveness Of  
Natural Selection Towards  
Developing New Structures**

**And**

**Five Characteristics Of Intelligent Design  
Exhibited By Living Systems**

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## **Chapter 1. Introduction.**

### **A. Roadblocks**

Essentially every modern encyclopedia and introductory biology textbook will feature a discussion on the origin of life. Their universal claim is that natural processes so favor a spontaneous, unaided, natural origin of life that the appearance of life is inevitable. All it takes is a suitable environment and lots of time and the appearance of some form of life is inevitable.

In this pamphlet we will demonstrate that the exact opposite is actually the case. Natural chemical processes and behavior work against the spontaneous formation of life, they do not favor it. A long list of roadblocks will be discussed, any one of which by itself could prevent a purely natural formation of life. Their combined effect is overwhelming; the laws of science effectively make a natural origin of life impossible. We will look at sixteen roadblocks in detail. Actually, we throw a few more in just for good measure. Yet, there are many, many more that could have been included. The ones we do present should be sufficient to make the point.

In reality, roadblocks against a natural formation of life exist about everywhere a person might look. Such roadblocks seem to be characteristic of our world. Thus, a person competent in biochemistry or a similar field should be able to add to the list quite easily if he wanted to and put any effort into it. This means that the issue is not the amount of evidence; rather, it is a person's willingness to acknowledge evidence that is abundant and is relatively obvious.

If science teaches against a natural formation of life, then can it give us any indication of where life might have come from? Surprisingly enough, the answer is. "Yes." Life shows the characteristics of having been designed by an Intelligent Being, a Creator God.

We live in an age where design engineers design all kinds of objects. The engineer figures out what he wants to make, how he wants to make it, and then uses his ability to manipulate objects in his world to make what he envisioned. This applies to bicycles, to computers, to airplanes, and just about everything else we use in our daily lives. Objects that have been designed by an intelligent being exhibit certain characteristics. We will look at five of these characteristics in this pamphlet.

So, what we observe from science about life teaches us that living objects cannot be formed by natural processes and that they show characteristics consistent with having been designed by an Intelligent Being. Furthermore, if the laws of science work to make a natural origin of life impossible, then the Intelligent Designer also needs to be able to work miracles. He is not bound by what we call the laws of science. We are bound by these laws and the creation itself operates under them. However, the Creator is greater than them and can override them at will. Thus, the very existence of life serves to demonstrate the existence of an intelligent, miracle-working God. Do you want simple, clear evidence that there is indeed a God capable of working miracles at will? Look in the mirror. Your very existence requires such a God.

In the book of Romans in the Bible, the following statement confirms this observation. The verse teaches that God designed the universe in such a way that He expects it lead a person to know that He exists and understand certain things about Him. Furthermore, He considers this evidence to be so strong that a person is without excuse who does not acknowledge it:

<sup>20</sup> For since the creation of the world His [God's] invisible attributes are clearly seen, being understood by the things that are made, even His eternal power and Godhead, so that they are without excuse,

<sup>21</sup> because, although they knew God, they did not glorify Him as God, nor were thankful.... (Romans 1:20-21)

Thus, from God's perspective, the person who rejects God as Creator does so against the evidence, not because of it.

The things presented in this pamphlet are items that the author believes fulfill this teaching. In other words, the issue is not just that science demonstrates a natural origin of life to be impossible. The issue becomes that God deliberately designed the universe for this to be the case. His intent is that the more carefully a person looks at the creation, the more evident it should be that it was placed here by a Creator.

This issue of how life originated is not a neutral issue. According to the above passage, God expects a person to glorify Him as Creator and give thanks. Attributing the origin of life to natural causes, particularly if science actually demonstrates this to be impossible, insults God's glory. Hence, believing and teaching natural origins apart from the activity of a Creator God is an offense against God's glory and is a sin for which God holds a person accountable.

The things we discuss in this pamphlet are extremely critical. They have eternal consequences. Therefore, it is worth the time and effort to understand them.

## Chapter 2. Miller's Experiment And Other Origin Of Life Experiments

### A. Target Audience and Level of Scientific Background

The target audience for our discussion is a typical college or university student, one who may or may not have much of a scientific background. It is assumed that most people reading this pamphlet will have had high school courses in algebra, chemistry and biology. This would provide sufficient background for a person to understand everything we talk about. However, for those who either have not had these courses or are rusty on their content, we have included a brief Tutorial in appendix A. If you find that you are unfamiliar with some of the terms we use in the pamphlet, you might consider studying the tutorial. Also, certain issues in the main body of text will refer to certain portions of the tutorial where it seems appropriate. The tutorial should be adequate to give you sufficient background to understand the material in the main body of the pamphlet.

It should also be noted that this pamphlet is written to a generalized audience. Therefore, technical jargon is avoided as much as possible. For instance, if a particular amino acid is among those that are repelled by water, it is said to be water-repelling instead of hydrophobic. When mirror images exist of a certain kind of molecule, they are referred to as left handed and right handed instead of levo- and dextro-. The assumption is that those with a thorough scientific background can still understand a concept with the simpler terms and it greatly simplifies the material for the lay person.

### B. Setting the Stage: Miller's Experiment

The chemicals used in and produced by living organisms tend to be different from those found elsewhere in nature. Among many other things, living systems are characterized by a prevalent use of enzymes and proteins. Enzymes and proteins are both made up of long chains of what are called amino acids. Therefore, amino acids may properly be thought of as the building blocks of life. **See Appendix A. Section 2. for a discussion on amino acid structure and Appendix A. Section 3. for a discussion on enzyme structure.**

The simplest amino acid is called glycine. It is chemically equal to a molecule of vinegar combined with a molecule of ammonia. Glycine is inherently a simple chemical combination, yet it does not form naturally and spontaneously anywhere on the earth apart from the action of living organisms. Besides glycine, there are 19 other amino acids coded for by the DNA in a living cell.

How did physical life originate? Is it truly a natural product of the normal laws of science? Or, is it the result of the creative efforts of a Living God? Can the things we scientifically observe from nature shed any light on these questions?

Most professors in most universities today are secular humanists. It has been this way for much of the past 100 years. A secular humanist believes that physical life formed as the natural result of the normal laws of nature working over long periods of time. He believes that these laws are adequate to account for everything we observe around us today. He rejects any claims to the existence of a Living God who has worked and still works within the domain of a creation that He brought into existence.

However, the origin of life has always been a thorny problem for evolutionists and humanists. The kinds of chemicals appearing in living systems are frequently extremely complicated and are not typical of those found outside of living systems. Thus, these chemicals do not seem to appear spontaneously. So, where did life come from?

In 1953, a young graduate student at the University of Chicago named Stanley Miller appeared to solve the problem. He assumed that the atmosphere on earth in the earliest days of its history might have been similar to that of the planet Jupiter today. Jupiter contains an atmosphere of hydrogen, methane, ammonia, and water. Jupiter also has large storms that produce lots of lightning. So, Miller designed an experiment in which he mixed methane, ammonia, hydrogen, and water in a spark chamber. He then zapped the mixture with a spark. His experiment paralleled what is taking place on Jupiter today. His results startled the world. He produced amino acids! The four simplest amino acids are called glycine, alanine, glutamic acid, and aspartic acid. Miller produced all four of these simple amino acids while running his experiment. Altogether, about four percent of the carbon that Miller

introduced into the spark chamber was converted into these four amino acids.

This experiment opened up a new branch of science, that of studying in a laboratory how life might have formed on earth using various assumed initial conditions. So, for instance, in the various different experiments the initial, starting mixtures would sometimes contain formaldehyde, carbon monoxide, or cyanide as well as some of the raw materials Miller used. Different energy sources such as ultraviolet light or even hot water were used.

The results of running these experiments showed that some raw materials and energy sources favored the formation of sugars. Others favored the formation of certain kinds of amino acids. Yet others favored various components used in making RNA or DNA.

Things seemed to be going well at first. It seemed that there was some combination of energy and raw materials that could be used to form almost any desired building block component for a living cell. However, each one of the experiments, no matter what conditions were tested, invariably reached dead ends. After an initial period of excitement, very little new progress has been made in this area during the last thirty years.

One major problem was tar formation. The various experiments tend either to produce nothing or produce lots of tar.<sup>1</sup> However, they do not produce living cells, they do not produce enzymes. They do not produce RNA. They do not even produce self-replicating molecules. Worst of all, they do not even produce the hypothetical “pre-life soup” of a rich concentration of cellular building block molecules.

This soup is typically presented as historical fact. However, even under the controlled conditions of a laboratory where the most brilliant scientists in the world can manipulate conditions at will, no satisfactory “soup” has ever been produced. Surprisingly enough, Miller’s original experiment is actually the closest anyone has come to forming such a soup. This was due to the high amounts of hydrogen he included in his initial atmosphere, but which has since been acknowledged to have been unrealistic—hydrogen is so light that it very rapidly escapes earth’s gravitational pull and becomes lost to outer space. Miller’s experiment produced more products at closer to a usable concentration than any that have followed after him. In Miller’s own words, talking in an October, 1996 interview about his early experiment, he said, “The surprise of the experiment was the very large yield of amino acids. We would have been happy if we got traces of amino acids, but we got around 4%. Incidentally, this is probably the biggest yield of any similar prebiotic experiment conducted since then.”<sup>2</sup> So, no one has really improved on his original experiment. Yet, we shall show that his products were not even close to providing an adequate starting point for the formation of life.

It is amazing that when one cuts through all of the empty rhetoric about a pre-life soup that evolutionists so proudly proclaim to be fact, he finds that there is essentially no substance to the claims. After more than fifty years of effort, with lots of fame at stake for anyone who could be successful, no scientist has ever been able to form a useful soup starting with reasonable pre-life conditions of any kind. Talk about dead ends. No one has ever been able to improve on the results of Miller’s original experiment.

All known experiments that start with raw, basic building block chemicals such as methane and ammonia eventually run into dead ends. No matter how long an experiment is allowed to run, it never forms a soup with a useful concentration and useful variety of chemicals. It forms either nothing or it forms lots of tar.<sup>5</sup> This is observation, consistent observation. This is what scientists should present as the results of pre-life experiments.

It is our thesis that these dead ends are the inevitable result of the normal laws of science acting normally. The laws of science work against a natural formation of life, they do not promote it. The dead ends reached by these experiments are exactly what we would predict based on applying certain basic principles of chemical behavior. Hence, our predictions are confirmed by experiment. Science teaches that a natural origin of life is impossible.

We will discuss many of these problems which lead to dead ends in our section on the 16 Fatal Roadblocks Against A Natural Origin Of Life.

First though, for the sake of the discussion, it will help to have a reference point. We will use Miller’s experiment as that reference point.

Most of the essential products necessary to form a living cell were NOT produced by Miller's experiment. Although various other experiments were able to produce some of the missing products, these other experiments invariably gave smaller yields than did Miller's, both in concentration of product formed and in the number of different products produced. Hence, for our discussion, we will focus on Miller's experiment. It is the best known of all similar experiments, its results are readily available with a simple Internet search, and it gave the best results.

I once was dialoging in an Internet discussion group with some people about these issues. A certain individual was constantly criticizing my use of Miller's experiment. He said he had in his files copies of over 200 other experiments that he claimed gave better results than did Miller's. Much of my discussion had featured certain mathematical calculations based on Miller's results, similar to what we will also be looking at later on in this pamphlet. Finally, I challenged the individual to use the results from any of these other 200 experiments, substitute them in the calculations, and show how they invalidated any of the calculations or conclusions. My claim was that it would not matter which experiment he used as a basis for the calculations, he would still ultimately end up with effectively the same results. **The reason was that the results were due to underlying principles of chemistry and that these principles were solid.** Interestingly enough, he never brought up the issue again. It is these principles and calculations that we will present in our discussion of the sixteen fatal roadblocks.

### C. Miller's Experiment, The Results:

85%	Tar
8%	Formic Acid (bee sting venom)
0.5%	Acetic Acid (vinegar)
3%	Other non amino acid organic compounds
2%	Glycine (a water-repelling amino acid)
1.7%	Alanine (a water-repelling amino acid)
0.02%	Glutamic Acid (a water-attracting amino acid with negative charge)
0.02%	Aspartic Acid (a water-attracting amino acid with negative charge)
< 0.002%	Other, trace amino acids

(Percentages represent the relative masses or weights of the products formed, not the ratio of the numbers of molecules formed.)

Notice, far more tar was made than anything else. This tar collected on the sides of the spark chamber, **away from** contact with the spark. Otherwise, the spark would have ripped the components of the tar apart and changed them back into their original or even yet smaller molecules faster than new, replacement molecules could form. What was in the tar? Miller said it was too complicated to analyze. It was a sticky goo of an unorganized, unspecified, unreacting mass of organic chemicals produced by his experiment; he called it *tar*. We will follow his example and call any similar products of an origin-of-life experiment *tar*.

From the chart we see that about eight times as much tar was produced as everything else put together. Actually, the other listed products were on their way to being added to the tar goo, too. However, Miller designed a trap into his apparatus to remove these products before anything happened to them. It was only Miller's expertise and insights as a biochemist that allowed him to extract even the small percentage of useful products that he did. Under truly natural conditions one would expect that all of his product eventually would have either turned to tar or have been ripped apart. One would not expect an accumulation of amino acids to build up. This is contrary to the claims of those who like to talk about the existence of a rich, pre-life soup full of amino acids and other complex molecules ready to be assembled into a living system of some sort.

Continuing down Miller's list, we see that the next highest product was formic acid at 8%. This is significant, because as we shall see in our discussion on Roadblocks 2. and 3., formic acid easily ruins progress towards getting an enzyme. What is formic acid? It is the major component of bee sting venom. In the experiment it was formed

from a single molecule of methane which had been forcefully joined with two water molecules in a certain manner by energy from the spark. Notice, formic acid is needed in order to make amino acids, yet it interferes with amino acids making enzymes. This will be discussed in detail later on.

Acetic acid (vinegar) was also detected. Finally, there were also a number of other organic compounds formed that we will not bother to list.

Next, we see the amino acids that Miller produced in significant quantities. The results are repeated here:

2%	Glycine	(water-repelling)
1.7%	Alanine	(water-repelling)
0.02%	Glutamic Acid	(water-attracting with negative charge)
0.02%	Aspartic Acid	(water-attracting with negative charge)
< 0.002%	Other,	trace amino acids

Notice the ratios between the various kinds of amino acids. Glycine at 2.0% and alanine at 1.7% are very close to each other. Also, notice that alanine and glycine are labeled as water-repelling amino acids. This is very significant, as we shall see later. Next, we find glutamic acid listed at 0.02%. Thus, only one glutamic acid molecule was produced for every one hundred glycine molecules. Aspartic acid is also at 0.02%, so it, too, has only one one-hundredth the occurrence of glycine. Glutamic acid and Aspartic acid are water-attracting amino acids and both have positive charge.

The ratio of 100 times as many water-repelling amino acids as there are water-attracting amino acids presents a problem when one tries to construct an enzyme with the products of Miller's experiment (or any similar experiments for that matter.) Likewise, the appearance of only positively –charged amino acids with absolutely no negatively-charged amino acids to balance accumulated charges will present another major problem. These things will be discussed in detail later on.

The final entry on the list is particularly significant. Miller produced many other amino acids than the four listed. However, they were in such small portions compared to glycine that they effectively did not exist. All of the unnamed remaining amino acids were so dilute that there would be over 1,000 glycine molecules for each one of them produced. For many, there would have been over a million glycine molecules for each of them produced.

There are many people who speculate that the laws of science favor a spontaneous origin of life. These people implicitly assume that these products appearing naturally in an origin-of-life scenario will randomly combine with each other to produce ever larger molecules. Furthermore, given enough time, such random combinations will provide all of the various components and organization required to form a living cell. However, this is only an assumption. When one actually analyzes the difficulties that would need to be overcome for this to take place, he finds the task becomes insurmountable.

In the next chapter, we will look at a series of fatal roadblocks against a natural formation of life. It is the combined effect of all of the roadblocks which becomes overwhelming. Although biologists are typically aware of these issues, they tend to think of them as isolated issues, ignore them, and blindly hope that they will go away. However, in real life we find that as we learn more and more about biochemistry, we find more and more roadblocks making their appearance. Roadblocks are not being removed by increased knowledge, they are increasing in number. Furthermore, their combined effects are becoming greater and greater, not lessened.

### Chapter 3. Sixteen Fatal Roadblocks against a Purely Natural Formation of Life.

**Fatal Roadblock Number 1. Tar Formation.** As we mentioned, the number one product Stanley Miller produced was tar. This was not because of some peculiarity of Miller's experiment, rather it was simply the out-working of basic scientific principles. It was what we should expect if we think through the process. Indeed, since 1953 when Miller first published his results, there have been hundreds of other experiments performed. These various experiments have used numerous variations of raw source materials, energy sources, and operating temperatures. Scientists have essentially exhausted their creativity in trying to improve on Miller's results. Yet, the major product of all of them is tar.

Sir Fred Hoyle, the British Royal Astronomer, summarizes the situation with these words: "Nothing happens when organic materials are subjected to the usual prescriptions of showers of sparks or drenched in ultraviolet light, except the eventual production of a tarry sludge."<sup>3</sup>

This is important: During the past 50 years scientists have exhausted their creativity in attempting to create a truly useful soup using assumed natural conditions. Yet, all they produced was tar and a few incidental products on their way to becoming tar. These results contradict the folk-lore of evolution, i.e., that the laws of science favor a spontaneous formation of life.

The idea behind spontaneous formation is that origin-of-life processes are not critical, that they can tolerate wide variations in conditions and still be effective. In fact, they are so uncritical that random conditions in a pre-life world will be adequate to make the eventual appearance of life inevitable.

Experimentally, we observe the exact opposite to be the case. A laboratory allows a scientist to have precise control of an environment. Slight changes of any desired parameter can be introduced at will. However, no matter how the conditions are varied, all anyone ever gets is tar.

This raises a truly significant issue: if satisfactory results are not possible in a controlled environment, how could they be inevitable in an uncontrolled environment?

