A Living God Reveals Himself Through the Creation: How Unbiased Science Leads to Knowledge of the Creator

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The following collection of five articles is significant in that together they plausibly

1) Falsify materialism and humanism,
2) Establish God as the Creator,
3) Explain the hostility of modern science to God, and
4) Establish that the God of the Bible is the God of Creation.

Article 1. Cellular Information Reveals a Creator God

This is a short 3-page article, yet it falsifies materialism. Science gives basis to understand that life came from a Creator God: Living cells are information-driven machines. This requires a large body of information to appear simultaneously with extremely complex cellular hardware. Both need to be fabricated in a single step in working form. The requirement of single-step, simultaneous appearance of functioning information and hardware imply a Creator God needs first to design a cell and then miraculously implement the design, placing atoms and molecules as required. Step-by-step, gradual, evolutionary processes are not capable of doing this.

Article 2. Supposed Strong Reasons against God: They are "Nothing"

This provides a Scriptural perspective for issues discussed in the other articles. God claims there are no valid, strong arguments against Him. Evolutionary theory is described here as modern idolatry, where natural processes instead of natural objects are worshipped. Theistic evolution gives credence to the arguments of those rejecting Genesis 1. This does not please God.

Article 3. A Natural Origin-of-Life: Every Hypothetical Step Appears Thwarted

This is a science research article co-authored by Pastor Stout which plausibly renders abiogenesis a closed field. This is new science: a single root is postulated which explains why there have been no successful demonstrations of any step of abiogenesis. Yet, a natural origin of life would require the entire path to be successfully traveled spontaneously without any failures. This is a deep article, written to the professional scientist. It is included for non-scientists that they may understand such an article exists. Many of the basic concepts can be grasped by a layman using diligence. It is a specific challenge to those scientists steeped in materialism: Can you falsify it?

Article 4. Is Evolutionary Theory Pseudoscience? A Historical Perspective

This discusses the history of how science was changed from a search for truth into a vehicle to promote materialism—"only materialistic explanations allowed." The spiritual issues underlying the great hostility of the materialist towards the creationist are also discussed. It appears that evolutionary theory represents fake science (pseudoscience). Those disagreeing are challenged to falsify these claims. A website, www.ctotim.com, is available to respond to the challenge.

Article 5. Who is the Creator? What does He want from us?

Fulfilled Messianic prophecy identifies the God of the Bible as the God of creation. It also falsifies claims by materialists that God does not intervene into nature.

A blog to discuss these articles is at http://ctotim.com .

Article 1. How Information Science Reveals a Creator God

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There are four observations of science that together work to reveal God as the originator of life:

1) Living cells are information-driven machines; they must be built according to a predefined plan.
2) Cellular Information is an abstract entity defined by a code. Codes to define information are a product of intelligence.
3) Virchow's aphorism defines the minimum complexity required for the appearance of the first cell for cellular information and for cellular hardware. Initially-required complexity is staggering.
4) Components decay more rapidly than they can spontaneously assemble or replicate.

The consequences of these four observations are significant. Plausibly they render a natural origin of life impossible, the evolution of complex organisms impossible, falsify materialistic naturalism as a valid explanation for life, and falsify evolution as the unifying factor of biology.

Information and Intelligence

Here is a simple definition: *Information is the abstract representation of meaning by a set of symbols arranged according to a code.* There is a key word in this definition, *abstract.* The online Oxford Dictionary defines *abstract* as "existing in thought or as an idea but not having a physical or concrete existence [1]." This is important: the code defines an abstract relationship. The relationship between *meaning* and its symbolic representation is mental, not material. There is no law of physics to determine a code used to represent a given meaning. It is whatever a mind chooses to assign.

There is yet more evidence that the invention of codes that use symbols to represent meaning is a function of intelligence. The complexity of a code and of the meaning it represents is dependent on the intelligence of the one inventing the code. Two children playing can invent simple codes to represent objects in a game; a dog can't. Einstein invented codes and symbols to represent meanings that very few people will ever understand. Codes are a function of mental activity and intelligence. Likewise, use of an existing code to define a complex operation is also a product of Intelligence. Software engineers and music composers and authors do this. Material phenomena such as mass and energy are not dependent on intelligence. Codes and their creative use are [2].

Information-Driven Machines: Computers and Living Cells

An information-driven machine uses information to control its operation. The machine is typically implemented by the following features:

1) Instructions for how the machine is to accomplish its tasks. In industry this is a design specification. Some tasks can be done in hardware or software. The choice needs to be defined.
2) A code defining how to represent the instructions symbolically.
3) A medium in which to store the symbols.
4) A means to place the coded information into the medium.
5) A means to read and decode the symbols representing information and stored in the medium.
6). Sensory inputs to know the external conditions that need to be taken into account for proper operation.
7) A processing unit capable of decision making and issuing commands.
8) Hardware to implement the commands of the processor in order to accomplish a task.

There is a key observation concerning this list: The information and the hardware need to make their initial appearance simultaneously. The gradual step-by-step processes of evolution are not compatible with the first appearance of an information-driven machine. Either all of the components work together initially or none of them work at all. Yet, everything is staggeringly complex.

I personally have four decades of industrial experience as a design engineer: two decades as an electronic hardware engineer and another two as a mechanical engineer. Most of the design work in electronics was with microprocessor-based systems. Most of the work was performed in Silicon Valley. Although I have written some software, normally I would be on a team in which other engineers did the software (information) design and I worked on hardware. I understand the design, fabrication, and debug of information-based machines very well, having lived it for two decades.

Since living cells are also a form of information-driven machines, many Issues that apply to microprocessor design will also carry over into the design of a living cell.

Here are some simple but important observations: 1) information is worthless without working hardware able to process it. Software stored on a disk that can neither be read nor processed accomplishes nothing. 2) An equally important issue is that no matter how well the hardware might work, without functioning software, the hardware sits idle and does nothing. 3) It is not sufficient to have working hardware and working software; they must be compatible with each other. A Mac OS is useless on a Windows PC. 4) Most critically: everything needs to work reasonably well from first power-up or nothing works at all. Gradual, step-by-step evolutionary processes don't apply here.

Normally, on a design team we would plan on spending two or three times as long in debug as in design. Either we just weren't smart enough to get everything right the first time, or the systems engineers at the top specifying the tasks for the software, for the hardware, and how they worked together would be in error. In real life, it could sometimes take four to five times as long to debug a large system as to design it. For debug, we had all kinds of specialized equipment available. There were many well-qualified engineers trying to figure out where the problem was and then how to fix it. It was still a formidable task. If we were limited to making random hardware or software changes to fix the problems, such as postulated for evolutionary processes, they would never get fixed. In fact, some problems were so subtle that even though they showed up in only rare, obscure conditions, they were fatal when they did. According to the laws of randomness (sometimes called entropy) random changes would tend to introduce new problems faster than they would fix known ones.

A design team always worked to a specification. The specification defined software and hardware requirements. The goal was for the hardware and software to work together the first time they came together. This required them to be built to a common specification, with certain tasks to be performed in software, certain tasks to be done in hardware, and their interactions with each other defined in advance. Ideally, the first time the system was powered up, it would work, with hardware and software dovetailing perfectly. In electronic design, we would next start debug. In abiogenesis, failure means no replication, no debug, components degrade, and the process would need to start over.

If there were no specification, just random activity, the hardware and the software would never come together properly. Debug was extremely difficult even in a well-managed project. If a hardware group were told, "Throw together some hardware that would make an interesting product" and if the software people were told the same thing, but there was no communication between the two defining a common goal, the products of the two efforts would never function together. Information-driven machines are so complex that both the hardware and the software need to be built to a previously defined specification. This renders abiogenesis impossible. Whenever I hear an evolutionist talk about what marvelous, complex organisms have been made by random evolutionary processes, I marvel at the naiveté. Cooperation between information and hardware does not spontaneously occur.

It must be defined in advance. Materialists talk as though evolution is completely random, without any goal. The God of the Bible shows that He plans things and then implements them (Isaiah 46:9). Unbiased science reveals that the random, undirected processes of the materialist are not capable of providing an information-driven living cell. Unbiased science leads us to a God such as the Bible presents as the source of life. Science is more consistent with the Bible than materialism. Do you praise God at the discovery of this and want to proclaim it? Or in anger do you want to suppress it?

Just how much complexity is needed to kick-off life? Many biologists seem to think that a "self-replicating molecule" represents initial life. Article 3 discusses the fallacy of this. For now, we will simply use Virchow's aphorism as the starting point. In the 1850s, Virchow said, "All cells from cells." This simple statement has born true over the decades. There are certain minimum cellular features which must be available for a cell to survive. Some of these are ATP production, replication, metabolism, nutrient ingestion, cell membrane functionality, etc. These are all extremely complex functions, requiring many very specific components using dynamic self-organization. Missing any of them proves fatal to the cell. Therefore, they represent an essential degree of complexity required for the appearance of the first cell. Plausibly, over a quarter of a million nucleotides will be needed to meet the minimum information requirements. The hardware components are equally complex.

The first cell is vastly more complicated than any design project I have ever worked on. Yet, there would be no special equipment available for isolating problems in cellular debug. There would be no specification for the information to include all of the essential features. There would be no way to build cellular hardware to read and use the information defining it until it already existed. In view of the extreme complexity of both the information and the hardware, this is fatal. Abiogenesis is impossible. The problem is how to get the required complexity to kick-start Virchow's aphorism.

Add to this another limiting requirement, also discussed in Article 3. RNA, which is typically considered the plausible building block for life before DNA appeared, has an average lifetime of only several days. The largest nucleic acid that can be made from RNA before it degrades is about 200 nucleotides. This is only one-thousandth of what would plausibly be required for a minimal cell. It degrades a thousand times faster than it can be copied. Where does the first copy come from?

There is a natural conclusion from this discussion. The appearance of a living cell points to an extremely intelligent being who defined the structures and functions to build a cell, the codes used within the cell, a large block of information meeting the design requirements, and a large hardware structure meeting the design requirements. Since RNA is so short-lived and the operations are so complex, DNA and proteins plausibly appeared from the beginning. This "being" had the intellectual capacity to build a working cell without a debug process. Since natural processes are unable to provide the chemicals of life, per Article 3, the intelligent being needed to have the capability to work outside of natural law in order to place atoms and molecules into a dynamic relationship with each other to implement the design. What do you call such a being? You call Him "God." Unbiased science leads to the understanding that a living, personal God is the source of life. This plausibly carries over into the appearance of complex organisms with substantially more DNA information than bacteria.

These simple observations, unless falsified, render a natural origin of life impossible, materialism inapplicable, and humanism without foundation. The unifying factor in biology becomes the Creator God. Unbiased science confirms Romans 1:20, "For since the creation of the world His 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." Genesis 1 - 3 is valid history.

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[1] https://en.oxforddictionaries.com/definition/abstract retrieved March 9, 2019

[2] Gitt, W. *In the beginning was information.*1997. ISBN-10:89397-255-2

Article 2. Supposed Strong Reasons against God: "They are Nothing"
And Implications for Theistic Evolutionists

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Does unbiased scientific observation lead to the understanding of a personal Creator God or to materialism/atheism? These two alternatives are mutually contradictory. Both are proclaimed.

The opening chapter of the Bible, Genesis 1, asserts that its God created the heavens, the Earth, and the life that is in it, including that of man. Furthermore, because God is the Creator, He has the right to rule over man and to judge his behavior. The early chapters in Genesis are presented as historical events which establish the proper relationship between an omnipotent, eternal Creator and man. If these chapters are valid, the foremost priority in a person's life is to search for this God in hopes of finding Him and then to submit to Him if He is found. Jesus promised that those who would seek Him would find Him (Matthew 7:7-8, 1 Chronicles 28:9). Everything else pales in significance by comparison.

By contrast, if the first four chapters of Genesis are not valid history, this reflects directly on the sovereignty, on the power, and on the truthfulness of the God spoken of in these chapters. If God can't get something correct which establishes His right to rule and to judge, then how can a person be confident in anything He says afterwards?

Modern science is controlled by materialists, people who believe that everything that has taken place in history is purely the result of unguided natural processes. No allowance is made for any god to overrule natural law at any time or under any conditions. Furthermore, they claim that science provides unarguably strong evidence that all of the complex life forms we see around us are the result of billions of years of gradual modification as the first living cells gradually became the complex forms we see around us. Man is the most complex example of this process. This claim is in direct contradiction to the natural meaning of the words in the Genesis account. Materialists assert that a person either can believe in science or he can believe in a literal interpretation of Genesis, but he cannot do both; if he is rational, then he must choose one or the other.

The materialist's assertion is directly contradicted by the Bible. In Romans 1:18-20 we read that because God designed the creation, both are in agreement: the creation so clearly reveals God's invisible attributes that a person who rejects God's testimony in this incurs God's wrath:

> [18] For the wrath of God is revealed from heaven against all ungodliness and unrighteousness of men, who suppress the truth in unrighteousness, [19]because what may be known of God is evident in them, for God has shown it to them. [20]For since the creation of the world His invisible attributes are clearly seen, being understood by the things that are made, even His eternal power and divine nature, so that they are without excuse…" (Romans 1:19-20).

The Bible teaches that the natural man is in his heart at war with God. Some people may serve Him outwardly in order to sooth their consciences, while in truth they are unwilling to submit their wills to Him as Lord. However, a materialist has no intention of recognizing God's authority over him in any manner. The early chapters of Genesis establish that God not only had the right to rule and judge because He is the Creator, but He actually exercised this right by setting standards for Adam and Eve in the Garden. Then, when His commands were disobeyed, He brought eventual death into Adam's life, Eve's life, and each of their descendents. He also put the entire world under

a curse. A materialist has zero intention of submitting in his heart to such a God. His response to the Bible is to attack the opening chapters of Genesis vociferously. In his muddled thinking, he convinces himself that if he can do this then he has justified his rejection of God. Therefore, the battle over Genesis actually has very little to do with science. The materialist has hijacked science in an effort to justify his rejection of God's authority over him. This is primarily a spiritual battle.

In the various articles included in this collection, a case will be made that unbiased science is in fact consistent with the Bible and falsifies materialism. However, before going into the technical analyses, in this Article 2 we will examine the Scriptural perspective of the issues.

Natural Selection and Evolutionary Theory: A New Form of Idolatry (processes not objects)

The verses from Romans 1 quoted above tell us that God gives every person personal testimony of His existence. Yet, natural man's reaction is to suppress this testimony. As the chapter continues, it speaks of how suppression is characteristically exhibited:

> …Because, although they knew God, they did not glorify Him as God, nor were thankful, but became futile in their thoughts, and their foolish hearts were darkened. Professing to be wise, they became fools, and changed the glory of the incorruptible God into an image made like corruptible man-- and birds and four-footed animals and creeping things (Romans 1:21-23).

The worship of idols is practiced instead of true worship of the living God. The worshippers claim this is a sign of wisdom. God's evaluation is that they are only fools. Since idolatry denies God the glory that He is rightfully due as Creator, He despises it in all its forms. Both the Old Testament and the New Testament continually speak against idolatry.

In our modern scientific age, educated men no longer worship idols made of molten metal, stone, or wood. These are physical objects. Instead, a new idolatry has appeared: the worship of physical processes in the form of evolutionary theory and natural selection. In the new idolatry, the Creator God is still denied. All of His glory as the Creator of life is now assigned to natural, materialistic processes. Genesis chapters 1 - 3 are mocked as myth; any historical validity they might have is denied. This charge effectively strips God of any inherent right He has to set rules for man and reward his obedience or disobedience. Therefore, those who convince themselves that natural evolutionary processes are adequate to form life in its varied forms, including man, can justify to themselves that they are free to set their own rules of behavior and do not need to submit to God's. We see the outworking of this attitude in full force in our society today.

Men steeped in evolutionary theory frequently not only adhere to it intellectually, but also stand in awe of its accomplishments. They give natural selection the glory God reserved for Himself. In giving natural selection the glory due uniquely to God, it is worshipped.

In many ways, the idolatry of evolutionary theory is more devious than traditional idolatry of images made of metal, stone, or wood. It is obvious that in truth images of so-called "gods" have no true power. However, a set of very carefully crafted arguments gives the new idolatry the appearance of being able to create life and, over the course of long, extended periods of time, turn initial simple forms of life into the complex living forms we see around us. If powerless idols could have a profound grip on a natural, unregenerate mind, the potential strength of an idol that plausibly could create life including complex forms will tentatively be even greater. Such a "powerful" idol makes it yet easier for a man to suppress the testimony of God given in creation, as discussed in Romans 1.

Attributing to natural processes the glory due to God alone started with none other than Darwin himself. The following is the final paragraph of the 1859 version of *Origin of Species:*

> It is interesting to contemplate an entangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling

through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent on each other in so complex a manner, have all been produced by laws acting around us. These laws, taken in the largest sense, being Growth with Reproduction; Inheritance which is almost implied by reproduction; Variability from the indirect and direct action of the external conditions of life, and from use and disuse; a Ratio of Increase so high as to lead to a Struggle for Life, and as a consequence to Natural Selection, entailing Divergence of Character and the Extinction of less-improved forms. Thus, from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.

Darwin attributes the appearance of all of the forms of life around us to the action of various natural laws. The worship comes in his personal response to these laws, a recognition of "grandeur in this view of life," and how "endless forms most beautiful and most wonderful have been, and are being, evolved." A mindless computer does not respond like this to the data input into it. This is worshipful awe at the awareness of stupendous tasks accomplished by mindless natural processes.

Space precludes us here from looking at the ubiquitous examples of the awe so many materialists experience for evolutionary processes as they see what has reputedly been accomplished by them. Suffice it to say that Darwin's example is commonly mimicked.

God has a very definite response to idolatry of any kind. In Isaiah 42:8 we read, "I am the LORD, that is My name; and My glory I will not give to another, nor My praise to graven images." God has "drawn the line in the sand." He will not allow anything to detract from His glory. This applies in particular to idolatry of every kind, whether it be of traditional physical objects or modern physical processes. Romans 1:18-2:5 makes it clear that those who attempt to suppress truth about Gods eternal power and divine nature incur God's wrath, accumulating more and more wrath for eternity as they sin more and more in their rejection of Him.

This brings up an important question. Why do evolutionists appear to have such strong reasons to support their cause if in fact they are false? From a scientific perspective this is discussed in Article 4. From a spiritual perspective, it is elaborated on in the remainder of this article.

There Are No Valid, Strong Reasons for Rejecting God

> [21] "Present your case," says the LORD. "Bring forth your strong reasons," says the King of Jacob. [22] "Let them bring forth and show us what will happen; let them show the former things, what they were, that we may consider them, and know the latter end of them; or declare to us things to come. [23] Show the things that are to come hereafter, that we may know that you are gods; yes, do good or do evil, that we may be dismayed and see it together. [24] Indeed you are nothing, and your work is nothing; he who chooses you is an abomination. (Isaiah 41:21-24)

In this passage God challenges those rejecting Him to present valid, strong reasons for their doing so. This passage is traditionally associated with idols and idolatry. It concludes that those rejecting God are nothing and their works (their strong reasons or their idols) are nothing. Initially there were 16 pages of analysis for this passage, establishing its broader context and showing how this passage fits into the flow of thought. That exegesis has been removed for lack of space, but is available online at www.trbap.org/articles/rejecting.

Regardless of how the passage is exegeted, it applies to this discussion. From God's perspective there are no strong reasons for rejecting His Word, including Genesis chapters 1 – 3. The reputedly "strong reasons" are "nothing." Furthermore, those who follow after these reasons are an abomination. This evaluation applies directly to materialistic evolutionists. The full exegesis shows how it also applies to theistic evolutionists, who reject a literal understanding of Genesis, giving assent to most of the arguments of the materialists—arguments that God in His Word counts as "nothing."

Although God knows His reasons for rejecting the arguments of materialistic evolutionists, we are not born with this knowledge. The proper response of the Christian is to look to our God for Him to reveal to us what they might be and then look to Him for an open door to expose the materialists. Materialists most certainly are not going to welcome the destruction of their well-crafted arguments. If their arguments go, so does their basis for rejecting God's authority.

The arguments presented in the various articles here are an attempt to apply God's perspective. The new idolatry has no true "strong reasons" in its support. Abiogenesis is the starting point for a materialistic origin of life. Without living cells as resources, there is nothing to become complex. If natural processes prevent a natural origin of life, everything else is moot. It is for this reason that my interest has focused on abiogenesis for the past several decades. The basic laws of chemistry are well-known and the literature in abiogenesis is relatively easy to understand. This also makes discussion of it of interest to people of broad backgrounds.

Abiogenists claim that a natural origin-of-life is fact. Yet, it does not take much insight to recognize this claim is mostly rhetoric. The literature in the field consistently points to failure, not success. Yet, the journals are unwilling to let this truth be proclaimed. If one wants a clear indication of the validity of Isaiah 41:21-24, that the idolaters have no strong reasons, he should look at the literature in abiogenesis.

