

Creation Matters

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Origin-of-Life Research Continues to Spark Debate While Only Offering False Hope

by Peter M. Murphy, PhD

Media headlines continue to promote the hope of finding life on other planets and solving the mystery of how it evolved, unguided, from inert chemicals (e.g., Arce, 2018; Kaplan, 2018; Retherford, 2018). The hope of discovering the origin of life (OOL) on earth was initiated in the early 20th century by A. I. Oparin in 1924, and J.B.S. Haldane in 1933. This effort gained momentum with the classic experiments investigating abiogenesis by Miller and Urey in the 1950s, which showed that amino acids could be produced in the laboratory from a few simple chemicals and electrical sparks. Six decades later, after much investigative research in a wide variety of scientific disciplines, we understand and appreciate more than ever the complexity of even the simplest life form.

In October 2017, André Brack published “Origins of Life: Open Questions and Debates” in the *Oxford Research Encyclopedia of Planetary Science*. Brack’s research and leadership in the field of OOL spans six decades, including authoring nearly 200 publications, receiving many honors, and serving as president of the International Society for the Study of the Origin of Life (ISSOL). Brack’s extensive summary of the OOL field describes a series of competing possible responses to the many open (unanswered) questions in the search for the OOL. In his opening paragraph, Brack sets the tone for his assessment of the state of OOL research:

Stanley Miller demonstrated in 1953 that it was possible to form amino acids from methane, ammo-

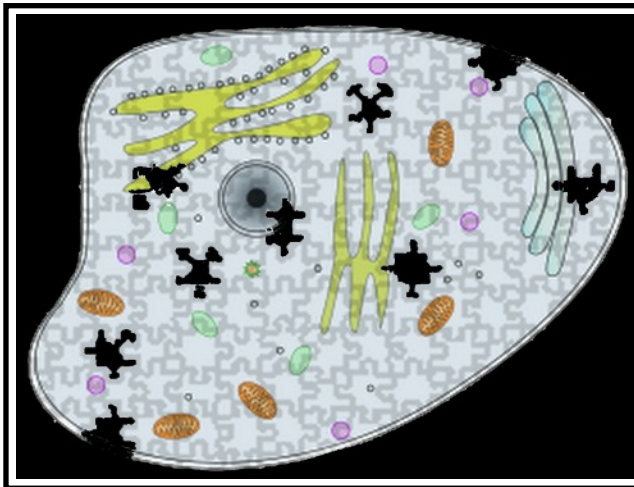


FIGURE 1. *Origin of life researchers are a few (actually, many) pieces short of a fully functioning cell. In fact, they cannot even demonstrate how the basic chemicals of life were formed abiogenetically, never mind the spontaneous formation of essential cell parts.*

nia, hydrogen and water, thus launching the ambitious hope that chemists would be able to shed light on the origins of life by re-creating a simple life form in a test tube. However, it must be acknowledged that the dream has not yet been accomplished, despite the great volume of effort and innovation put forward by the scientific community.

Brack’s candid admission of the lack of progress in OOL research is a conclusion widely acknowledged in the OOL community. At a 2014 international conference on *Open Questions on the Origin of Life*, an entire session dealt with the question, “Why is the origin of life still a mystery?” (OQOL, 2014). In 2001, Lahav concluded that: “After almost 50 years of modern

research, there is no paradigm of the origin of life.”

Origin vs. origins

Brack’s article provides an opportunity to stay current with the evolving research in the OOL field, and to think clearly about OOL discoveries reported in the media. While OOL science will continue to cling to the current best theory, we may examine criticisms of all OOL theories without accepting any scenario that excludes God as Creator. Consider carefully the title of Brack’s article and the ISSOL society name. The ISSOL name assumes that life was a singular event (“origin”), while Brack’s title assumes that life formed through a confederacy of independent events (“origins”). Since the 1980s the “origins” view has opened OOL research to the search for life beyond earth, and has expanded interest from the disciplines of chemistry and biology to the fields of astrobiology, astronomy, and geology.

The “origin” view limits chemicals, energy sources, and reaction conditions to what may possibly have been available in the past here on earth. The completely naturalistic “origins” view generally includes panspermia, the interplanetary transfer of organic material and possibly even living organisms from unidentified extraterrestrial sources. The “origin” vs. “origins” view of life is one of the many debates in the OOL field, and Brack frames his encyclopedia entry around many of these debates (Brack, 2017).