Since tar is the primary product of pre-life scenarios, it is worth discussing a little bit.

There is a primary problem caused by tar formation, that of isolation. The molecules internal to the tar goo are isolated from the raw source chemicals that would be needed to continue their progress towards becoming a useful enzyme or some other structure. The interior molecules are randomly joined together in an inert, useless hodge-podge. Thus, once a molecule becomes part of the goo, it becomes useless for anything productive. In a growing glob, the molecules at the surface one minute are part of the inert interior soon afterwards.

If the true goal is to produce some kind of enzyme, or even just something that even remotely resembles any kind of enzyme, the tar problem is serious.

Why is the tar produced? The answer is not really that difficult to understand.

Living cells require an internal liquid water environment to function properly. In fact, a long chain of amino acids will not acquire the shape of a target enzyme unless it is in a water environment. Furthermore, water, as a universal solvent, acts as a transport mechanism to allow the various different molecules in a cell to find each other and then interact with each other.

However, a molecule of water has an interesting structure. It is composed of two hydrogen atoms combined with one oxygen atom. Each hydrogen atom has a single positive charge. By contrast, the oxygen atom has two negative charges. Thus, the positive charges on the hydrogen atoms cancel out the negative charges on the oxygen atom.

However, there is a weird characteristic of water. Both of the hydrogen atoms stay close to each other on the same side of the oxygen atom. So, if another molecule gets close to the hydrogen atoms, it will sense the positive

charges on the hydrogen atoms more effectively than it does the negative charges on the oxygen atom. So, that portion of the water molecule near the hydrogen atoms appears to have a positive charge. Likewise, if a molecule is closer to the oxygen atom than the hydrogen atoms, it will sense the two negative charges on the oxygen atom more strongly than the positive charges on the hydrogen atoms. In this case the water molecule will appear to have a negative charge.

So, even though the overall water molecule is electrically neutral, the hydrogen end seems to be positive and the oxygen end negative. This characteristic is called polarity. So, water is an electrically polar molecule.

Electrical polarity has a huge impact on the behavior of water molecules. The positive end of one molecule will attempt to get as close as it can to the negative end of another molecule. This attraction produces a force called "surface tension." It is why wet sand at the beach is stiffer and easier to walk on than loose, dry sand. The surface tension in a thin coat of water acts as a weak cement bonding the grains of sand together, producing a stiffer surface for walking. In a solution of organic chemicals dissolved in water, the electrical attraction between water molecules for each other is strong enough to cause them to try to push aside any unpolarized molecules in their vicinity.

Most carbon-based molecules are non-polar. These non-polar molecules are unwelcome guests in a water-molecule party, and the water molecules rudely try to push them aside as they squeeze past them to find other water molecules. The result is that if there are several non-polar molecules near each other and if they accidentally come in contact with each other, the water's surface tension will cause them to tend to stay together instead of drift apart.

So, the first step in making tar is the very natural process of water molecules pushing together unpolarized molecules. This is one of the more fundamental, basic characteristics of chemical behavior. Indeed, we have all heard of why oil and water do not mix. This is why.

The next step has to do with the various kinds of bonds between atoms. The strongest and most well-known are ionic bonds and co-valent bonds. These bonds form crystals and molecules. There are also three weaker kinds of bonds. They are known as hydrogen bonds, Van Der Waals forces, and London-dispersion forces. Non-polar molecules can lightly bond to each other because of these weaker bonds. The larger the molecules are, the more effective these bonds become and the more likely they are to bond to each other. A group of weakly bonded molecules is called an aggregate. If the aggregate becomes large enough, it can precipitate out of solution. A precipitated aggregate of unspecified, weakly-bonded molecules is what Miller referred to as tar.

Methane is a non-polar molecule. In an origin-of-life environment, one of the more common ways that molecules can be made more complex is by the addition of methane molecules. The larger a randomly formed molecule becomes and the more locations it has within itself of methane molecules grouped together, the greater the tendency of the molecule to aggregate. The natural tendency is for aggregates to get added to the tar goo.

Our point here is that it is not an accident that so much tar is formed in the various origin-of-life experiments. This is a natural process. It is exactly what one should expect when basic principles are applied to the situation. A fully developed, living cell has means to deal with the tendency to form tar. This goes so far as to include the existence of extremely complex mechanisms called chaperones. However, a random combination of chemicals in a pre-life environment does not have these means. The result: origin-of-life scenarios produce tar, not enzymes. They produce tar, not long chains of RNA. They produce tar, not living cells.

When theory leads one to predict certain observed results in a given set of conditions and when observed, experimental results are in agreement with the prediction, then it is reasonable to say that the rules of science demonstrate the predicted behavior.

The rules of science lead us to predict that tar would be formed by "origin-of-life" processes—not enzymes, not self-replicating molecules, and not living cells. A wide-ranging variety of experiments are all in agreement with these predictions. Hence, it is reasonable to say that the natural tendency for organic chemicals combining under pre-life conditions is to form tar, not physical life nor even the more complex molecules required for physical life.

The principles behind the strong tendency for tar formation present a fatal roadblock against a natural origin of life.

### **Fatal Roadblock Number 2. Early Termination.**

The next two roadblocks deal with different facets of a common situation. If the various kinds of organic chemicals in a pre-life “soup” were to combine with each other randomly, most of the combinations formed would contribute nothing to the formation of life. The number of useless combinations greatly exceeds the number of useful combinations. Furthermore, the biologically active molecules of living systems tend to be extremely large, being made up of hundreds of small building block molecules. Getting a random combination of soup components to come together to form useful large, biologically useful molecules, is for all practical purposes impossible.

Instead, most random combinations of raw-building block molecules will simply end up in the tar goo. Indeed, this is what is observed experimentally. This is not a neutral issue, for the tar then essentially “sucks up” all of the available raw materials. In the next two roadblocks, our goal will be to produce some rough calculations of the likelihood of a random chemical combination producing tar instead of something useful.

Most of the chemicals found in living cells are in the form of extremely long chains that are composed of many small molecules joined together into large molecules. If the wrong kind of molecule is joined to the end of a forming chain, then it effectively terminates chain growth and makes the chain useless. We will call any kind of molecule capable of terminating a chain a terminator. Unfortunately, a pre-life “soup” invariably contains many more potential terminators than potential “linkers.” Since Origin-of-life processes combine chemicals randomly out of the soup, the odds favor chain termination over chain extension.

The basic structure of an amino acid consists of four parts. (See Appendix A.2.) A central methane atom is bonded to a formic acid molecule at one of its ends. It is bonded to an ammonia molecule at another end. Finally, it is bonded to what is called a side-chain along one of its sides.

Amino acids can connect to each other in a chain. This chain is made by the ammonia portion of one amino acid bonding to the formic acid portion of another amino acid. A molecule of water is released during this reaction. The bond formed by this process is called a peptide bond. It tends to be a quite strong, relatively stable bond.

Let’s suppose we have a soup made up of a relative high percentage of Miller’s products, ignoring the tar. We want to join a series of amino acids together to form a long chain.

Notice, there was a lot more formic acid formed than amino acids. This is a problem. If the formic acid segment of an amino acid can bond to the ammonia molecule at the end of a chain, then an individual formic acid molecule can also bond to it. If this happens, there is no longer an amino group at the end of the chain and the chain has been terminated. It is no longer capable of growth.

Here is the problem. There are a lot of terminators in Miller’s soup. Indeed, the basic components used to make amino acids will always be present in a soup in a high concentration. However, formic acid is not the only possible terminator. All of the various other non-amino acid molecules he produced are also capable of bonding to a chain and terminating its progress. If we consider the ratios of the actual numbers of the various kinds of molecules in Miller’s soup, we find that there are about 4 times as many terminator molecules as amino acids.

Let’s assume that in a pre-life soup the various terminators and amino acids all have approximately the same likelihood of connecting to an ammonia molecule at the end of a chain of amino acids. This means that every time something new gets added to the end of a chain, 4 out of 5 times it will be a terminator and only 1 out of 5 will it be an amino acid.

How hard will it be to get an unterminated chain of amino acids? Well, pick your length. Enzymes in real life normally vary between 200 and 1,000 amino acids each, although a small percentage can be either shorter or longer.

Let’s take an unusually small enzyme of only 101 amino acids. What are the odds of getting a sequence of 100





in our minds something irrelevant. The reality is, though, that an insurmountable problem is truly insurmountable, regardless of whether or not we comprehend it.

Of course, there is no reason that the molecules connecting at the end of the chain should be limited to amino acids. They could just as easily be terminators. So, what are the odds of forming an amino acid string without it being undone either by early termination or by spurious side chains? They are simply the product of the two numbers, or  $1$  in  $10^{70}$  times  $1$  in  $10^{152}$ . Thus, the odds of forming a successful chain have now become  $1$  in  $10^{222}$ .

These are some pretty stiff odds against forming a single, tiny enzyme of only 101 amino acids.

#### **Fatal Roadblock Number 4. The Laws of Chemical Equilibrium.**

The laws of chemical equilibrium are the most basic laws of chemistry. Chemical reactions proceed towards equilibrium. Period.

How does this affect origin of life issues?

Remember, we mentioned earlier that whenever two amino acids join to form a peptide bond, a water molecule is given off. In this situation, because of the extremely high existing concentration of one of the products of the reaction, namely water, chemical dynamics will then favor the disassociation of a peptide bond instead of its formation. In other words, it is more likely that a high energy water molecule will break apart an existing peptide bond than it is for a high energy amino acid to form a new one.<sup>4</sup>

Because of this release of a water molecule in peptide bond formation, the equilibrium state of an amino acid mixture in solution is for amino acids to stay as individual amino acids. Equilibrium does not favor the formation of chains of several hundred amino acids.

In a collection of articles on thermodynamics, Dwayne Gish states that it takes a certain amount of energy to join two amino acids together with a peptide bond (about 2.75 kcal/mole).<sup>5</sup> The same amount of energy is released when the bond breaks and they split. He then goes on to state the significance of this. In an equilibrium situation, in round numbers, every time a chain of amino acids is extended by one more link, its concentration decreases by a factor of about 100. We have all heard of the proverbial phrase, one step forward and two steps backward. This situation is sort of like that, except much worse. It is one step forward and one hundred steps backward.

Gish's calculations have been crudely confirmed by a pair of experiments. Both simulate an origin of life using hot ocean vents. In the first experiment, solutions of various amino acids were combined with other chemicals in an effort to catalyze chain-forming reactions.<sup>6</sup> A number of tests were run at different temperatures, different catalysts, and different concentrations of catalysts. Potential terminators and spurious cross-linkers were not included as part of the solution. Most of the runs did not produce chains of 3 or more amino acids, but a few of them did. Looking more carefully at these particular runs, we find that the concentration of an amino acid pair (i.e., two amino acids joined together with a peptide bond) was about 2% - 3% of the initial amino acid concentration. This was a little better than Gish's rough prediction. However, chains of three amino acids were less than 1/1,000th the concentration of the two-amino acid pairs. This was worse than Gish predicted. There were no chains of 4 or more amino acids detected.

The second experiment also simulated a hot vent, but it took a somewhat different approach.<sup>7</sup> The goal was to simulate a soup which rapidly recirculates between a hot region and cold region. The trick was to get the chain to be in the hot region long enough to add an amino acid to it and then get it back into a cold region before it had a chance to disassociate. This approach was somewhat effective in that the concentration of 3-amino acid chains was actually slightly greater than that of 2-amino acid chains. However, before one gets too excited about this, the reality is that there was no trace of any chains of 4 or more amino acids. This was despite an extremely complex system tweaked by intelligent scientists to get the absolute optimum performance possible from the system. The experimenters commented that they believed that chains of 4 amino acids were formed, but then broke apart so rapidly that they could not be detected.

This is the problem: an amino acid chain can be relatively stable in cold water without any free energy acting on it. However, this stability works against the chain extending in length. In order to extend an amino acid chain by the addition of one more link, approximately 2.75 kcal/mole of energy needs to be supplied. However, this energy will break the peptide bonds much quicker than it forms them.

Notice, neither of these experiments was able to produce measurable amounts of 4-amino acid chains. Yet, in living systems, enzymes are typically in chains ranging from 100 to over 1,000 amino acids. Forming enzymes through natural processes in a pre-life soup sounds good in theory, but in practice the roadblocks preventing it are effectively impossible to overcome.

Let's see just how impossible this roadblock is. Suppose that as a crude approximation every time an amino acid is added to a chain of a certain length, it falls apart so fast that its concentration would decrease by a factor of 100. How serious would this be? Quite serious.

Going through the math, in order to find a single string of 100 amino acids joined in a chain, we would need a total of  $100^{100}$  amino acids interacting with each other. Reworded and simplifying the calculation, out of a pool of  $10^{1000}$  amino acids interacting with each other, we would expect to find only a single chain 100 amino acids in length. Yet, there are only  $10^{80}$  atoms in the universe and amino acids average about 100 atoms each.

Therefore, if the entire known universe were not separated into stars and galaxies, but instead were a single solution of amino acids, the odds would be greater than one in  $10^{920}$  against finding a single string of only 100 amino acids anywhere in the universe. Of course, getting a single, 100-amino acid long enzyme is not even close to the formation of life.

Some people, such as those involved in the SETI project, have postulated that life originated in some other part of the universe. However, in the face of the odds we have been looking at, the universe isn't big enough to be of much help in overcoming the roadblock imposed by the laws of chemical equilibrium against a natural form of life.

Hence, a person who believes that life started through purely natural processes has to reject the validity of the laws of chemical equilibrium. We have theory confirmed by experiment showing the impossibility of getting long chains of amino acids to form spontaneously. **This is a heavy burden for any one to carry who understands anything about chemistry.** The laws of chemical equilibrium work against a pool of amino acids spontaneously organizing themselves into long strings connected by peptide bonds.

However, some origin-of-life experiments have succeeded in getting strings of 30 to 40 amino acids joined to each other. This sounds promising until one looks at the details. Cross-linking was still a major problem. Potential terminators were removed from the solution, so the results were meaningless—the experiment did not represent a realistic true-to-life scenario. However, these long strings of amino acids did seem to refute the numbers we presented.

How did they do it? The amino acid chains in the experiment were brought together and joined with each other in the crevices of certain clay crystals. Their locations within the cracks helped the various amino acids that were joined together stay together. The amino acids were not floating freely in a water solution, but were attached fairly strongly to the clay. This helped them stay together even when they might be hit with a high-energy molecule from the solution. However, these bonds can become so strong that frequently the bonds become permanent. The strings become permanently bonded to the clay.

Unfortunately, though, for the evolutionists, linear chains of amino acids do not function as enzymes. Enzymes are made of sheets and coils, not linear chains. So, these chains stuck in the crevices of a clay crystal do not function as enzymes. They have nothing to do with a natural origin of life.

Furthermore, while they are attached to the clay they cannot relocate to be used with cooperating enzymes. For instance, in order to burn fuel such as sugars and fats and convert them into controlled forms of energy, a living cell makes use of a number of enzymes cooperating with each other in what is called the citric acid cycle (Kreb's cycle.) In real life, the enzymes used in this cycle process the fuel in a certain sequence. The enzymes are located

next to each other in their proper order according to their sequence in the cycle. So, even if an enzyme sequence useful for accomplishing a specific task in the citric acid cycle were to form on a clay crystal, it is highly unlikely that it would be located near enough other, cooperating enzymes—if they even existed—for it to be of use.

The details of the experiment also revealed another problem. Although there were a large number of amino acids joined together, many were connected as side chains, not as peptide bonds, which are required to link together an enzyme. So, it was actually a chaotic jumble of amino acids connected randomly and not in an organized manner. Bonds to the clay helped overcome some of the disassociation problems faced by free amino acids in a water solution. But, this approach also introduced another whole set of problems, problems that in real life would prove fatal towards forming a legitimate, useful enzyme.

There is another problem that these strings of amino acids will face. The amino acid string cannot function as an enzyme when it is stretched out on the clay. However, if it does break loose from the clay, hydrolysis will immediately begin ripping it apart until it approaches equilibrium. If there is enough energy in the molecules surrounding the amino acid/clay hybrid to cause new amino acids join the bonded amino acid groups, then there is also enough energy to fairly rapidly begin ripping things apart when help from the clay is no longer available.

To repeat an earlier statement that was made, a person who believes that life started through purely natural processes has to reject the validity of the laws of chemical equilibrium. This is a heavy burden to carry for anyone who understands anything about chemistry.

#### **Fatal Roadblock Number 5. Unusable Ratios of Building Blocks.**

The pre-life soup would have been missing essential ingredients. Beyond this, even the ingredients it did have would have been in the wrong ratios for random combinations to be useful.

The following ratios of amino acids are taken from the earlier table of Miller's results:

2%	Glycine (water-repelling)
1.7%	Alanine (water-repelling)
0.02%	Glutamic Acid (water-attracting with negative charge)
0.02%	Aspartic Acid (water-attracting with negative charge)
< 0.002%	Other, trace amino acids

Notice, in round numbers there are about one hundred times as much glycine and alanine formed as glutamic acid and aspartic acid. This observation leads to a number of new problems. Even if long strings of amino acids could form without early termination, without spurious side chains, and without rapid disassociation because of chemical equilibrium, we still have serious problems.

First of all, enzyme shapes are built up from various combinations of coils and sheets. A common, typical coil is made from a string of about 10 or more amino acids.<sup>8</sup> A typical sheet is made from a string of about 36 or more amino acids in its formation, but can be more than 100.<sup>9</sup>

Certain of the twenty amino acids tend to form sheets. Others tend to form coils. These are tendencies, not absolute characteristics. The various other amino acids near a particular amino acid exert a major influence in whether a particular amino acid becomes part of a sheet, a coil, or an interconnecting loop.

However, one thing is clear. The four amino acids shown above are **not adequate to form sheets and coils**. Usable enzymes **cannot** be made from only the four kinds of amino acids provided by Miller.