I have a B.S. in physics from UCLA from over fifty years ago. Most of my career was spent as an industrial design engineer. I also have about 15 years experience pastoring small churches. This is hardly the background to write an article challenging the validity of a major field of science. If I have overstated my case, it should be trivial for a materialist to falsify it. Personally, I believe God directed me in putting the concepts together in order to demonstrate the bias of those in the field. If someone like me can see the problems, why haven't others far more qualified already done so? As discussed in Article 4, the answer is simple. They are not allowed to. Nothing is allowed which openly challenges materialism. Evolutionary theory is carefully controlled fake science. And—they are not willing to pay the price for faithfulness to God instead of those controlling their careers.

Yet, my background in physics is relevant. The underlying cause of the argument presented next, randomization, is also the underlying basis for thermodynamic entropy (the second law of thermodynamics) and Shannon information entropy. *Entropy* is only a mathematical representation of randomness viewed from a certain perspective. I suggest that the same underlying principle that prevents an engineer from building a machine which delivers free energy is the same underlying principle that prevents natural processes from transforming raw, non-biological chemicals into an information-driven cellular machine. The following article explains how and why. The same principle makes both impossible. This is why I am so confident the underlying argument to the following article will not be falsified.

If you have accepted materialistic or theistic evolution over a straight forward understanding of Genesis 1 - 3, I challenge you or a friend either to falsify the basic arguments of Articles 1 and 3 or, if you can't, then confess before God that you have sinned greatly before Him. He claims there are no valid arguments against Him. Are you willing to devote your energies to discovering why?

Research Paper

A Natural Origin-of-Life: Every Hypothetical Step Appears Thwarted by Abiogenetic Randomization

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Internet access: https://doi.org/10.31219/osf.io/p5nw3

This is a preprint and has not been peer reviewed.

Version 7. May 5, 2019

Abstract

The study of the origin-of-life (abiogenesis) presents a history of failed experiments. Abiogenesis is viewed as a series of steps of increasing complexity, such that an initial supply of chemicals naturally present on a planet or moon gradually turn into living cells. Yet, not a single step has been observed that turns starting chemicals into new ones which represent an advance towards life, such that the new ones can be used as produced as the starting point in the next step. Steps do not flow smoothly from one to another. Yet, an eventual appearance of living cells requires a natural, smooth flow between steps along the entire pathway, without external guidance or intervention by scientists. If scientists cannot accomplish this for any step using controlled processes and conditions, it is implausible that the entire path could be traversed in nature under uncontrolled conditions. Historically, the causes for failures have been viewed as isolated instances, with hope that in time solutions can be found. By contrast, this article represents new science in that it proposes a common root cause leading to most if not all of the various failures.

We propose the following hypothesis of Abiogenetic Randomization as this root cause: 1) prebiotic processes naturally form many different kinds of products; life requires a few very specific kinds. 2) The needs of abiogenesis spatially and temporally are not connected to and do not change the natural output of prebiotic processes. 3) Prebiotic processes naturally randomize feedstock—they turn starting chemicals into more random molecular combinations. A lengthy passage of time only results in more complete randomization of the feedstock, not eventual provision of chemicals suitable for life. The Murchison meteorite provides a clear example of this. 4) At each hypothetical step of abiogenesis, the ratio of randomized to required products proves fatal for that step. 5) The statistical law of large numbers applies, causing incidental appearances of potentially useful products eventually to be overwhelmed by the overall, normal product distribution. 6) The principle of emergence magnifies the problems: the components used in the later steps of abiogenesis become so intertwined that single-step first appearance of the entire set is required. Small molecules are not the answer. Dynamic self-organization requires from the beginning large proteins for replication, metabolism and active transport. Many steps across the entire spectrum of abiogenesis are examined, showing how the hypothesis appears to predict the observed problems qualitatively. There is broad experimental support for the hypothesis at each observed step with no currently known exceptions. If this hypothesis is valid, then abiogenesis is a closed field. There would be natural barriers against the appearance of life at every step along any proposed path. This appears confirmed by experiment. This has a number of philosophical implications, although these are outside the scope of the paper.

Keywords: abiogenetic disconnects; emergence; abiogenesis; natural selection; systems chemistry; discontinuity; Virchow; entropy; randomization; dynamic self-organization

1. Introduction

1.1 Overview

In 1953 Stanley Miller and Harold Urey reported an experiment that successfully converted certain simple, naturally occurring compounds—methane, ammonia, hydrogen, and water—into various amino acids [1]. Amino acids are the building blocks of life. It appeared that natural processes were sufficient in themselves to provide the chemicals needed for a natural, spontaneous origin of life. The ensuing excitement was so great that it set off a new field of scientific study, initially called chemical evolution and now more frequently called abiogenesis. Sara J. Walker *et al*, in the British Royal Society's publication *Philosophical Transactions A*, commented on the reactions to the experiment, "There was some optimism that, had the experiment been left running, living creatures would soon be crawling out of the laboratory [2]." It has been over sixty years since Miller and Urey reported their results. However, the results have not come close to living up to these early expectations.

Steve Benner is the founder and president of the Westheimer Corporation, a private research organization, and a prior Harvard University professor. He is one of the world's leading authorities on abiogenesis. This is his evaluation of what he has observed:

> We are now 60 years into the modern era of prebiotic chemistry. That era has produced tens of thousands of papers attempting to define processes by which "molecules that look like biology" might arise from "molecules that do not look like biology" …. For the most part, these papers report "success" in the sense that those papers define the term…. And yet, the problem remains unsolved [3].

As we study the various stages of abiogenesis and hear about all of the optimism, it is well to keep Benner's comments in mind. The origin of life still cannot be explained scientifically.

We suggest the following hypothesis explains the root cause of most if not all of the observed failures in abiogenesis over the entire 60 plus years of its modern research activity.

2. We hypothesize:

1. Product Possibilities. At each hypothetical step of abiogenesis prebiotic processes at work in that step will be capable of forming a significantly larger number of products than are suitable for an advance towards the appearance of living cells.

2. Abiogenetic Disconnects. There is no connection between the natural products of prebiotic processes at a given step and the principles of biology and biochemistry that determine which products need to be provided for use spatially and temporally.

3. Randomization. Prebiotic processes are inherent randomizers. They tend to provide a random assortment of possible products according to a natural statistical distribution. Products suitable for life may appear on an incidental basis, but not systematically at higher yield than the natural distribution. Lengthy, extended spans of time for abiogenesis result in greater randomization of initial feedstock, not biochemicals.

4. Fatal Ratios. Because of randomization the ratio of wrong products provided at each step to those that are required for an advance towards life will be large enough to prevent any given step from successfully providing usable feedstock to its successor. This is the ultimate cause of the consistently failed steps and experiments in abiogenesis.

5. Law of Large Numbers. The statistical *law of large numbers* applies to prebiotic processes. A single mole of a given compound contains 6×10^{23} instances of the compound. This is a large number. In abiogenesis there will be a natural distribution of possible products for the outcome of a given set of conditions and processes. Fluctuations within the distribution are normal, but the larger the total number of instances worked on, the closer the average distribution yielded

comes to the natural distribution. This effectively neutralizes the significance of incidental deviations.

6. Emergence. The principle of emergence can exponentially compound the difficulties of the above assertions, particularly in later hypothetical steps towards the appearance of living cells.

These assertions are not difficult to understand. Neither is their application. Yet, they lead to conclusions with far reaching implications. Their simplicity and their ease of application to a given scenario make the hypothesis a powerful tool.

Two generations of consistent failures without a single success should tell us that something is fundamentally wrong with current foundational premises. We suggest that the above hypothesis explains the problem. The assertions represent fundamental properties of nature and any and every hypothetical step appears to be affected by them. In the Analysis section to follow, we will look at a number of the major proposed steps to see if the hypothesis provides a qualitative prediction/explanation of the outcome of experiments associated with the steps. Over the past sixty years, there have been reputedly thousands of experiments performed representing various postulated steps. None have been able to provide product usable as feedstock for its successor, which is the standard defining success within this analysis. The vast number of already performed experiments provides a substantial base for evaluating the validity of the hypothesis.

3. Discussion on the hypothesis

3.1 Product possibilities

Carbon, nitrogen, oxygen, hydrogen, sulfur, and phosphorous are the primary elements used in living cells. There are virtually an unlimited number of compounds that can be made using all or some of the possible combinations of these elements. The Beilstein Database lists over seven million organic compounds by their names and characteristics. Isomers are treated as separate entries. Polymers are not included. Along the same lines the Murchison meteorite contains over a million different organic compounds when isomers are included in the count [4]. Isomers are properly treated as separate chemicals because they are not interchangeable among themselves within proteins and nucleic acids.

The Murchison meteorite provides a true-life instance of prebiotic processes at work on initial compounds without any kind of interference or guidance. An initial feedstock plausibly consisting of only a handful of simple compounds was converted into over a million variants. By contrast, most of cellular chemistry is based on proteins and nucleic acids, which are built from a feedstock of twenty-eight kinds of building block molecules—twenty canonical amino acids (coded for in DNA), four kinds of RNA nucleotides, and four kinds of DNA nucleotides. Abiogenesis requires large, pure quantities of these 28 molecules to the exclusion of most others. Natural processes appear to work towards provision of random arrangements of the million plus possibilities, not to focus provision on the handful of building blocks needed for life.

The pattern of a prebiotic processes providing more unusable product than useable appears to repeat itself at each of the remaining steps of abiogenesis.

3.2 Abiogenetic disconnects

There appears to be no dependency, relationship, or connection of any kind between the products naturally produced by prebiotic process and those needed for life. Chemicals useful to life do appear, but only on an incidental basis. Potential utility towards life does not override the randomness of the normal statistical distribution. We have coined the term *abiogenetic disconnects* to represent this lack of connection [5]. On the one hand, *abiogenetic disconnects* is merely stating

the obvious. On the other, it defines a standard of reference and perspective for the ensuing discussion.

Chemical engineers regularly design processes and equipment to form complex products with controlled precision. Nature frequently provides processes which under tightly controlled conditions are capable of restricting their yield to specific targets from a broad range of possible outputs. The work of the chemical engineer is to sequence and control these processes so that the target is provided with sufficient purity for use in a succeeding step or final product. Accomplishing this in an industrial chemical plant typically requires suitable feedstock, suitable processing equipment, suitable mechanisms for environmental modification, suitable sensory equipment to supply feedback information, and a suitable mechanism for operational control. Living cells also feature these mechanisms. However, they are not available to prebiotic process. For instance, there is no feedback mechanism available to regulate the effect of an electric discharge on a mixture of methane, ammonia, water, and hydrogen, the constituents of Miller's experiment. A reputed prebiotic process which is dependent on the pre-existence of specialized equipment or on human intervention to mimic it in order to accomplish these tasks is not prebiotic.

Environmental disconnects. There are also environmental disconnects between the factors which determine the physical environmental conditions at a site and conditions required for abiogenesis. For example, just because too much rain could wash out a pond with incipient abiogenesis underway will not result in the appearance of a protective shield, diverting an approaching severe thunderstorm. The needs of abiogenesis have no restraining impact on the normal physical and chemical behavior. For another example, entrained mud flowing into a lake during spring run-off may potentially adsorb all of the organic molecules involved in abiogenesis and bury them during sedimentation, either at the lake or at some distant site downstream. This could prove fatal to incipient abiogenesis at the site. This would be similar to what happens to pollutants in Lake Michigan [6]. Yet, this possibility does not result in any restraint on the potential mud flow into a lake. There is a disconnect between the principles which determine environmental conditions at a site and those which are needed for successful abiogenesis.

This is important because most environmental conditions tend to fluctuate randomly over large values over periods of time. By contrast, chemical engineers exert precise control over a number of factors relevant to the processes used. Precise control is required in order to restrict output to a selected target or range of targets from an otherwise broad range of possibilities. One serious disadvantage of abiogenesis is that feedback mechanisms are generally sufficiently complex that their implementation requires cellular capabilities of genome specification, translation, implementation, and replication. Our assumption is that once this level of sophistication has been reached, abiogenesis has met its goals and living cells are now subject to Darwinian evolution. Thus, these tools are not available for use in abiogenesis.

Cellular products are far more complicated than those of any chemical plant. This plausibly makes them more sensitive to environmental variation than industrial chemical processes. If relatively simple industrial processes fail without feedback control and the ability to sustain a specified environment, it is even less plausible for abiogenesis to succeed without it. Perhaps current emphasis in abiogenesis does not emphasize environmental constraints because potential processes are not defined well enough to define constraint boundaries. Yet, we suggest that this is an extremely critical, often overlooked factor.

In his book *A Skeptics Guide to Origins,* Roberts Shapiro discusses the possibility of streamflow supply of feedstock [7]. Sometimes a process may require provision of multiple chemicals having incompatible formation chemistries. Shapiro proposes a solution for this in having the different chemistries take place in different ponds, with local conditions providing the proper environment for

each of the required chemicals. Streams then transport the chemicals from the supply ponds into the main processing pond, wherein the different intermediate reactants are processed together. This is obviously a scenario capable of many more wrong possibilities than correct ones.

The most significant problem with environmental variables is that they vary widely from day to day, month to month, year to year, century to century, etc. They have no stability. We suggest that it is implausible for a natural setting to provide adequate stability for any proposed situation which depends on streamflow from different locations meeting at a common downstream location for additional processing. RNA decays in only a matter of days [8]. Therefore, interruption of nucleotide supply for more than this could be catastrophic, potentially destroying all progress towards life. When nucleotide supply is dependent on environmental conditions such as specific rates of streamflow from multiple supply ponds simultaneously feeding into a mixing pond, the risk of an interruption in nucleotide supply becomes great.

3.3 Prebiotic processes appear to yield random mixtures of the possible products

Prebiotic processes inherently function as random product generators, using an external energy source to rearrange the chemical elements of substrate into a random set of new product molecules. The species and probabilities of the new molecules will be formed in accordance with the laws of physics and chemistry on a molecule-by-molecule basis in accordance with local environmental conditions. The total results will be the sum of individual, independent interactions.

As a general observation, energy utilization will typically take place in one of two settings: controlled or uncontrolled. Controlled energy usage requires a precisely defined physical mechanism to convert a specific form of energy into a new form suitable to accomplish a specific function. For instance, gasoline is a rigidly specified form of energy. It can be taken from a tank, metered into a cylinder, mixed with a suitable proportion of air, compressed, ignited by a spark, and then produce a controlled displacement of a piston which can be converted into rotary motion to turn the wheels of a car. A specific physical mechanism matched to the energy source is provided to perform all of the tasks required in order to burn gasoline as a controlled source of motive energy. There must be a good match between the form of energy supplied and the machinery. By contrast, simply dumping a tank of gasoline onto a car and igniting it will typically result in an uncontrolled fire or explosion. There is an exceedingly great probability that this will not improve the car but damage it. The energy from a tank of gasoline poured onto a car and then ignited will most certainly not provide a means for the car to be driven through heavy stop-and-go traffic for hundreds of miles. Uncontrolled energy does not provide controlled results.

Prebiotic processes are similar in character to dumping a tank of gasoline on a car and igniting it. By contrast, living cells have machinery which converts energy appearing in a specified form into ATP, which is useful for biotic processes. The form of energy to be converted into ATP varies among cellular types, such as UV light, visible light, methane, metallic ion flow, or digestible nutrients. Without machinery matched to the form of energy, energy tends either to have no effect or to act like a tank of gas dumped on a car.

Long periods of time do not make life inevitable; they only make randomization more complete. The large number of molecules in just a few kilograms of material overrides any temporarily useful fluctuations that might appear.

Since prebiotic processes are natural randomizers and abiogenesis requires specific products, it does not appear that prebiotic processes have inherent capability to meet the requirements necessitated for successful abiogenesis. This plausibly characterizes every hypothetical step of abiogenesis and explains why none have succeeded.

3.4 Emergence

3.4.1 Definition of Emergence

Life is noted for its highly organized structure across many different levels. Products and processes in living systems are typically the result of interactions between multiple components: a number of components need to be in place and functioning before the desired phenomena can appear. *Emergence* is the term used to describe this behavior.

Harvard biologist Ernst Mayr described emergence like this:

> Systems almost always have the peculiarity that the characteristics of the whole cannot (not even in theory) be deduced from the most complete knowledge of the components, taken separately or in other partial combinations. This appearance of new characteristics in wholes has been designated as *emergence*.... Actually, emergence is equally characteristic of inorganic systems. As far back as 1868, T. H. Huxley asserted that the peculiar properties of water, its 'aquosity,' could not be deduced from our understanding of the properties of hydrogen and oxygen [9].

Notice, Mayr mentioned that systems in general almost always exhibit emergence. It is not a rare phenomenon, but pervasive throughout nature.

Penzlin explained emergence in more detail, explaining how knowing details of component behavior does not allow one to predict their combined behavior. This starts with elementary particles combining into atoms and applies to each step as one works up from atoms to molecules to cells, and yet higher levels [10].

3.4.2 Virchow's aphorism and emergence

During the 1850s a number of researchers were concluding that cells form exclusively through the division of existing cells. Rudolph Virchow is generally credited with the aphorism *omnis cellula e cellula* (all cells from cells) [11].

Petra Schwille, a synthetic biologist and a director and scientific member of the Max Planck Institute in Biochemistry in Germany, gave a recent summary of the significance of this aphorism: "We still do not have a strategy to escape the circular dictum of the 19th century—attributed to Rudolf Virchow—that every cell derives from a cell ('omnis cellula e cellula'). Presumably there wasn't one right after the big bang, so where did the first one really come from [12]?"

There is an obvious discontinuity in the aphorism. At one point in time, cells did not exist and the aphorism was not active. At a later time, cells did exist and the aphorism was effective. Continuing with the question, "What is life and how could it originate?" Schwille declares "we are ironically still far from giving a convincing answer to this question…. [12]"

This paper will arbitrarily use the standard that the objective of abiogenesis is to bridge the discontinuity between naturally occurring non-biological chemicals and operational status of Virchow's aphorism. On one side of the discontinuity is abiogenesis. On the other is a fully-functioning cell subject to traditional Darwinian evolution. The goal of abiogenesis is to bridge the gap, at which point its role is finished. A major question facing abiogenesis is whether or not this gap is bridgeable by natural processes. This question needs to be answered on the basis of scientific observation, not dictated by metaphysical presuppositions of any sort. The question is, "Where does science lead?"

In the same paper cited earlier, Penzlin also explained why he believes Virchow's aphorism still applies despite the work of Oparin, Haldane and Miller. His comments show the ramifications of emergence applied to biology: "The whole cell is the most elementary unit that can maintain life; it is the least complex thing that properly lives [10]."

Penzlin's basic point, as summarized above and further developed in the paper, is that a cell functions as a complete unit. Life is an emergent feature which is more than the sum of its parts.

This was the root of Virchow's statement, "All cells from cells." Penzlin also adds issues of dynamic self-organization as an inherent component of cellular existence. All of a cell's essential components need to be present from the beginning, including many mutual interactions in dynamic self-organization far from equilibrium. In a static state at thermodynamic equilibrium, a cell rapidly degrades beyond recovery. His thesis is that prebiotic organic chemistry (i.e., the gradual steps of abiogenesis) does not have the capability to deal with the new complexities revealed.

Philosophers discuss the degree to which sufficient understanding of basic principles would allow emergent phenomena to be predicted [13]. We suggest that these discussions are irrelevant to abiogenesis. Natural processes work on what is actually present, not what could be. Philosophical discussions are irrelevant. Either everything is in place and an emergent phenomenon appears, or if any component is missing it does not appear. There is a discontinuity. No matter how close a system might be for all of the pieces to work together properly, there is no success until they actually do. Then, with all of the pieces in place, success suddenly appears. Discontinuity is the exact opposite of Darwin's continuity principle and where discontinuity exists by definition there is no continuity.

Emergence might not be a big issue if all of the components are statistically likely to appear on a frequent basis. Then it should only be a matter of time for random processes to bring them together. However, if their appearances are virtually impossible statistically, if random processes are all that are available, and if a number of these components need to appear together spatially, temporarily, and in a specified environment, the likelihood for success becomes exceedingly implausible. This appears to be the situation facing abiogenesis.

4. Miscellaneous Issues:

4.1 Entropy, random behavior, and free-energy machines

It is frequently understood that entropy results in random changes to an organized system making it less organized. Claude Shannon showed that randomization is the fundamental behavior and entropy is simply a mathematical expression of certain of its aspects [14]. Since randomness is intuitively simpler to understand than entropy, since it is more fundamental than entropy, and since it is adequate for purposes of this discussion, we will focus discussion on the effects of randomness. Entropy will only be mentioned in citations or discussion about them.

It is generally understood that perpetual motion machines and free energy are impossible because of entropy. Shannon's analysis of randomness was very broad in scope and applies to any probability distribution. When the rules of thermodynamic molecular behavior are applied to his analysis, the laws of statistical mechanics appear [14A]. A mathematical expression of entropy appears naturally in statistical mechanics.