Organic substances refer to carbon-

... continued on p. 3



Math Matters

by
Don DeYoung, PhD

Seeing the Forest for the Trees

How many living trees are in the world? This difficult question is similar to asking the worldwide total of birds, butterflies, or boulders. One traditional estimate for trees is 400 billion. However, a Yale University research team reports that the number of living trees is actually 7–8 times greater (Crowther, et al., 2015). The group mapped global tree density using ground surveys and satellite images totaling nearly a half-million

measurements. The criteria included trees that are at least 10 cm (4 inches) in diameter when measured at a height of 4.5 feet. This measurement is known in forestry studies as DBH, or the diameter at breast height.

The count totaled 3.04 trillion trees, or about 400 trees for every person on earth. Three trillion trees is also about ten times the number of stars in our Milky Way Galaxy. Tropical and subtropical regions hold 1.3 trillion trees, or 43 percent of the total. In the creation worldview, the pre-Flood world with its global tropical climate could well have supported a far greater number of trees than at present.

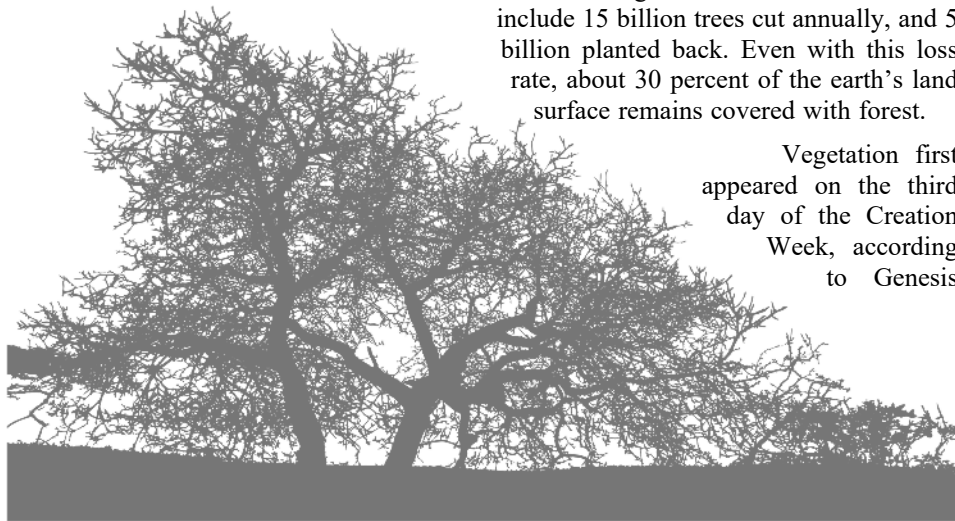
The determination of the number of trees on earth is a “moving target” which decreases as population grows. For example, Europe was once largely covered with forest, and now is reduced mainly to isolated woods and grassland. World estimates include 15 billion trees cut annually, and 5 billion planted back. Even with this loss rate, about 30 percent of the earth’s land surface remains covered with forest.

Vegetation first appeared on the third day of the Creation Week, according to Genesis

1:11, including trees in great variety. They range from the most common in the U.S. today, the red maple, to the towering western redwoods reaching nearly 400 feet into the sky. Trees are an essential part of creation with multiple benefits, including clean air and shelter for people and wildlife. Genesis 2:9 gives two further purposes of trees from God’s perspective—food and beauty. Thank you, Lord, for the trees.

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and hydrogen-containing compounds that may include oxygen, nitrogen, sulfur, phosphorous, and other elements. Complex carbon compounds are produced by plant and animal life (by biochemistry), and by organic chemists in the laboratory who synthesize carbon-containing drugs and plastics. When headlines proclaim the discovery of carbon-containing compounds on some planet, comet, or other distant object, they never refer to chiral biochemical materials found in living creatures (see discussion below).

Two articles published in *Science* in June 2018, were widely cited in the general media which reported that organic material was found on Mars. Webster (2018) reported on the levels of methane in the Martian atmosphere over a five-year period, which averaged 0.41 parts per billion by volume (ppbbv) compared to about 1,800 ppbbv of methane in the current earth's atmosphere. Eigenbrode (2018) reported organic matter under Mars' surface, including organosulfur compounds and aromatics which are found in crude oil. Finding ultra-trace levels of carbon compounds on Mars does not advance OOL theories.