To add to the difficulties, all of the water-attracting amino acids Miller produced had a negative charge. He did not produce any positively-charged amino acids and no one else has done so in usable amounts either. Yet, in real life, there tend to be roughly equal numbers of amino acids with positive charge as with negative charge. This balance is necessary to get an enzyme to fold properly. So, if all of the available water-attracting amino acids have a negative charge and there are not any positively charged amino acids available for balance, then getting a proper en-

zyme shape would be impossible.

There is yet another issue. Remember our discussion about tar, about how water pushes non-polar molecules together until they aggregate? The water-repelling amino acids are water repelling because they are non-polar.

In real life, if an enzyme uses an amino acid sequence having more than three or so water-repelling amino acids in a row, this will cause a strong tendency for the amino acid chain to aggregate with any other non-polar molecules near it.

Think through the implications of this. Miller produced 100 times as many water-repelling amino acids as he did water-attracting ones. (By contrast enzymes in real life tend to be composed of roughly equal numbers of each kind.) This means in a sequence of 101 amino acids made randomly from the products of Miller's experiment, there will tend to be 100 water repelling amino acids and only one water-attracting amino acid.

This means that even if a long string of amino acids could be joined together using the products available from a scenario represented by Miller's experiment, that they then would head straight for the tar goo.

The ratios of amino acids Miller produced work against the possibility of anything truly useful being done with his products. The same is true of all similar experiments. This is a fatal characteristic.

### **Fatal Roadblock Number 6. Contradictory Processes.**

A number of different experiments mimicking assumed origin-of-life conditions and processes have been performed. These experiments have produced sugars, nucleotide bases, and amino acids. However, the processes for producing the various products are contradictory to each other. Conditions that make any one kind of the needed molecules can't make the others.

There was a book written a few years ago by Robert Shapiro, a chemistry professor at the University of New York, called *ORIGINS A Skeptic's Guide To The Creation Of Life On Earth*. A number of different scenarios and processes to explain the origin of life have been proposed by various scientists over the years. In this book Shapiro looks at a number of these, first explaining a particular approach and then acting as a skeptic and showing all manner of problems from scientific observation that contradict the approach. If a person did not know better, after reading Shapiro's book he might decide that he himself did not actually exist, or at least that he shouldn't. Shapiro is also a prolific research scientist in his own right. He has written over 100 articles that have been published in various science journals.

Shapiro discusses the issue of contradictory processes on pages 182-186 of the book. Basically, the goal was to provide a source of RNA nucleotides for use in the spontaneous formation of a self-replicating molecule. RNA molecules are built of smaller molecules including adenine, cytosine, guanine, uracil, sugar (preferably ribose, which is used in RNA), and phosphate. The processes to form these contradict each other. What is needed to form one destroys the next. So, Shapiro proposed a scheme where separate ponds of water somehow provided different environments, such that each pond would form one of the needed compounds.

Streams then brought these chemicals together and in their proper ratios into another, common pond for mixing. It was in the common pond that RNA nucleotides were formed. Everything had to be "just right."

In summary, Shapiro made the following statement: "Many steps would be required which need different conditions, and therefore different geological locations. The chemicals need for one step may be ruinous to others. The yields are poor, with many undesired products constituting the bulk of the mixture. It would be necessary to invoke some imagined processes to concentrate the important substances and eliminate the contaminants. The total sequence would challenge our credibility, regardless of the time allotted for the process."<sup>10</sup>

I find it interesting that Shapiro, a committed evolutionist but also an informed biochemist, acknowledges that so many contradictory processes are needed to make source RNA nucleotides for use in a self-replicating molecule that their actual historical existence "would challenge our credibility." In other words, he really does not see how it could happen.

I agree with him, but would state it more bluntly: Science teaches us that the practical impact of so many contradictory processes serves to make a natural origin of life impossible.

**Fatal Roadblock Number 7. Odds against a useful sequence of links in a chain in a single try are astronomical.**

The sequence of chemicals used in making the long molecular chains used in living systems is critical. Yet, getting a suitable sequence for a specifically required function using random processes is essentially impossible. This would be true even if all of the raw materials were available and in the right ratios—which they are not. Getting multiple chains sequenced properly becomes impossibly impossible.

We observe from life that frequently a limited number of substitutions of amino acids can take place in an enzyme without destroying its effectiveness. Many introductory biochemistry textbooks will even take a simple enzyme such as cytochrome c and show its amino acid sequences for a number of different plants and animals.<sup>11</sup> They like to claim that these differences represent evidences of chemical evolution. By contrast, I believe the observed variation simply represent instances of a Creator God showing His creativity, showing how many different ways He can accomplish the same task. That He chooses to make sequences closer for related organisms than for distant organisms can be a design choice, having the effects of displaying detailed orderliness and a certain organizational beauty in His creation.

Anyway, it is well established that there are many possible ways to sequence amino acids to produce a desired enzyme shape. Of course, there are many, many more wrong ways than right ways to do a sequence properly.

I would like to show how difficult it is to get a proper enzyme shape. To do this, I will make a number of concessions in favor of chemical evolution. We will see that even with these concessions, getting a proper enzyme sequence is impossible.

We will assume that we do not need to make use of all twenty amino acids defined in the genetic code in order to make up an enzyme, but rather that we could make any desired enzyme using only 6 representative amino acids. Of course, this would not actually work; it is difficult to find a single enzyme of any significant size in a living system that does not use each of the twenty possible amino acids at least once. But, this assumption allows us to compensate for the potentially large number of different amino acid combinations that can be effective in producing a required enzyme shape and does this in a manner very generous to the evolutionists.

We will need **glycine**. Glycine is specifically needed to make sharp bends in enzyme folds. We will want another non-polar amino acid so that water can push it towards the center of an enzyme in making a desired shape, such as **alanine**. We will want an uncharged polar enzyme such as **serine**. We will want an amino acid with a positive charge, such as **lysine**. We will want an amino acid with a negative charge, such as **glutamic acid**. We will want an amino acid with a sulfur atom, such as **cytosine**.

These six amino acids represent basic categories of amino acids. For the purposes of the following calculations, we will assume that the only issue facing us is to get the an amino acid from the correct category into a particular location.

Again, in real life, the situation is much more complicated and restrictive than this. For one thing, this small an assortment does not distinguish between and allow selection between amino acids which favor sheet forming versus coil forming. So, it is not nearly as restrictive as what is actually needed in real life. There is another, equally great problem. In order to make a specific enzyme, the various coils and sheets need to form a precise alignment with each other in order to produce an exact final, product shape. The task of forming coils and sheets from amino acid strings is actually not particularly difficult. A subset of the twenty-commonly used amino acids could easily form coils and sheets. However, the really difficult part in building an enzyme is in getting the coils and sheets to align with each other properly. This is the task which requires the wide variety of amino acids actually used in living systems. It is this characteristic which makes our concession of only one amino acid representing each category an unrealistic oversimplification of what would be needed in a real-life scenario.

Continuing, though, how many possible amino acid sequences are possible with an enzyme made up of 101 instances of our six available amino acids?

It is six times itself 101 times. This can be written in scientific notation as  $= 6^{101}$ . This converts to  $4 \times 10^{70}$ .

This is about the same number as what we showed in Fatal Roadblock Number Two, Early Termination. Since I wrote out the number of zeroes there, I will not do it here. However, the discussion on the significance of that number would also apply here.

Actually, it would be impossible to form the string. Even these six minimal components were not available in Miller's experiment. If you do not have any flour available, you cannot bake a cake.

Enzymes speak a language of coils, sheets, and connecting loops. Six amino acids are not nearly enough to talk in that language. Yet, origin-of-life experiments cannot give us even these six amino acids to work with, even though they have a highly intelligent, well-educated biochemist exercising precise control over the proceedings, making sure everything possible favors success. In a wild, pre-life environment, such a biochemist doesn't exist.

A British scientist named Richard Dawkins wrote a book, *the Blind Watchmaker*, which discussed a process called cumulative selection.<sup>12</sup> It is beyond the scope of this article to discuss his book here. However, there are a number of fatal flaws in his model which makes it entirely irrelevant concerning a discussion of real-life issues. Some of these flaws are mentioned in passing in our discussion on Roadblocks 15. and 16.

So, we have seen that the theoretical odds against getting a useful sequence of 101 amino acids selected was greater than  $10^{70}$ . This number was based on having far fewer choices of amino acids than what are actually needed to form enzyme coils and sheets and loops. Therefore, a more realistic assortment of amino acids to choose from is needed. However, this would result in yet higher odds. Nonetheless, even the proposed assortment had too much variety in too high a concentration to be supplied by a realistic pre-life soup. So, apart from issues of early termination, spurious side chains, the laws of chemical equilibrium, etc., we still cannot properly sequence an enzyme in pre-life conditions. Notice, if we take into account the combined odds against getting an amino acid chain without termination, without cross linking, without chemical equilibrium problems, and with a valid sequence, the results are staggering. The calculated odds against success are now  $10^{1212}$  ( $= 10^{70} \times 10^{152} \times 10^{920} \times 10^{70}$ ). It becomes the combined weight of all of the arguments that becomes so formidable. These horrendous odds are simply the result of the combined effects of some of the more obvious difficulties against natural processes forming a tiny 100-amino acid enzyme.

### **Fatal Roadblock Number 8. Uncontrolled Energy Destroys Existing Order.**

A cell controls application of energy precisely. It has and uses an extremely elaborate mechanism in order to do this. By contrast, origin of Life processes have only uncontrolled energy sources available. Yet, uncontrolled energy sources tend to destroy existing order, not add to it.

I once did an experiment. I used firecrackers to turn the pages of a book. It takes energy to turn the pages of a book, just as it takes energy to join together molecules in an origin-of-life experiment. Now, a firecracker is an uncontrolled energy source. I was indeed able to turn the pages of a book with a firecracker. However, I also blew part of the page out of the book in the process. I would not have been able to turn very many pages of the book in this manner until it would have been completely destroyed.

Likewise, uncontrolled energy sources can easily destroy developing enzymes in a pre-life setting. For instance, suppose that a small chain of amino acids has managed somehow to form. Another amino acid is oriented correctly and heading towards the end of the chain. If it does not have enough energy, it will not join to the chain but will bounce off it. If it has the right amount of energy, within fairly narrow limits, it has the possibility of connecting to the chain. However, if it has significantly more energy than is needed, it will be like the firecracker turning the page of the book. Just as the excess energy of the exploding firecracker damaged the book, the chain can easily

be damaged by the excess energy of the amino acid colliding with it. It is far easier to rip apart a complex molecule using uncontrolled energy sources than it is to add to its complexity in a systematic, orderly manner. This is the underlying problem why the two earlier experiments we looked at could not even get 4 amino acids to join together and stay joined together.

I once tried another experiment. I wanted to see if I could make some amino acids using a mixture of vinegar and ammonia and exposing it to an ultra-violet light source. I completely blackened the sides of a glass jar holding the mixture, except for a narrow slit in order to allow the UV light to enter the jar. I let the UV light source run for three weeks and had absolutely nothing to show for it. I was not surprised, though, because there was a fair amount of reflection within the jar itself, and apparently the reflected UV was sufficient to destroy any amino acids or other compounds that may have formed from that part of the solution directly in the UV light. Just as Miller needed to build a trap into his apparatus in order to collect his amino acids before they were destroyed or became tar, I needed some way to remove any amino acids than might have formed in my setup. I did not have the time to play with the equipment and try various options.

Perhaps I should have also added some hydrogen; its presence seems to help experiments like this. However, then I would have been playing research scientist or design engineer. I would have inadvertently acknowledged how difficult it is for good results to happen spontaneously, without outside interference. The experiments showed me just how difficult it is to actually get an experiment like this to work properly. In reality, in a pre-life setting there would be no scientist around to control how the energy is applied to the solution or how product gets removed from it (unless one acknowledges the existence and workings of some kind of Creator God.) It seems that those who talk as though it would be a trivial matter for life to form spontaneously in a natural setting without any kind of intelligent interference are deluding themselves.

#### **Fatal Roadblock Number 9. No Pre-life Mechanism to Copy Useful Enzymes.**

A single enzyme is not useful for much of anything, even inside a single cell. Instead, multiple copies of enzymes are needed in order to accomplish anything of significance. So, even if a useful enzyme happened to show up through random processes, then how would it be recognized as useful and then copied?

In one sense this is actually two separate roadblocks, since it represents two unrelated issues. Recognition of a useful enzyme sequence is not trivial. In real life, enzymes typically work as part of a team of enzymes. It is not enough to get a useful amino acid sequence and produce a single useful enzyme. That enzyme must also appear in the right time and right place to do some kind of a needed function. Otherwise, even if it is useful and maybe even necessary for some critically required function, the fact that it has not appeared in the right place or the right time for that function makes it essentially worthless. If a university were to send out a single basketball player onto a football field to represent the school in a football game, it would be embarrassing for the school and possibly dangerous for the player. There would be absolutely no way to evaluate how good the basketball player might actually be. He was simply in the wrong place at the wrong time. Indeed,, the same player might lead the school to a national championship when he represented them in basketball and was surrounded by proper players.

Living systems are extremely complicated. It is not enough simply to get required component parts. They need to show up at the right time and in the right situation or they are useless.

So, how does an emerging cell recognize that a randomly formed sequence of amino acids actually has value? If it did recognize this, how does it protect it from being further modified and its usefulness destroyed?

Beyond this there is the issue of how to make copies of an enzyme if it is indeed useful.

In real life, copies of enzymes are made using information that has been placed in RNA or DNA. This information is stored in a specific code. The cell uses approximately 100 or so enzymes and ribozymes in order 1. to extract the information from the DNA, 2. build the required enzymes according to the amino acid sequence coded in the DNA, and 3. to control when the enzyme is built and where it is used.

All of the components of an enzyme copier need to be in place or the system does not work.

1. There needs to be RNA.
2. There needs to be the proper information contained in the RNA.
3. There needs to be a means to copy the RNA for use by future generations.
4. There needs to be a means to convert the stored information into the intended product enzyme.
5. There needs to be a means to control properly the timing of when the enzyme gets built and where it is used.
6. There needs to be a source of controlled energy to drive the whole process.

Missing any part of this process will render the other parts useless.

There is a concept being discussed today called “irreducible complexity.” It is considered by many to represent evidence of Intelligent design. A very clear example of irreducible complexity is the mechanism that a living cell uses in order to extract and use the information contained in the genetic code.

Evolutionists in general acknowledge the seriousness of this problem. Their proposed solution features what is called a self-replicating molecule, a molecule that can make copies of itself. The underlying concept is that after a self-replicating molecule accidentally appears that it can gradually evolve into more and more complex forms. Eventually, cooperating self-replicating molecules would work together. This would lead to complex systems formed by association with other self-replicating molecules, with a gradual development of cooperative specialization. Eventually, these complex systems somehow developed into an actual living cell.

It is important to realize that all of the discussion on self-replicating molecules is nothing more than a fantasy. There is zero physical evidence that it ever existed. It is a fantasy proposed by the evolutionist out of necessity. Why? Because no other mechanism has been thought of in order to get from the products of an experiment such as Miller’s to an actual fully developed living cell.

We will talk about the difficulties of a self-replicating molecule in the discussion for Fatal Roadblock Number 14. Just be assured for now that no origin-of-life experiment has ever produced anything close to a self-replicating molecule and that there is a long list of principles from biochemistry which would lead a rational person to reject the possibility of them ever forming by random chance in a pre-life environment.

This inability to copy anything useful that might show up in the earliest stages of cell development is a fatal roadblock to a natural origin of life.

#### **Fatal Roadblock Number 10. Origin Of Genetic Code** (Arbitrary Selection).

Where did the genetic code come from? The code is simply an abstract sequence of information bits placed into the DNA. At a conceptual level, it is very similar in structure and function to the storage of information bits on a computer’s disk drive. (Author’s note: I worked as a design engineer in Silicon Valley for over two decades. At one point in my career, I was a staff engineer at National Semiconductor Corporation. My responsibilities included the electronic design specification for a disk drive controller chip. This controller determined where on a disk to place segment identification information, start bits, stop bits, and the actual information to be stored in the various information segments (sectors) of a disk drive. Concerning the disk information, there were several available coding formats to store the data, known as FM, MFM, and run-length limited. The controller could write and read the data using any of these formats. I am awed by the similarity in the high-level structure between disk drive storage formats and the genetic code, which also has identification sequences,<sup>13</sup> start bits, stop bits, and a particular format for storing blocks of information.)

Notice, the manner in which information is stored in a disk drive—that is, the use of block identifiers, start bits, stop bits, and a reduction of abstract information into strings of data bits—represents and is the product of years of progressive effort by many different design engineers. It is the product of applied intelligence. When I see how many of these same characteristics have been implemented in the structure of the genetic code and the format in which it stores information, to me the parallel strongly implies that the genetic code is also the work of an intelligent designer.

The genetic code is based on tiny segments of information called codons. A codon consists of three sequential nu-

cleotide bases. There are four bases available for use in a codon. The sequence of bases defines the stored information content. In RNA, the bases are represented by the letters C, G, A, and U. These letters represent the molecules cytosine, guanine, adenine, and uracil. The structure of DNA and RNA is such that a living cell has available an elaborate mechanism capable of extracting the information contained in a sequence of bases.

The three sequential bases in a codon, with four possibilities per position, give a total of 64 possible codons. The following chart shows the relationship between nucleotide base sequence and codon function. Except for start and stop bits, all names represent a specific amino acid defined by the nucleotide base sequence of the codon.