Every experimentally tested step of abiogenesis appears to be plagued by randomness in the products yielded. Some of the later steps that are too complex to be tested are known to have many more wrong possible results than required ones. Randomness is plausibly going to be an issue for these as well. If randomization is an underlying root to the observed failed steps throughout abiogenesis then there is little basis to expect natural, prebiotic processes to be capable of overcoming its effects. Therefore, it appears that randomization is at the root of both free-energy machine failure and the failed steps of abiogenesis. With a common root cause for both application, there is little basis to expect abiogenesis to be any more successful than efforts to build a free-energy machine. Perhaps this explains the past sixty years of failure. If this is the case, then the problem will prevail no matter how many more years of effort are made. 6,000 more years will not solve anything.

This discussion appears to provide plausible basis to consider abiogenesis a closed field, even as are free-energy machines. A primary goal of abiogenesis should be to falsify this conclusion.

4.2 Prigogene, abiogenetic disconnects, and randomization

Ilya Prigogine won the Nobel Prize in Chemistry in 1977. He demonstrated that in a system far from equilibrium, self-organization can take place. A dramatic example of this would be the formation of an organized thunderstorm complete with tornado when a calm, stable mass of cold, dry air collides with and flows over a calm, stable mass of warm, moist air. Prigogine suggested (without evidence) that the phenomenon of self-organization could be extrapolated to account for the appearance of life [15]. Normally, random changes to organized systems destroy existing order. Since the emergence of life requires unorganized chemicals to become extremely organized, this would appear to be contrary to entropy. However, following Prigogine's lead abiogenists have postulated that an initially disorganized system in a far from equilibrium condition can self-organize using energy from an external source such as sunlight, with the resultant self-organization leading to life.

There is a fallacy with this hypothesis. Although self-organization can take place in far-from-equilibrium conditions with the result that complex molecules form out of simpler ones, yet abiogenetic disconnects and randomization still determine the nature of the products that are produced. The number of possible products that could be formed far exceeds the number suitable for life temporally and spatially. The Miller-Urey experiment illustrates how, because it presents a simple example of Prigoginian self-organization as applied to the origin of life at its initial step. First, start with simple, non-biological chemicals in an equilibrium state. Then add energy. The starting chemicals are randomly ionized, placing them in a far from equilibrium condition. The interactions of the ionic mix produce self-organization leading to new products, including many that are more complex than the original ones. Hence, the process represents self-organization. Importantly, though, these products still appear in accordance with a normal, random distribution of the possible outcomes. Biochemicals appear in their natural proportion to the whole; they are not superabundant as would be required for abiogenesis. The near total randomization of the Murchison meteorite compounds [4] is the plausible destiny of Prigoginian self-organization. Most of the products will be more organized than the starting compounds. However, their distribution among the possibilities will not be restricted to providing temporally and spatially those needed for abiogenesis.

Prigogine did not discuss how disequilibrium from sunlight could cause unorganized chemicals to invent a triplet code for protein translation, create the information to build an organism using the triplet code, and form the hardware to process the information. Emergence requires all of these to appear simultaneously. They represent essential capabilities necessary for transition into cellular life. Most if not all of the components to implement them are so complex that it is virtually impossible to form them using random processes. By contrast our thesis of interaction between abiogenetic disconnects and randomness leads to the expectation that any self-organization that takes place from the external energy source will produce a random set of molecules, ones that in general can have increased organizational complexity but without the specific organization required for an advance towards life.

We will see that instead of dynamic self-organization providing a simple solution for life as the required molecules spontaneously appear, it actually places new, significantly increased demands on origin-of-life processes. Prigogene plausibly did not understand that the dynamic self-organization observed in a living cell does not randomly appear, but is extremely controlled. It needs to be implemented by interactions explicitly defined in the genome of a cell and precisely implemented by cellular machinery. Being in an out-of-equilibrium state opens up the door to many possible forms of self-organization. The number of possible characteristics of a molecule's behaviour is significantly greater for a molecule used in a dynamic, self-organizing system than for a static system. Without a means of pre-existing control, random self-organization will not meet the specific requirements of abiogenesis. Dynamic self-organization does not simplify chemical evolution as is commonly presented. It significantly increases the difficulties. This will be discussed in more detail later.

.5. Methods

No original experiments were performed in this investigation. A broad study of the literature in abiogenesis, biochemistry, and cell theory was undertaken. The initial interest was on the relationship between Miller's experiment and the impact of entropy on the products it produced, particularly from the perspective of Prigoginian self-assembly/organization in systems far from equilibrium. The initial investigation was broadened substantially as the subject was pursued and newly discovered issues led to new topics for investigation. It appeared that randomness prevented the self-organization observed in Miller's experiment from organizing into the chemicals of life. The question than became whether or not the principles of randomness that governed the results of this experiment applied to abiogenesis as a whole. The answer to this question became the foundation for this paper.

6. Analysis of Steps from the Perspective of the Hypothesis

In this section we will examine a number of different steps/of abiogenesis from the perspective of our hypothesis presented earlier.

6.1 The initial step—conversion of raw, naturally appearing chemicals into biological building blocks.

6.1.1 Miller's Experiment and Variations

The initial step of abiogenesis transforms naturally appearing raw chemicals into building block chemicals, typically amino acids or nucleotides. These in turn would be used to form protein or nucleic acid polymers, which would be the next step.

The question is whether our hypothesis can explain qualitatively the results of experiments performed at this step. Do the products generally produced represent a random assortment of those possible or are products suitable for life preferentially provided? Is the randomness so extensive as to thwart progression into the next step, polymerization?

The Miller-Urey experiment of 1953 provides a clear example of this step. Miller started with an initially high concentration of four very simple compounds: methane, ammonia, hydrogen, and water. This represents a high degree of organization, occupying only four out of more than a million possible combinations of the initial elements. However, the initial compounds did not represent the organization required for life. Molecular rearrangement would be needed to provide for that. The initial compounds were subjugated to a high-voltage spark in batch mode until all of the carbon in the methane had been consumed and the process was stopped. Our hypothesis predicts increased randomness to the point that any useful molecules will be overwhelmed by those interfering with subsequent steps.

In Miller's initial report of 1953, he stated,

> On this basis the amino acids glycine, a-alanine and b-alanine are identified. The identification of the aspartic acid and a-amino-n-butyric acid is less certain because the spots are quite weak. The spots marked A and B are unidentified as yet, but may be beta and gamma amino acids. These are the main amino acids present, and others are undoubtedly present but in smaller amounts [1].

In 1953 only amino acids were discussed as products of the experiment, nothing else was mentioned. It was specifically anticipated that there were yet other amino acids, although in smaller amounts.

This report gives the impression that prebiotic processes do not work towards total randomness in chemical complexity, but favor formation of amino acids, the building blocks of life. This would imply that natural processes favor the appearance of life, which in turn implies that there is some as yet unknown connection between the results of natural processes and the requirements of life. This suggests that abiogenetic disconnects, the second assertion of our proposed hypothesis, had been

falsified by the results of the experiment, at least for this step. Harold Urey, Miller's graduate advisor and a Nobel Prize winner, co-authored the paper. This gave it credibility. It is not surprising that this experiment set off serious research in origin-of-life studies. It established a perspective which still seems to continue to this day among many abiogenists, that prebiotic processes naturally lead to supply of chemicals needed for life spatially and temporally; if we can just get the proper process methodology, then the problems associated with randomness will disappear.

Two years later Miller updated his report. By this time he had run three versions of the experiment, with one of the three being a repeat of his first one. He also had had time to do a more complete product analysis. This time the amino acids represented only a small portion of the reported compounds. Miller listed the following as identified in the yield: "HCN, amines, aldehydes, alcohols, most of the volatile acids, acrylonitrile, polymers, nitriles" …" amino acids, hydroxy acids, part of aliphatic acids, polyhydroxy compounds, part of polymers [16]."

The chemicals of life were not favored after all. The original chemicals started out representing only four very simple chemicals (methane, ammonia, hydrogen, and water) in high concentration. In the span of one week, this had increased to a broad range of product categories with multiple kinds of compounds in them. These are randomized compounds as predicted by and consistent with our hypothesis. In the course of a single week, the initial feedstock was significantly randomized.

Miller also reported in the 1955 paper that in one variation of the experiment, the condenser and electrodes were interchanged. In this case "a considerable quantity of hydrocarbons was formed and only a very small quantity of amino acids." This shows that not only are a wide range of products besides amino acids possible, but even getting amino acids is dependent upon having the correct process mechanism in place. Otherwise, randomization still takes place, but most of it in product space far away from amino acids.

A later report by Miller *et al* showed that the amino acid concentration was consistent with equilibrium reactions when one mixed methane and ammonia together in approximately equal amounts, as was done in the experiment [17]. Thus, Miller acknowledged that the observed amino acids appeared only in accordance with normal chemical reaction theory; they did not indicate any tendency to concentrate the chemicals of life. This acknowledgment is the exact opposite of the impression given by his initial 1953 report.

Upon close examination the experiment appears to confirm our hypothesis. A broad range of new products are formed which randomizes the initial chemicals provided. Chemicals suitable for life appear, but in what appears to be part of a natural distribution without any special emphasis on requirements for life. The products yielded by the experiment would not make suitable substrate for the next step, polymerization.

From a practical perspective, all initial step experiments appear to be mere variations of Miller's original. The starting chemicals can be varied, the energy source can be varied, and environmental features can be varied. However, in general all of the variants give the same kinds of qualitative results. An initial substrate is acted on by an external energy source with sufficient energy to reorganize the molecules. However, being prebiotic, there is no mechanism to harness the energy and apply it in a controlled manner, thereby restricting the yield to specific products—such as happens in a living cell or an industrial chemical plant. As a result, the products will represent a random assortment of those possible temporally and spatially. No special preferences are given to those needed for life. This observed behavior appears to be due to fundamental properties of nature which have no plausible workarounds.

There is no basis to believe that in a natural setting steps after the initial one will ever have the chemicals they need for satisfactory function. It is perhaps ironic that Miller's experiment set off all of the excitement to begin abiogenesis studies in earnest. However, it actually demonstrates clearly how abiogenetic disconnects and randomness combine to prevent the step from supplying new

chemicals in a form usable in subsequent steps. With Miller's experiment abiogenesis has reached a dead end before it gets started. There appear to be no workarounds for the problems it has revealed. Sixty years of intense study has not made a dent in resolving the problems revealed by this, the first experiment.

6.1.2 The Murchison Meteorite

In 1969 a large meteorite landed on earth near Murchison, Victoria, Australia. Over one hundred kilograms of its fragments were collected within a short time of landfall, while it was still essentially uncontaminated. It was of a class known as carbonaceous chondrite. Of these fragments two percent (2.0 kg) were of organic matter. Amino acids were among the organic compounds [18].

The Murchison meteorite and others similar to it provide unique examples of natural, prebiotic processes at work over an extended period of time apart from any form of human interference. S. Pizzarello gives an overview of the organic content of carbonaceous chondrite meteorites reporting, "Overall, their molecular composition appears to fulfill the expectations of abiotic syntheses governed by purely physicochemical processes and is quite dissimilar to the structural specificity characterizing biochemistry, a contrast that also vouches for meteorite organics' indigeneity [19]."

The above comment is significant. Pizzarello *et al* revealed that meteoritic prebiotic processes lead away from the chemicals of life, not towards them. Therefore, it was evident that the meteorite was not contaminated from earthly microbes. This is not what would be expected from claims that the appearance of life is essentially inevitable given suitable initial compounds, suitable energy sources, and a suitable environment. The meteorite appeared to meet all three of these requirements, but used them as an opportunity to produce a random assortment of chemicals far from those characteristic of life. Furthermore, Pizzarello acknowledged that this is what should be expected from "purely physicochemical processes." This is not orthodox abiogenetic theory.

Philippe Schmitt-Kopplin *et al* provided a detailed analysis of high-resolution mass spectroscopy of Murchison meteorite samples over the limited mass/charge range of 150-1,000. Over 14,000 unique molecular compositions were observed. Extrapolation over a fuller range and accounting for "a realistic minimum of several thousand isomers for each chemical composition" resulted in a projection of several million different compounds residing in the meteor. This suggested that "Constraints of temperature, radiation, accessibility, and selectivity of reaction pathways (e.g. aromatization) have likely guided the trajectory of organics evolution into a complex mixture, eventually approaching an entropy-driven near continuous distribution of molecular compositions and structures characteristic of abiotic syntheses [4]." The continuous distribution referred to represents near-complete randomization, where the observed species have been randomized until they occupy almost all of the multiple millions of possible molecular configurations.

If one starts with high concentrations of the naturally appearing non-biological chemicals located only a few "steps" away from those needed for life and if these quickly randomize into a broad range of products of near-complete randomization, then it is difficult to comprehend how one could start with the broad range and for them randomly to converge on the twenty-eight compounds needed for life.

It is difficult to imagine a clearer testimony against the possibility of natural processes supplying the chemicals of life than that offered by the composition of the Murchison meteorite.

6.1.3 RNA

6.1.3.1 Problems with traditional approaches to RNA fabrication. RNA nucleotides are composed of three moieties: a phosphate molecule, the sugar ribose, and one of four bases. For years scientists have tried without success to simulate a prebiotic process that could properly assemble

these with each other. Saidul Islam and Matthew Powner give a thorough analysis of the problems that underlie the failures. In a paper on systems chemistry they have a discussion under the heading "The Traditional Disconnection of RNA Leads to Impossibly Difficult Ribonucleotide Assembly." The heading summarizes the issue. Natural processes make traditional approaches to a prebiotic fabrication of RNA nucleotides virtually impossible. They go into great analytical detail justifying this statement. They then offer as an alternative the systems chemistry approach pioneered by John Sutherland and cohorts at Cambridge University [20].

6.2.3.2 The systems chemistry approach to RNA fabrication. "The origin of life is now considered as that of co-evolution of different subsystems than a self-organization process in a system made of a single biopolymer [21]." Systems chemistry is the current hope of abiogenists to get past the problems of RNA nucleotide production that have plagued them for so long. A simple definition of systems chemistry is "a multi-component reaction giving many products [22]."

We will examine the issue of systems chemistry as represented by the work of John Sutherland in detail. Since this has become the current focus of emphasis in abiogenesis, it warrants careful, thorough analysis.

Sometimes Sutherland and cohorts had better results than expected. This resulted in claims that chemistry is predisposed to provide the chemicals of life [23]. If this were true on a broad scale and across a broad range of steps, it would falsify the abiogenetic disconnects phenomenon of our hypothesis, at least for this step. However, close examination reveals that the apparent predisposition is limited in scope and requires constraints too strict for natural, unguided implementation. In a prebiotic setting randomization should still prevail over predisposition.

We suggest that the predisposition being spoken of by Sutherland and others is in essence no different than other well-known processes providing specific chemicals, except it applies to simultaneous "multi-component reactions giving many products." This would analogous to claiming that amino acids are predisposed structures and therefore prebiotic processes favor the appearance of amino acids. The Strecker synthesis could be provided as evidence. However, Miller's experiment plausibly makes use of the Strecker synthesis to form its amino acids. That does not prevent other syntheses from working simultaneously and in parallel, with an overall effect of significantly increased randomization. This has just been discussed. Likewise, it could be claimed that there is a predisposition to form sugars and then using the formose reaction or the Kiliani-Fischer synthesis as evidence. The reality is that nature does provide paths to form various specific products. This is the basis for chemical engineering as well as the underlying chemistry used in living organisms. The issue is that any specific paths/products are only a small portion of the total available and they require strict process control lest the target not be reached, being diverted into some other direction. A true predisposition would be so robust in favoring a particular route that it would be difficult not to take it. By contrast it takes very strictly applied conditions for the systems chemistry of Sutherland to be effective.

Initially, Sutherland's goal was to synthesize a nucleotide in a single pot using a systems chemistry approach [24]. By 2017, the goal had expanded to forming all of the basic building blocks—lipids for compartments, amino acids for metabolism, and nucleotides for information—starting with cyanide as a common initial substrate. However, this ended up requiring six separate ponds with their own unique geochemical conditions and whose products then needed to be mixed together in a specific sequence. Even this degree of complexity did not supply required product, but only precursors [25]. The requirement of so many unique ponds and associated chemistries in such close proximity to each other begins to stretch plausibility. Their latest paper [27] discusses further refinement of one of these paths. It requires drying and wetting cycles, with a suggestion that a wetting cycle would take place when rain had resumed after a drying cycle. This has the potential to represent a long period of time, particularly during drought conditions. It is implausible for a process

based on this mechanism to serve as a nucleotide source for RNA, which degrades in a matter of days and needs to be replicated before it degrades. Between rains it is plausible that any incipient progress towards overcoming Virchow's discontinuity would be undone, resetting progress back to the beginning. Sutherland just introduced a step which plausibly could preclude his approach from meeting its target objective.

One of the authors, TS, has four decades of industrial design engineering experience. Standard engineering procedure for a big design project is to break the overall task into a series of subtasks. The subtasks would be assigned to specific engineers or engineering teams as appropriate. The goal was for a subtask to represent a design effort which could meet a specified schedule by those assigned to it. The subtasks would then need to be integrated into a final, total solution. Generally, in a large design effort far more time is spent in debug of unanticipated problems than in the initial design. Even gifted, well-trained, well-experienced engineers working on complex projects spend most of the project time debugging unanticipated problems. Good designs of complicated processes do not just happen. There are far, far too many wrong ways to do something and even the most brilliant and well-trained engineers are frequently "blind-sided" by various unexpected "wrong ways."

Sutherland's approach provides a good example of a design engineer at work. Whether this was deliberate or unintended is irrelevant. The important thing is that his approach represents an elaborate engineering design. This approach can be readily observed by reading the papers reviewed here [21-27] as well his many others. He characteristically starts off with a general objective as well as an assumed set of variables which include feedstock, environmental conditions, and energy source. He experimentally tests what happens to the feedstock when energy is applied. He modifies the variables to observe what gives the best results towards meeting his goal. When intermediate reactants start to veer away from the target, he then analyzes what happens, proposes possible solutions, and tests them to see what works best. He pieces together a flowchart as he constructs a model of how abiogenesis could work. Whenever the model "goes off in the wrong direction", he "tinkers" with it until he discovers some kind of process constraint which resolves the issue. He adds this to his flowchart and then proceeds to the next deviation away from a path to his target chemicals. As a result of repeating this process a number of times with a gifted, trained team for many years, he can as of now provide precursors for a number of products. But, he still does not yield suitable products for use as substrate in a subsequent stage of abiogenesis, the standard we have set as a successful experiment. Furthermore, he in effect assumes replication. He latches onto what "works" when his intellect tells him it is closer to his target and then attempts to progress to the target from the known, successful setting. In a natural setting, because of emergence, the target is an unknown possibility. Even if a potentially useful process step appears, it would plausibly be only temporary. There would be no way to start from it for future steps.

What Sutherland has discovered—and this represents a significant advance in chemistry—was that nature not only provides paths for single-molecule synthesis, but also provides for systems synthesis allowing multiple substrates to form multiple products simultaneously. Nonetheless, his proposed synthesis still needs strict control over all of its variables. This includes substrate composition and timed introduction along with controlled environmental conditions—wetting and drying, temperature, pH, specific concentrations of dissolved metals, etc. Failure to meet the conditions required for effective systems chemistry at any process step quickly leads to provision of the wrong products.

A general predisposition to biological products would result in many paths leading to them starting from widely scattered initial locations. There would be a general tendency to head towards specific biochemicals regardless of where one started. This does not happen, either with Sunderland's approach or any other approach.

A chemical engineer can specify feedback sensors and control mechanisms to modify substrate flow and environmental conditions to keep a process under control, allowing it to make necessary corrections to produce the desired product. Living cells have similar mechanisms. Prebiotic processes do not have this. There is no means to sense what a lower mixing pond needs and then use this information to control what a higher-level pond produces or to regulate streamflow as it carries intermediate reactants into a lower mixing pond. There is no means for the needs of the mixing pond to be reflected in determining the kind and concentration of minerals to be dissolved into stream waters during the flow. There is no means to adjust the spectrum, intensity, or timing of ultra-violet light falling on a pond. An industrial chemical plant has control over all relevant factors. It fails to produce target product when any aspect of process control breaks down. An abiogenetic process does not have control over any of the factors affecting its success. Yet, the flowcharts being developed by Sutherland and cohorts are plausibly much more complicated than the process flowcharts used for many industrial chemical processes. Sutherland is designing what is needed in order to use natural process capabilities to produce lipids, amino acids, and nucleotides, but nature ostensibly does not provide the process control means to implement the design effectively.

We suggest that the single biggest obstacle to the success of Sutherland's approach is its dependence on precise environmental conditions, with rainfall variation presenting one of the more serious difficulties. Extreme variations in rainfall will plausibly occur at any given site throughout the Earth when observed over an extended period of time, particularly when one contrasts typical variations in instantaneous streamflow values between drought conditions and flood conditions. Furthermore, a frozen stream in winter acts like a drought, stopping flow. The problem is that even if a site could be found which could naturally implement Sutherland's flowchart without any outside intervention some of the time, this should plausibly be only a temporary phenomenon. Normal fluctuations of rainfall and other environmental variables could periodically lead away from suitable environmental conditions with resultant cessation of nucleotide production. Although this may be only temporary from a long-term perspective, it only needs to be long enough for degradation of all incipient progress to make the approach unviable. The only protection against this is for progression of an incipient cell into a living, autonomous cell, one capable of independent, standalone existence, such as we observe in bacteria today. The progression to autonomy needs to be completed before drought or flood conditions reset progress.