Chirality and degradation

The complexity and specificity of the biopolymers, the building blocks necessary for life, cannot be overstated. Sugars and amino acids can be formed in the laboratory under simulated conditions existing naturally (e.g., hydrothermal vents) or delivered extra-terrestrially (e.g., comets or meteorites). Brack gives many examples of organic syntheses and the diversity of materials formed under these conditions (2017).

However, no one has demonstrated how these few biochemical building blocks are isolated from the complex mixture of organic and inorganic chemicals that may have formed naturally, without intelligent chemists. Chirality, the spatial orientation of carbon, bonded to four different chemical groups, is inherent in all living creatures, being manifested in biochemicals such as sugars, starches, cellulose, amino acids, proteins, DNA, and RNA. Abiogenetic syntheses result in racemic products, not homochirality (Murphy, 2013).

Furthermore, proteins, carbohydrates, and nucleotides are biopolymers subject to degradation by hydrolysis because the ther-

modynamic equilibrium highly favors the monomeric units. Brack noted that researchers have been able to abiogenetically polymerize the simplest biological amino acid, glycine, the only non-chiral proteinogenic amino acid, into chains of up to 20 units long (2017). But such results tell us nothing about how hundreds of amino acids can spontaneously form specific sequences, which coil and fold in precise ways into proteins, providing the diversity of structure, metabolism, and catalysis necessary for life. Neither do they inform us how thousands of DNA units assemble to form double-helix chains encoding enormous quantities of genetically valuable information.

A major debate within the OOL community is between the metabolism-first and the replication-first scenarios, a classic chicken-and-egg dilemma. Closely related is the search for primitive single-celled autotrophs and heterotrophs. Autotrophic organisms can produce their own organic food and building blocks from inorganic materials such as CO₂ or H₂S. Brack (2017) concluded that:

So far, the proponents of a metabolism-first approach [autotrophic] have not been able to produce large enough precursor prebiotic molecules to create simple primitive life in a test tube.

An RNA world

Heterotrophic organisms utilize available combinations of complex organic chemicals for growth and energy. Heterotrophic schemes require significant quantities of a diverse collection of organic chemicals prior to self-assembly. A hotly-debated, open question is how so many different and specific building blocks for life were naturally synthesized, gathered together in the proper proportions, separated from complex mixtures, compartmentalized into cell parts, and self-assembled into a living system.

One leading possibility is the RNA world hypothesis. Since RNA has demonstrated both information storage and catalytic activity, many consider the RNA world hypothesis the worst theory of the early evolution of life, except for all the others (Bernhardt, 2012).

As a single biomolecule, RNA is hoped to be a stepping stone to DNA/protein for living creatures. But the RNA world hypothesis faces many challenges, including that RNA is too complex

a molecule to have arisen through abiogenesis, and that RNA is quite unstable, especially to hydrolysis. The "protein interaction world" (PIW) hypothesis is an alternative to the RNA world hypothesis, with proteins as the critical metabolism-first stepping stone to living systems; but the unresolved problems of dilution, hydrolysis, homochirality, and directed amino acid sequencing into specific proteins appear to be overwhelming (Andras, 2005; Cepelewicz, 2017).

Emergence

Emergence remains a common theme in the OOL community. Emergence is the idea that order, coherence, and increasing complexity can arise far from equilibrium in complex biochemical systems. Brack only briefly mentioned self-organization, auto-catalysis, and entropy because most of the OOL work in these areas is only theoretical (2017). OOL articles often cite examples of emergence being analogous to hurricanes, schooling fish, snowflakes, and sand dunes.

No one in the OOL community has even theorized how biochemistry and biology produce "emergence," in a consistent way, from existing chemistry and physics processes to create more complex living systems. OOL researchers remain hopeful that a law of emergence will be discovered, perhaps a fourth law of thermodynamics. But the three laws of thermodynamics and the chemical reactivity of actual, complex chemical mixtures remain insurmountable hurdles.