### The Genetic Code

AAA lysine	ACA threonine	GAA glutamic acid	GCA alanine
AAG lysine	ACG threonine	GAG glutamic acid	GCG alanine
AAC asparagine	ACC threonine	GAC aspartic acid	GCU alanine
AAU asparagine	ACU threonine	GAU aspartic acid	GCU alanine
AGA arginine	AUA isoleucine	GGA glycine	GUA valine
AGG arginine	AUG start bit	GGG glycine	GUG valine
AGC serine	AUC isoleucine	GGC glycine	GUC valine
AGU serine	AUU isoleucine	GGU glycine	GUU valine
CAA glycine	CCA proline	UAA stop bit	UCA serine
CAG glycine	CCG proline	UAG stop bit	UCG serine
CAC histidine	CCC proline	UAC tyrosine	UCC serine
CAU histidine	CCU proline	UAU tyrosine	UCU serine
CGA arginine	CUA leucine	UGA stop bit	UUA leucine
CGG arginine	CUG leucine	UGG tryptophan	UUG leucine
CGC arginine	CUC leucine	UGC cysteine	UUC phenylalanine
CGU arginine	CUA leucine	UGU cysteine	UUU phenylalanine

In life, it really does not matter what the code assignment is, except that it needs to be consistent. Any one assignment would work about as well as any other. There is a reason for this. Implementation of the code takes place in certain kinds of molecules called transfer RNA.

It is the structure of the transfer RNA molecule that makes definition of the genetic code arbitrary. Transfer RNA molecules consist of two parts. At one end of the molecule there is the proper chemical structure to recognize a particular codon triplet in RNA. Let's call this end the triplet recognizer. The other end of the molecule has the proper chemical structure to select for a particular amino acid. Let's call this end the amino acid selector.

The important thing is that the various triplet recognizers and amino acid selectors connect to each other in an identical manner. Hence, it is arbitrary concerning which triplet recognizer is associated with which amino acid selector. There is no particular advantage of any one association over another. Yet, it is the choice of association that determines the definition of the genetic code. **By simply rearranging which triplet recognizers are connected to which amino acid selectors, the code definition could easily be changed.**

There needs to be a survival difference between choices in order for natural selection to choose between the best of the two or more alternatives. Yet, we saw that assignment of amino acid codon sequences is arbitrary, there is not any particular advantage of any one choice over any other. Natural selection is ineffective in choosing between equivalent alternatives.

When a design engineer is faced with a set of equivalent choices to implement a particular feature in the course of working out a design, which is a normal, frequent situation, he simply makes an arbitrary decision to use one of the choices and moves on with the design. Since selection in this case is arbitrary, I have coined the term "arbitrary selection" to describe it. Natural selection cannot perform arbitrary selection because there is no difference in survival value between the alternatives.

The identifier bits used by the genetic control mechanism to identify the location of various genes represents another case of arbitrary selection. Normally, the specific choice of identifier bits is not important. However, certain things are critical. 1. The bit pattern must be unique. It must actually be capable of identifying a required gene sequence. 2. The various patterns must be properly embedded at the correct location within the stored information. 3. A control system to use these bits is needed. All three of these items must appear from the very beginning with absolute consistency. Random mutation and natural selection cannot meet these three requirements, because they represent specific assignment. Yet, an intelligent designer would find the task trivial.

Stephen Jay Gould said that if natural selection did not offer an adequate mechanism to account for the development and creation of everything we see in the various forms of life we see around us today, then evolutionary theory is dead.<sup>14</sup> Well, evolutionary theory is dead.

### **Fatal Roadblock Number 11. Information Content of DNA.**

There is an overwhelmingly huge quantity of information in the DNA, even in the simplest living cell capable of independent existence. Where did all this information come from? It is far too complicated and there is far too much of it to be generated by trial and error. This is particularly true considering the time limitations of Roadblock 14.

DNA represents a storage medium, such as a blank CD purchased from the store. Burning information into a CD physically alters its structure. The manner in which the structure is altered represents recoverable information. Notice, though, the distinction. A CD is not information. It is a medium for storing and releasing information. This parallels DNA. DNA represents a storage medium. The ability of a cell to synthesize a long strand of DNA has nothing to do with its information content. That is a separate issue. It turns out that in life, the information is inserted into DNA at the time it is synthesized, like a high volume CD which has its information content stamped into it as part of the manufacturing process. An emerging cell's ability to make DNA would not automatically mean that it also had useful information available to store in it.

Shortly after James Watson and Francis Crick determined that DNA was built in the form of a double helix, Crick discovered what is called the Central Dogma of molecular biology. According to the Central Dogma, DNA makes RNA and RNA makes enzymes and proteins. It is frequently shortened to DNA makes RNA makes proteins.<sup>15</sup>

Notice, this is a one way street. A cell has an extremely elaborate mechanism that it can use to read the information stored in DNA. However, there is no provision within a cell to systematically introduce new information into the DNA in a controlled manner.

According to neo-Darwinian evolution, mutating the codons storing information in a cell's DNA generates new information. However, this process is useless for creating the initial information stream of the first cell. It is useful only for modifying already existing information. As a minimum, the original DNA information must be of sufficient magnitude to provide a "blueprint" for building all of the required components to use the information. One cannot 1. start with a tiny amount of information, generated randomly, 2. gradually increase it over time by means of cycles of mutation and natural selection, and 3. gradually acquire enough information so that eventually it becomes possible to read the information. Yet, in real life, the starting point for this process requires over 100 cooperating enzymes to do this (55 for a bacterial ribosome, at least 20 for transfer RNA molecules, at least 20 transfer RNA synthetases, plus various control enzymes to recognize start bits and identifiers, etc.) It is obvious that if it takes over 100 cooperating, interrelated enzymes to read initial information, these enzymes need to appear at the same time as the information. One is useless without the other.

This actually represents a huge quantity of components for an initial minimum. This is discussed further in the next roadblock.

The reality is that there is no rational, materialistic explanation of how to place into DNA initial information, par-

ticularly in the huge quantity required. Mutation and natural selection can only modify existing information; it cannot generate initial information. However, this would be a trivial task for a Creator God.

### **Fatal Roadblock Number 12. Information is Useless Without A Decoder.**

This is the counterpart to the previous fatal roadblock. An already living cell uses an extremely complicated decoding system to extract information from RNA, as we discussed in the previous roadblock. Just a partial accounting of the essential functions of a decoding system is implemented in life by over 100 enzymes.

Evolutionists may speculate that an earlier system would not have required this degree of complexity. Well, what would the minimum complexity be? We need enough kinds of amino acids to make both enzyme sheets and coils and loops. Six is not enough. Yet, even such an inadequate system would still require the simultaneous appearance of six species of transfer RNA molecules, one for each amino acid, plus six transfer RNA promoters (enzymes which fasten a particular amino acid to its associated transfer RNA molecule), and something to serve as a ribosome. Suppose we allot ten enzymes to the ribosome function, which, considering the complexity of a ribosome, is rationally unreasonably low. Then we are still looking at at least 22 enzymes that need to show up simultaneously with the appearance of sufficient information in the DNA to build them. In reality, a system such as this is not complex enough to make the sheets, coils, and loops of the enzymes to make an information decoder. Yet, without the simultaneous appearance of an adequate information decoder and the information to specify its construction, physical life cannot exist. Mutation and natural selection cannot be used to generate this initial quantity of information.

Notice, evolutionists talk about self-replicating molecules as being the first step towards getting a living cell. We will discuss self-replicating molecules in the next roadblock. However, it is worth pointing out that even if a self-replicating molecule could be formed under origin-of-life conditions, which it can't, the gap between it and a true information based copying system is essentially infinite. Evolutionists gloss over the size of this gap and simply state as fact that once self-replication got underway, everything else would be automatic. That is the equivalent of believing a fairy tale. We have already talked about how the genetic code, an extensive body of information based on it, and many, many specialized components need to come about in a single step. It represents an irreducibly complex system. None of the components have any value without the presence of all of the others. Furthermore, arbitrary selection, not natural selection, needs to be used to make many of the design choices. Thus, the detailed observations we learn from science teach us that natural selection and slow gradual processes do not provide adequate means to jump the gap from a self-replicating molecule to an information-based system.

Being unable to use any information that might accidentally form before a decoder exists to interpret the information is a fatal roadblock to a natural formation of life.

### **Fatal Roadblock Number 13. The Fantasy of Self-Replication.**

There is a natural inability for a **single** molecule to do **all** of the steps necessary to copy itself.

There is a serious problem facing the evolutionist. In discussing the earlier roadblocks, we have seen how difficult it would be to get a single enzyme to appear spontaneously out of a pre-life soup. Yet, getting a single molecule means nothing. There also needs to be a mechanism to copy the enzyme if it did form. Yet, enzyme-copying mechanisms are elaborate and most evolutionists will acknowledge the unreasonableness of getting an elaborate copying mechanism to appear in a single-step.

However, if a molecule could accidentally form that could make copies of itself, using the raw materials available to it, then this seems more reasonable. Such a molecule is called a "self-replicating molecule." Self-replicating molecules of various kinds can be created by a biochemist in a laboratory. The goal is to find one that could reasonably have formed out of the raw materials of a pre-life soup.

Enzymes do not have the ability to store information. Storage is a task more compatible with the characteristics of RNA and DNA. However, RNA strings can both act as enzymes and store information. Therefore, it seems that if there were a string of RNA that could copy itself, it would solve the problem. Both enzymatic and information

storage tasks would be accomplished in a single molecule.

Therefore, the appearance of an RNA-based self-replicating molecule at an early stage in the development of the first cell seems to be an essential step towards a natural origin of life. To those who accept evolution by faith, it becomes so critical for life to have gone through the self-replicating molecule stage of development that the issue is not if it happened, but rather the particular manner in which it happened.

We should not forget, though, that the notion of an RNA nucleotide-rich soup contradicts the things we have learned from observation. As we discussed in Roadblock 6, Contradictory Processes, there is no known means for viable natural processes to form a soup containing a high concentration of RNA nucleotides. Without appropriate raw materials as a feed stock, the target RNA self-replicator could not form.

I was participating in an Internet discussion group on some of these issues once. One of the participants in the group was taking issue with my arguments and position. He said that tremendous strides had taken place in the laboratory concerning self-replicating molecules, showing how simple it would have been for them to have formed on an ancient, pre-life earth. Oh, how I wished he would have read the journals instead of just listened to and believed the empty rhetoric from an evolutionary salesman. Just how far have we actually progressed in the laboratory concerning self-replicating molecule experiments?

In 2002, the National Academy of Sciences featured an article on a self-replicating molecule.<sup>16</sup> This article is only six years old and was published by a prestigious organization. Hence, it may be considered representative of fairly recent state-of-the-art in self-replication theory and experimentation.

This article reported on an experiment. A solution containing RNA strings composed of a specific 48-nucleotide sequence was purchased from a biochemical supply house. A second solution composed of RNA strings of a different, 13-nucleotide sequence was purchased from a different supplier.

The goal of the experiment was for these two kinds of strings to join together on a template to produce a third string comprised of 61 RNA nucleotides. This third string would be chemically identical to the template and could serve as a template for future repetitions of the process.

When the solutions from the suppliers were mixed together along with some template seeds for starting the process, it was found that new instances of the third, template string appeared in the solution. The conclusion was that the template was self-replicating, that it was able to make copies of itself using the raw materials of the solution.

It was amazing to me to see that this experiment was considered noteworthy. The problems with it should be self-evident.

1. In a pre-life situation there would be no supply houses to serve as a source for these extremely long, very complicated molecules. This experiment has nothing to do with real life.
2. There were no potential cross linkers or spurious side chain formers in the solution. It would have been much more interesting to hear about the results if lots of formic acid, vinegar, sugars, alcohols, ammonia, and other active chemicals had been in the solution, and in a realistic proportionality to what one would rationally expect to find in real life.

The situation was kind of like a football game with only one team on the field. During workouts, a coach may drill a team in the plays he wants it to learn and he might not have any defensive players on the field while the plays are being practiced. Scores made under these conditions bear no relationship to a team's ability to score in a true game situation. The same applies to origin of life experiments done without potential terminators and spurious cross linkers in the solution. The typical response of an evolutionist to this kind of criticism is to claim that adding these "contaminants" would greatly increase the amount of time required to get the target reaction. Realistically, the contaminants would be more likely to turn everything to tar and to stop progress altogether. More time would only mean more tar. This is certainly what happens during modern origin-of-life experiments, as we have already discussed.

3. I was surprised that the goal of the experiment was merely to join together two extremely long, already sequenced strings of RNA. It would be much more interesting to put an RNA template into a soup of RNA nucleotides, amino acids, various terminators, and various active ammonia compounds along with some kind of uncontrolled energy source and then observe what happens. This would at least be a more realistic modeling of the real world, not just a laboratory curiosity.

4. Even at this the experiment did not work as planned. In order to get good results, some seeds of the template were mixed with only one of the RNA strings; the other needed to be absent. Then, when the second string was added, the reaction proceeded. However, if the two strings were added to each other without a template, they quickly joined to each other in a non-useful random manner and only slowly came apart to fasten to a template. Again, if real life contaminants had been in the solution, they probably would also have combined with the randomly joined RNA strings and the whole mess would have headed straight to the goo.

In one sense as a creationist I like this experiment. It shows just how remote a possibility it would be to actually get a self-replicating molecule in pre-life conditions. There is no known viable mechanism to get an RNA nucleotide soup, and the experimenters started with a 48-nucleotide base RNA string. The gap between the experiment and pre-life conditions is overwhelming. The accomplished results are not.

It amazes me that the National Academy of Sciences thought this experiment significant enough to publish the results. It appeared more effective in documenting the sorry state of self-replication art than to confirm its reasonableness.

Now, if one could start with raw materials such as Stanley Miller used in his experiment, form a soup from them, and then form a self-replicating molecule from the unmodified contents of the soup, that might have some validity. This would not prove that it was the way the things happened historically, but at least it would demonstrate such a possibility.

However, to do this would go against so many fundamental processes of science that no one expects it to happen. No self-replicating experiments start at the level of Miller's experiment or its equivalent. It is known and understood that if this were done, tar and not self-replicating molecules would be the result.

I wish evolutionists would talk about these kinds of things, instead of presenting their fairy-tales as scientific fact.

The laws of science teach against the practical possibility of a self-replicating molecule forming in a pre-life environment.

#### **Fatal Roadblock Number 14. Chiral Instability.**

Evolutionists like to talk as though there were tens of millions of years available to make the progression from the appearance of the first enzymes or self-replicating molecules until the first fully developed cell appears. However, this is only wishful thinking. An issue called chiral instability reduces this down to something closer to thirty years. This is far, far too short a period of time for evolutionary processes to create a fully developed cell in the wild from scratch. By comparison, it has already been over fifty years since 1952, when Stanley Miller first did his spark chamber experiment.

Most biological chemicals appear in mirror image forms, called left-handed and right handed. This characteristic is called "chirality." Most amino acids have this characteristic and this presents a problem. Enzymes are made of coils and sheets formed out of a single, continuous string of amino acids. These amino acids are normally in the "left-handed" form. All it takes is for a single right-handed amino acid to be placed in a sheet or coil, and it will force the coil out of its proper shape. The ripple effect will destroy the shape of the entire enzyme, rendering it useless.

The problem is that some of the most common amino acids spontaneously flip from one form to the other in a relatively short period of time. As we shall see, this has a major impact on the maximum time available for chemical

evolution to produce a fully functioning cell. The maximum time is reduced from the tens or hundreds of millions of years proposed by evolutionists down to about 30 years. This is a significant issue.

A recent article in the Biological Pharmaceutical Bulletin discussed how the accumulation of enzymes that have flipped chirality can affect a person's health in only a few years. So, this is not just a theoretical problem, it is an issue that affects the health of every senior citizen. Here are some key points taken from the article, reworded for simplicity:<sup>17</sup>

Aspartic acid is an amino acid which, like other amino acids, is always in the left-hand form whenever it appears in a newly formed enzyme. Recently, however, right-handed forms have been detected in various human tissues such as eye lenses, brain, teeth, skin, bone, aorta, erythrocytes, lung, and ligaments from elderly individuals. Also the right-handed forms of two amino acids, serine and aspartic acid, were found in certain brain tissues in patients with Alzheimer's disease.

Aspartic acid in human tooth enamel was found to flip its chiral form at a rate equal to 1 out of every 1,200 molecules per year. Thus, any protein (or enzyme) molecule that lasts a long lifetime in the body will accumulate right-handed aspartic acid molecules with age. For instance, about 8% of the total aspartic acid in tooth enamel will be in the right-handed form after 60 years. Therefore, right-handed amino acids in proteins can be interpreted as molecular markers of aging.

It is well known that deposits of what is called "b -amyloid protein" in the brain causes Alzheimer's disease. Analysis of the problem proteins revealed the presence of a significant amount of right-handed amino acids. Proteins with these right-handed amino acids have a greater tendency to aggregate (form tar) than those without them.

Recently, the authors of the article found right-handed aspartic acid molecules in the elastic fibers of skin from elderly donors. By contrast, only left-handed molecules were found in young people and in skin tissues not exposed to the sun. These results suggest that the accumulation of right-handed molecules of aspartic acid is accelerated by exposure to sunlight and that the exceptional protein accumulates in aged skin during UV-related aging.

Let's interpret the significance of the above items that were presented in the journal. Most cells in the body have a maintenance system that regularly replaces the enzymes in the cell. Normally, all the amino acids in a cell will be replaced within any seven-year span. There are a number of issues that can degrade the quality of a protein or an enzyme. Spontaneous hydrolysis, spurious cross-linking, and chiral flips are among these. As long as the maintenance system can stay ahead of the degradation, the cell remains healthy. However, there is some indication that a person's maintenance system slows down as he ages. In addition, sometimes a maintenance system can be overwhelmed by other problems which develop. Either of these problems can result in degraded enzymes accumulating. This in turn can kill a cell.

For instance, it appears that Alzheimer's is actually a result of an improperly functioning maintenance system. Whether the problem is due to the maintenance system itself or something else which overwhelms the maintenance system is currently not understood. Because of chiral instability, enzymes will spontaneously degrade. These destroyed enzymes then will accumulate, aggregate, and become tar, even as the article mentioned happens in Alzheimer's patients. If the tar is not removed from the cell, the cell dies.

Of course, our concern is not Alzheimer's disease. Rather, it is the impact of chiral changes in an origin-of-life scenario. A cellular maintenance system is extremely complicated. It cannot exist in a cell until all of the other features are available and working properly, such as raw information, information decoding systems, reproduction, energy metabolism, cell-membranes, etc. As people age, it seems that the cellular maintenance system is one of the first components of a cell to function inadequately. This is a measure of the complexity of physical life.