Sutherland hints at our hypothesis

In the closing comments of his 2018 paper cited above, Sutherland discusses the plausibility of his postulated processes, stating:

> However, it is not the authors wish or intent to persuade the reader that all roads must have led to Rome. In fact, we caution the opposite. While there are many small, and large, variances of sequence that could have still permitted a route to life, there are far, far more that would not… It follows that the sequence of events that led to life must have been highly contingent and the origin of life as we know it could have been a low probability event [27].

It has taken years of effort for Sutherland *et al* to reach their current stage of development. When they say that even though there are many variances in the path along the route to life, that there are far, far more that do not lead there, they speak from long experience and hard work in studying and experimentally testing this issue. No one living today understands more than them the problems they have faced and the effort it took to keep the reactions from heading off into randomness. Significantly, their observations have led them to conclude what amounts to the essence of our hypothesis.

We suggest that the evidence supports the understanding that systems chemistry falls within the scope of behaviors impacted by our hypothesis. Many abiogenists today view systems chemistry as their hope of breaking out of the pattern of failures that have plagued the field since its inception.

Just as Sutherland eventually recognized that there are far, far more wrong ways than correct paths that lead to life, problems he still faced even with systems chemistry, we predict that others who are hoping for systems chemistry to give them breakthrough success will ultimately face a similar scenario as Sutherland. There are far, far more wrong paths than correct ones. Randomization rules.

6.2 The appearance of protein and nucleic acid polymers

The goal of the next step is to convert the amino acids and/or nucleotides supplied by an initial process, as represented by Miller's experiment, the Murchison meteorite, or Sutherland's systems chemistry into polymers of sufficient length and purity for use in replication or metabolism. Plausibly the most serious issue here is that random assembly of building block molecules, such as amino acids and nucleotides, produce aggregate instead of forming biopolymers of amino acids or nucleic acids [4]. Aggregated compounds are called by many names in the literature, including inert organic matter, tar, asphalt, tholin, chaotic polymers, intractably complex mixtures of organic compounds, and gunk. *Tar* is the term of choice used here.

According to our hypotheses, the uncontrolled energy of prebiotic processes results in uncontrolled self-assembly of molecules. We saw in the first step that small, initial compounds can increase into larger, more complex ones. But, there is no reason for the process to stop there. Larger molecules can also join together randomly. Apparently, this is what happens. For instance, living cells need polymers of amino acids linked into proteins using peptide bonds, a specific kind of bond formed when the amino moiety of one molecule links to the acid moiety of a second and a water molecule is formed at the junction and then removed. Life requires this specific bond to form. However, there is nothing in prebiotic processes to constrain this reaction instead of alternatives.

R. Shapiro observed that considerations of entropy [i.e., randomization] would lead one to expect that prebiotic mixtures should "combine haphazardly, producing chaotic polymers [28]." In other words, the effect of randomization on prebiotic mixtures should result in the production of tar.

A.W. Schwartz commented, "Attempts to model the spontaneous chemistry which presumably preceded the origin of life on Earth commonly result in the production of intractably complex mixtures of organic compounds. It is, therefore, difficult to understand how any kind of evolutionary process might have begun [29]." Thus, prebiotic processes preferentially form inert organic matter. After discussing the issue at length, he offers several hypothetical solutions. He then concludes with the following statement:

> Without such selectivity [some kind of protective structure capable of selectivity] and its consequences, or some equivalent mechanism of selection, nothing but intractable mixtures (*i.e.*, gunk) would have been deposited on the shores and in the sediments of ancient seas and streams. Identifying such organizing phenomena may be the path to the future, leading to a resolution of the mixture problem sketched above. On the other hand, the solution to the problem is very likely something we have not thought of yet [29].

Steve Benner commented about the problem, "An enormous amount of empirical data have established, as a rule, that organic systems, given energy and left to themselves, devolve to give uselessly complex mixtures, 'asphalts' [3]."

In summary the *asphalt* problem, also known as the tar problem, is the typical, expected outcome of prebiotic processes. Randomly joined assemblies of random molecules of either covalent or hydrogen bonds should plausibly form random, chaotic mixtures not linear polymers. This has been repeatedly, consistently observed experimentally.

6.1.2.1. Miller and peptide polymers.

Did Miller form any peptide polymers? E. T. Parker *et al* first addressed the general case with the statement, "… the transition from simple molecules, such as amino acids, to more complex ones, such as peptides, has proven challenging under plausible primordial conditions [30]." However, they had recently found an archived solution of an experiment Miller performed in 1958 in which cyanamide was intermittently added to the solution. The amino acids formed were approximately equivalent to his original 1953 experiment. However, ten different dipeptides were detected and two tripeptides were tentatively detected. Parker *et al* continued, "The ratio of amino acids to dipeptides in the cyanamide samples was calculated to be approximately 1000:1 – 100:10, which agrees well with experimental data that indicates that the amino acid to dipeptide ratio is approximately 1000:1 under equilibrium conditions." In another experiment R. B. Martin observed that in general there is a seeding effect, such that the equilibrium ratio between the concentrations of the first two amino acids in a chain and the chain is about 400:1, but adding subsequent amino acids to an existing chain reduces the concentration by a factor of about 50:1 for each additional amino acid [31]. These ratios are in approximate agreement with Miller's samples as measured by Parker.

This observation is significant. Monomers in aqueous solution do not spontaneously form peptide chains of several hundred amino acids such as characterize typical proteins. This explains why plausibly prebiotic polymerization experiments, even using pure substrate constituents and controlled environmental conditions, have only limited success. Concentrations drop off exponentially as the incipient polymer lengthens. For instance, an experiment by Imai *et al* reported a maximum detectable chain length of 6 amino acids [32]. An experiment by Huber and Wächtershäuser reported a maximum detectable chain length of 4 amino acids [33]. When a short chain is so dilute as to be barely detectable and when it has a relatively short lifetime, it is useless as a component of a prebiotic soup leading to a formation of life [5]. It is perhaps also significant that the above experiments started with pure solutions of reactant monomers, not the contaminated, chaotic mixtures characteristic of natural, initial-step processes such as Miller's experiment. Contamination was not an issue with their feedstock. Yet, long peptide chains still did not appear. They do not report on whether tar formation was an issue or not.

In summary Miller's experiment readily and preferentially forms tar, but not peptide polymers. There is a disconnect between the products of natural processes and those required for the appearance of life.

Sohan Jheeta reported results of polymerizing RNA nucleotides on an ion-primed Montmorillonite clay surface. However, the concentration decayed exponentially with each additional nucleotide and was only a trace at 10 nucleotides [34]. This does not appear to be a plausible approach for provision of the approximately two hundred nucleotides estimated to be needed for a self-replicating molecule.

6.1.2.2. The Murchison meteorite and tar

Two classes of organic matter have been observed in the Murchison meteorite, soluble and insoluble. The soluble matter constitutes about 30% of the total and the insoluble the remainder. The insoluble is mostly kerogen-like but difficult to analyze [4]. It is found in a chaotic mixture of compounds with chaotic bonding between them. However, one kind of bond is almost completely missing: peptide bonds between the extant amino acids. Yet, these are the ones needed for chemical evolution. Shimoyama and Ogasawara report that in their spectral analysis of the organic matter of the Murchison meteor, they detected peptide dimers of glycine - glycine, but at a concentration four orders of magnitude less than that of the glycine monomers. Thirty-one other, specific dimeric combinations of amino acids were analyzed; all were below detection limits. No mention was made of tripeptides or greater [35]. From a practical standpoint this represents effectively no peptide polymerization. Apparently, the unguided prebiotic processes at work in the Murchison meteorite

preferentially provided chaotic mixtures of product (tar and kerogen) instead of chains of amino acids joined by peptide bonds. Life requires the opposite.

The Murchison meteorite provides an example of natural processes at work without human interference. There was plenty of energy available to randomize molecular components towards nearly complete randomization. Inert organic matter was formed in abundance. Yet, peptide bonds, which are the kind needed for life, were virtually non-existent. There is a disconnect between products produced naturally and products needed for life. As a result of the disconnect, randomization controls the output.

Earlier we looked at Shapiro's comment that because of entropy, "The components of a mixture should combine haphazardly, producing chaotic polymers." The original paper continued,

The formation of an information-bearing homopolymer through undirected chemical synthesis appears very improbable. The difficulties involved in such a synthesis are illustrated by considering the prospects for the assembly of a polypeptide of L-amino acids, based on the contents of the Murchison meteorite as an example of a mixture of abiotic origin. In that mixture, potential replicator components would be accompanied by a host of interfering substances, which include chain terminators (simple carboxylic acids and amines), branch-formers, D-amino acids, and many classes of substances for which incorporation would disrupt the necessary structural regularity of the replicator. Laboratory experiments dealing with the nonenzymatic synthesis of biopolymers have not addressed the specificity problem [28].

If one speculates that the Murchison meteor plausibly started off with simple natural materials, such as methane, ammonia, cyanide, cyanamide, or similar simple molecules of carbon and nitrogen, then the above statement is revealing. It describes a mixture which has become chaotic through extensive randomization of initial products. Randomization was the primary action of uncontrolled energy sources acting on a substrate through prebiotic processes.

6.3 Appearance of Specific Polymers.

According to our hypothesis, there should be many more wrong ways than correct ones to sequence a protein or nucleotide suitable for use in a living cell. Yet, extant cells do have proteins and nucleic acids with usable sequences. How does the hypothesis apply to this step?

6.3.1 Protein Analysis: Provision of enzymes for use in cellular metabolism

Proteins are long strings of amino acids joined by peptide bonds. How hard is it to get a sequence that can provide a specifically needed function? The average protein length in extant archaea, which constitute the simplest ones observable, is approximately 270 amino acid residues [36]. There are 20 alternative amino acids coded for in DNA for use in protein fabrication. The number of possible combinations of a 270-amino acid sequence is 20^{270}, which converts to approximately 10^{351}. This certainly counts as a large number of possible arrangements of a polymerization process.

There is some redundancy in protein sequencing. It is known that a number of specific substitutions can be made to a protein without destroying its functionality. This is not always the case; hemophilia and sickle cell anemia are two well-known diseases, both of which result from a single improper amino acid substitution in the hemoglobin molecule.

Anthony Keefe (a Harvard professor) and Jack Szostak (a Harvard professor and Nobel Laureate) established experimentally and confirmed with computer database analysis that only about 1 in 10^{11} randomly-sequenced proteins are functional [37]. That ratio is in itself sufficient to thwart life. In an assortment of randomly sequenced proteins, functional ones represent a concentration of only 10 parts per trillion. This concentration is certainly too low to form any kind of metabolic pathway useful for life.

The next question concerns how many different kinds of proteins are possible among the functional proteins. The Protein Data Base lists about 150,000 unique proteins [38] in late 2018, with the number increasing daily. Assume for discussion purposes that these 150,000 proteins represent the total number of possible uniquely functioning proteins, although the actual number is expected to be far, far greater than this. In this case, the odds for random processes to provide a specifically needed protein are 1 in 10^{11} times 1 in 150,000. This calculates to 1 in 1.5 x 10^{16}, which is about 70 parts per pentillion. In a solution of randomly formed proteins, this concentration would be too dilute to be useful.

The issue of redundancy can be looked at from a different perspective. It is known that there is a certain number of substitutions permitted in sequence and still have a functional protein. This number is not actually known, but we can make some estimates which provide a useful perspective. For purposes of discussion, we will assume on the average, each amino acid site in a protein can be satisfied by a choice between two amino acids. It appears that three alternatives would be too high, in that if there were three alternatives for every position, it would be plausibly very difficult to align sequence maps between homologous proteins. However, it is not generally that difficult. So, only one choice means no redundancy, which we know is not true. Three choices plausibly give too much. So, two is a reasonable estimate and adequate for our purposes.

P	=	odds against getting a usable protein sequence.	[1]
C	=	average number of amino acid alternatives per position	[2]
N	=	number of proteins	[3]
20	=	number of amino acid species	[4]
P	=	$(20/C)^N$	[5]
P	=	10^{270} for an average archaea protein.	[6]

This calculation is extremely easy to work with for a protein of any length. The odds against getting a suitable protein with an average of two choices per position is simply 10 raised to the power which equals the number of amino acids comprising the protein. Thus, the odds against getting a useful protein sequence for a 500-residue protein is 1 in 10^{500}.

This probability number is useful in discussing complexity issues. If an assumption is made that a certain number of random sequences could plausibly be formed in one year, then adding 100 zeroes to that length multiplies the time average time per appearance, one year, by 10^{100}, a googol. Adding a second 100 amino acids to the protein multiples the average time between appearances by another googol. Suppose a scenario existed such that 10^{70} random sequences of amino acids could be supplied in a year. Then, incrementing the number of amino acids in a chain to 71 would take ten times as long—10 years average time to supply a single instance of the protein. The time to supply a single instance of an average size archaea protein through random processes would then be 10^{200} years—a google times a google of years. The 15-billion years total projected age of the universe is rather small in comparison. It doesn't register until the 190th decimal place. For all practical purposes, this will never happen.

One might suggest that prebiotic proteins do not need to be as large as modern ones. Therefore, smaller ones might be viable for early stages of abiogenesis. However, if dynamic self-organization is required of cellular components from the beginning, then smaller proteins might not be adequate even from the beginning. Plausible reasons for this will also be discussed later. In this case we are stuck with the staggering odds just examined.

Obviously, with these kinds of odds independent, random assembly for each instance of a protein is not a viable source of supply useful to abiogenesis. Multiple googols of years between appearances of a single molecule represent too dilute a solution to be of value. Continuity of action or function would be impossible. Hence, translation and the information controlling it need to be available and active at the time Virchow's discontinuity is challenged. Actually, the problem does

not truly go away with translation. It would plausibly be more difficult to get the proper information to appear in a genome for use by translation to make a given protein than for random processes to make a single instance of it, because the task is more involved. So, although translation helps in the production of multiple copies, it poses more of a problem for the first copy—and the problem is severe. This will be elaborated on later in our discussion.

6.3.2. The appearance of self-replicators and their usefulness towards RNA-world cells.

By definition there can be no chemical evolution without replication. The above discussion of protein sequencing underscores this. The random appearance of a protein specifically needed to help bridge Virchow's discontinuity is too rare to be useful.

There are two possibilities of simple replication. The first is a single-molecule ribozyme capable of copying a random template as large as itself. It needs to have an average life-time long enough to do this many times before it degrades. Plausibly a ribozyme needs to be larger than 200 nucleotides to do this. The second is a molecular network composed of a number of smaller nucleotides which can self-assemble to form a replicator. Both of these have serious problems. Neither has been able to be demonstrated experimentally.

6.3.2.1 Single-molecule replicators. In 2011 Woechner *et al* fabricated a ribozyme RNA polymerase, an incipient self-replicating ribozyme, *tC19z.* It comprised a little under 200 nucleotides and was capable of replicating a 95-nucleotide ribozyme in vitro, about half of its length. It had greatly improved transcription fidelity over its precursors, although it was still inadequate for self-replication [39]. The following year Jack Szostak listed eight problems facing efforts to produce a molecule capable of replicating itself. Among these problems were 1) separating a template from its complement once the template exceeded about 60 nucleotides in length, 2) the copying fidelity was too low for sustained operation, and 3) template and ribozyme degradation occurred in about the same time it took the ribozyme to copy the template, typically "over a course of days." These and the other problems would need to be resolved before an active self-replicating system could be demonstrated [8]. Gerald Joyce *et al* reported an improved version of the tC19z ribozyme they called *24-3* [40]. Despite the improvements, it still did not resolve any of the problems listed by Szostak. Nonetheless, based on continually improving reported results, it is plausibly only a matter of time until a ribozyme sequence capable of serving as a fully-functioning self-replicating ribozyme under controlled conditions for a brief period of time will be discovered. However, it is also plausible that eventually accumulated degradation products would act as parasites, dominating the template function and potentially leading to complete degradation of active replicators.

The self-replication experiments described above required the use of expensive equipment with extremely complicated processing directed by human guidance. After extensive randomization, purification, and testing they were still unable to discover an effective self-replicator. This conclusively demonstrates that there are many more wrong ways to sequence a replicator than correct ones. It also confirms that there is no connection between what is required for abiogenesis and what natural processes produce. Random sequences are the normal result. At this point we only understand reasons that prevent any lengthy RNA polymers from forming, not how to demonstrate plausible formation. Our hypothesis appears to explain why.

6.3.2.2 Replicating networks of small, cooperating RNA molecules. Robert Shapiro observed, "Several scientists have put forth theories that do not require an ordered polymeric replicator at the start of life. They propose, instead, that life began with a mutually sustaining set of catalytic reactions involving smaller molecules....Insufficient experimental attention has been given to such ideas, but if the hypothesis presented here is accepted, perhaps they will move to the forefront of origin-of-life research [28]."

Shapiro wrote this in 2000. In the eighteen years since then, there have been a number of studies on small, cooperative replicators. It appears this is another side trail which will need a major breakthrough for it to have true value. For example, J. Atwater and P. Holliger commented that these studies still require supply of preassembled polymers--they do not assemble monomers into the individual replicators [41].

A primary purpose of small, cooperative replicators is to provide the first step of replication. However, these experiments require feedstock of specific, preformed polymers. This skips the step that is most critically needed, assembly of free nucleotides into specific polymers. N. Vaidya *et al* reported on an experiment "among cooperative RNA replicators." They described a self-assembly process of a group of four interacting nucleotide strings. Significantly, these strings were not trivial in size, such as formed by a few monomers spontaneously assembling, but instead ranged from 43 to 65 nucleotides each. When mixed together in the experiment, they cooperatively assembled into a larger ribozyme.

Assume there is a natural setting with a suitable supply of nucleotides and an environment conducive to polymerization. A large number of polymers are formed having random lengths and sequences. The odds of forming a specific polymer of 43 nucleotides, the size of the smallest in the group, are one in 4^{43}, which equates to 1 in 8 x 10^{25}. Therefore, the odds against finding a polymer of 43 nt with the given sequence among the 43-nt products are a little over two orders of magnitude larger than Avogadro's number. The other three polymers were even larger and would face even greater odds against their appearance. Even with a certain amount of redundancy allowed due to permitted substitutions, this still represents extremely low relative concentration. Furthermore, provision of a solution of a large concentration of molecules comprising only lengths of the four polymers is implausible in a natural distribution of polymer lengths. A natural distribution should comprise a mixture of a wide range of lengths. The statistical law of large numbers should insure this takes place. Incidental beneficial fluctuations are quickly overridden. When one considers a natural distribution of polymer length as well as nucleotide sequence among the components plausibly present in a system, the expected ratio of wrong components to those needed is staggering. Also, RNA typically degrades in a matter of days and there is no known mechanism to remove the products of degradation from the setting. Eventually, accumulated degradation products should present yet another layer of contamination. Experiments on small replicating networks do not test for operation in a setting with this much contamination, although this would be more realistic than the current approach of restricting feedstock to pure solutions of purchased chemicals having a precise specification.

Our hypothesis appears well confirmed when applied to the observed results of replication experiments. Natural processes tend to make many more wrong products than usable ones and the ratio is plausibly large enough to prove fatal to abiogenesis.

7.1 The big barrier: overcoming the discontinuity hindering the initiation of Virchow's aphorism

As was discussed earlier, Virchow's aphorism still governs cell theory today. Cells only come from existing cells. From our perspective the study of abiogenesis has met its purpose when it can give a plausible explanation based on experimental evidence of how Virchow's aphorism can be initiated. A system of self-replicators, whether they are large individual molecules or a network of smaller ones are not living cells and fall short of this. The issue concerns whether Virchow's discontinuity can be crossed in tiny increments governed by natural selection or whether there are natural barriers preventing this and thus requiring it to be bridged in a single step.

In Penzlin's earlier citation, he tied Virchow's aphorism to the principle of emergence. Cells cannot be divided because qualities exist in a system of interacting components that do not exist in

the components individually [10]. This impacts abiogenesis, because even if simple replicators are extant, natural selection cannot favour emergent properties that do not yet exist. Incipient progress towards the appearance of a cell does not alter the probabilities for a needed target to appear. Only when everything is in place does it suddenly appear.

This leads to the question of what the likelihood might be for required components to appear suddenly through random processes. If small polymers can bootstrap themselves into more complex ones, perhaps Virchow's discontinuity would not be a true discontinuity; it would just be a bottleneck requiring passage by slow, gradual step-by-step random process. By contrast if the functions require a number of interacting components and if a large fraction of these components would plausibly be unlikely to appear once in a googol years, then the discontinuity represents a formidable barrier, unlikely to be overcome. We suggest that dynamic self-organization (DSO) is required in fully functioning form from the time of the first cell's initial appearance. Furthermore, the complexity of components required to implement DSO precludes small molecules from use. This provides a basis for plausible validity of the scenario presented earlier requiring an average of over a googol years between appearances of an average-size archaea molecule.