Remaining hopeful

Nevertheless, OOL papers and essays remain hopeful and optimistic. Most peer-reviewed scientific publications are written in a positive, declarative style that contains the data and analyses to support the authors' conclusions. OOL publications contain many phrases that speak more to the aspirational nature of the OOL research and less to empirically established evidence. Examples from Brack's (2017) article include:

1. "conditions in hydrothermal systems ... may have been an important source of biomolecules"
2. "comets could have played a crucial role in the emergence of life on Earth"
3. "metallic sulfides, oxides, and clay minerals ... could have pro-

moted the reactions leading to the origin of life”

4. “this nucleoside formation pathway can be fused to sugar-forming reactions, providing a plausible scenario of how purine nucleosides may have formed under prebiotic conditions.”

Authors often point to the complexity of the OOL problems, and to the nature of being in the early stages of discovery. Therefore, optimism is necessitated while rarely claiming any definitive conclusions. Brack commented that certain aspects of OOL research “...have attracted a great deal of interest but have generated, at the same time, a lot of controversies about false positives” (2017). We should be especially watchful for news stories which pass off theoretical models as fact. (Cepelewicz, 2017; Johnston, 2017; Pearce, 2017).

Summary

The history of science contains many theories that, after further investigation, were shown to be obsolete and inadequate. Examples include spontaneous generation, phlogiston, luminiferous aether, and various theories of disease. Unfortunately, it is only in hindsight that we recognized that we had placed our faith and hope in these incomplete and inaccurate conceptions of the natural world. After more than six decades, OOL research continues to pursue the supposed historical, continuous, and naturalistic path from lifeless chemicals to cellular life, encompassing both genetics and metabolism. The gap between their hopes and their evidence is still “profound” (Luisi, 2010).

OOL research today consists of lab experiments, theoretical models, and copious speculation on the source of rare molecules found in terrestrial or extraterrestrial environments. None of the numerous OOL hypotheses provide a convincing alternative to the true beginning of history, when God created the heavens and the earth. Perhaps the only topic not debated within the OOL community is that science does

not have a naturalistic or materialistic answer to the origin of life on earth.

Time will tell how people will respond to being repeatedly disappointed by the false hope of godless origin(s) of life. As their naturalistic assumptions lead to more scientific contradictions, and as the “modern” answers to how life originated remain increasingly impossible to believe, the account of Creation in Genesis and throughout Scripture will stand as the only viable explanation for the origin of all living creatures in the created world. To paraphrase Sherlock Holmes, when you have eliminated the impossibility of a naturalistic origin of life, whatever remains, however improbable, must be the truth of creation by the triune God.

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GM

Matters of Fact

by

Jean K. Lightner, DVM, MS

That's not Natural Selection!

Editor's note: You may submit your question to Dr. Jean Lightner at jean@creationresearch.org. It will not be possible to provide an answer for each question, but she will choose those which have a broad appeal and lend themselves to relatively short answers.

Q Isn't it better to just substitute "natural selection" for "evolution" when talking about observable changes in populations?

A No, because natural selection is not a legitimate synonym for these changes. When one inaccurately uses terms, it does not help promote clear thinking or understanding in ensuing dialog.

What is evolution?

One of the most confusing aspects of the creation/evolution debate is that the word "evolution" has a range of meanings, even as it relates to biology. At the most basic level, evolution can be defined as change in heritable characteristics of biological populations over successive generations, or descent with modification. This has been observed in the wild, and can be seen in domesticated species as new breeds and cultivars are continually being developed.

Many people think of evolution in terms of humans descending from apes, or all life descending from a single common ancestor. This, of course, has never been observed and is inconsistent with the history presented in the Bible. Worse, evolutionists market this unbiblical story based on equivocation, implying that if living things change over generations, eventually a microbe could become a man. In real life, such changes are not observed. There are no observable changes that can build complexity in organisms. Rather, all known changes not only require complexity to already be established, but also structured in such a way that allows for adaptive changes.