If the maintenance system does not keep up with the rate at which proteins get damaged, then defective enzymes begin to accumulate in the cell and form tar deposits. After two or three decades, these damaged enzymes can kill the cell.

The significance for us is that the issue of chiral instability places a maximum time allowable for an emerging cell in an origin of life scenario to develop a maintenance system.

A typical enzyme in a living system ranges from 200 to 1,000 amino acids. Let's consider a 400-amino acid enzyme, which is simply an average-sized, ordinary enzyme. Aspartic acid, the most rapid flipper, averages about 5% of enzyme content. This means that our 400-amino acid enzyme will have about 20 aspartic acid molecules in it. If only one of these 20 molecules flips its chiral form, the enzyme will be destroyed. Thus, each year about 2% of these enzymes will be destroyed by an aspartic acid change. After thirty years, about half of these enzymes will have been added to the tar. Currently it is not known what fraction of accumulated, degraded enzymes it takes to kill a cell. However, excessive tar does kill cells, as has been observed in Alzheimer's patients.

If in thirty years about half of the normal-sized enzymes in a cell are destroyed by tar, then it seems that thirty years would be about the maximum time a cell could survive—unless it has a means to remove the tar. This means that an emerging first cell has about thirty years from the time it first starts assembling random components together until it has progressed sufficiently far in its development to provide a maintenance system capable of removing degraded (denatured) enzymes.

So, if in an origin-of-life scenario, an emerging first cell had acquired everything with the exception of a maintenance system capable of dealing with chiral instability, how long could such a cell survive? Although it is difficult to compute exactly, based on the things we currently understand, the period is probably not more than about thirty years.

Thirty years is certainly way too short a period of time for an emerging cell to progress from a random collection of chemicals to an organized cell, complete with DNA and information in the DNA. It is too short to evolve the roughly 2,000 unique enzymes needed to do everything required for an isolated cell to sustain independent life in the wild.

Forget the millions of years that evolutionists talk about as being available to develop the first cell. The actual maximum period, from start to finish including a maintenance system, is more realistically about thirty years. Evolution is presented as a slow, gradual process. Chiral instability does not allow slow, gradual processes to be used. Thus, effectively all of a cell's components form in a single step. Only a Creator God can make a cell with all of its organizational complexity in a single step. Science points to a Creator God as the source of life.

### **Fatal Roadblock Number 15. Initial Functionality Is A Single-step Process.**

Natural selection is useless to choose between the best of two failures. The first appearance of anything completely new must therefore be a single-step process.

When I was reading Dawkins *Blind Watchmaker*, I was struck by an obvious discrepancy between the model he proposed and real life. This is the problem. Dawkins claimed he was mimicking natural selection by picking which of two sequences was the closest to a target, when neither of the alternatives came close to meeting the functional requirements of the target. In other words, as far as the target was concerned, both sequences would have been complete failures.

Notice, natural selection is useless to pick which of two enzyme sequences is closest to matching a needed sequence, if neither of the choices available has any capacity at all to function in the manner needed.

Natural selection really does not care about the details of how an enzyme is sequenced. It only cares about behaviors that are "expressed," that is, that actually affect an organism's functionality.

Let's give an illustration. Every living cell—with the exception of certain anaerobic bacteria—uses the citric acid cycle as part of its mechanism for burning fuel to generate controlled energy for use by cell components and processes. This applies to bacteria. It applies to plants. It applies to animals. At a certain step in the citric acid cycle an enzyme called succinate dehydrogenase controls activity.

At this particular step it is necessary to remove two hydrogen atoms from specific locations of the molecule being burned for energy. A double bond between two specific carbon atoms then takes the place of the hydrogen atoms. Succinate dehydrogenase is the enzyme that performs this two-fold function.

Removing the hydrogen atoms and creating the carbon double bond is a complicated task. It is so complicated that in real life, it requires a 1,100-amino acid enzyme to perform it; the number varies only slightly between species whether one considers bacteria or oak trees or elephants.

This is the critical concept to understand. There is no value for an enzyme to have an amino acid sequence which almost allows it to function if it is, nonetheless, inadequate. For instance, consider the step of the citric acid cycle that requires an enzyme to remove two hydrogen atoms and insert a double carbon bond in a certain molecule. Either an enzyme does this to some acceptable degree or it does not do it. This is a very exacting, very specialized function. Very few amino acid sequences out of the total number of possible amino acid sequences will be capable of producing an enzyme that can perform this task with any measurable degree of success. For a large enzyme, this number is effectively infinitesimal.

**Natural selection is incapable of improving on an early form of succinate dehydrogenase unless and until it already works to some degree. Therefore, getting this initial degree of functionality is a single-step process. It is critically important to understand this statement and the reasons behind it. If this statement is true, then evolutionary theory is dead.**

In our earlier discussions, we talked about the effective impossibility of piecing together a tiny enzyme of only 101 amino acids. The mathematical odds against it were overwhelming. Early termination, spurious side chains, chemical equilibrium issues, the difficulties of getting a usable amino acid sequence, all become mind boggling when one thinks about a 1,100<sup>+</sup>-amino acid enzyme such as succinate dehydrogenase.

Furthermore, it is not even sufficient to get the first appearance of some form of succinate dehydrogenase in a single step. All of the control mechanisms to use it properly also need to show up at the same time. In a cell, enzymes that work cooperatively to perform a specific function, such as turning a sugar molecule into a usable form of energy, are typically arranged next to each other in proper sequence. They mimic the layout of workstations of a well-designed assembly line in a factory. So, the first time some version of succinate dehydrogenase shows up in some early form of an emerging cell, it also needs to be positioned correctly in the internal assembly line, next to other enzymes do neighboring steps of the cycle.

An enzyme sequence could be very close to something that works. Many times changing a single amino acid can completely change the shape of an enzyme, ruining its functionality. However, before natural selection can begin to improve on it, it has to work effectively to some degree. Suppose there was an amino acid sequence that was only one or two amino acids away from performing the function of succinate dehydrogenase properly. Yet, because of a few critical, errant amino acids the shape expressed by this sequence was completely wrong and offered none of the required enzyme functionality. Suppose there was another enzyme sequence that had nothing to do with the required enzyme functionality and was not close to it in any manner. Since both sequences produce failures, natural selection cannot tell them apart. Therefore, the first appearance of anything completely new is a single-step process.

A single-celled bacterium capable of sustaining life in the wild totally independently of other organisms typically has about 2,000 different enzymes, almost every one of which is critically required and almost every one of which works in cooperation with other enzymes as they together perform some specific, critical function.

So, we have an interesting situation. Once it is acknowledged that the first appearance of something new is a single-step process, then there is a ripple effect that requires the entire cell to appear as a single step.

Essentially every function in a cell depends on all of the other functions of the cell to work properly in order for it to work properly. Energy processors, information decoders, reproductive mechanisms, cell maintenance systems, cell membranes, and so on, as well as the proper mechanisms to control them, are all mutually dependent on each

other's successful functioning for their own survival as well as their ability to contribute beneficially. Therefore, the initial appearance of each of the 2,000 enzymes ripples into a gigantic single-step process for the entire system.

In summary, there exist large enzymes in a cell that perform very specific, extremely specialized tasks as steps in some sort of complex process. The initial appearance of these enzymes is single step because there is no value in having an amino acid sequence that is extremely close to one which is capable of working but which, nonetheless still does not. In an enzyme of 1,136 amino acids, if a person were to get 1,130 of them to match a sequence which functions properly, but the remaining six destroyed the ability of the enzyme to acquire the required structure, then the sequence is useless. Natural selection cannot distinguish it from an alternative having only 6 that match and 1,130 that do not. Dawkins's model in *The Blind Watchmaker* breaks down at this point. Initial functionality is single step.

Yet, having only one component of a complicated process is useless. It is like having only some of the parts needed to build an airplane. The ripple effects of this ultimately require the entire first cell to be created as a single step.

Evolutionary theory is dead. The data of science points to and requires a Creator God as the source of life.

### **Fatal Roadblock Number 16. Jerky Relationship between Amino Acid Sequence and Enzyme Shape.**

Enzymes are long chains of amino acids. However, the relationship between amino acid sequence and enzyme shape is not a smooth relationship, but is "jerky" and erratic.

Suppose a specific enzyme is needed to perform a new, specific function. You cannot change an existing enzyme shape into an arbitrary, new target shape by making smooth gradual changes, one amino acid at a time, such that each change produces a shape closer to the target than the preceding one. There will inevitably be steps somewhere along the way where an amino acid change needs to be made in order to produce the final target shape, but which results in a disruptive change in the immediate shape of the enzyme.

For example, Enzymes are made of coils and sheets. Suppose an existing enzyme with a particular shape has 6 coils and 4 sheets. We mentioned earlier that coils average about 10 amino acids each and sheets about 36 each, although tremendous variation in this is possible, both smaller and larger.

The desire is to change this enzyme into a new shape by eliminating one of the sheets and using the sequence of amino acids that formed it to form two more coils plus some loops. Suppose the existing enzyme uses about 220 amino acids and the new one will have 180 amino acids in common with the old one. 40 amino acids need to be changed to make the transformation.

According to the principle of cumulative selection presented by Dawkins, it will take an average of only 18,826 mutative events to the enzyme to effect the change. That seems trivial compared to the astronomical numbers we have been looking at. But, is it really so simple?

Here is the problem. Dawkins's methodology assumed that every time a mutated enzyme was even a single amino acid closer in sequence to the final target than its unmutated parent, that there would also be a selective advantage to the mutation. In real life, it does not work this way at all.

Changing one amino acid in a sheet will not make that portion of the enzyme begin to function like a coil. Thus, there is no selection advantage to implement it. Nor will two or even three changes be adequate to give an advantage. However, at a certain point before a new coil can be formed and properly positioned, the sheet will fall apart into a "nonsense structure." It will be neither a sheet nor a coil. This will be so disruptive that the entire enzyme will fold into a useless shape, not effective in either its old function or new function.

So, there is a problem. A required change to match the new sequence was implemented by a new mutation. However, this change was so disruptive to the enzyme's immediate shape that the enzyme was useful in neither its old nor new capacity. Therefore, natural selection will select away from the change. The new amino acid sequence

was closer to the target, but the shape was further. Natural selection will then eliminate a specific change needed for overall progress. **So, in this case, natural selection is not the friend of evolution, it is its enemy. It prevents progress.**

Here is where Dawkins went wrong in *The Blind Watchmaker*. Dawkins did not recognize that the relationship between amino acid sequence and enzyme shape is jerky, it is discontinuous, it is not smooth. He treated it as though it were smooth.

The above observation has far reaching consequences. If there exists an inherent quality in enzyme structure that systematically causes natural selection to select away from required steps to transform one enzyme into a significantly new one and different one, evolutionary theory breaks down. The discontinuous nature of enzyme shape is sufficient to effect such a break down. The first cell cannot have evolved from a soup. Reptiles cannot have evolved into mammals.

To restate the issue: if it is impossible to change one enzyme into another, one amino acid at a time, while also having a selection advantage driving every step of the transformation, then macro-evolution is impossible. Building the first cell is impossible.

The underlying value of having a self-replicating molecule was to provide a first step of information and copying, one that could eventually become the seed of a cumulative selection process. Once it was underway, it would be straightforward to make all kinds of new products with little effort. What we have just observed about enzyme discontinuity, though, effectively prevents this from happening. Instead, there is such a huge gap between a self-replicating molecule and a living cell that the existence of a self-replicating molecule would be irrelevant. It would be useless.

It appears that the jerky relationship between amino acid sequence and enzyme shape effectively requires an enzyme to be sequenced properly in a single step. Consider an enzyme as complex as the 1,100<sup>+</sup>-amino acid succinate dehydrogenase. It is far too complicated to create by natural processes in a random, single-step event. It is far too complicated to form its strings and coils and loops one amino acid at a time from an unrelated enzyme. In short, science can tell us why it should not exist. It cannot tell us why it does exist.

The things we observe from science make a purely natural origin of life impossible. Hence, the origin of life must come from a source greater than the universe and which is not bound by its laws. The existence of physical life points to and requires the existence of a living, Creator God.

## **17. Other Fatal Roadblocks.**

**1. Problem of phosphorous.** Phosphorous is an essential mineral used in living systems. It serves as the controlled energy source for cell metabolism, as cells use the energy in ATP and release ADP. It provides the backbone for RNA and DNA. However, very, very little phosphorous is available in water solutions. It tends immediately to combine with any calcium and precipitate out. Unfortunately, calcium tends to be an abundant mineral in natural sources of water. In fact, relatively little amounts of life are in the center of the oceans, specifically as a result of the limited phosphorous available in the water far from shore. In real life, plants extract phosphorous from the soil. Animals get their phosphorous from plants. However, in an origin-of-life scenario, before cells had developed sufficiently to extract their own phosphorous, there would effectively be none available for them to use.

Hence, there would not be sufficient phosphorous to make an RNA-nucleotide soup. This also presents another potentially serious roadblock for the formation of self-replicating molecules.

**2. The issues of start and stop bits in the genetic code as well as gene identifying information** were mentioned in passing in the discussion of earlier fatal roadblocks. However, they are worthy of being their own set of roadblocks. Notice, it is extremely critical to identify properly the exact starting location in the DNA of an enzyme/ amino acid sequence. Starting in the wrong place would guarantee a wrong shape.

Likewise, if an enzyme under formation does not stop adding amino acids when it has reached its full size, it will

ultimately end up with a wrong shape. So, a useful means of terminating the enzyme formation process needs to exist. Furthermore, the body of information in the DNA to build an enzyme must be marked with this means.

Identification and control information also needs to be imbedded in the information. In fact, some of the identification information is actually used as part of the “start” process, in that misaligned sequences could easily generate false start bits but they are much less likely to generate both false start bits and false identification information.

So, information is useless and cannot be formed in DNA until a mechanism for implementing 1. start bits, 2. stop bits, and 3. identification/control information is already in place. The choice of mechanisms to perform these tasks is characteristic of arbitrary selection. Lots of equivalent options are available and lots of different components need to use the selected mechanism from the beginning. The body of stored information must also be consistent with the choice of mechanism.

The three items actually represent three more roadblocks.

**3. No adequate source of positively charged amino acids.** Stanley Miller fairly recently (2003) said, “I do not think that there is yet a good prebiotic synthesis of arginine, lysine, and histidine, and of other biochemical compounds.”<sup>18</sup> On the surface, this statement may not sound serious. However, these three amino acids are the only positively-charge amino acids used in living systems. The existence of at least one of them or some fourth equivalent is essential to the ability of making stable enzymes of a proper shape. In real life, an analysis based on the average distribution of amino acids across a wide variety and large number of living organisms revealed that about one out of every 8 amino acids used in an enzyme is selected from among these three.<sup>19</sup> That represents significant, extensive usage. After 50 years of brilliant scientists trying to use every imaginable combination of energy, temperature, and ratio of all kinds of raw materials, they still can’t make any of these amino acids appear with any significance. To claim that their appearance in useful concentrations would be “inevitable” under uncontrolled conditions in a pre-life environment talks against experimental observation. Yet, life as we know it cannot exist without them.

**4. Entropy, self-organizing systems, and Prigogine’s fatal flaw.** Random changes to an organized system tend to destroy the order that exists. This principle is called entropy. Perhaps the clearest example of entropy is the effect of a two-year old toddler left alone in a room which has lots of different things in it but starts off neat and tidy. As the child randomly rearranges things, he messes it up. This is entropy in action.

Creationists like to talk about how entropy presents a barrier to evolution. Random mutations destroy order. Furthermore, they will destroy it faster than natural selection can fix it. Therefore, living systems today are going downhill, not advancing.

Emil Prigogine is an evolutionist who seemed to have found the solution to this dilemma. He won the Nobel Prize in 1978 for his study of thermodynamic systems out of equilibrium. The bottom line of his work is that entropy does not apply to certain aspects of systems that are not in equilibrium. Self-organization can occur in these systems.

We can see self organization at work in weather systems. For instance, a mass of cold, dry air can be clear and stable. A mass of warm, humid air can be clear and stable. If the systems are moving and if the warm air flows over the cold air, the conditions remain stable. However, if the cold air flows over the warm air, something happens. The warmer air is lighter than the colder air, so it starts to rise. As it rises, it cools off. As it cools off, the moisture in it condenses and rain start to fall. If the difference in temperatures and humidity between the two air masses are great enough, a long line of thunderstorms called a squall line can develop. Tornadoes can even form in the squall line. Hail can form.

A thunderstorm containing a tornado or two represents organization. Where did this organization come from?

Prigogine showed that when a system which consists of a collection of many independent, interacting particles is out of equilibrium, self-organization an occur: “A non-equilibrium system may evolve spontaneously to a state of *increased complexity*.”<sup>20</sup> This is what happens in a thunderstorm.

Prigogine also demonstrated that the observed self-organization is the result of certain kinds of resonances developing between the interacting particles.<sup>21</sup>

However, Prigogine went too far. He tried to apply self-organization as a means to overcome the problem of entropy in the origin of life. However, in doing this, he overlooked a major, but obvious fact:

**Resonance does not generate information.**

Living systems are information based. It is true that there is a limited degree of self-organization produced in a thunderstorm. However, a thunderstorm does not generate information. If resonance does not generate information, then the natural limitations on self-organization keep it from being adequate to be useful in an origin-of-life scenario.

To illustrate the problem: To a lesser extent, the formation of various cloud shapes on a spring day represents a degree of self-organization. In my lifetime, I have seen many shapes by many clouds. Most of them seem to look like animals, ranging from ducks to monsters. I have also occasionally observed a commercial skywriter. A skilled acrobatic pilot in an acrobatic airplane would fly in various loops and lines in the sky, releasing smoke at critical points. Ultimately, he would spell out several words. Perhaps it might have been the name of a politician running for office or the name of a local car dealership having a sale. At any rate, the smoke trails were more than just interesting shapes made by a skillful pilot who was fun to watch. They also contained information. I could read a name. By contrast, I have never seen the name of a politician or car dealer spelled out by puffy clouds on a spring day. The clouds simply do not contain a body of information unrelated to their structure and function.