In a modern factory an assembly line features a series of workstations, each having specialized equipment to perform an operation on a product being fabricated. Gradually, as the product moves from station to station, the fabrication becomes more and more complete until it is finished. However, there are no assembly lines and workstations available to put build a cell. The observed solution is for the cell to build itself in DSO.

DSO described. Johnson and Lam summarize the essence of DSO. They include discussion on how 1) Self-organization requires specific cellular conditions to initiate self-organizing processes. 2) Molecular crowding of interacting components is characteristically required. 3) The components must be able to interact with each other in a manner capable of proving a specific self-organizing function. 4) Self-organizing processes are sensitive to the environmental conditions; therefore, the ability to control these conditions is essential. 5) An isolated group of interacting components does not have the capability of controlling environmental conditions, whereas extant cells do. 6) Self-organizing activity typically occurs in its entirety or not at all [42].

Johnson and Lam acknowledged that the gradual, small, incremental steps of evolutionary processes are incompatible with the requirements to form a usable metastable system. Their analysis continued with the observation that "…self-organizing mechanisms do not seem to be the products of slow, incremental change" and "…the evolution of the self-organizing process is dependent on an initial qualitative jump in phenotype." This description fits emergence as the root of the observations. Also, there are many, many more wrong ways than right ways to program DSO. This is consistent with predictions from our hypothesis.

In dynamic self-organization, energy is required to assemble components. They are meta-stable—stable for a brief time and then dissipate. However, a structure can be maintained over a long period of time as long as new, energized components can replace those that are decaying. Penzlin discussed that a fundamental purpose of cellular metabolism is to maintain the existence of various dynamic structures in a cell. Self-organizing structures in a living cell require minimum energy expenditure just to maintain existence.

A. Makarieva *et al* report that, "Despite the enormous biochemical, physiological, and ecological differences between the surveyed species that vary over 10^{20}-fold in body mass, mean metabolic rates of major taxonomic groups displayed at physiological rest converge on a narrow range from 0.3 to 9 W kg^{-1}. This 30-fold variation among life's disparate forms represents a remarkably small range…" "Endogenous metabolic rate [is] the rate of nongrowing, unicellular organisms in nutrient-free suspension [43]." Thus, without this minimally required energy expenditure, essential metastable structures dissipate and the cell dies. Endogenous metabolism of

prokaryotes and basal metabolism of eukaryotes represents the energy required to maintain minimally required metastable structures.

The same 30-fold, absolute range of minimal metabolic rates applies to major taxonomic groups, from bacteria to elephants and in between. This is consistent with the understanding of a common level of dynamic self-organization that has existed in all cells from their beginning. It is not enough that the initiation of Virchow's aphorism would need to feature all required cellular components from a static perspective, they also plausibility need to make their initial appearances in fully-developed far-from-equilibrium conditions along with all of the required controls over the cellular environment and feedback. The initial genome needs the complexity to define component structure and cellular conditions to provide dynamic self-organization. There appears to be no plausible way to avoid this conclusion.

A. Kurakin makes a thorough analysis of the dynamic qualities of cellular self-organization. Some highlights of his observations:

> "...Any given protein usually partitions into macromolecular organizations only when it is functionally competent. Inactive proteins tend to remain in a freely diffusing, 'unemployed' pool and/or to have significantly shorter residence times within the molecular organizations employing them....", "...A protein may be recruited to a given macromolecular organization only temporarily, when its particular activity/competence is needed, and it is discharged into the freely mobile pool when its services are no longer required...." "...it appears that many, perhaps all, macromolecular complexes and sub-cellular structures are assembled and maintained as steady-state molecular organizations only when they perform their functions. They are dissolved or restructured when their functions are no longer needed or altered within the cell." "...metabolic compartments are often assembled on demand to satisfy changing or local needs of cellular economy that emerge in response to transitory environmental challenges and opportunities." "It can even be generalized that any environmental change normally triggers the formation and stabilization of metabolic compartments or complexes that self-organize either to alleviate the problems or to take advantage of the opportunities created by environmental change within the economy of the cell [44]."

This description summarizes DSO. Modern cells clearly use it. However, it adds to an extreme degree the complexity of the proteins (or ribozymes) used. Modern cells primarily use protein. It is plausible that the complexity required for DSO goes beyond what a ribozyme can provide. The discussion below refers to protein with the recognition that in instances where a ribozyme can provide required functionality, its inclusion in the discussion is to be understood. Discussion of external or internal (DSO) fabrication

1) DSO characteristically joins molecules in a transitory capacity in a condition far from equilibrium. Static bonds interfere with the disassembly process, so temporary bonds such as hydrogen bonds or Van Der Waals interactions are used. With proteins, this requires a precise shape for alignment between the two molecules as well as a complimentary choice of amino acids which will form the correct bonds at the alignment site. We suggest this is part of the factors determining minimal protein size.

2) It is plausible that in order to avoid spurious bonding, each element in the set of all possible alignment sequences between the kinds of components in a system need to be filled by a single pair of components. This would permit only intended bonding to take place. In a large cell with many different kinds of proteins, the number of potential bonding surfaces will increase, increasing the size of the alignment set. This plausibly adds significant complexity to each of the proteins contained together; avoidance of spurious bonding requires each component to "know" not only how to make its appropriate bond, but also how to avoid spurious bonds. This capability needs to be present from the beginning. We suggest this is part of the factors determining minimal protein size.

3) DSO can be extremely sensitive to environmental cues. This sensitivity is built into the structure and choice of amino acids to fabricate a given protein. Environmental cues can be physical, such as pH or intensity of light. We suggest this is part of the factors determining minimal protein size.

We suggest the requirement for a cell to use DSO requires as a minimum all of the above elements to be in place and functioning from the time Virchow's aphorism is active, yet cannot be provided before the discontinuity has been bridged.

Prokaryotes (bacteria and archaea) typically gain selection advantage through speed of replication. Replication accuracy, translation accuracy, and redundancy are not as much of an advantage as are speed of replication and efficient use of nutrients. This would suggest that proteins in bacteria have high selection pressure to be as small as possible while meeting all functional requirements. Proteins are smaller in prokaryotes [36], an observation consistent with this hypothesis. This in turn suggests that protein size in prokaryotes is very close to the minimum required for a protein to provide DSO capability.

In line with the above train of thought, it appears implausible that proteins significantly smaller than extant proteins would be adequate for cellular self-fabrication using DSO. The choice appears to be external cellular fabrication using external machinery such as an assembly line in a factory or internal cellular fabrication using DSO. Despite the increased complexity posed by including DSO in the list of features that need to be present in order to bridge Virchow's Discontinuity, this appears to be a better solution than external workstations. It is difficult even to imagine how external workstations could be implemented.

`Our hypothesis starts with the statement that there are many more wrong ways than correct ways to make a chemical suitable for life. The discussion on DSO underscores this.

DSO and our hypothesis

It was once assumed that self-organization would solve the problems of the complexity of a cell, with life spontaneously emerging in an extremely out of equilibrium environment. All that was needed was a source of raw material and an external energy source [28]. Self-organization would then produce preferentially the chemicals of life as needed spatially and temporarily. Since then we have come to recognize that self-organization has the exact opposite effect. Cellular self-organization requires path, sequence and end result built into the structure of a large number of interacting proteins and the stored information to provide them. It also requires simultaneous control over a number of critical cellular environmental conditions which control organization and disorganization. Self-organization in the cell is not some vague, mysterious mechanism which allows one to gloss over problems. It is a precisely defined process which needs to have all manner of interacting, predefined features come together in a single-step appearance. It increases the requirements of genome specificity by an incomprehensible degree. It is an application of abiogenetic disconnects, randomization, and emergence working together. There are many more wrong ways to attempt self-organization than proper ones. There is nothing to restrain the proper ones to appear as needed spatially and temporally in greater abundance than what is normally provided by a random distribution of possibilities. As a result, wrong ones would be consistently produced in overwhelming relative quantities by random processes.

The scope of difficulties is underscored when one remembers that the goal of abiogenesis is to provide an autonomous cell featuring minimal replication capability. Until replication appears, there is no means to reproduce a subsystem that might appear simultaneously in usable form. Ultimately, degradation and dilution will tend to render ineffective the spontaneous appearance of subsystems until a complete system capable of sustained replication has appeared temporally and spatially under favourable environmental conditions.

Single step, simultaneous first appearance of everything

In a living cell, DNA information is used to define structures and control their operation. This is perhaps the epitome of emergence. Cellular structures cannot be supplied in required frequency or spatiality by random processes, but must be manufactured according to a set of instructions. The information has independent existence from the structures.

The information, the code, and hardware to process the information and to use it to accomplish a specific task all need to appear simultaneously. None have value without the others in place. This requires single step first appearance of all of them. Required tasks for simultaneous first appearance include replication, information storage and processing, metabolism, organic compartments with active transport, and various additional miscellaneous functions, including DSO. All of these are so intimately connected together than none can function without the others in place. Together, they form the basics of a minimal cell. They provide a clear example of emergence. A living, autonomous cell can suddenly survive and replicate when everything is in place. Otherwise, whatever degree of life it might have had quickly dies and the organization degrades. Either the entire system including information and hardware to use and replicate it exists or none can appear in a controlled manner. Emergence precludes the ability to break the task into many small, simple steps of lesser difficulty and then synthesize them into a new whole, such as is done in chemical engineering. There is no means to perform the various individual tasks without the others in place. Nature does not provide prebiotic processes with the required tools to implement engineering designs as discussed earlier.

Information

Werner Gitt was a director and professor at the Federal Institute of Physics and Chemistry and the Head of the Department of Information Technology in Braunschweig, Germany. We have synthesized a number of his statements and observations about information scattered in his book *In the beginning was information* to give a working description of information suitable for abiogenesis: Information is an immaterial entity—it has no physical characteristics such as weight, mass, or energy, phenomena which characterize physical objects. It is an abstract representation of meaning, such that a code maps between the two. It is abstract in the sense that it is not the meaning, only a representation of the meaning. The code is completely arbitrary; there are an almost limited number of equivalent codes capable of being formed. Because of this there are no laws or principles of nature which can be used to define a code. There are various forms of information; the kind used in biological systems uses a set of symbols arranged in a particular pattern defined by the code. Although the information and the code mapping to it are immaterial, the information is stored in a physical medium. The choice of medium is arbitrary and information can readily be transferred or copied from one to another without any loss. For instance, genetic information can be stored in a sequence of nucleotides, computer bits, symbols printed on a page, or magnetic fluctuations on a disk without any loss. Information has no value unless there is means to read it and use it. Therefore, an arrangement of nucleotides can represent an amino acid sequence in a protein, but this is valueless unless there is a physical medium capable of reading the symbols, extracting the meaning from them through a decoding process, and then doing something with it. Since information is an abstract entity, as is also the code mapping it to a medium, there are no physical laws capable of creating it [45]. Gitt also discusses his personal perspective on the origin of information, but that is outside the scope of this paper.

Information represents a powerful tool for cellular control, as we can readily observe with the tools that technology has made available to us today. However, since its abstract nature is outside the bounds of physical processes, there has never been an adequate explanation of where it came from. Thirty years ago, K. Dose alluded to this problem with the comment, "…We do not actually know where the genetic information of all living cells originates [46]…." As of today, we still don't. We

are aware of and can explain many specific obstacles against its appearance. We cannot explain its appearance.

Our perspective is that Virchow's discontinuity cannot be bridged piece meal, but must do so in a single step. On the abiogenesis side of the discontinuity, scientists are struggling with the construction sequence of a self-replicating molecule of approximately 200 nt length. The biggest problem is that it degrades faster than it copies at this size. On the cellular-life side of the discontinuity is a fully functioning minimal cell. Hutchinson *et al* have experimentally observed basis to project that a minimal cell requires a genome of approximately 541,000 nt. Regardless of whether the actual minimum is 100,000 nt or 500,000 nt, this is all beyond a nucleic acid technology struggling with falling apart at 200 nt. Current understanding of information can give many explanations of the difficulties of creating it. It cannot explain where it comes from.

As a simple measure of the difficulty of creating information, consider the example of the average archaea protein of 270 nucleotides. Even under realistically favorable assumptions, it should take a googol of googol years to generate a single instance of this molecule. It would take three times this many, i.e., 780 nucleotides, to code for it. Prebiotic appearance of nucleotides and long polymers is more difficult than appearance of amino acids and proteins. Hence, it should take longer than a googol of googol years to for the appearance of a 780 nt gene able to code for a specifically required protein. Yet, a 200 nt ribonucleic acid degrades in a matter of days. It is implausible that a googol of googol years would be enough time. On a practical basis this discussion is nonsense. These numbers are so extreme that the human mind cannot comprehend their significance. Extending the time for the appearance of a genome of over 100,000 nt is meaningless. The information polymer degrades long before it can be built. Beyond this is the issue that abiogenesis is actually stuck at the starting blocks, unable even to provide a set of amino acids suitable for protein formation.

Because of emergence a chicken and egg scenario in cellular function can be discovered at will. The essential components of a minimal cell cooperate with each other, such that when all work together life appears and missing any one of them prevents its appearance. If one tries to explain the appearance of <u>any</u> component through the gradual step by step process of natural selection, he will quickly find himself facing a chicken and egg scenario, a catch-22 situation, a paradox, a conundrum. Ignoring the fact that natural selection doesn't work for large genome systems before replication appears, there is another basic issue. How could natural selection define a proper genetic structure to produce a protein so that the protein could provide a step in the production of an essential product before all of the other proteins for the others steps have appeared? There is a long list of products essential to the appearance of the first cell. Pick any one of them and try to explain how this product could appear apart from single-step, sudden first appearance. You will find that emergence leads you straight to the chicken and egg scenario. This is the impact of emergence on abiogenesis.

The Appearance of Translation

The translation system of a cell consists of the cellular components used to extract information from DNA, feed it to a ribosome, and assemble amino acids into proteins. Wolf and Koonin (2007) made a concerted effort to figure out how this might have happened through the gradual, step-by-step evolutionary processes of the continuity principle. In the light of their following comments on irreducible complexity, it is worth pointing out that Koonin is one of the most respected of modern scientists. With an h-factor of 182 (182 papers written in established journals with at least 182 citations each) he is the 56th most cited scientist in history (Sigmund Freud is first) [47]. He and Wolf came to the following conclusion concerning the difficulty of the origin of translation:

The origin of the translation system is, arguably, the central and the hardest problem in all evolutionary biology. The problem has a clear catch-22 aspect: high translation fidelity hardly can be

achieved without a complex, highly evolved set of RNAs and proteins but elaborate protein machinery could not evolve without an accurate translation system.... The fundamental problem we wish to address here: the origin of the translation system and the genetic code. Indeed, the translation system might appear to be the epitome of irreducible complexity because, although some elaborations of this machinery could be readily explainable by incremental evolution, the emergence of the basic principle of translation is not. Indeed, we are unaware of translation being possible without the involvement of ribosomes, the complete sets of tRNA and aminoacyl-tRNA synthetases (aaRS), and (at least for translation to occur at a reasonable rate and frequency) several translation factors. In other words, staggering complexity is inherent even in the minimally functional translation system....Even this does not do the full justice to the difficulty of the problem. The origin of translation appears to be truly unique among all innovations in the history of life in that it involves the invention of a basic and highly non-trivial molecular–biological principle, the encoding of amino acid sequences in the sequences of nucleic acid bases via the triplet code… This principle, although simple and elegant once implemented, is not immediately dictated by any known physics or chemistry (unlike, say, the Watson-Crick complementarity) and seems to be the utmost innovation of biological evolution [48]."

They later bring up the issue of irreducible complexity a second time, "It might not be much of an exaggeration to note that, at least, at first glance, the origin of the translation system evokes the scary specter of irreducible complexity [48]."

The entire discussion above is consistent from the perspective that Wolf and Koonin were trying to explain the appearance of emergent system properties from the individual component focus of chemical evolution. They were amazed by the effectiveness of the behavior they observed, but could not account for it. More than once they alluded to "irreducible complexity." It appears they were actually speaking of emergent phenomena. Perhaps it might have been appropriate to substitute *emergence* for *irreducible complexity* in describing the above problems. This would allow the issues to be discussed without the emotional connotations of irreducible complexity, which appeared to concern even them. Also, emergence is a recognized, well-established phenomenon throughout all of nature including chemistry related to origin-of-life issues. As Ashkenasy mentioned earlier, "The chemical sciences are entering the new territory of systems chemistry. This young field aims to develop complex molecular systems showing emergent properties: *i.e.*, properties that go beyond the sum of the characteristics of the individual constituents of the system [49]…."

The problems confounding Wolf and Koonin were plausibly more extreme than discussed. They assumed a fully functioning, replicating cell in an RNA-world with extant evolutionary capability. The only difficulties they addressed were those associated with the appearance of protein translation in an already functioning RNA world. However, if RNA genomes degrade upon attempts to provide complexity much beyond that of a 200-nt self-replicating ribozyme, then the RNA world is plausibly not capable of providing replication of the complex genomes which Wolf and Koonin assumed to be available as a starting point. Without an RNA world intermediary and because of emergence, the task becomes to go from a self-replicating molecular system past Virchow's discontinuity and into a full-blown functioning cell in a single step. Observational science teaches why this must be done. It does not show how natural processes can do it.

If 1) there are no laws of physics or chemistry to define the triplet code, if 2) some of the components used in translation are extremely complex with many plausibly requiring googols of years between naturally occurring random appearances under ideal conditions, if 3) at least several dozen of these components need to make a simultaneous spatial-temporal first appearance in already working form, and if 4) this scenario is predictable from applying the principles of randomization, abiogenetic disconnects, and emergence, then it appears safe to conclude that at this point in time there is no experimental basis to illustrate how chemical evolution has removed Virchow's

discontinuity and initiated the aphorism. Thus, in the light of what we understand from scientific investigation; the aphorism still stands, unchallenged by chemical evolution [5].

Metabolic Pathways.

A metabolic pathway is a general term used to describe any series of cellular reactions using enzymes to transform one chemical into another [50]. Metabolic Pathways appear to represent emergent processes. An initial substrate is acted upon by a sequence of operations to convert it into a final product, which does not appear until all of the operations required to make it have taken place. There is a discontinuity—until it appears, there is no indication of pending appearance. Even if replication had already appeared, the discontinuity would prevent natural selection from gradually providing the set of enzymes required which, when all are present and fully functional, could transform a substrate into a specifically-needed final product. When the topic is initial appearance of metabolic pathways, it is a non sequitur to ascribe the appearance of a new pathway as a serendipitous modification of an existing one—there are no pre-existing ones to modify. Therefore, in the pre-replication scenario of the appearance of the first cell, all of the pathways required to implement replication will need to make a simultaneous first appearance in functioning form [5].

In illustration a sample metabolic flowchart is published online by IMBUB [51]. Suppose an incipient cell needs to burn glucose for ATP production. The chart shows that glucose goes through ten enzyme-controlled reactions to be transformed into acetyl-CoA, which then can enter another pathway, the Krebs cycle, for the production of NADH. This in turn is fed into the electron transport pathway to supply the energy to convert ADP into ATP, where ATP acts as the energy source for most cellular activity. The enzymes controlling the reactions for all of the steps of all three pathways (or their alternatives) need to be present and available before ATP appears in a controlled manner. The pathways are emergent phenomena. The appearance of each enzyme presents a chicken and egg scenario with the others—none result in the required product until the others are available.

The pathways shown on the IMBUB chart would not be the only ways to make the required products, alternatives are feasible. Regardless of how many optional paths and optional enzyme structures to implement the paths may be available, emergence requires that any given path actually provided needs to be complete and functioning adequately at the time of its first appearance. According to our hypothesis, there will be many more ways to provide pathways which do not provide required product than there are ones that do. Randomization will result in a preponderance of the wrong ones.

All of the enzymes used in a pathway, regardless of which pathway may be provided to accomplish the transformation, need to be provided through a copying process such as replication (RNA world) or translation (protein-DNA world), because the enzymes need to appear in large, controlled quantities. By contrast random appearance is not a suitable means of provision because of the googols of years between each the appearance of each instance. Therefore, provision of a metabolic pathway requires specification in a genome first, along with all of the hardware apparatus required to process the genomic information. Then the required pathways can be provided in a controlled manner as needed. The perplexing question is where the information came from to build a protein that would take multiple googols time googols of years to appear through random assembly [5]. Dose didn't know thirty years ago. We still don't, either.

When Stanley Miller performed his origin-of-life experiments, he had no comprehension of the scope of the task facing him.

7.8 Cell Membranes with Transport, Passive and Active

Compartmentalization is generally accepted among abiogenists as a basic requirement for life. Cellular processes require interacting chemicals to be proximate for interaction. The cell membrane accomplishes this. A semi-permeable enclosure allows small, non-polar molecules to diffuse in and

out, while retaining larger molecules such as polymers. A simple phospholipid membrane may be adequate for a self-replicating ribozyme system. However, a genome-based system operating under DSO needs active transport proteins in order to provide required molecular crowding [52]. Nutrients need a means to pass through the membrane into the cell and waste products and secretions need to pass through it out of the cell [5]. The minimum genome bacterium of Hutchison III *et al* devoted 31 of its 473 genes (~6%) to membrane transport [53]. That shows how essential transport proteins are.