We live in a "sound bite" culture. Unfortunately, sound bites can be very misleading. One that occasionally shows up among creationists is "that's not evolution; that is natural selection!" The problem with this dictum is that it is not correct. While it is true that changes in populations over generations are not the same as one type of

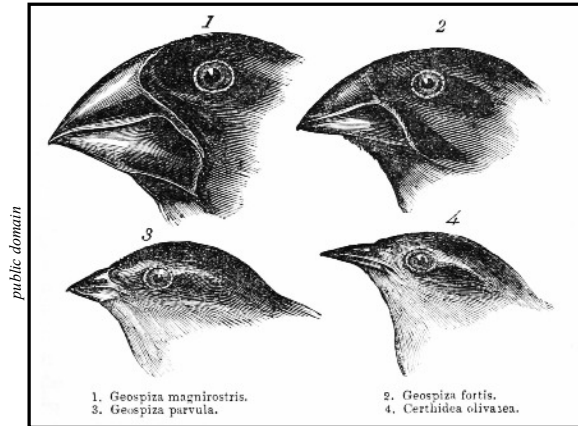


FIGURE 1. "Darwin's Finches." *The fact that beak size and shape can change in finches does not explain the origin of the beak, or how it was designed so that these adaptive changes can take place. The complex design of the beak and its ability to vary are better understood from a biblical creation perspective (Lightner, 2012).*

[Darwin's finches by Gould.jpg]

organism changing into a fundamentally different one, the phenomenon still fits a longstanding, commonly used definition of evolution. It does not fit the definition of natural selection.

What is natural selection?

Natural selection is based on the idea that organisms that are better adapted to their environments tend to survive and produce more offspring. As a result, traits of the survivors become more common in the next generation. Over time, this should help the population as a whole become better adapted, as less adaptive traits decline or are eliminated. So, natural selection is a possible *cause* of observed (or inferred) changes.

Does this really happen? To some extent it certainly does. For example, once the genetic trait for antibiotic resistance is present in a population of bacteria, use of the antibiotic will eliminate those that are susceptible, and the resistant bacteria will become more plentiful. However, field studies have demonstrated that in the animal world, natural selection is often not the cause of adaptive changes in a population.

Peter and Rosemary Grant, who spent decades observing and measuring finches in the Galapagos, demonstrated that natural selection operates during extreme environmental conditions (Grant and Grant, 2014). In the populations they observed, otherwise

healthy, well-adapted birds were eliminated from the population during several droughts. Not only that, but in different years the direction was different — affecting small beaked birds in one drought, and large beaked birds in another. In neither case was natural selection working in a way that benefitted the population long-term.

Causes of change

Many biologists and promoters of evolution *assume* that natural selection is the major cause of adaptive changes in populations. Unlike the presumptuous conclusions of most evolutionists, the Grants were careful to make observations and measurements to eliminate other possible explanations for the changes they observed. First, they determined that the traits they were concerned with (beak size and shape) were indeed heritable. This was necessary because physiologic responses alone are a potential mechanism for changes in some traits. They also showed that the traits in question were related to how efficiently the bird could exploit a particular food source, which would affect survival in years where resources were scarce.

The Grants uncovered another major mechanism of change — one that they had not expected: hybridization with related species. While hybridization would not always result in adaptive changes, it often did in their study. It re-introduced some of the healthy variety that natural selection had removed. Although zoologists had often insisted this could not happen to any extent in nature, observational evidence has now demonstrated otherwise (reviewed in Lightner, 2018). So ironically, for the medium-sized ground finches in their study, hybridization resulted in adaptive changes, while natural selection removed healthy variation.

In addition to natural selection and hybridization, there are other mechanisms that can result in changes of heritable characteristics over generations. Migration, in or out of an area, can shift traits. The Grants observed an example where this change was

not “random,” as evolutionists typically assume in their models. Genetic drift (which by definition is random) and meiotic drive (which is always assumed without substantial evidence to be random) may also play a role.

Conclusion

The creation/evolution debate can be confusing enough without redefining words to mean what we prefer them to mean. Evolution, in the most basic sense of changes in heritable characteristics of a population over time, clearly occurs. When people claim they do not believe in evolution, many people assume they believe in species fixity. As cumbersome as it may sometimes be, we should define what we mean when we use the term “evolution”

since it is inherently ambiguous and often carries a lot of naturalistic baggage.

It is essential to recognize that changes in characteristics that already exist (e.g., size, shape, or color of body parts) does not tell you the origin of the underlying trait (i.e., beak, feathers, fur, or the ability to form pigment), or why that trait is able to change. Further, as can be seen from this discussion, the fact that changes are observed does not tell you the fundamental mechanism. Where did the trait originate (creation, random genetic errors, designed DNA editing)? What caused a change in the frequency of the trait in the population? Was it hybridization, migration, meiotic drive, genetic drift, or natural selection? To glibly claim such changes are from

natural selection is nothing short of presumption — it is not a scientific claim.