The gap between the organization of a thunderstorm and an information-based living system is huge. It is too huge for resonance-based self-organized systems to overcome.

Entropy is still a fatal principle to evolution.

**5. The large size of typical enzymes in a cell.** Evolutionists are aware of the statistical problems against putting together useful enzymes through chance processes. Usually, they either ignore them or make a feeble effort to explain them away. The most typical efforts to explain them away are to claim that in an origin-of-life scenario, an enzyme could still be effective even if it were significantly smaller than what we see in cells today. Sizes ranging anywhere from ten to forty amino acids for an emerging enzyme are sometimes talked about. The justification for this is the observation that the actual active area of an enzyme typically uses only a few amino acids. Therefore, a few amino acids are all that are really required.

Of course, this is nonsense. To claim that the active area of an enzyme is its only important part is the equivalent of claiming that a piston is the only important part in an automobile engine. The piston has no meaning without a cylinder to contain it, etc. The active area of an enzyme has to be of an exact, precise shape and amino acid composition. However, the enzyme is built of sheets and coils. There need to be enough sheets and coils of the appropriate composition such that when they come together, the appropriate active area is formed.

Notice, in living systems today these proposed small enzymes simply do not exist. Yet, bacteria have been found to be extremely efficient at getting rid of useless structures. If it were possible to have effective enzymes of only ten to 40 amino acids, bacteria should be characterized by many examples of these kinds of enzymes. But they aren't.

By contrast, consider succinate dehydrogenase again. This enzyme is found in every living cell, with the exception of a few kinds of anaerobic bacteria. Yet, it takes over 1,100 amino acids to make this enzyme. Where did this enzyme come from? There is no selection value in forming it until it already exists. Hence, there is no rational means for it to evolve into its current form. If something simpler than an 1,100 amino acid enzyme would work, one would expect that at least some bacteria would show us such an alternative. But they don't.

The large sizes of the actual enzymes used in living systems is problematic.

I started off with a list of about 8 roadblocks. This expanded to 16 when I first wrote the pamphlet. I keep finding

new ones. I haven't even written down many of them I have thought of. A person skilled and knowledgeable in biochemistry should be able to add to this list easily if he wanted to and put any effort into it. The Bible teaches us that these roadblocks are here by design. God deliberately made them so that a person who is unwilling to acknowledge Him as Creator would be without excuse.

## **Chapter 4. Limitations On Natural Selection.**

Evolutionists speak as though natural selection is adequate as an effective means to account for evolution and is always evolution's friend. However, in the earlier discussions over some of the earlier roadblocks, we showed that this was not always the case. We will now bring together the various issues involving problems with natural selection and add a few more.

### **1. Natural Selection Cannot Choose Between The Best Of Two Failures.**

For discussion, see Fatal Roadblock 15. Initial Functionality Is A Single-step Process.

### **2. Natural Selection Cannot Choose Towards A Target Before A Target Exists.**

Evolutionists like to claim that evolution is a random wanderer, that it has no real target. It can look back to see where it went but cannot predict where it is going.

These words sound impressive, but they are nonsense. Any function that requires multiple components to work properly has as a target getting the last few members to work with the previous ones. Almost anywhere one looks in cell structure, he finds examples of where this would apply.

For instance, most birds do not have oil glands for their feathers, but ducks and geese do. The development of an oil gland becomes a target for a bird spending time in the water.

At the molecular level whenever several enzymes are implementing a complicated process such as the citric acid cycle, providing for any missing steps becomes a target. For instance, at a certain point the enzymes processing energy in a cell need an enzyme such as succinate dehydrogenase to carry out certain critical steps in order to work properly. Getting such an enzyme becomes a target.

However, natural selection cannot select towards a target before the target exists. This becomes most critical when a large number of components need to work in a cooperative manner, such that all of them need to show up simultaneously. In fact, this is the underlying principle upon which the argument of irreducible complexity is built.

There is a big gap between a generalized need and turning that need into a group of specific tasks capable of meeting the need. In fact, professional design engineers make a living using experience and creativity to do this very thing, it is what their job is about. Evolutionists like to think in general terms, that if a high-level function needs to be performed, natural selection will somehow mysteriously figure out how to do it. This is naive. Converting a general need into specific steps is what design is all about. There is no such thing as a generalized enzyme to burn sugar and transform it into a controlled bit of energy that a cell can use.

Instead, a general requirement needs to be defined by a series of interlocked, cooperating tasks and then the components need to be formed and synchronized with each other to meet these tasks.

Geneticists talk about a term called "survival advantage." Natural selection can work only where a difference in survival advantage exists between alternative choices. However, there is no survival advantage for the various components capable of performing a new function until enough components show up at the same time to allow the function to be met to a minimum degree. An elephant does not need feathers.

### **3. Natural Selection Works Against Progress, Not For It, Where Progress Is Discontinuous.**

See the discussion under Fatal Roadblock 16, Jerky Relationship.

### **4. Natural Selection Is Ineffective If Too Many Issues Appear Simultaneously.**

Statistical geneticists like to talk about a term called "survival advantage." This number represents how much of an advantage a particular trait has for its possessors. However, there is a limit to the number of different simulta-

neous improvements that can take place at a time. Otherwise, they get lost in the statistical “noise.”

“As the number of mutations increases, [excluding extremely harmful mutations which result in still births], the individual mutation effect becomes less and less significant, and the efficacy of selection for each one approaches zero.... Each time we add a new trait that must be selected for, the maximum selective pressure that can be supplied to each trait individually must decline. As the number of traits undergoing selection increases, selection efficiency for each trait rapidly approaches zero, and the time to achieve any selective goal approaches infinity.... Trying to select simultaneously against more than several hundred mutations should clearly lead to cessation of all selective progress. Yet, even in a small human population, millions of new mutations are appearing every generation and must be eliminated! In the big picture, we really need to be selecting against billions, not hundreds, of mutations.”<sup>22</sup>

### **5. Natural Selection Works Best With Linear Genes, Not Stacked Ones.**

Discussions on natural selection tend to assume a one-to-one relationship between genes and enzyme sequences. One gene controls one trait as an expression of the effects of one enzyme. Thus, a mutation to a particular gene may hopefully, occasionally give a survival advantage to some trait.

However, multi-cellular organisms do not have a one-to-one relationship between genes and enzymes. Instead, the sequence of codons in a gene defining a particular amino acid sequence gets interrupted by what are called interons. These represent control points in the DNA information sequence which do not get decoded into amino acids. The interons represent boundaries between short segments of information that do get decoded.

Here is the catch. A single gene in the DNA may actually be used to build half a dozen or so different enzymes. The different enzymes make use of different segments of information contained within the same gene. A specific enzyme gets assembled from the various segments by specialized control enzymes.<sup>23</sup> For instance, it is now thought that human beings have only about 30,000 genes in their genome. However, these 30,000 genes code for perhaps 100,000 different enzymes. That is an overall average of 3 different enzymes per gene.<sup>24</sup> Normally, no enzyme uses all the segments. The choice of segments determines the structure and usage.

The problem is that a mutation that might supposedly be beneficial for the structure of one enzyme could be harmful to the others formed from the same gene.

It is hard enough to get a beneficial mutation to begin with. Experiments with fruit flies during the 1950s did not give observable evidence of a single known beneficial mutation. Yet, multiple thousands of harmful ones were observed.

As a result of this situation, it is not enough for a mutation to somehow be of benefit in the changes it makes to a particular enzyme. The ripple-effect changes to the other enzymes built from the same code segments must not harm them lest any advantage to the first quickly becomes lost. If one thinks his way through how enzymes are actually formed, with various coils and sheets pieced together in an exactly prescribed manner, he can realize the difficulties in changing the shape of one enzyme without changing the shape of another enzyme when both use the same segment of a common gene.

Of course, as a creationist, I believe that this extraordinary complexity of the code was placed there by a Creator. He let us find out about it so that we may be in awe of His extreme intelligence and wisdom.

### **6. Natural Selection Is Ineffective If Harmful Mutations Accumulate Too Rapidly, Particularly If They Are Recessive.**

John Sanford is a giant in the field of biogenetics. He invented and received patents on what is called the “gene gun.” It is what biogeneticists use to introduce manufactured gene sequences into a cell.

Sanford is an adjunct Associate Professor at Cornell University and has many, many journal articles and patents in biogenetics in his name. He is also a young-earth creationist.

He wrote a book, *Genetic Entropy & The Mystery of the Genome*, which presents arguments from his perspective concerning how science requires a Creator God. He covers many more issues than I do in this pamphlet and also in much deeper detail. I would highly recommend it for anyone interested in a deeper understanding of these issues.

Chapter 3 of the book is interesting. First he discusses various authorities in genetics. They agreed that if each individual person were to average one or more new mutations that his parents did not have, that the “genetic load” posed by this would be greater than what natural selection could deal with. The quality of the total genetic information in a population would slowly decrease, generation by generation. He then quotes various sources as indicating that currently the actual genetic load is over 100 mutations per individual per generation. We are not advancing. We are deteriorating at break-neck speed. Natural selection cannot deal with the rate new mutations are being placed in the genome.

Sanford makes an interesting statement, “If mutation/selection cannot *preserve* the information already within the genome, it is difficult to imagine how it could have *created* that information to begin with.”<sup>25</sup>

Natural selection does not have unlimited capacity to deal with a large number of new mutations per generation. This is a serious limitation in view of the observed mutation rates facing humanity.

## **Chapter 5. Conclusion: Science Teaches Normal Chemical Processes Do Not Favor The Formation of Life.**

We have just seen a list of many, many ways in which the normal chemical processes of nature work against a natural formation of life. The list is by no means complete, many other items could be added to it and more are being discovered on a regular basis. So, it becomes conclusive that normal chemical processes work against a natural formation of life instead of favoring it. Furthermore, long periods of time would not help. More time would just mean more tar.

At a certain point we need to say enough is enough. Almost anywhere one looks, if he is honest he can find issues that demonstrate how natural processes work against a natural formation of life. In effect these issues show that it would be impossible for life to form without a Creator God intervening into the normal affairs of His creation. After a while and with the accumulation of issue after issue, the situation becomes more of a person's willingness to acknowledge the evidence than the amount of evidence available.

I find it intriguing and grievesome to observe how an evolutionist will reject all manner of scientific observation that goes against his beliefs. He justifies this on the expectation that new experiments and discoveries in the future will somehow explain away all of the problems. Then, he accuses creationists who take the results of the observation at face value as unscientific and he, the one who is holding on to a belief which is contradicted by the observed evidence, as the one who is scientific. Somehow, things seem backwards here.

## Chapter 6. Evidences of Design

If the observations of science—honestly evaluated—show us that the normal laws of science make a natural origin of life impossible, can they at least give us an indication of where life might have come from? In an indirect manner, they do.

Items that have been designed exhibit certain characteristics. These characteristics are not normally possessed by naturally appearing objects, at least in the same manner or degree. It takes intelligence to design something. Hence, these characteristics are frequently called evidences of Intelligent design, with the implication that a Creator God is the source of the intelligent activity.

The following characteristics do not exist in a vacuum. We have just shown how natural law makes it impossible for life to start without some kind of outside influence. Once the reality of this is acknowledged, then these arguments take on an entirely new level of significance and importance.

The following discussion shows us parallels between what we observe in nature and the things we see designed by human design engineers. The implication is that an extremely intelligent Designer designed physical life.

### **Intelligent Design Characteristic Number 1. Irreducible Complexity.**

A characteristic of design is the existence of a number of complex components working together to accomplish a function, where the elimination of even a single component renders the function inoperative. As a result, the first formation of at least minimal performance capabilities of a complex organ or structure becomes a single step process in which a number of different components need to make their first appearance simultaneously. Even evolutionists normally acknowledge single-step appearances of complex systems to be impossible.

The most obvious example of irreducible complexity concerns the huge amount of information contained in the DNA along with a mechanism to extract and use it. It takes many, many complex components working together to extract and use information from the DNA. Everyone of them needs to function properly or the entire system fails. Yet, one cannot build a decoder without having the structure and operating instructions of every decoder component already defined in the DNA information. It takes an already existing decoder to read already existing information before life can start. There is no room for evolution in this. The combination of information and a decoding system represent an irreducibly complex system.

This is a huge issue and a number of Fatal Roadblocks came from it. The ripple effects of this problem ultimately require formation of the first cell to be a single-step process.

### **Intelligent Design Characteristic Number 2. Specific Assignment.**

Specific assignment is a selection method required when there are 1) multiple alternative, equivalent choices available to implement a function and 2) a large number of components need to use the same choice from the very beginning. The assignment of codon triplets in the genetic code is a prime example of this. Natural selection cannot perform specific assignment. By contrast, for design engineers it is a trivial task, one that they commonly and regularly perform.

### **Intelligent Design Characteristic Number 3. Design To A Target.**

There are basically two approaches used in design. One is called top down. The other is called bottom up. The things we see in nature—from paramecium to people—give the appearance of a well thought out, top-down design. This points to an existence due to an Intelligent Designer.

Top-down design is the approach where a person has a complete target design specification worked out before anything is actually designed. The first step of the design effort is then to break apart the specification into major functional blocks. An example of this would be how the various functions to make a living man are distributed among various specialized organs. Next, details of the blocks are represented in their own functional overviews, such as the various tissues comprising each of the organs. Each step further down is defined in more and more detail. Fi-

nally, at the lowest level, the tiniest of details are worked out, such as the structures of individual molecules suitable to perform tiny tasks.

By contrast, a bottom up design starts at the bottom and works up. It would be like a person building a house a wall at a time and having no idea what the house would look like when it was finished. He would not even know if a room were a bathroom or kitchen until it was almost finished. He would constantly need to back up to compensate for details (doors, windows, insulation, electrical wiring, plumbing, carpeting, etc.) he didn't know he would need when he started. Bottom-up designs tend to be very chaotic, very disorganized and very inefficient in their use of materials. This chaos becomes so deeply imbedded it is essentially impossible to undo to an appreciable degree.

In industry, the ability to perform a top-down design normally requires a lot of experience. The engineer needs to have an implicit understanding of what can be done at the detailed level so that he can focus at the high levels and understand how a detail will be carried out without actually needing to work through it first.

On the other hand, junior engineers fresh out of school typically do a bottom-up design. They will start by defining extreme details of some portion of a specification before they have even considered how it will fit in with other portions. They do not have the experience that allows them to start at a high level and really have no choice but to work at low levels first.

An experienced design engineer can readily determine the approach used when reviewing a design. A good engineer using a top-down approach will have a design that is extremely efficient and organized. It can do complicated tasks with a minimum of materials. Multiple functions can be performed by a common structure. By contrast, a bottom-up design is an organizational chaos. Simple jobs require lots of materials. Nothing ever seems to work quite like it should.

Evolution represents bottom-up design. Evolutionists like to talk as though evolution is a random walk. In the words of Dawkins, "Evolution has no long-term goal. There is no long-distance target, no final perfection to serve as a criterion for selection..."<sup>26</sup>

Yet, there is an awesome beauty in the organizational perfection of living systems, no matter at what level they are studied. When one looks at external form, there is beauty. When one looks at the division of labor by the various organs of the body, there is beauty in its perfect distribution of tasks. When one looks at the various kinds of cells that can be used by the various organs, there is a marvelous perfection. When one looks at cell structure, there is again an overwhelming amount of organization, with a very logical breakdown of tasks into organelles, which are like tiny organs within a cell to perform various specialized tasks within the cell. Then, when one analyses the actual biochemical molecules used to perform some very specific, detailed, low-level task, there is again tremendous organization and efficiency. There truly is beauty in the perfection of how function fits form at every level. No matter at whatever level one looks, even down to the choice of individual molecules to perform a tiny task, he finds structures and processes that give the appearance of a very well thought out top-down design. There is an awesome beauty in the perfection between top-level function and detailed implementation.

This awesome beauty displays itself in perfection across all levels of living organisms, from man to bacteria. This perfection is characteristic of a top-down design worked out by an extremely intelligent Designer. It is not characteristic of designs produced by a wanderer who had no idea of where he was headed. It is not representative of the chaotic design of a junior engineer who did not have a sufficient intuitive understanding of options at the detailed level to focus on higher level issues first.

A person may refuse to recognize these things because he does not want them to be true. However, his unwillingness to acknowledge the obvious does not change the fact of its existence. Living organisms at every level give the appearance of something designed by a very good Design Engineer, who had a specific target in mind as he designed it.

#### **Intelligent Design Characteristic Number 4. Multiple uses of a Common Element.**

Another characteristic of good design is to use a single object for many functions. The observance of many struc-

tures in a living organism having multiple functions is evidence of an Intelligent Designer. An extreme example of this is the structure of the genetic code, where many different enzymes can be made from the same gene, depending on how gene segments between interons are assembled.

#### **Intelligent Design Characteristic Number 5. Common Design Approaches Used In Different Applications.**

There is another practice common among design engineers, the practice of using a common design approach for many different situations. It appears God did the same thing with life. He simply used similar basic approaches for a number of different structures and processes. He then implemented the approach in a large variety of ways. In this case, evolution has nothing to do with the observed patterns. The different forms then become a demonstration of the creativity of God. In that case, many of the evidences evolutionists use to support evolution are not evidence at all, since they can just as easily represent examples of God using a common design approach for many different scenarios.

For instance, the arms of a man, legs of a reptile, and pectoral fins of a fish have a similar skeletal structure. Evolutionists like to claim that this is a proof of evolution. In reality, though, it proves nothing. The similarities could just as well reflect a common design approach deliberately chosen by an Intelligent Designer and modified to fit a number of different applications and scenarios. In this case, they represent a good illustration of a common design approach used in different applications.