I. T. Paulsen *et al* compared the transport capabilities of eighteen prokaryotes whose complete genomes had been sequenced. The gene sequence of transport proteins tends to be conserved across species. They attempted to identify all transporter genes in each of the species analyzed. They show 76 families of transporters. All of these are not necessarily required for survival, based on the above analysis of Hutchinson, but many would be. Even in prokaryotes approximately 80% of the transporters had genes coding for 400 or more residues [54]. As a whole, these are large proteins. They need to be in order to provide a passageway for sometimes large molecules. The ability to select for specific molecules and to control their rate of passage under specific conditions is a DSO characteristic that needs to be built into the protein structure. The capability of a transporter to penetrate a cell membrane at a proper location and properly embed itself within it is a DSO function. Emergence and DSO working together require a significant minimum number of transporters to be functionally available at the first appearance of a cell. Yet, at 400 residues using overly generous standards, random processes would still average googols of googols of years between each isolated appearance. This is a rather dilute solution. We still do not know how to get the information to do this into a genome.

8. Conclusion

Prebiotic processes inherently provide random products. An already living cell has internal hardware for process control and is therefore able to restrain chemical activity to provide predetermined results. However, the conditions to do this successfully are very specific and allow little deviation. Natural variation in environmental variables, particularly stream flow variation, works against natural processes providing a required steady flow of products. Randomness appears to prevent formation of usable building block amino acids and nucleotides. It prevents formation of usable polymers of protein or nucleic acid. An autonomous, living cell needs all of its components to function properly, it cannot be divided beyond certain basic systems. Virchow's aphorism and emergence work together to require the first cell to appear fully assembled from the beginning.

This is not a paper on metaphysics. No solution is offered to these problems posed by the conclusion presented; they are beyond the scope of the paper. However, it appears that nature itself provides conclusive evidence that natural processes are incapable of assembling a living cell. Wherever one looks there are problems.

Most of these problems are due to randomization of feedstock chemicals by prebiotic processes. Just as there are no betting schemes that allow a person to overcome randomness in a casino, there appear to be no schemes able to overcome randomness using prebiotic processes. We suggest that an unwillingness to acknowledge this has led to the sixty plus years of failure in the field. There is a large body of evidence—essentially all experiments in abiogenesis performed since its inception sixty plus years ago—that appear to be consistent with the hypothesis presented in this paper. Randomization prevails.

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Article 4. Is Evolutionary Theory Pseudoscience? A Historical Perspective

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This is the fourth of a collection of articles. It assumes the validity of the first three, i.e., 1) that the genetic information used to make and operate a cell shows a personal God as the author of life, 2) that there are no strong arguments against God or His Word, and 3) that natural processes cannot spontaneously form the first cell. Yet, modern evolutionary science claims vociferously that creation science is fake science—pseudoscience. These two perspectives are mutually contradictory. In this article the case will be made that modern evolutionary science has departed from true science. Evolutionists have turned science into a tool to force their philosophical preferences onto the world. Yet, they do not have sufficient evidence to justify their claims in free, open discussion. In an effort to stifle opposition, they prefer mocking, slander, and suppression of arguments over an open discussion of scientific issues. It appears that in the process, they have become the actual pseudo-scientists. The historical documentation to demonstrate this is readily available and clear. This issue is so important that it is examined and documented thoroughly. Almost half the content in this collection is in this one article.

Jesus went about doing good (Acts 10:38), yet the world hated Him because He testified that its deeds were evil (John 7:7). Jesus also said to His followers that because they were not of the world, the world would hate them and if they persecuted Jesus, they would also persecute those who followed Him (John 17:18-21). Since evolutionary theory is the primary tool modern, unsaved man uses to excuse Himself from submitting to the Creator, he will in particular hate a scientist who shows his excuses to be nothing more than empty, futile attempts to deny the Creator. The scientist serving God properly will greatly offend those of the world, showing how they twist evidence God intended to reveal Himself and lead a person to Him. Yet, as we saw in the opening article on Isaiah 41:21-24, the scientist professing to serve God while compromising to avoid offending the world offends God. Evolutionary theory is a key weapon in the spiritual battle of our age, whether a person wants it to be this way or not.

This article shows how Thomas Huxley and a group of friends called the *X-Club* were materialists that hijacked science shortly after Darwin published *Origin of Species* in 1859. They did not want to submit to a Creator, yet did not have the evidence needed to establish their position in open dialogue. So, they used power play behind the scenes to stifle open discussion while carefully putting a spin on their evidence, claiming it to be stronger than it was. It appeared they were more interested in winning arguments and establishing materialism than in uncovering scientific truth. Calling opponents inflammatory names, as we shall see, was a tool used to justify their unwillingness to discuss all evidence in open dialogue. In other words, "You are so stupid and so irrational that I don't need to pay any attention to what you say." Huxley was successful in changing British science into an aggressive tool to support materialism at the expense of unbiased scientific discussion. His approach spread to encompass most of secular science to this day.

Darwin faced a problem. Most scientists in his day were creationists and many including Darwin errantly believed that God had created every species exactly as it appeared to them. Eventually, Darwin's scientific observations appeared to contradict this; he saw strong evidence

of descent with modification, such that related species in his day appeared to have descended from a recent common ancestor. The more he studied the problem, the more convinced he became that the observed evidence contradicted his understanding of the Bible. Darwin decided to discard all notions of a Creator and to credit purely mechanical, natural processes for all of the complex life forms we see today, starting with extremely simple life forms and then gradually increasing in complexity over time; after extremely long periods of time the current complexity appeared.

Today, we understand that the Genesis account in the Bible teaches that God created *kinds*. The initial kinds would have been provided with sufficient genetic information to radiate very quickly into a broad range of similar yet different species, readily adapting to varying local environmental conditions, which included issues such as weather, geology, food supply, and competition. The formation of new species was merely specialization within a common kind; specialization was at the expense of the loss of original information present in the original kind. This would be a one-way process; once the information was lost it was gone unless resupplied by a close hybrid. Mutations can broaden the characteristics of a kind, only minimally. Most creationists who study kinds estimate that a creation-day kind might typically have been at about the level of a taxonomic family. However, the Bible is very general in its description and does not recognize human classification schemes. Thus, a literal understanding of the Biblical account was consistent with what Darwin initially observed, but he was unaware of this and the reasons for it.

The closing sentences of the Introduction to *Origin* describe Darwin's conflict:

> I can entertain no doubt, after the most deliberate study and dispassionate judgment of which I am capable, that the view which most naturalists until recently entertained, and which I formerly entertained—namely, that each species has been independently created—is erroneous. I am fully convinced that species are not immutable; but that those belonging to what are called the same genera are lineal descendants of some other and generally extinct species, in the same manner as the acknowledged varieties of any one species are the descendants of that species. Furthermore, I am convinced that natural selection has been the most important, but not the exclusive, means of modification (*Origin of Species*, 1872, p. 23).

Notice, Darwin's observations were consistent with our modern understanding of Biblical kinds, except in many cases he could have extended the common lineage to *families* instead of *genera*. Ultimately, the supposed conflict resulted in Darwin repudiating the creation account. Once he had done this, it was a simple matter conceptually to extrapolate the scope of his observations from the small scale he just mentioned, i.e., a genus descending with modification into multiple distinct species, to encompass all of life. Simple organisms would have been the first to appear a long time ago and then would have gradually and smoothly, step-by-step, become more and more complex until the highly complex organisms we see around us today appeared. His new goal became to use the above listed principles as the foundation for this much grander scope. Whenever he talked about "his theory," this is what he had in mind—not genus to species specialization.

However, Darwin ran into a problem as he tried to find evidence to support the grander perspective. It wasn't there. He spent decades making intense search for the evidence. *Origin of Species* is a large book and an overwhelming number of examples from nature validate his theory for changes on a small scale. The evidence presented in the book represented only a

small portion of the total he had accumulated in his search. His grand theory made sense intellectually and philosophically. Yet, despite the breadth and scope of data he had accumulated, he recognized that the evidence needed to legitimize his grand theory was missing: ubiquitous for the small-scale changes, but missing for extrapolation. He knew better than anyone else what evidence his theory required. He himself recognized what he had found as deficient and inadequate. He faced a paradox. His observations implied materialism. The same observations contradicted his attempt to apply a materialistic perspective to a broader scope.

Despite the voluminous quantity of evidence presented in the book, it did not actually support the scope of application he presented for his theory. So, he imagined excuses to explain away the missing evidence. A regular pattern throughout the book was for him to

1) make a statement regarding some aspect of large-scale evolution,
2) provide pages and pages of evidence reputedly supporting it,
3) admit that there were inconsistencies between the actually observed data and what was required by his theory on the grand scale,
4) invent an imaginary explanation for the problems,
5) draw his conclusions, giving priority to his imagined evidence over the observed evidence.

Steps 4) and 5) make his work pseudoscience. Here are representative examples from *Origin*:

Limits of variation. In chapter 1 of *Origin*, Darwin discussed observed limits of variation. He postulated that there were no innate limits or boundaries to the degrees of variation possible for an organism. In the evidence presented, he discussed how plant and animal breeders reported that they quite rapidly reached limits of variation whenever they would breed for any specific trait. Unfortunately, this observation conflicted with his understanding of the requirements for success on the grand scale he envisioned for his theory. If the limited variation reported by breeders were true, this would present a problem for the transitions he understood to be necessary. As a result, he discounted the well-known, consistent observations of experienced breeders, imagining them to be nothing more than an assumption: "On the other hand, the ordinary belief that the amount of possible variation is a strictly limited quantity is likewise a simple assumption[3]." With this simple statement, he discounted the evidence and claimed that it was not an issue. This statement showed Darwin had become a pseudo-scientist, defending his personal philosophical preferences over scientific observation.

Today we understand the genetic limitations of variation and understand why the breeders were right. The concern is Darwin's methodology in placing defense of his theory above an honest application of evidence he had available. This methodology is that of a pseudo-scientist, not an honest enquirer.

The fossil record. Darwin was bothered about what he called "imperfection of the geological record." Fossils appear in groups which are exemplified by similar characteristics, but with systematic gaps between the groups. Thus, we read, "…so must the number of intermediate varieties, which have formerly existed, be truly enormous. Why then is not every geological formation and every stratum full of such intermediate links? Geology assuredly does not reveal any such finely-graduated organic chain; and this, perhaps, is the most obvious and serious objection which can be urged against the theory. The explanation lies, as I believe, in the extreme imperfection of the geological record[4]." "From these several considerations, it cannot be doubted that the geological record, viewed as a whole, is extremely imperfect….[5]" "The case

at present must remain inexplicable; and may be truly urged as a valid argument against the views here entertained[6]."

Personally, it intrigues me that despite the fact that the fossil record is now based on fossils discovered from all over the world, it still appears to be characterized by the same basic gaps. The "finely-graduated organic chain" of many links he had hoped to find has not appeared, not even for a single instance out all of the potential paths. We have variations of dogs and variations of cats extant today and in the record, but no clear, finally graded chain leading to an imaginary dog-cat ancestor or its equivalent between any distinct groups. Yet, despite all of the different weather patterns and different geological histories and varying environments at individual, isolated locations all over the world and all of the potential paths that could illustrate his theory, all of the sites seem to have lost roughly the same portions of the record. This is extraordinary. Could there be another explanation? Could the Biblical account of a world-wide flood explain the evidence? This is beyond the scope of this paper and my own scope of study, but is the position taken by many creationists. Although on the one hand Darwin did openly acknowledge the problem, on the other hand he ignored it when drawing his final conclusions.

The eye. Darwin was disturbed about the complexity of the eye. In fact, in *Origin* he admitted that he could not imagine a scheme which could truly account for such complexity. Yet, by this time he had become a true believer in evolution, so this did not faze him. He wrote, "To suppose that the eye with all its inimitable contrivances…could have been formed by natural selection seems, I freely confess, absurd in the highest degree.... Reason tells me…the difficulty of believing that a perfect and complex eye could be formed by natural selection, though insuperable by our imagination, should not be considered as subversive of the theory[7].

Darwin could not imagine how to get around the problems posed by the eye. However, *reason* told him that he *should* be able to imagine it. For him that had become sufficient. This does not appear to represent clear, rational, unbiased thinking. Darwin was now stooping to "imagined" imaginary evidence to get around an observed problem. I suppose this should be counted as pseudo-pseudoscience, which is potentially more remote from truth than pseudoscience. It is hard to imagine how one could get much further from true science than this. It appears that his train of thought could be summarized as, "I can't even imagine the evidence needed to support my theory. But reasoned imagination tells me I should be able to imagine it. Therefore, the issue should be counted as proven and my theory still stands." Darwin's comment that this train of thought explains why his observation "should not be considered as subversive of the theory" shows that in his mind, the theory stands regardless of problems with the evidence. He has become a pseudo-scientist, such that his philosophical preferences carry more weight than rational evaluation of observed evidence. Sadly, I have read of other evolutionists marveling at Darwin's wisdom with this conclusion, claiming that in *Origin* he resolved the problem of the eye. With logic like this, it is definitely going to be hard to carry on an intelligent, legitimate dialogue with evolutionists about the validity of evolutionary theory. Darwin is their hero and this was how he made his case. They are quick to follow his methodology to this day.

The problem of missing evidence was real. Darwin lived another two decades and was active in scientific research the entire time. He never did find the evidence he was looking for. Neither did his contemporaries. This was a legitimate problem. It was not that the work to find it had not been done, perhaps due to lack of funds or other issues. The problem was that

extensive search had been made, volumes of evidence sifted through, and it still consistently supported his observations on a small scale but not a large scale. The normal response of unbiased science would then be to limit claims to the small scale and count the larger scale falsified, or as a minimum to suspend judgment on the truth of the large scale.

Despite all of the rhetoric of modern materialists to the contrary, it appears one can make the case that the problems Darwin faced have persisted to this day. Darwin's faulty methodology still characterizes the field. In contemporary science journals, articles submitted for publication tend to be accepted or rejected on how well they support materialism, not on unbiased evaluation of scientific merit. This is particularly true if the "wrong" conclusions are presented. Discussion of negative results is suppressed.

For instance, a major journal at https://www.mdpi.com/journal/life/sections/hypotheses specifically states that any article submitted which attempts to refute evolution will be rejected without comment. It openly states that which most journals simply practice more discreetly. An early version of my Article 3 was submitted to them and it took only three hours for them to reject it without comment. It appeared to me to meet all of their standards for publication and it presented new science with potential significance, yet it was inconsistent with materialistic philosophy. It was immediately rejected.

Here is a challenge: Evaluate for yourself if the new science presented in the article is worthy of open discussion. If you find understand the presentation and find fatal flaws in its content, please post if for the world to see. A blog is available for you to do this. Details are available at the end of this article. Truth does not fear honest, open discussion the way materialists do. Incidentally, if you understand it and agree with it, it is also acceptable to post that.

Darwin's Paradox

Darwin now faced a paradox. He was unable to accept the Biblical account because his scientific observation and analysis appeared to demonstrate that species were not fixed, but descended with modification in their successive generations. Then, in the light of a materialistic perspective, he extrapolated his theory to account for the complex forms of life. Yet, despite the reasonableness of the theory philosophically and intense search for this evidence spanning decades, he was unable to find the evidence which met the standards he considered necessary to prove that this had actually happened. The failures were systematic, not just occasional and isolated. Unbiased science appeared to teach against whatever approach he took. Fixed species? Not according to scientific observation. Large scale variation? Not according to scientific observation. He faced a paradox. His solution was to imagine that the missing evidence actually existed and act accordingly. But this is pseudoscience, not science. Slight observed discrepancies sometimes lead to major discovery, such as a constant measured speed of light in all directions leading to the theory of relativity. Systematic replacing of observed evidence with imaginary evidence is pseudoscience. Is there a resolution?

Resolution of the Paradox is Found in Genesis 1—The Genesis Creation Account and Science Agree

There is a resolution to Darwin's paradox which is surprising for many: The paradox is removed by a creation-based model which properly interprets and applies Genesis 1. The error was in the claim that the Bible teaches fixed species. The proper interpretation of Genesis 1:11 and similar verses leads to a model which explains both why small-scope variation is valid and

can be observed and why large-scope isn't and can't. Darwin should have discarded his errant interpretation of Genesis 1, which was the actual cause of the paradox, not his earlier belief in the Creator.

We discussed these things in the opening comments and expand on them here. We read:

> [11] Then God said, "Let the earth bring forth grass, the herb that yields seed, and the fruit tree that yields fruit according to its kind, whose seed is in itself, on the earth"; and it was so. [12] And the earth brought forth grass, the herb that yields seed according to its kind, and the tree that yields fruit, whose seed is in itself according to its kind. And God saw that it was good (Genesis 1:11-12).

The key to the problem is the meaning of *kind.* This is a general term. Restricting its meaning to represent that of the most specific and restrictive modern scientific taxonomical category, species, is foolish, because that perspective was unknown when the Bible was written. Furthermore, the issue is not kinds as they exist today but as they would have existed in the day of creation. The Brown-Driver-Briggs Hebrew Lexicon is a standard dictionary for words used in the Old Testament. It provides the following discussion about the Hebrew word translated *kind* in Genesis:

> Groups of living organisms belong in the same created "kind" if they have descended from the same ancestral gene pool. This does not preclude new species because this represents a partitioning of the original gene pool. Information is lost or conserved not gained. A new species could arise when a population is isolated and inbreeding occurs. By this definition a new species is not a new "kind" but a further partitioning of an existing "kind".

So, anything which has descended from an original creation-day kind is still part of that kind. Darwin described the process in his comment cited earlier, "I am fully convinced that species are not immutable; but that those belonging to what are called the same genera are lineal descendants of some other and generally extinct species, in the same manner as the acknowledged varieties of any one species are the descendants of that species." Everything in this statement is consistent with current creationist understanding. In fact, a creationist today would typically suggest that a kind should frequently be a taxonomic family, although taxonomic classification was unknown in Biblical times and God's designs represented His own preferences.

The word *kind* can be ambiguous in many ways. Whatever the exact boundary of a given kind may be, there are basic truths relevant here:

> 1) All of the kinds were created at approximately the same time, the creation week of Genesis 1. Complex life forms were initially created already having their essential complexity, with the capability for specialization within it. Specialization is mostly loss of existing information with minimal allowance for slight modifications from mutations. This contradicts Darwin's theory which proposes that the simplest forms of life started off very simply and gradually acquired increasing complexity along with required substantial amounts of new information until eventually the complexity we see around us appeared. These two models are mutually contradictory. Darwin went too far in his proposal and despite decades of intensive effort never found the evidence to support his grand scheme. We still don't have a viable mechanism for the appearance of large blocks of information for new features, as discussed later in this article.

2) Reproduction takes place within a kind. There are boundaries beyond which a kind does not vary. Mutations may slightly extend the boundary of a kind, but this would be limited in scope. Hybridization becomes a useful indicator of an approximate boundary. For instance, consider hybridization in mammals. A housecat can breed with a cat called a margay and produce offspring that are alive. Cats do not breed with dogs, fish, or apricot trees and have living offspring. This would indicate that housecats and margays are modern species descending from a common kind. Margays and ocelots, ocelots and pumas, pumas and leopards, and leopards, lions, and tigers all successfully mate with resultant living offspring. This would indicate that the entire string originated from a common creation-day kind. Consider canines. Dogs, wolves, and coyotes can hybridize with living offspring. They were all from the same original kind. It is interesting that the fixed boundaries of species taught in Darwin's day simply do not appear to exist in reality. An internet search quickly shows that hybrid fish, birds, reptiles, and mammals exist in abundance, despite contrary claims in *Origin*. Living offspring from a hybrid relationship indicates both parents were descents of the same original kind. Failure to hybridize does not automatically indicate separate kinds: house cats and lions do not hybridize.

3) Genesis 1 lists general categories of kinds: grass, trees with fruit, herbs, fish, birds, cattle, creeping things, and beast of the earth. Division of a category into more specific kinds is implied but not defined any more than this. However, fish most certainly could not become birds or cattle. Despite the vagueness and general nature of the terminology, Darwin's theory is specifically taught against.

4) Man's creation was unique. He is not part of another kind.

This is all we need to know about kinds. The most important issue is hybridization demonstrates a Biblical characteristic of kinds, i.e. reproduction takes place within a kind. The exact taxonomic boundary of a kind is not emphasized in Scripture, nor do we need to either. However, there are broad general categories of kinds listed. Efforts to extend a kind beyond these general categories, as Darwin did with his grand theory, are to be rejected from a Biblical perspective.