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CM

Speaking of Science

from the Creation-Evolution Headlines

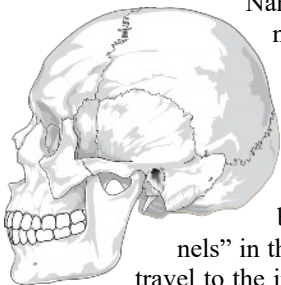
by David F. Coppedge

Editor's note: These S.O.S. (Speaking of Science) items have been selected from "Creation-Evolution Headlines" by David F. Coppedge at <http://crev.info> and are used by permission. Unless otherwise noted, emphasis is added in all quotes. Content may be edited for style and length.

Humans: Better Designed and Capable than Darwinism Can Explain

Look at the equipment humans come with. Look at the things they can do. Is this the work of blind chance?

Equipped for Rapid Repair. An expert in stroke recovery noticed something interesting.¹ Experimenting with rats, Dr. Matthias Nahrendorf noticed that immune cells called neutrophils appeared too rapidly in the damaged brain tissue to have arrived from the usual sources— bone marrow in the limbs. Pursuing the discovery, his team looked more carefully at skull tissue and found neutrophils in the marrow of the skull bones. Looking closer, they found tiny “tunnels” in the spongy bone tissue where the neutrophils travel to the injury site.



Dr. Nahrendorf's team detected the channels throughout the skull as well as in the tibia, which led them to search for similar features in the human skull. Detailed imaging of human skull samples obtained from surgery uncovered the presence of the **channels**. The channels in the human skull were five times larger in diameter compared to those found in mice. In human and mouse skulls, the channels were found in the both in the inner and outer layers of bone.

Future research will seek to identify the other types of cells that travel through the **newly discovered tunnels** and the **role these structures play** in health and disease.

Survival of the Wisest. People have been fascinated by Robinson Crusoe stories for a long time. A new wave of interest in “primitive

technology” revolves around the *YouTube* channel whose author demonstrates human ingenuity at a very basic level.² George Pierpoint describes the movement:³

Primitive technology is more than just survival skills. It's like hitting the reset button and seeing how advanced you could become if left to fend for yourself.

Need an axe? Make one from a stone and a branch. Need a pot? Mix your own clay and make a kiln. Need to crush some rocks? Make a water-powered hammer.

From Robinson Crusoe almost 300 years ago to Tom Hanks in the film *Cast Away*, the idea of **surviving alone in the wild** still captures the imagination of many.

Primitive technology videos regularly receive millions of views and have spawned an active online community who discuss the latest videos.

Most of us live like pampered house cats who couldn't survive a day “naked and afraid” in the wild. But John Plant shows that we still come with the body and brains able to do it if we had to. Humans are exceptional at using intelligence and wisdom to solve problems. Some birds build elaborate nests. Some crows can make tools. Some mammals help one another in social groups. No other creature on the planet can match the creative ingenuity of the lone human being to find solutions to problems, and then store and communicate the knowledge gained. Most of us profit from the collected wisdom of thousands of years. There's something fascinating about seeing someone go out and show that the capacity for raw, primitive technology still exists in some of us willing to exercise our innate capabilities. Those living in ‘primitive’ hunter-gatherer cultures probably have more know-how than many couch potatoes today, who couldn't survive without a car and a grocery store.



Rapid Creativity. The video cited here⁴ shows violinist Jonathan Leviim, accompanied by pianist Oleg Poliansky and accordionist Garnik Militonjan, performing “Czardas” by Vittorio Monti (1868–1922). As Leviim demonstrates incredible virtuosity and speed, think of how rapidly the neurons in his arms, fingers, and

... continued on p. 9

Why Geology Matters

by

Michael J. Oard, MS and John K. Reed, PhD

Editor's note: This series of articles emphasizes the unique role that geology plays in establishing a creation model of origins. Our goal is to encourage the study of geology, especially by those who are beginning their careers in creation science.

Despite their breezy dismissals today, the bogeyman of uniformitarian geology has always been the biblical Flood. This can be seen in the visceral reaction against it, from geology's earliest days to the present. If the Flood were not an enemy, it would be just another "water-cooler discussion" in the halls of academe—no more important than any intramural dispute.