**Summary:** If a person is honest in looking at the evidence, he should be able to see that science shows us two things: natural law makes a natural origin of life impossible. 2. Living organisms exhibit many characteristics of items that have been designed. These two observations complement each other; it is their combined effects working together that provides such a strong testimony.

According to Romans Chapter 1 in the Bible, God considers the evidence of His existence so clear that He counts a person without excuse who refuses to acknowledge it.

A person can harden his heart against receiving the things we have talked about. However, he should be aware that He does this at the risk of offending a Living Creator God, a God powerful enough to speak the universe into existence. He does this with the consequence of suffering eternal judgment for his belief. These are not neutral issues.

## **Chapter 7. Characteristics of an Intelligent Designer:**

What are the characteristics of an intelligent Designer, one capable of forming life? Romans 1:20, which we quoted at the beginning of this pamphlet, says that God's "invisible attributes are clearly seen, being understood by the things that are made, even His eternal power and Godhead, so that they are without excuse..."

According to the Bible, there are certain things we can learn about the Creator simply by observing the things He made. Here are five of them:

### **Characteristic Number 1. Extreme Intelligence.**

First of all, the Designer needs to be extremely intelligent. For a Designer to design living organisms, He needs to have an absolute understanding of all of the laws of physics and chemistry. Can you imagine designing a fully functioning cell, starting only with the laws of physics and chemistry? The task would be overwhelming. Yet, God did it. The intelligence of the Living God is extreme.

"O LORD, how manifold are Your works! In wisdom You have made them all." (Psalm 104:24)

### **Characteristic Number 2. The capacity to perform miracles.**

Life exists. Yet, according to normal laws and processes, it shouldn't. Therefore, the Designer needed to override the normal laws and processes in order to implement His design. A miracle is an event that takes place outside of the normal physical laws. Therefore, the formation of physical life required a miracle. This in turn means that there exists an Intelligent Designer who is capable of working miracles at will. Some people have a hard time believing that a God capable of working the various miracles recorded in the Bible actually exists. This is foolish. If one wants to see evidence of the activity of a miracle working God, all he needs to do is look in the mirror. Physical life, including the person's own, required the intervention of the Creator God into the affairs of the world.

As discussed earlier, the creation of all of the enzymes and other structures and raw information of the first living cell was a single-step process. Once a person acknowledges the existence of a Creator God capable of intervening into normal physical processes in order to bring about the sudden appearance of the first cell, then the rest of the miracles in the Bible are trivial. Even the creation of the various original "kinds" of plants and animals spoken of in Genesis are not a big deal. Evolutionary theory is dead. The eternal Creator God is alive.

"Ah, Lord GOD! Behold, You have made the heavens and the earth by Your great power and outstretched arm. There is nothing too hard for You." (Jeremiah 32:17)

### **Characteristic Number 3. The Designer has a will.**

The Designer makes choices and decisions. He is sovereign over His creation. His will is revealed in all kinds of arbitrary decisions He made during the design process. Actually, even the very decision to create life was an exercise of His will.

"You are worthy, O Lord, to receive glory and honor and power; for You created all things, and by Your will they exist and were created." (Revelation 4:11)

### **Characteristic Number 4. The Designer has personality.**

He placed beauty in His design. He also made human beings capable of recognizing and appreciating that beauty. It is difficult--essentially impossible--to comprehend any manner in which the capacity to enjoy and appreciate a beautiful song is based on "the survival of the fittest." It is far more rational to believe that the Intelligent Designer has personality, that beauty is something innate to His character, and that He willfully placed the capacity within man to appreciate it.

"Give to the LORD the glory due His name; bring an offering, and come before Him. Oh, worship the

LORD in the beauty of holiness!” (1 Chronicles 16:29)

**Characteristic Number 5. The Designer is holy.**

People naturally want to suppress truth about God because of the sin in their lives. The holiness of God is something every man instinctively knows because God placed that knowledge in Him. Yet, man does not really want to deal with it because it interferes with how he prefers to live his life. A man’s sin cuts him off from God. Praise God that in His mercy He has freely provided a means of reconciliation to any and all who are willing to receive it. However, He has made it clear that salvation is on His terms, not ours. He has revealed His will about salvation. We need to understand it and submit to it.

“You are of purer eyes than to behold evil, and cannot look on wickedness.” (Habakkuk 1:13)

“<sup>18</sup> For the wrath of God is revealed from heaven against all ungodliness and unrighteousness of men, who suppress the truth in unrighteousness, <sup>19</sup> because what may be known of God is manifest in them, for God has shown it to them.” (Romans 1:18-19)

## Chapter 8. Concluding Remarks:

What do you call a Being who has essentially unlimited intelligence, has the power to set aside the laws of the universe and work miracles, has a will and makes arbitrary decisions, has personality, and is holy? **You call Him God.**

The creation itself testifies of His existence.

In the Bible God says, “I am the LORD, that is My name; and My glory I will not give to another...” (Isaiah 42:8). Not recognizing God as the Creator of life denies Him His glory rightfully due Him as the Creator. God counts this denial as sin, indeed, as sin for which a person must give an account. However, as we shall see, God in His mercy has also provided a means of forgiveness for the sinner who is seeking to turn from His sins and be reconciled with his Creator.

It is amazing that not only has the Creator designed the creation so that it teaches us of His existence, but He has also decreed that we can know Him personally. A very precious universal promise is given in 1 Chronicles 28:9 of the Bible:

“The LORD searches all hearts and understands all the intent of the thoughts. If you seek Him, He will be found by you; but if you forsake Him, He will cast you off forever.”

The living God who created the heavens and the earth promises that a person who seeks Him will find Him. This is good news. It is the most significant promise a person can have. Becoming at peace with the Creator—that is, finding Him and knowing Him—is more important than a job, than a marriage, than health, or a few more years of life, all of which will soon pass away anyway. Along with the promise, though, is responsibility. If a person rejects the light God has given Him, the consequences are eternal. He will be cast off forever.

How do you come to know God? The first step is to believe that He exists and that He will reward you if you seek Him diligently:

“But without faith it is impossible to please Him, for he who comes to God must believe that He is, and that He is a rewarder of those who diligently seek Him.” (Hebrews 11:6)

So, you need to believe that He exists. You need to receive the testimony He has placed in Himself concerning His existence. Then you need to seek Him and do this diligently. Finding Him needs to become your highest priority.

The situation we are in is described in the book of Isaiah,

“Behold, the LORD’S hand is not shortened, that it cannot save;  
Nor His ear heavy, that it cannot hear.

But your iniquities have separated you from your God;  
And your sins have hidden His face from you,  
So that He will not hear. (Isaiah 59:1-2)

The problem is sin. Sin separates us from God. There is a spiritually deadening effect that sin has on a person. We do not need to be told this; we know it from experience. In fact, sin can get such a strong grip on a person that he becomes its slave. The person instinctively knows that sin in His life offends the Creator and for that reason is uncomfortable talking about Him. He does not like to think about Him. He does not seek God even though He knows God exists.

However, the above verse is a verse of hope. Even though our sins separate us from God, God is able to save us from our sin. The question is whether or not we want Him to. The issue is whether or not we are willing to seek Him.

Isaiah also told us how God would go about saving us from sin. We read about this in the 53rd chapter of the

Book of Isaiah in the Bible:

<sup>3</sup> “He is despised and rejected by men...He was despised and we did not esteem Him.”

God is going to use a man to save us who was despised and rejected by men. Earlier, in verse 1 this man was identified as the *Servant* of God. We will also call Him by that name for now.

<sup>5</sup> “But he was wounded for our transgressions,  
He was bruised for our iniquities;  
The chastisement for our peace was upon Him.  
And by His stripes we are healed.

Isaiah speaks of how the *Servant* was wounded because of our sins. We who are separated from God by our sins can be at peace with God, because His *Servant* bore the punishment, bore the chastisement that was due us. It is by means of His affliction that we can be healed from sin and its consequences. The next verse continues,

<sup>6</sup> All we like sheep have gone astray; we have turned, every one, to his own way; and the LORD has laid on Him the iniquity of us all.

Again, the problem is our sin. We stray from God. We want to go our own way, not His. We want God to bless us for our sakes; we are not interested in serving Him for His sake. Yet, praise God! In His mercy, He has laid on His *Servant* our sins. Dropping down to verse 10,

<sup>10</sup> Yet it pleased the LORD to bruise Him; he has put Him to grief. When You make His soul an offering for sin, he shall see His seed, He shall prolong His days, and the pleasure of the LORD shall prosper in His hand.

God was willing to bruise Him, to put Him to grief for a bigger benefit to follow. This was a grief unto death. The *Servant* was made an offering for sin. An Old Testament offering always required the death of the one being offered. Our sins create a barrier between God and us. That barrier can only be removed by the death of an acceptable substitute. God has provided a substitute for us in the person of the *Servant*.

<sup>11</sup> He shall see the labor of His soul, and be satisfied. By His knowledge My righteous *Servant* shall justify many, for He shall bear their iniquities.

Was God unfair to lay our sins on the *Servant*? Not from the *Servant*'s perspective according to this verse as well as the one preceding it. Although the *servant* suffered on our behalf, God resurrected Him after the sacrifice was finished. After the resurrection, the *Servant* could see the fruit of His labors, the salvation of those who would come to know Him. Upon seeing this, the *Servant* was satisfied. It was worth it. His death and the suffering associated with it will result in the salvation of many. He bore their iniquities and this was a grief. However, seeing the results will make it all worthwhile.

This is one of the most precious statements in the Bible. My situation is not good. I have sinned against God. My iniquities have separated me from Him. Yet, in His love for me, He sent His *Servant* as an offering for my Sin. In His love for me, He has saved me. He offers that salvation to anyone willing to receive it on His terms, which are simple. He offers salvation as a free gift to the one willing to receive it.

How does a person receive this gift? The above verse teaches us that it is by coming to know Him. We will discuss this later. Finally, the chapter concludes,

<sup>12</sup> Therefore I will divide Him a portion with the great, and He shall divide the spoil with the strong, because He poured out His soul unto death, and He was numbered with the transgressors, and He bore the sin of many, and made intercession for the transgressors.

God is going to greatly honor this person, because He poured out His soul unto death as He bore the sin of many

and because He made intercession for the transgressors.

Friend, the Servant of God is willing to intercede before God on your behalf, that you might become clean in God's eyes and counted by Him as righteous—not because of what you have done, but because of what the Servant did for you out of God's love.

Who is the Servant who offered Himself up for you? Isaiah talks about Him a few chapters earlier, in chapter 42:

<sup>1</sup> "Behold! My Servant whom I uphold, my Elect One in whom My soul delights! I have put My Spirit upon Him; he will bring forth justice to the Gentiles.

The Servant is One whom God has chosen to bring forth justice to the Gentiles. The Servant is none other than the Old Testament Messiah, an anointed King that God has promised to send and rule the entire earth, both Jew and Gentile, in peace and justice. We could say more about this passage, but this is sufficient for now.

A sacrifice had to be perfect. Any blemish in a sacrifice made it unacceptable. Both Jew and Gentile need the benefits of such a sacrifice, for we all have sinned before God. There is only One who is perfect, who is without sin. That is God Himself. Somehow, then, God would need to be the one who was sacrificed. How could this be?

The Bible teaches that God has a Son. The Son is God, but separate from Him. We read about the Son in the Psalm 2 of the Bible:

<sup>2</sup> The kings of the earth set themselves, and the rulers take counsel together, against the LORD and against His Anointed....

<sup>7</sup> "I will declare the decree: the LORD has said to Me, 'You are My Son, today I have begotten You.

<sup>8</sup> Ask of Me, and I will give You the nations for Your inheritance, and the ends of the earth for Your possession.

These verses teach us that the Messiah, the Anointed One of God, is also the Son of God. It is His own Son that God will send to rule on the earth.

In Deuteronomy 29:29 we read that,

“The secret things belong to the LORD our God, but those things which are revealed belong to us and to our children forever....”

In other words, there are some things that God reveals and some things He keeps secret. He has revealed that there is only one God. He has revealed that He has a Son. The Old Testament of the Bible ascribes deity to His Son (Psalm 45:6-7, Micah 5:2), so His Son is God. How can there be only one God, and yet God have a Son who is also fully God? To the human mind, these things are contradictory. However, the problem lies in our understanding, not in God's nature. A person with a submissive spirit towards God will accept what God has revealed and respond to it in faith. He will be content to recognize that God's ways are higher than our ways and that there are some things that God chooses not to reveal to us. By contrast, the one who has a rebellious heart will come across something he does not understand. He will then use that as an excuse to rebel against God and reject what He has revealed.

Continuing in Psalm 2 we read,

<sup>11</sup> Serve the LORD with fear, and rejoice with trembling.

<sup>12</sup> Kiss the Son, lest He be angry, and you perish in the way, when His wrath is kindled but a little. Blessed are all those who put their trust in Him.

How we respond to the Son determines our destiny. Refusing to respond with affection to the Son will kindle His

wrath. However, those who are willing to put their trust in Him will be blessed. We will discuss a little later what it means to put our trust in the Son.

Even though the things we have just looked at are remarkable, there is more.

Who is the Servant? Well, let's look at some more verses. In Micah 5:2, we come across something really interesting:

<sup>2</sup> "But you, Bethlehem Ephrathah, though you are little among the thousands of Judah, yet out of you shall come forth to Me the One to be Ruler in Israel, whose goings forth are from of old, from everlasting."

This passage speaks of the Messiah, the One who is to be Ruler in Israel. He has existed forever (He is God.) Yet, He shall be born in the tiny city of Bethlehem. Another interesting passage is found in Isaiah 7:14,

<sup>13</sup> Then he said, "Hear now, O house of David! Is it a small thing for you to weary men, but will you weary my God also?"

<sup>14</sup> "Therefore the Lord Himself will give you a sign: Behold, the virgin shall conceive and bear a Son, and shall call His name Immanuel.

How was an eternal God with an eternal Son going to have that Son be born into the world? To God the solution was simple. A virgin would conceive and bear a Son. He would be called, "God is with us" (Emmanuel). Although modern scoffers have claimed in their disbelief that the word translated *virgin* should be translated "young woman," their error is easily refuted. The Septuagint is a translation of the Jewish Bible, the Old Testament, into the Greek language. It was made several hundred years before the birth of Jesus. It was made by people who actually spoke both languages in their daily living. They had a choice between translating the word into the Greek as "young woman" or "virgin." They chose a word which explicitly means "virgin" because that is what the Hebrew word means. God was going to give a sign to the House of David. The virgin would conceive and bear a Son, who will be called, "God is with us."

A God who can create the universe and who can create life at will would certainly have no difficulty in fulfilling this verse.

There is another key to the puzzle of the identity of the Servant. In Daniel 9:25-26 we read,

<sup>25</sup> "Know therefore and understand, that from the going forth of the command to restore and build Jerusalem until Messiah the Prince, there shall be seven weeks and sixty-two weeks; the street shall be built again, and the wall, even in troublesome times.

<sup>26</sup> "And after the sixty-two weeks Messiah shall be cut off, but not for Himself...."

The command to rebuild both Jerusalem as well as its wall took place in approximately 446 B.C., during the 20th year of King Artaxerxes. It is recorded in Nehemiah 2:1-8. From the time of this command until the Messiah is killed (cut off) will be 69 weeks. A study of related passages shows that a week in this context is a period of seven "almost" years—seven periods of 360 days each. Calculations place the time of the Messiah's death as somewhere in the timeframe of 31 A.D. However, His death would not be for Himself. Indeed, the death of the Servant was to be a sacrifice for us, ones who have gone our own way and sinned against God.

So, we have learned a lot about the Messiah. We have learned that He is the Son of God, but will literally become God in the flesh after a virgin birth. He will ultimately rule over the entire earth, although the time for that is still future. However, He will offer Himself as a sacrifice for the sins of men, will be raised from the dead, will be satisfied that it was worth the grief and suffering when He sees those who were saved, and was to die somewhere around 31 AD. He was to be born in the city of Bethlehem.

Is there anyone who fits the description of these things? Yes, Jesus of Nazareth, a man who went about doing

good, who demonstrated the power of God in His life by working many miracles, who has had a greater impact on world history than any other single man. He is the One described in all of these various verses. Furthermore, He is the only person in history who could fulfill the various prophecies, for the decreed time of His death has long since passed.

What is interesting is that every one of the passages we have looked at concerning the Servant, the Messiah, and the Son were written well before the birth of Jesus the Messiah. In fact, the time span ranges between about 500 and about 1,000 years before His birth. The Creator had a specific plan in order to redeem man. He told man about what He decided to do long before He did it. Then, in accordance with His power He did what He said He would do. He did this at the exact instant He had determined to do it.

There is a verse in the New Testament, Romans 5:8, that summarizes the underlying motive of God in doing these things:

“But God demonstrates His own love toward us, in that while we were still sinners, Christ died for us.”

The word *Christ* is the Greek word for the Hebrew *Messiah*. The Messiah died for us! He did this because God loves us.

Friend, what will you do with Jesus? Nature requires a Creator God. God specifically designed the creation to point towards Him and we have looked at ways in which it does. Beyond this, the Bible confirms that it is the Word of God by fulfilled prophecy. The scope and magnitude of the prophecies are overwhelming. These are not prophecies of some minor event happening in the life of some inconsequential person. These are prophecies of the Son of God taking on human flesh through virgin birth and then dying as a sin offering for the sins of mankind. These are prophecies of resurrection after the death and of satisfaction over it all. These are prophecies of where the Son would be born and the year He would die. Only the Creator could make and fulfill prophecies of this magnitude.

Because God loves you, He sent His Son into the likeness of human flesh that He might make Himself an offering for you, bearing your sins in His body. You have no other hope, because He is God’s only provision. If anything else had been adequate, God would not have gone to the extreme measure of offering His Son as a sacrifice for our sins.

The Son of God offered Himself as a payment for your sins. If you will trust Him, He will bless you eternally. However, if you refuse Him, you will kindle His wrath, for you have despised something extremely precious and costly which for now is being offered to you freely.

God offers you eternal life. He offers you forgiveness of sins. He gives you the promise of knowing Him on an intimate basis.