An unexpected observation concerning the paradox resolution

There is a surprising observation about the above-discussed resolution of Darwin's paradox. The resolution is based on a literal interpretation of Genesis chapter 1. Far from science and the Bible being at odds with each other, they complement each other and work together in revealing truth. Science revealed the flaw in the common misinterpretation of what Genesis 1 actually taught. It then revealed the flaw in Darwin's excesses as he tried to explain the appearance of the various forms of life apart from the Creator. Science and the Bible work together. If the God of the Bible is the God of creation, this is exactly the way it should be.

As a side note, in Article One on Information, we also noticed that science teaches us that an information-driven machine must be built to a specification. This is foreign to the materialist's attitude that evolution has no goal or purpose in mind. Without a predefined design specification, the information and the hardware to process it will never agree. Thus, natural processes cannot provide for an information-driven cell. Unbiased science supports a Creator God such as described in the Bible, particularly in Genesis 1, as the source of life. Materialism is falsified—it can't provide the specification needed for provision of an information-driven machine. Consistent testimony throughout the Bible is that God plans then does. There is unity between observed science and literal Biblical understanding.

Two things emerge from recognizing Biblical kinds: 1) Darwin's studies of finches and of horses were meaningless, being nothing more than variation within a kind. 2) The reputedly missing portions of the fossil record are the gaps between kinds. This explains their ubiquity.

Properly understanding the meaning of Biblical kinds resolves the issues plaguing Darwin. This was a resolution neither Darwin nor Thomas Huxley, discussed below, had anticipated as even a possibility. Yet, it is the proper Biblical perspective. This situation should be a warning to Christians and doubters alike that just because there may be something we don't understand now, that we don't immediately use this as an excuse to reject God. Instead, we look to God to show what the true resolution might be and wait for His answer. Many pieces to the puzzle are still missing.

Darwin was inconsistent. He rejected God when scientific observation appeared to contradict Genesis. Yet, he was unwilling to hold his own work to the same standards. This is not how to impress or please God.

Operational Science vs. Historical Science

Operational science is the study of natural law, i.e., the way God designed the universe to function whenever He is not intervening in it for His own purposes. There is no experiment which can control a sovereign God. Therefore, His existence is outside the domain of science—science can neither deny Him nor quantify Him. Operational science is limited to defining normal actions that occur within the creation when God is not overriding them. A fundamental error of modern evolutionists is they forget this basic, simple observation and claim that since science can teach us many aspects about the operation of natural law, then there is no God. As a scientific statement, this is without foundation. To present it as scientific truth is to lie.

Historical science attempts to explain past events in the light of present knowledge. However, the Bible presents its God as working continually in the creation and that He will do so into the future. There is no scientific basis to preclude God from being able to do this.

There are five weaknesses in historical science: **1)** Historical events are not repeatable in a laboratory. They have already occurred and no one can change history. By contrast natural law is repeatable; changing the values of variables and observing the effect is the basic methodology of operational science. **2)** We only have sketchy information available and don't understand the significance of the unknown. **3)** Science does not give us the tools to determine whether events in the past were the result of natural law, of God's intervention into natural law, or some combination of the two. There is no scientific basis to exclude the possibility of God's intervention; this is a philosophical issue outside of science. It is misrepresentation to claim that science teaches against God or God's possible intervention. **4)** God does give proof of His continual intervention into the affairs of His creation through prophecy. He first declares He will do something and then does it. For a person willing to listen, the evidences of the intervention of the God into the affairs of the creation are numerous and strong. But, it is hard to say something that will convince a person who plugs his ears in order to avoid hearing your message (Acts 7:57). **5)** God gives internal evidence of His living interaction with men to those who come to Him on His terms. The fellowship of the Lord, a life of interaction between oneself and God, the fruit of the Holy Spirit all bear testimony to the presence of a living God. A Christian's conviction of the truth of Scripture is based on a large number of factors beyond mere science. Historical science is interesting but very limited in its authority.

The problem with the materialist is not lack of evidence that God is active in the world today, rather it is that he does not want it to be true. The rejecter actively seeks to deny the

evidence. The claims of a materialist are more wishful thinking than evidence-based, although in his arrogance he boldly claims the opposite. Scripture teaches that God designed the creation to reveal the invisible things of God—His eternal power and divine nature (Romans 1:18-19). This would be indirect evidence. Nonetheless, God placed it there and He calls it valid. Furthermore, God states that even though His attributes are invisible, the creation gives clear testimony of them.

Scripture also teaches that natural law exists only because God sustains it (Colossians 1:7, Hebrews 1:3) and the day will come which He no longer will (2 Peter 3:10). It is a matter of sovereign, personal choice for God whether He works within natural law, outside it, or continues to sustain its existence. Natural law is good—its operation provides us with consistency and order. However, it does not restrict God in any manner. Wisdom starts here.

Biblical theology makes no sense outside of its historical context. A person who rejects Genesis 1 – 3 because it contradicts materialistic philosophy is forced into rejecting the entire Bible for the sake of consistency, because the Bible presents God as continually intervening into the affairs of the world. When a theistic evolutionist denies the literalness of Genesis 1 – 3, he is rationally forced in denying the rest of the Bible. God has severely judged people for not believing His Word. This is why theistic evolution appears to be an abomination to God and a true believer needs to be very careful about identifying with it in any manner.

Attempts to explain the past apart from God lead to contradictions. This plagued Darwin, as discussed, it plagued Huxley, as discussed below, and it continues to plague modern science as discussed in the final paragraphs in this article. The issue is that God can use these contradictions to point us to Him. The materialist just says that the contradictions will be resolved in the future and proceeds to ignore them. Unsaved man was quick to latch onto Huxley's approach 150 years ago. Suppression of truth about God is in the heart of natural man (Romans 1:18) and Huxley showed him how he could <u>appear</u> to avoid dealing with God legitimately. Modern science continues the tradition established by Huxley.

The History of Science Regarding Evolution

Peter J. Bowler is a science historian. He wrote *Evolution: The History of an Idea,* a book which Wikipedia refers to as a standard textbook on the history of evolution. It has been revised several times, with significant differences between the editions. The revised edition of 1989 (ISBN:0-520-06386-4) is of particular interest to this discussion, as in it he discussed various aspects of Darwin's life and the impact of his book, *Origin of Species*.

Bowler reports:

> Many historians who are studying Darwin's early papers are convinced that by 1838 [21 years before *Origin* was published] he already had recognized that the materialistic implications of his theory…. From this point on, Darwin was doubtful about the prospect of reconciling natural selection with even a watered-down version of natural theology. …As Darwin gradually explored the implications of his theory, he became increasingly pessimistic over the prospect of reconciliation with natural theology (pp 154-157).

If *Origin* had so many problems, why did it become such a success? Within a span of little over a decade, his theory had completely overtaken much of official science. The answer may be illustrated by comparing it to crossing a mountain that many people wanted to cross but historically had considered it impassable. It appeared to Darwin's observers that he almost made it over the mountain, even if he didn't quite do so. The reasons he didn't were not

relevant. He laid down a trail which looked viable. Now lots of people wanted to be the one that actually found the successful trail. To a generation that was already becoming materialistic in its thinking, Darwin's theory gave the hope that a materialistic explanation for the appearance of living organisms was available, even if his arguments weren't quite right. Darwin and his theory provided the spark that lit the fuse. Many of his specific ideas were initially rejected; it was generally recognized that he had not entirely succeeded in making his case—even as we just discussed. But he sparked excitement that a successful trail was close at hand and its discovery inevitable. After *Origen*, many believed it to be only a matter of time until the actual details would be worked out. The materialist of today still has this same hope. Incidentally, despite his assertions to the contrary, he is still waiting 160 years later.

Thomas Huxley played a major role in the acceptance of evolutionary theory. He was an extrovert, extremely intelligent, and very vocal in outspoken contempt for anyone who disagreed with him. He dominated relationships. Bowler has this to say about Huxley:

> Huxley was typical of a new generation of scientists determined to wrest intellectual authority away from its traditional resources.
>
> > [comment: By "traditional resources he primarily refers to creationists. As further comments show, Huxley had no interest in dialogue, but authoritative control.]
>
> Evolutionism was useful to them precisely because it demonstrated that science could now determine the truth in areas once claimed by theology….
>
> > [comment: Huxley was wrong about science. Operational science is impotent to say whether there is a living God or not. Huxley made a fatal error here. He assumed—not demonstrated—that science could determine truth concerning the appearance of living forms. If the assertions of the three previous Articles of this package are valid, then theology continues to be the source of truth—not only for the origin of life as a minimum, but plausibly for all of life. It is easy to gloss over the significance of this citation. Yet, it reveals the fatal flaw of Huxley 160 years ago and modern science today. There were many evolutionists long before Charles Darwin, as is common knowledge in evolutionary history. What Darwin proposed and which so gripped his followers was his proposal of a method sufficient to explain how evolution could work. What none of them understood was how this method was consistent with Scripture for descent within a kind, specialization, but fell apart when attempts were made to extend it beyond this—to account for the appearance of classes, phyla, and kingdoms. In truth, modern evolutionary science still does not understand this, primarily because they don't want to. This is a major issue discussed at the end of this Article.]
>
> Huxley went on to become a leading public figure, serving as a scientific expert on numerous governmental commissions. He was also a member of the "X-club," an informal but extremely influential group of men whose behind the scenes activity shaped much of late Victorian science. It was by exploiting their position with this network that Huxley and his fellow converts ensured that Darwinism had come to stay…. They avoided open conflict in scientific journals
>
> > [comment: At this point Huxley became a fake scientist, a pseudo-scientist. He pretended science supported his personal philosophical preferences, which it didn't. He then worked "behind the scenes" to insure that his approach was established as legitimate science and anything which didn't support him was suppressed. This position did not flow naturally from science. He was determined to restrict science to

interpretations and discussion which agreed with his personal philosophy. In truth his position was so weak that open discussion would risk its collapse. So, he and his friends put a spin on the data that made it appear that theirs was the only valid interpretation of science, yet they could not do this if open discussion were allowed.]

but used their editorial influence to ensure that Darwinian values were incorporated gradually into the literature. The journal *Nature* was founded at least in part as a vehicle for promoting Darwinism.

[comment: Their goal was not to encourage honest, open scientific discussion however it led. They viewed it as a vehicle for promoting a materialistic interpretation of scientific data. This is pseudoscience, claiming to be the only valid representation of science while at the same time stifling open discussion of relevant issues not in accord with their philosophical preferences. *Nature,* despite all of its prestige, is at its heart pseudoscience in the issues that count—those relating to the intervention or non-intervention of a Creator God in the formation of complex life forms.]

Academic appointments were also manipulated to favor younger scientists with Darwinian sympathies, who would ensure that the next generation was educated to take the theory for granted

[comment: If you want a job, promote Darwinism, otherwise someone else will get it who is. Implied: promote it the way Huxley does or your replacement will. This message was apparently well understood by younger academics who understood one thing for certain: their careers were based on their aggressively promoting Darwinism. Notice, this was behind- the-scenes manipulation of academic appointments. It had nothing to do with scientific dialogue; it was power play by pseudo-scientists to force their materialistic views onto the scientific community. The goal was to get evolution "taken for granted," not proven. There is a serious difference between these. Perhaps it is worthy of mention that requiring faculty to promote evolutionary theory for the sake of their jobs is not new to our day; this was the result of behind the scenes effort beginning with Huxley and the X-club 160 years ago in their efforts to enforce materialistic philosophy onto the science community of their day. Huxley was so effective his approach spread and still applies. Man in general wants it to be true. Huxley was "preaching to the choir" so to speak—and the choir listened willingly.]

So successful was this takeover of the British scientific community that by the late 1800s, its remaining opponents were claiming that Darwinism had become a blindly accepted dogma carefully shielded from any serious challenge….

[comment: When a personal philosophical perspective is presented as unbiased science, when the duplicity is carefully shielded from serious challenge, and when public authority is used to enforce it, it is not science but fake science. The opponents of Huxley and the X-club recognized what he and his fellow club members were doing, but their complaints had little impact. This situation continues to this day, although God has graciously raised up the modern creation science movement to expose what is going on and to show the validity of the Biblical position for those willing to hear it. The standard science journals and the major funding grantors today are still firmly in the control of materialists. Even today whenever issues related to the validity of evolution or materialism are at stake, a research scientist either plays their game according to their rules or he is rejected. Shielding evolutionary theory from serious challenge is still aggressively practiced. Much of the legal court challenges to laws

some states passed a few years back not only desired to prohibit the teaching of creationism or intelligent design in a public schoolroom, but even to prohibit acknowledging known problems in evolutionary theory. Evolutionists mock creationists. They boast of their own strength and a creationist's reputed weakness. Yet, they are completely unwilling to discuss the evidence openly. Their goal was for the courts to require it be taught as proven fact. This is true pseudoscience.

Whatever the debates over the actual mechanism of evolution

[Comment: no one, including Darwin, Huxley, or members of the X-club ever really came up with a satisfactory explanation of the actual mechanism of evolution. Yet, it was initial belief that Darwin had done this or almost done it that popularized him. Yet, neither the problems nor the difficulties associated with them are discussed publicly. Darwin did not have a satisfactory mechanism. Huxley did not. We still don't have a theory today that can truly explain the appearance of complex structures; this is discussed in the final paragraphs of this article. Historically, there has always been a large gap between the claims of materialists and what observed science teaches.]

the new movement was committed to a causal interpretation of the development of life, repudiating not only divine creation, but any teleological explanation in which evolution was drawn toward predetermined goals. The permanent success of Darwinism lay in the triumph of this attitude, because the arguments over natural selection itself did not diminish as the century drew to a close (p. 196).

[Comment: they didn't have the answers; they just wanted to restrict which answers would be allowed and in particular repudiated divine creation as a possibility as well as various other perspectives. Before a theological evolutionist follows after them, he would do well to take to heart their motives—looking for a method to replace and deny God's role in creation. These early evolutionists did not actually have any more answers than creationists or anyone else. They just worked behind the scenes to create an illusion of success while avoiding an open discussion that would reveal their actual weakness. The same pattern continues to this day. Is this who you want to follow instead of God? Can you trust their filtered evidence?]

Peter Bowler is a historian who is an evolutionist himself. In his book he makes clear that he finds creation science without merit. Even so, he recognized and documented a significant issue: the open, extreme hostility of evolutionists to creation science goes back to Huxley and the X-club members using behind-the-scenes power plays to force their personal metaphysical philosophies onto science. Avoidance of open debate was deliberate—they understood that they didn't have the answers themselves; they just wanted to restrict the allowed answers to fit their own personal, philosophical mold.

I was quite surprised that Dr. Bowler had been so candid exposing how evolutionary theory was established by the manipulations of those hating creationism and not by open scientific dialogue. Bowler exposed the very methodology that evolutionists do not want made known. Sadly, in the third edition of the book in 2003, all of this discussion was removed. This is significant history. It explains a lot. It refers to events that happened well over one hundred years ago and whose references were already well established. One can only speculate why he removed this discussion.

Because of Huxley's unusually superior intellect and extreme belligerence it was difficult for anyone to stand against him. Huxley's approach was like a modern politician who diverts attention from the issues by attacking his opponent viciously. The personal attack Huxley

spewed was horrific. Before a person could defend himself against one charge there would be a host of new ones. Defense was particularly had because Huxley controlled the dialogue. This did not make Huxley right. But it was effective in shaping the battle. It worked behind the scenes. Moreover, the position Huxley espoused was what unsaved man wanted to be true. They were happy to have him fighting for them. Some examples from his writings show his approach and spirit.

Huxley's son Leonard Huxley published a two-volume set of his father's statements, *Life and Letters of Thomas Henry Huxley,* McMillan and Co., Limited, London, 1900. Here is an extended citation from the work. Notice the confrontational tone of Huxley's comments:

> As I have already said, I imagine that most of those of my contemporaries who thought seriously about the matter were very much in my own state of mind—inclined to say to both Mosaists and Evolutionists, "a plague on both your houses''
>
> [Comment: this is vicious personal attack, not respectful analysis of issues. In truth, Huxley did not have better answers than his opponents. He was more interested in winning a philosophical victory for materialism than uncovering scientific truth.]
>
> and disposed to turn aside from an interminable and apparently fruitless discussion,
>
> [Comment: when *you* talk about it, it is apparently fruitless discussion]
>
> to labor in the fertile fields of ascertainable fact.
>
> [Comment: when *I* talk about it, it is ascertainable fact. Hold on, here Mr. Huxley. Science is inherently incompetent to discern whether God acted in the past or not. You have made the philosophical assumption that God can't do anything and mock anyone who claims he did. But, this only shows your bias. It does not make you right. Furthermore, it is now well over 100 years since you died. Neither you nor anyone following after you from then until now has successfully indentified natural processes that could explain the origin of life and appearance of complex structures apart from God. It appears the distinction of "fruitless discussion" most definitely applies to you. Your fields have not proven as fertile as you claimed they would be.]
>
> And I may therefore suppose that the publication of the Darwin and Wallace paper in 1858, and still more that of the "Origin" in 1859, had the effect upon them of the flash of light which, to a man who has lost himself on a dark night, suddenly reveals a road which, whether it takes him straight home or not, certainly goes his way.
>
> [comment: this is pseudoscience. Huxley had no idea which road would lead to success. He never found it. All he cared about was searching for one which denied the Creator.]
>
> That which we were looking for, and could not find, was a hypothesis respecting the origin of known organic forms which assumed the operation of no causes but such as could be proved to be actually at work. We wanted, not to pin our faith to that or any other speculation, but to get hold of clear and definite conceptions which could be brought face to face with facts and have their validity tested. The "Origin " provided us with the working hypothesis we sought. Moreover, it did the immense service of freeing us forever from the dilemma—Refuse to accept the creation hypothesis, and what have you to propose that can be accepted by any cautious reasoner?
>
> [comment: this is more twisting. There is a fatal error of logic in this statement. He wanted to restrict his conclusions to those coming from causes such as could be proved to be actually at work. He did not and could not prove that natural processes

are capable of doing this. He hoped that by restricting his enquiry to natural causes, a solution would be found. But, that implies that a natural solution actually exists. By contrast, my article on abiogenesis[1] shows how unbiased science clearly shows how natural processes are not in themselves capable of forming living systems. Random processes at the molecular level have proven fatal to every postulated step experimentally tested. Yet, major journals have rejected the article because it challenges materialism. Following Huxley's example, they are still waiting for a solution to appear, but have rejected without basis the apparently true solution, special creation. If the assertions of Articles 1 and 3 prove valid, they becomes specific examples of how modern science is pseudoscience and Huxley's assumptions were false. It also shows how modern science does not have the answers it boldly presents as fact. Huxley may have succeeded in swaying materialistic young scientists in his day, but did so at the risk of offending the eternal, Creator God that he was deliberately denying.]

In 1857 I had no answer ready, and I do not think that anyone else had. A year later we reproached ourselves with dullness for being perplexed with such an inquiry. My reflection, when I first made myself master of the central idea of the "Origin" was, "How extremely stupid not to have thought of that I" I suppose that Columbus' companions said much the same when he made the egg stand on end.

[comment: why this continual emphasis on how stupid or dull a person is who takes a certain position? This is totally inappropriate. Worse yet, after 160 years of *Origin,* Huxley's followers still don't have an answer. They have irrigated their field from a dry well and mock anyone who attempts to call attention to the problem. Why such emotional, personal attacks? Why not simply state the facts and let them speak for themselves? Apparently, he did not believe he would prevail with such an approach. He acts as though he knew he really didn't have the answers any more than Darwin did. His approach was to present what he wanted to be true as fact and then attack personally anyone who attempted to expose him, and hoped that time would be on his side. This is not true science and time has not been good to him.]

The facts of variability, of the struggle for existence, of adaptation to conditions, were notorious enough; but none of us had suspected that the road to the heart of the species problem lay through them, until Darwin and Wallace dispelled the darkness, and the beacon fire of the "Origin" guided the benighted.

[comment: Yes, Darwin and Wallace dispelled the error of the false interpretation of Genesis 1. However, the facts of variability, etc. which underpinned their discoveries were only valid for specialization, for variation within kinds. An immovable "brick wall" blocked attempts to go beyond this. However, the potential existence of such a brick wall was an observation to be suppressed. It still is to modern evolutionists, who are effectively Huxley's disciples.]

Whether the particular shape which the doctrine of Evolution, as applied to the organic world, took in Darwin's hands, would prove to be final or not, was to me a matter of indifference. ….But, with any and every critical doubt which my skeptical ingenuity could suggest, the Darwinian hypothesis remained incomparably more probable than the creation hypothesis….

[comment: The reality is that Huxley didn't care what the answer was as long as it didn't involve creation by a living God. Too many of the puzzle pieces were missing for

Darwin, Huxley, or anyone to understand all of the problems and issues at work. He certainly did not have evidence that could support and justify his hostility to the "creation hypothesis." It was the Genesis account that ultimately explained the reason that he, Darwin, and those of like mind could not grasp the victory they thought was in their hands. God was the real mover. Plausibly, their inability to "find the right path" was because that path went through God and they were rejecting Him, the true solution.]