However, if you forsake Him, if you turn from Him, He will cast you off forever.

The decision is yours. God rewards those who seek Him diligently. Putting off the decision is to risk eternal damnation.

So, how do you receive the Son as your Savior? It is explained to us in John 3:16,

“For God so loved the world that He gave His only begotten Son, that whoever believes in Him should not perish but have everlasting life.

We receive God’s Son, the Lord Jesus Christ, as our Savior by believing in Him. This verse is really an application of Psalm 2:12 we looked at a little while ago, “Blessed are all those who put their trust in Him.”

What does it mean to believe in Him? The Greek word translated here as “believe” can also be translated *trust in* or *rely on*. Believing in Christ as Savior means accepting what God has revealed about His person, that He is the Son

of God and will some day rule as King. It means accepting what God has revealed about His work, i.e. that Christ died for our sins, was buried, rose again three days later, and was seen by many witnesses. Finally, it means RE-LYING on these things for our salvation. We no longer rely on ourselves or on our own works. We rely on Christ's finished work to save us.

We have lived in rejection of God. We have suppressed truth about God so that we could live in sin. We recognize that God is holy and will have nothing to do with sin.

It is our desire to come to Him, to know Him, to be pleasing to Him. Yet, we know that our sins make this impossible and there is nothing we can do about it. Our sins have too powerful a grip on us.

Yet, God loves us and has done all of the work for us. He is willing to receive us if we come to Him His way, which is through His Son Jesus Christ.

As we come to Christ, He reveals our sin to us. We can look to Him to forgive us of our sins or we can turn from Him and go our own way. But, we cannot deliberate determine to continue in our sins and come to Christ to save us, doing both at the same time. Repentance is the willingness and desire to have Jesus make us clean. It is turning from a life of rebelling against God and going our own way. Yet, it is not us trying to become clean in our own will power, we do not have the strength to do this. It is yielding to Him to save us and clean us up. "God now commands all men everywhere to repent." (Acts 17:30)

Friend, may you cast yourself on the mercy and grace of Jesus, relying on Him to cleanse you and make you acceptable to God.

Jesus said,

"The one who comes to Me I will by no means cast out. (John 6:37)

The Old Testament prophet said that if you forsake God, He will cast you off forever. But, Jesus promises that if you will come to Him, He will not cast you off. You come to Him by believing that He is the Son of God, that He died for your sins and rose again. This is a belief that results in reliance on Him, the Lord Jesus Christ, to clean you up and to make you acceptable in God's eyes.

Friend, will you come to Jesus now? The following is a suggested confession of faith. May it express your internal decision to trust Christ as Savior:

Father in Heaven, I have sinned against you. I have not glorified you, I have not honored you, and I have gone my own way, even when I knew better. I am guilty before you and deserve eternal judgment. However, I believe your Word, that Jesus Christ is your Son and that His death paid off my judgment. I am relying on Jesus to forgive of my sins and to give me eternal life. Thank you. In the name of Your Son, Jesus Christ, Amen.

Thanks be to God for His indescribable gift! (2 Corinthians 9:15)

If you have just trusted Christ as your Savior, please let us know by sending an e-mail with a brief note telling us of your decision. The address is on the back page. We have some material we would like to send you telling you "what's next" and also to encourage you in your service to God.

## Appendix A. Tutorial

### 1. Atoms and Molecules

An atom is a unit of matter that contains a nucleus surrounded by one or more electrons. The primary components of a nucleus are protons and neutrons. Thus, an atom consists of three primary components or *particles* as they are technically called: neutrons, protons, and electrons.

There are two basic characteristics that distinguish the three particles: mass and electrical charge. Since weight is simply the resultant force produced by a body of mass under the influence of gravity, then from a layman's point of view one might think of the particles as distinguished from each other by their weights and their electrical charges.

A neutron has no electrical charge.

A proton has exactly one unit of positive charge.

An electron has exactly one unit of negative charge.

A neutron and a proton have almost the same mass (or weight) as each other. By contrast, an electron is light. It only has about 1/2000 the mass of a proton or neutron.

<sup>205</sup>The kind of atom is determined by the number of protons in the atom's nucleus. Therefore, we can make a chart showing the number of nuclear protons in one column and the names of the corresponding elements in its adjacent column.

These are some of the better-known kinds of atoms (*elements*):

protons	element
1	hydrogen
6	carbon
7	nitrogen
8	oxygen
15	phosphorous
26	iron
79	gold
92	uranium

So, a hydrogen atom has one proton in its nucleus. A carbon atom has six protons in its nucleus. Similar relationships apply down the list.

An object with positive charge attracts objects with negative charges and repels other objects with positive charges. Likewise, an object with negative charge attracts objects with positive charges and repels other objects with negative charges. Or, as it is commonly shortened to, opposite charges attract each other and similar charges repel each other.

If two or more atoms are brought close to each other, then under certain circumstances they may share some of their electrons. Shared electrons result in atoms bonding to each other.

### Chemical Bonds

There are five kinds of bonds between atoms. Two of these are strong and three are weak.

**Strong Bonds.** The strong bonds are ionic bonds and covalent bonds. These kinds of bonds are typically discussed in high school chemistry books. Atoms joined by ionic bonds typically form crystals. Atoms joined by covalent bonds typically form discrete molecules.

Here are examples of three common molecules that we will talk about frequently in later sessions.

1. Methane. One atom of carbon can make covalent bonds with four atoms of hydrogen. This forms one molecule of methane, more commonly called natural gas.
2. Ammonia. One atom of nitrogen can make covalent bonds with three atoms of hydrogen. This forms one molecule of ammonia.
3. Formic Acid. Formic acid is more commonly known as bee sting venom. It also gives ants their characteristic pungent smell. Formic acid is made of one carbon atom joined to two oxygen atoms and two hydrogen atoms.

**Weak Bonds.** The three weak kinds of bonds are hydrogen bonds, Van Der Waals forces, and London dispersion forces. These weaker bonds are extremely important in biological compounds. However, at our level of discussion in this presentation, we only need to know that the weak bonds are the kinds of bonds that make tar. The natural tendency for biological compounds to form tar was the first fatal roadblock presented in the first session. We will discuss the weak bonds briefly in the next session when we talk about tar.

Carbon. Carbon is a unique element. Physical life at the chemical level is structured around carbon's characteristics. Two of these are particularly important.

1. A carbon atom is capable of sharing 4 electrons with other atoms. This allows it to make 4 covalent bonds, which is more than most other elements. This in turn allows carbon form the complicated molecular structures required for physical life. It is also why a molecule of methane is composed of one carbon and 4 hydrogen atoms.
2. Carbon atoms like to form long chains with themselves. Consider a garbage bag. It is made of a plastic called polyethylene. Polyethylene molecules are made from several hundred thousand-carbon molecules strong together in a long chain. Each carbon atom in the chain, except those at the ends, have one bond connected to the molecule ahead of it, one to the molecule behind it, and the remaining two connected to two hydrogen atoms.

It is this capacity for carbon to form long chains that makes the molecules of life possible.

## 2. Amino Acids: Life's Building Block Molecules

We just talked about three kinds of molecules, methane, ammonia, and formic acid. It turns out that these three molecules can easily join to each other in various combinations. Some of these combinations are extremely interesting and useful. Others are not useful in living systems and if they accidentally formed under origin-of-life conditions would only promote the formation of tar.

Let's take one molecule of formic acid and one molecule of methane and join them together. A new molecule is formed from the two original molecules. It is called acetic acid, more commonly known as vinegar.

Now let's join a vinegar molecule to an ammonia molecule. The molecule formed by this reaction is called glycine. Glycine is really significant. It is a particular kind of an amino acid; in fact it is the simplest amino acid. Amino acids are extremely important in living systems and we will talk more about them in a minute. Just be aware that the simplest amino acid is nothing more than a molecule of vinegar joined to a molecule of ammonia in a certain manner.

Notice, we can also think of glycine as being a molecule of formic acid, a molecule of methane, and a molecule of ammonia joined together in a tiny chain.

There are literally thousands of kinds of amino acids possible. However, living systems are based on twenty common ones.

Let's start with a molecule of glycine. Let's then bond a second methane molecule to the first one. This new structure represents another amino acid called alanine. The second methane molecule is called a side chain.

Lots of different molecules and combinations of molecules can be used in side chains. The different amino acids differ from each other by the composition of their side chains.

For instance, let's start with a molecule of alanine. Then we will add a molecule of formic acid to the end of its side chain. This forms a third kind of amino acid called glutamic acid.

Finally, let's start with a molecule of alanine. Then let's add a molecule of vinegar to the end of its side chain. This forms a fourth kind of amino acid called aspartic acid.

These four amino acids—glycine, alanine, glutamic acid, and aspartic acid—are the four simplest amino acids. We will also talk about them a lot in the next session. So, you might do well to remember their names. These are the only ones we will talk about, so you do not need to worry about getting completely overwhelmed with a lot of strange names.

### **3. Enzymes and Enzyme Shape**

In one sense a living cell is like a large factory, one in which energy is used to fabricate raw materials into various components and the components are then assembled into a useful product. In an efficient factory, a dedicated workstation is used for each component made.

In comparison, a plant cell takes in raw materials such as minerals, air, nitrogen, and water. Sunlight provides the energy source. Then, a series of separate “work stations” use sunlight as an energy source in order to convert carbon dioxide from the air and water into sugars and starches. Other “work stations” convert other raw products into other materials.

In such a cell, enzymes serve the equivalent of the workstations. Specialized enzymes control everything a cell does. Even the simplest cells capable of independent life need almost 2,000 unique, distinct kinds of enzymes in order to survive. Generally, the loss of any single one of these enzymes will either kill the cell or seriously undermine its overall fitness.

The only known functional purpose of the genetic code is to manage a cell's enzymes. The genetic information in a cell tells the cell how to make the enzymes it needs to use, when to make them, and how to use them. So, life as we know it is enzyme-based.

An enzyme is simply a long chain of amino acids. Very few enzymes are less than one hundred amino acids in length. Most are in the two hundred- to one thousand-amino acid range. The largest enzymes are over 1,000 amino acids in length. Normally, if the job for an enzyme is so complicated that its implementation would require much more than a thousand amino acids, then a cell will use an enzyme complex made of several smaller enzymes instead of a single huge one.

Enzymes are formed by adding one amino acid onto the end of a chain of other amino acids. As the chain lengthens, the chain spontaneously folds into coils and sheets to produce a specific shape. Some of the 20 amino acids seem to promote coil formation. Others seem to promote sheet formation. Some amino acids like to be on the outside of an enzyme, next to the water in a cell. Other amino acids like to be on the inside of an enzyme, as far away from the water as they can get. The choice of amino acids used in the sequence making up a chain determines the shape that the enzyme forms. It is amazing to see just how precisely a huge, complicated combination of coils and sheets can form simply by using a proper sequence of amino acids.

Perhaps a third of the amino acids in an enzyme are extremely critical. Normally, changing just one of these can completely change the shape of an enzyme. Perhaps another third are not so critical; a number of substitutions can be made without ruining a required shape. Perhaps another third are not very critical at all; a number of substitutions can be made to them without much impact at all.

An enzyme's shape determines how the enzyme functions. One typical enzyme function is to join two specific

kinds of molecules to each other to form a new, third molecule.

So, suppose a certain enzyme is needed to join together two different kinds of molecules for some function useful to a cell. Maybe combining the molecules are steps required to convert sugar into energy. Maybe combining them is needed to form a component to be used in decoding the genetic information of the cell. Maybe the product will become part of a cell membrane. There are lots of enzymes and lots of enzyme functions. We are simply showing one manner in which a typical one can work. Now, each of the two molecules that need to be joined will have a unique size, shape, and possibly electric charge.

So, our enzyme then will have two sections in it. One section is shaped so that the first molecule fits into it, like a hand into a glove. As the various molecules in a cell bounce around, only the desired molecule fits. Then, when it happens to bang into the enzyme, the enzyme traps it and holds it. Likewise, the second section of the enzyme is shaped so that the second molecule fits into it, like a foot into a sock. As the various molecules in a cell bang into each other, eventually the enzyme will trap the second molecule. As soon as both molecules are trapped, they react with each other, forming some new, desired product. This is how an enzyme works.

For us, the important thing is that this shows what we mean when we say enzyme shape is important. It is shape that allows it to snugly fit over a desired molecule (or atom such as iron or calcium) and attach to it. With even a slightly different shape, an intended molecule might not fit any longer, destroying the effectiveness of the enzyme. Equally bad, even if the desired molecule still fits, the shape might become so sloppy that other molecules also fit. This would ruin the selectivity of the enzyme and as a minimum, degrades its performance, and possibly ruining its effectiveness altogether.

In order to construct a desired shape, enzymes are made of smaller structural units in the form of sheets and coils, which in turn are connected together by loops. A single chain of amino acids will fold into the specifically needed structure.

#### 4. RNA and DNA

In real life complicated objects are built from plans. A contractor builds a skyscraper according to blueprints. A software program is compiled according to its source code. Even a cook in a fast-food chain restaurant needs to make a hamburger according to a very specific recipe.

Cells do not just happen. They are also built according to a specification. That specification is stored in information blocks. The information blocks in turn are composed of long chains of either RNA or DNA nucleotides. DNA nucleotides do not appear spontaneously in nature, but are about 100 times as stable as RNA. In other words, spontaneous mutations occur about 100 times as frequently in RNA as in DNA. Living cells form individual DNA nucleotides from RNA nucleotides by removing a single oxygen from a specific location of a sugar molecule contained in the nucleotide.

A nucleotide consists of three components: a base molecule, a sugar molecule, and some phosphate molecules. Four different bases are available. In RNA they are given the names *adenine*, *cytosine*, *guanine*, and *uracil*. In DNA thymine is substituted for uracil. For us here, all we need to know is that four kinds of nucleotide bases are available in both RNA strings and DNA strings.

The sequence of nucleotide bases in a DNA string or RNA string represents information. Just as a string of bits stored in a computer's disk drive can represent anything from a picture to a symphony to a love letter to a mathematical program, strings of nucleotide bases represent the information to build and operate all of the different tissues and organs of a living organism.

The stability of DNA is important for organisms that have already formed. Bulk information is stored in DNA. However, in an origin-of-life scenario, RNA is more important because it is easier to form than DNA and also can function as an enzyme, which DNA cannot do.

The actual structure of an RNA nucleotide is simple to visualize but difficult to form by chance process. A base is



## EndNotes

<sup>1</sup> Robert Shapiro, *ORIGINS: A Skeptic's Guide to The Creation Of Life On The Earth*, 1986, ISBN 0-671-45939-2, Summit Books, New York, p. 113, 302

<sup>2</sup> Exobiology <http://www.accessexcellence.org/WN/NM/miller.html>

<sup>3</sup> Shapiro, p. 208 quoting Sir Fred Hoyle: "Nothing happens when organic materials are subjected to the usual prescriptions of showers of sparks or drenched in ultraviolet light, except the eventual production of a tarry sludge."

<sup>4</sup> Shapiro 171, 193

<sup>5</sup> Emmett Williams, Editor, *Thermodynamics And The Development Of Order*, 1987, Creation Research Society, ISBN 0-940384-01-9, chapter by Duane T. Gish, Origin of Biological Order And The Second Law, p. 75-77

<sup>6</sup> Claudia Huber and Guenter Waechtershaeuser, Peptides by Activation of Amino Acids with CO on (Ni, Fe)S Surfaces: Implications for the Origin of Life, *Science* **281**, 670 (1998)

<sup>7</sup> Ei-ichi Imai, et al., Elongation of Oligopeptides in a Simulated Submarine Hydrothermal System, *Science* **283**, 831 (1999)

<sup>8</sup> Carl Branden et al., Introduction to Protein Structure, Second Edition, Garland Publishing, New York, ISBN 0-8153-2305-0, p. 15

<sup>9</sup> Voet, Voet, and Pratt, *Fundamentals Of Biochemistry, 2<sup>nd</sup> Edition*, 2006, ISBN 0-471-21495-7, John Wiley and Sons, p. 137

<sup>10</sup> Shapiro, discussion on p. 182-186, quote taken from p. 186

<sup>11</sup> Voet, , p. 120-121

<sup>12</sup> Richard Dawkins, *The Blind Watchmaker: Why The Evidence of Evolution Reveals A Universe Without Design*. ISBN 0-393-31570-3, 1986, W.W. Norton and Company, Inc., New York, NY p. 48

<sup>13</sup> Voet, , p. 847, 1023F. See discussion on operators.

<sup>14</sup> Gould, Stephen Jay, *The Structure Of Evolutionary Theory*, The Belknap Press of Harvard University Press, 2002, p. 18, 20

<sup>15</sup> Shapiro, p. 74

<sup>16</sup> Natasha Paul and Gerald F. Joyce, A self-replicating ligase ribozyme, Proceedings Of The National Academy Of Science Of The United States Of America, 2002;99:12733-12740.

<sup>17</sup> Noriku Fujii, D-Amino Acid In Elderly Tissues, *Biol. Pharm. Bull.* **28(9)** 1585—1589 (2005)

<sup>18</sup> Primordial Recipe: Spark and Stir, Astrobiology Magazine, a NASA publication, May 14, 2003, page 6

<sup>19</sup> Voet p. 79. The ratio was calculated from information in Table 4-1.

<sup>20</sup> Elya Prigogine, *The End of Certainty*, The Free Press, New York, ISBN 0-684-83705-6, 1997, p. 64

<sup>21</sup> Prigogine, p. 39, 41, 42, 149

<sup>22</sup> John C. Sanford, *Genetic Entropy & The Mystery Of the Genome*, p. 77

<sup>23</sup> Voet, p. 949

<sup>24</sup> Voet, p. 948

<sup>25</sup> John C. Sanford, *Genetic Entropy & The Mystery Of the Genome*, ISBN 1-59919-002-8, Ivan Press of Lima Publishing, Elmira New York, 2006 p. 105

<sup>26</sup> Dawkins, p. 50

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