Another example shows Huxley's wrath against anyone believing in God. By "the Pentatatuechal writer" he refers to Moses and the Bible:

> …So far as this question is concerned, on all points which can be tested, the Pentateuchal writer states that which is not true. What, therefore, is his authority on the matter—creation by a Deity—which cannot be tested? What sort of "inspiration" is that which leads to the promulgation of a fable as divine truth, which forces those who believe in that inspiration to hold on, like grim death, to the literal truth of the fable, which demoralizes them in seeking for all sorts of sophistical shifts to bolster up the fable, and which finally is discredited and repudiated when the fable is finally proved to be a fable? If Satan had wished to devise the best means of discrediting "Revelation" he could not have done better.

Huxley had an irrational hatred of God. A child of God walking in fellowship with Him has all kinds of evidences within him of the reality of God. Huxley apparently neither understood this nor wanted to understand it.

The University of California *Museum of Paleontology* posted an internet article on Huxley. Huxley had read a pre-release copy of *Origin of Species*. He wrote the following personal letter to Darwin the day before *Origin's* official, public release:

> I trust you will not allow yourself to be in any way disgusted or annoyed by the considerable abuse & misrepresentation which unless I greatly mistake is in store for you…. And as to the curs which will bark and yelp—you must recollect that some of your friends at any rate are endowed with an amount of combativeness which (though you have often & justly rebuked it) may stand you in good stead—I am sharpening up my claws and beak in readiness.[8]

Origin had not even been officially released and Huxley was already counting anyone who would challenge it as a barking mongrel dog. Huxley was already planning how to aggressively combat opposition. He was "sharpening up" his "claws and beak in readiness." To him this was open warfare before anyone had declared war. He had no intention of open scientific dialogue.

This is the man whose teaching theistic evolutionists want to identify with. He had no answers, just a long string of blasphemous accusations against God and His word. He relied on emotional rhetoric masquerading as truth instead of honest dialogue. He suppressed the fact that he had no proof that his assumptions were any more adequate than those of creationists.

Richard Lewontin, a somewhat recently retired biologist of Harvard University, shows how he carried on Huxley's tradition:

> We take the side of science in spite of the patent absurdity of some of its constructs, in spite of its failure to fulfill many of its extravagant promises of health and life, in spite of the tolerance of the scientific community for unsubstantiated just-so stories, because we have a prior commitment, a commitment to materialism. It is not that the methods and institutions of science somehow compel us to accept a material explanation of the phenomenal world, but, on the contrary, that we are forced by our a priori adherence to

> material causes to create an apparatus of investigation and a set of concepts that produce material explanations, no matter how counter-intuitive, no matter how mystifying to the uninitiated. Moreover, that materialism is absolute, for we cannot allow a Divine Foot in the door. The eminent Kant scholar Lewis Beck used to say that anyone who could believe in God could believe in anything. To appeal to an omnipotent deity is to allow that at any moment the regularities of nature may be ruptured, that miracles may happen. (https://www.nybooks.com/articles/1997/01/09/billions-and-billions-of-demons/)

Here it is. In Dr. Lewontin's own words, his commitment to materialism is absolute. His opening statement is a lie. He does not take the side of science, he takes the side of materialism in the name of science. Science does not compel him to support materialism, rather his materialism compels him to force materialistic explanations for his "science" regardless of any absurdity of the conclusions. Why? "We cannot allow a Divine Foot in the door." This is out and out pure pseudoscience. To a person with this mindset, open discussion on any of the issues brought to attention in the articles of this collection would not merely be rejected, it would be forbidden. This has nothing to do with their potential scientific merit, but because his highest priority is to defend materialism. In the above citation, Lewontin represents a modern example of Thomas Huxley. Science is treated as a tool for materialism. It is not a free exchange of ideas in search of understanding natural processes as best possible. We saw earlier science cannot say anything one way or the other about the existence of God or His interventions into His creation. Yet, Lewontin treats his personal philosophical preferences as the exclusive domain of science. This is fake science. Sadly, he represents the attitude of most scientists today. Huxley's legacy lives on.

By contrast, a Christian believes that true science leads a person to the knowledge of God as the Creator, with a testimony so powerful that there is no excuse for missing it. God specifically designed the creation so that it does this.

Furthermore, God is holy. He does not want His reputation tainted with sin. The responsibility of the Christian is to show how science legitimately leads to Christ, providing honest discussion of the evidence. Twisted evidence only taints God's name. The goal is not to win an argument by any means as is the policy and practice of the materialist. The standard God sets is truth. He is to be glorified by honest representation. This will be possible to do because God made it possible.

There is a living God who can and does rupture the regularities of nature at will. The Bible presents a continual stream of situations where God first says what He will do something and then does it. He says, "…Indeed I have spoken it; I will also bring it to pass. I have purposed it; I will also do it" (Isaiah 46: 9-12). In God's case, fulfilled prophecy is not merely knowing the future in the manner claimed by fortune tellers. It is having a specific plan He wants to accomplish and then having the power to bring about what He wants to do, working outside of natural law when it suits Him. He foretells His actions; He doesn't merely foretell the future. He continually ruptures the regularities of nature at will. The problem is not the evidence of His working; it is man's unwillingness to hear the evidence. Miracles can and do happen. But God does them according to His purposes and His timing and not ours.

Word games by a human materialist are not going to make a living God disappear. This is particularly the case for One who can speak galaxies into existence and not even get tired. God has declared a prophetic plan for the ages that He is actively carrying out according to His will and no one is able to thwart it. This is miraculous, outside of natural law. From a scientific perspective, the two articles on abiogenesis and information in this packet, when taken

together, show that the appearance of living cells required the living God to work outside of natural law in their creation. Do you want to see a product of God's supernatural handiwork? Look in a mirror.

Creationists and "Only Negative Results"

Some people claim that creation science only gives negative results and is not useful for making predictions. Therefore it is not valid. This appears to be more rhetoric than substance. Scientists in general believe in negative results. A fundamental aspect of scientific investigation is to define bounds of behavior. Showing that a specific application lies outside these bounds is legitimate. For instance, a person applying for a research grant to develop a free-energy system would be ridiculed unless he can first falsify entropy. Entropy is considered one of the most basic properties of nature, with no known work around. Yet, entropy is merely a mathematical expression of randomization at the molecular level by natural processes. The study of this in a heat engine is called *statistical mechanics*. I suggest that the same root (randomization) leading to the second law of thermodynamics for heat engines also leads to the consistent failures of experiments in abiogenesis, as discussed in Article 3. This same principle would also plausibly impact attempts to create complex new organs and large bodies of new information as required by general evolutionary theory. It is not that we do not have a theory. It is that the things we understand clearly teach against the possibility of natural processes having the capability to create life. Science shuts doors as well as opens them. Responsibility and honesty require this to be openly acknowledged.

I have talked personally with scientists who understand the issues presented here, but are afraid of losing their jobs or their research grants if they speak out. As a pastor, I can speak out boldly on these issues. Even if I am mocked as a fool, in the long run, God can still use the message (1 Corinthians 1:27-29). If I were on the faculty of a large research university, I would not be allowed to do this at the risk of censure at one level or another. As a pastor, I also have the freedom and training to give a Biblical perspective on the issues, which is relevant.

The complexity of stacked genes in a genome, alternating exons and introns, the appearance of spliceosomes (which make ribosomes seem trivial) and the requirement of simultaneous initial appearance of all three of these is plausibly beyond the capabilities of random mutations and natural selection to provide. The required complexity is so great that googols and googols of years would not be adequate for random processes to complete the task, per Article 3. Any incidental incipient progress would degrade before the task was completed. Extant living cells in complex organisms feature all three of these. It is legitimate science to recognize that there is serious incompatibility between known principles of science and their capacity to provide via random processes the above structures and processes of cellular systems. The modern evolutionist typically responds to problems like these with the comment that since we cannot prove that a future discovery might not solve the problem, therefore it is not a problem. However, this is copying Darwin's error. It is pseudoscience to make an unfounded assumption based on philosophical preferences and then give this higher value than actual observation. A true scientist acknowledges the situation as it actually stands at present.

The above discussion is consistent with Romans 1:20, "For since the creation of the world His 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…."

What about the Phrase, "Evolution is Fact!"?

The phrase "Evolution is fact!" appears to be a mantra among evolutionists. This phrase is frequently used to refute challenges to evolutionary theory by creationists—evolution is fact! Is this statement valid? The National Center for Science Education gives the following definition for *fact*:

> *Fact:* In science, an observation that has been repeatedly confirmed and for all practical purposes is accepted as "true." Truth in science, however, is never final and what is accepted as a fact today may be modified or even discarded tomorrow. [9]"

I suggest that the material presented here related to information-driven machines (Article 1) and randomization (Article 3) represent new perspectives that obsolete this statement. Unbiased science establishes a Creator God as fact! God designed it this way (Psalm 119, Romans 1:18-25).

Article 4 Appendix. How to Falsify the Assertions in This Package

At various locations in this package a challenge is made to falsify its contents if possible. In an effort to provide an example of the openness that is proper for scientific discussion, which is in contrast to the practice of materialists in suppressing anything which challenges their assertions, a specific mechanism is provided for those wishing to accept this challenge.

A website is provided with a blog to allow a response to be posted: **www.ctotim.com.**

Darwin set the modern example of ignoring observed science whenever it contradicted his theory, as long as he could imagine an explanation for it. Proof was not required for the imagined explanation. Then, when in the case of the eye he could not even imagine the required evidence, he in effect said that reason told him that he should be able to imagine it, and that was adequate for him to ignore the observed problems. This is fake science. "Talk boldly and ignore problems." Thomas Huxley took this a step further. "Talk boldly, ignore problems, and aggressively mock anyone who attempts to expose you. This continues to be the methodology of evolutionists to this day. It is not my desire to follow this pattern with my own assertions. To that end the blog has been set up.

[3] Darwin, Origin of Species, 1872, p. 31
[4] Darwin, *Origin of Species,* 1859, p. 230
[5] (Darwin, 1859, p. 240)
[6] (Darwin, 1859, p. 252).
[7] (Darwin, 1859, *Origin of Species,* pp. 155–156)
[8] Letter of T. H. Huxley to Charles Darwin, November 23, 1859, regarding the *Origin of Species.* Retrieved February 21, 2019 from https://ucmp.berkeley.edu/history/thuxley.html
[9] https://ncse.com/library-resource/definitions-fact-theory-law-scientific-work

Article 5. Who is the Creator? What does He want from us?

by Timothy R. Stout

On occasion when discussing the above train of thought with university students, some of them would ask, “You are a Christian? How do you know that the God of the Bible is the right one? There are lots of religions out there.”

This is a reasonable question. God welcomes honest dialogue. In fact, in Isaiah 1:18 of the Bible we read, “‘Come now, and let us reason together,’ says the LORD.” God gives evidence concerning His person and what He wants from us. The problem is that many people do not want to hear the evidence. Even so, it is available for those willing to hear it.

The Bible claims its God is unique among all of the gods of other religions. He tells what He intends to do and then does it. Fulfilled prophecy then becomes the basis to recognize His person. In Isaiah 46:9-12 we read,

> Remember the former things of old, for I am God, and there is no other; I am God, and there is none like Me, declaring the end from the beginning, and from ancient times things that are not yet done, saying, 'My counsel shall stand, and I will do all My pleasure….” Indeed I have spoken it; I will also bring it to pass. I have purposed it; I will also do it. Listen to Me, you stubborn-hearted, who are far from righteousness.

The Bible indicates that it speaks of a God who declares the end from the beginning. He can do this because He has a plan and also has the power to implement it. In the big picture it appears that at times He is open to the requests of man; His will is not always fixed. At other times, He has purposed something specific will happen; in this case nothing can overrule His decision. He is not pleased with those who in their stubbornness reject His testimony.

God’s standards for a prophet are very high. No failures are allowed. Bible scholars have determined that over ¼ of the Bible was prophetic of future events when it was stated. Some of these are short term and the fulfillment has long since past. Others are yet still future, being related to end-time events which have been foretold far in advance. Deuteronomy 18:20-22 speaks of these high standards:

> But the prophet who presumes to speak a word in My name, which I have not commanded him to speak, or who speaks in the name of other gods, that prophet shall die. And if you say in your heart, “How shall we know the word which the LORD has not spoken?”--when a prophet speaks in the name of the LORD, if the thing does not happen or come to pass, that is the thing which the LORD has not spoken; the prophet has spoken it presumptuously; you shall not be afraid of him.

God decreed the death penalty for false prophets. This is due to the serious spiritual damage they do those who follow after them. This damage can have disastrous eternal consequences. Seeing this, God takes false prophecy extremely seriously. There are many prophets who claim they can foretell the future. Many appear to be right a large part of the time. God will not let them be always right, so that they can be identified as false. No other religion offers such extensive prophetic proof of its authenticity as does the Bible and its God.

The God of the Bible does not back away from open discussion of truth. For instance, we read in Isaiah 41:21-24 God’s challenge to false prophets and teachers who claim they have strong reasons to reject Him. He says,

> Present your case," says the LORD. "Bring forth your strong reasons," says the King of Jacob. "Let them bring forth and show us what will happen; let them show the former things, what they were, that we may consider them, and know the latter end of them; or declare to us things to come. Show the things that are to come hereafter, that we may know that you are gods; yes, do good or do evil, that we may be dismayed and see it together. Indeed you are nothing, and your work is nothing; he who chooses you is an abomination.

In this passage God sarcastically mocks those challenging His person to give their "strong reasons." The implication is that from His perspective they will be weak. Then He sets forth two standards: 1) show the future things, what they will be, or 2) show the former things, what they were. The assumption is that those representing false gods will not be able to do either. He alone can do this.

This is relevant to our discussion in two ways. First, fulfilled prophecy reveals God to be God. Only God knows and controls the future. One cannot do this extensively with 100% accuracy apart from Him. Second, the "former things" spoken of represent whatever God has revealed in the Bible. It can be prophetic or historical. Therefore, "former things" include the early chapters of Genesis, in which the origin of life is discussed. God created life instantly and directly as fully-formed entities, not through gradual evolutionary processes. Any attempts man makes to come up to an alternative explanation to what God has revealed will be "weak" from His perspective. Ultimately, God counts those doing this as "nothing." Moreover, those who follow their message God counts as an abomination. Woe to those who blindly follow a materialist or humanist in their denial of Him.

From a Biblical perspective, the reason for all of the chaos in abiogenesis is because those speaking out have rejected the Biblical account. Having rejected truth, there remains nothing for them but error.

From a Biblical perspective, there is no way that human investigation could discover the truths of the opening chapters of Genesis. The materialist does not want the Biblical account to be true. God will not allow the materialist to "get it right." There is a natural hostility between man in his natural condition and God.

Jesus spoke many prophecies while living on Earth. One of the purposes is stated in John 14:29, "And now I have told you before it comes, that when it does come to pass, you may believe." Jesus Himself presented prophecy as a legitimate basis to believe what God has said.

Shortly after Darwin published *Origin of Species*, Thomas Huxley saw Darwin's theory as a tool for promoting humanism. Science historian Peter J. Bowler wrote what Wikipedia calls a standard textbook on the history of evolution, *Evolution: The History of an Idea* [2]. He talks about how Huxley and those of the X club worked behind the scenes to get evolutionist into positions of power in academic universities. When Darwin wrote *Origin,* most scientists were creationists. Huxley and cohorts did not allow open debate of the issues, but used his political influence to get humanists/evolutionists into power. The established scientists complained they were cut out of the debate without even getting a chance to present their position. The same situation exists today. Creationists are mocked and slandered and their ideas discounted without consideration.

Glorifying the 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 greatest sin of all is wanting not to know God.

A person can "find" the living God who created the heavens and the earth. This means to approach Him in the manner He has prescribed, being made presentable to Him through His Son Jesus Christ. It means to have an intimate personal relationship with God as the Holy Spirit comes to dwell in us personally. 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. According to the verse, such a person 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, he expects you to believe that He exists and He expects you to receive the testimony He has given of Himself concerning His existence. Much of this booklet has been focused on evidences demonstrating the reality of His person. Once you recognize that He is real, you need to seek Him and do this diligently. Finding Him needs to become your number one 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 us that we becomes its slave. A 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 sins. 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:

"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.

5 "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 and 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,

6 “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,

10 “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 the Servant, 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 created a barrier between God and us. That barrier could only be removed by the death of an acceptable substitute. God provided a substitute for us in the person of the Servant.

11 “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 saw the fruit of His labors in 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 resulted and will result in the salvation of many. He bore their iniquities, and this was a grief. However, when He sees the product of His labors, the salvation of men, He will be satisfied that it was worth the cost.

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 has sent His Servant as an offering for my sin. In His love for me, He has saved me. Furthermore, He offers His 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, 12 “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 42:1, "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, the anointed King that God has promised to send to rule the entire earth. We could say more about this passage, but this is sufficient for now.

A sacrifice had to be perfect. Any blemish in a sacrifice would have made that sacrifice unacceptable. Both Jew and Gentile would 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 distinct from the Father. We read about the Son in Psalm 2 of the Bible:

[2] "The kings of the earth set themselves, and the rulers take counsel together, against the LORD and against His Anointed...." [7] "I will declare the decree: the LORD has said to Me, 'You are My Son, today I have begotten You. [8] '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 this God have a Son who is also fully God? To the human mind, these things seem 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 understands that human intellect is not sophisticated enough to fully comprehend God's nature. 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 and will then use that as an excuse to rebel against God and reject what God has revealed. Such a person places his own wisdom above God's revealed truth. He limits the nature of the eternal, omnipotent, living God who created the universe to what makes sense to himself, a created being. This is foolishness.

Continuing in Psalm 2:11-12 we read, "Serve the LORD with fear, and rejoice with trembling. 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.

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:

"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 (i.e., He is God.) Yet, He shall be born in the tiny city of Bethlehem. Another interesting

passage is found in Isaiah 7:13-14, "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? '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 could an eternal God with an eternal Son 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, from the original Hebrew language into the Greek language. It was made several hundred years before the birth of Jesus by people who actually spoke both Hebrew and Greek in their daily living. The Greek language makes a clear distinction between a woman who is merely young and a woman who is a virgin. The translators had no particular agenda or bias when they translated the passage and they chose a word which explicitly means "virgin." The reason for this is simple. It is also what the Hebrew word means. The issue is not the meaning of the word. The issue is that many people do not believe what the passage says and want to soften it into something they can believe.

However, in this passage, God was going to give a sign to the entire House of David. It would be a momentous sign. The virgin would conceive and bear a Son who would 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. The only difficulties are in the mind of man.

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

"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. "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) would 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 to be 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 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 eternal Son of God who would take on human flesh and literally become God in the flesh after a virgin birth. He was to be born in the city of Bethlehem. He will ultimately rule over the entire earth, although the time for that is still future. However, before this He would offer Himself as a sacrifice for the sins of men. He would die somewhere around 31 A.D. and would be raised from the dead. Then, when He sees those who were saved from their sins because of His sacrificial, substitutionary death, He would be satisfied that it was worth all of the grief and suffering it cost Him.

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 have fulfilled the various prophecies, for the decreed time of His death has long since passed.

It is interesting 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 of authorship ranges from about 500 to 1,000 years before His birth. The Creator had a specific plan in order to redeem man. He told man about what He had decided to do long before He did it. The documents foretelling these things were recorded in a very well known body of writing, the Hebrew Testament. Then, in accordance with His power, God 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? Science points to a Creator God. God specifically designed the creation to reveal His person, and we have looked at ways in which it does. Beyond this, fulfilled prophecy confirms that the Bible is truly God's Word. 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 a virgin birth and then dying as a sin offering for the sins of mankind. These are prophecies of resurrection after His death and of His ultimate satisfaction over what His suffering accomplished. These are prophecies defining where the Son would be born and the year He would die. Only the Creator could make and fulfil prophecies of this magnitude.

Because God loves you, He sent His Son in 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 and which for now is being offered to you freely.

God offers <u>you</u> eternal life. He offers <u>you</u> forgiveness of sins. He gives <u>you</u> 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 gives the reward for seeking Him diligently. Putting off the decision is to risk eternal damnation.

So, how do you receive the Son as your Savior? It is explained 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, which we looked at a little while ago and which states that, "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 RELYING 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. But now, 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.

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 come to Christ to save us while deliberately determining to continue in our sins. Repentance is the willingness and desire to have Jesus make us clean. It is turning from a life of rebelling against God and from going our own way. Yet, it is not trying to become clean by our own will power. We do not have the strength to do this. It is yielding to Him to save us and cleanse us. "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 out. You come to Him by believing what God said about Him, that He is the Son of God, that He died for your sins, and that He rose physically from the dead. Indeed, we read in Romans 4:5, "But to him who does not work but believes on Him who justifies the ungodly, his faith is accounted for righteousness."

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 inwardly I knew better. I am guilty before you, an eternal God, and deserve eternal punishment. However, I believe your Word, that Jesus Christ is your Son and that His death paid off my judgment. I believe He rose physically from the dead after three days, is alive today in Heaven, and has the authority and power to forgive me from my sins, saving me from the penalty they incurred. I am relying on Your Son, the Lord Jesus Christ, to forgive my sins and to give me eternal life. Thank you. I come to you In the name of Your Son, Jesus Christ, Amen."

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

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