That geology is an anti-Christian enterprise from the outset is seen in the continuity of a narrative promoting slow processes over millions of years. When one set of arguments fails, another is slotted in to replace them. Like Orwell's *1984*, the narrative changes from day to day, but none dare notice.

An example of this is seen in the earliest arguments raised against the Flood. What we know today as geology was in its infancy, but already it promoted long, slow processes to explicitly oppose biblical history. Between 1750 and 1850, geologists harped on three crucial lines of evidences to steer Western culture away from the Bible: 1) volcanism and volcanic deposits, 2) valleys, and 3) thick accumulations of strata (Rudwick, 2005). In each case, a "solid, scientific argument" was advanced, which later proved fallacious and had to be abandoned, ignored, or modified. Yet, no re-examination of the underlying premises was ever attempted.

Volcanoes and volcanic terraces

One of earliest arguments against Noah's Flood was the rate at which extensive volcanic terranes would form, based on modern eruptions (Reed, 2012). In the late 1700s, this was focused on mounts Vesuvius and Etna, and the volcanic terrane at Auvergne in southern France. Naturalists of that time, assuming a nascent "uniformitarianism," concluded that mountains and terranes would take more time to form than was allowed by the Bible's timescale:

Volcanoes provided some of the best evidence for such natural rates ...

Although the eruptions [of Etna and Vesuvius] were irregular and notoriously unpredictable, the records did give savants [i.e., 'scholars'] a rough sense of the rate at which those great volcanic cones might have accumulated, and hence of their overall age. (Rudwick, 2005, p. 119)

Estimates of accumulation stretched back tens of thousands of years. Applying the rates of Etna and Vesuvius to other terranes resulted in even older ages. No allowance was made for different rates; yet, within decades the "present-day" Krakatoa eruption would dwarf anything they had previously imagined. Not only ignorant of varying individual eruption scales, they also ignored variations in eruptive frequency. Of course, as that embarrassing information surfaced, it was neatly and seamlessly (and shamelessly) worked into the uniformitarian narrative.

Ancient river valleys

Valleys are significant geographic features affecting agriculture, travel, and communication. In the late 18th century, they were another key line of evidence against Noah's Flood. Clearly, rivers flowing at modern rates would take much longer than a few thousand years to erode these large features (Reed, 2011). Historian Martin Rudwick (2005, p. 122), explains:

River valleys were a second feature that was likewise invoked as evidence to suggest that the traditional short timescale [from Genesis] was inadequate. ... But it seemed possible that at least some valleys could be attributed to erosion by the streams that still flowed in them. On a summer's day a stream might look to be too placid to do anything of the kind, but after a winter storm the swirling water might be seen to be scouring its banks and carrying away mud, pebbles, and even boulders. In principle, such erosion could have carved out a whole valley, though it would have had to be continued for an almost inconceivably long time.

Three Early Geological Arguments for an Old Earth

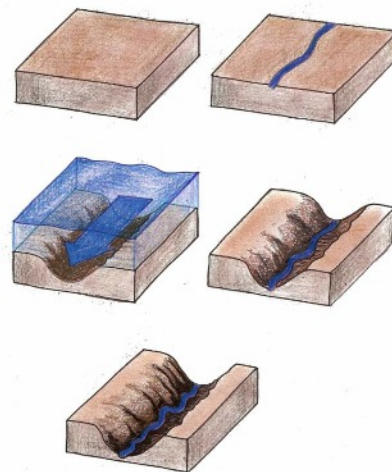


FIGURE 1. *Two hypotheses on the origin of a valley (drawn by Mrs. M. Richard). The top two panels represent terrane where there is either no valley (left), or a tiny valley recently formed by a river (right). The left middle panel shows terrane which has been inundated by a tsunami (usually not the Flood), and which is then rapidly eroded by water runoff (channelization). The right middle panel illustrates a valley formed by river erosion over millions of years. As indicated by the bottom panel, the resulting valleys would appear the same.*

This view was extensively debated between 1750 and 1850—most arguing for gradualistic erosion, and a minority for extra-biblical (Oard, 2008, 2013a), catastrophic erosion (Figure 1), such as that resulting from a large tsunami. The Lisbon earthquake and tsunami of 1755 were still vivid in the public mind. Ironically, the gradualists were forced to admit to a glacial origin for many valleys by the mid-19th century, but of course the uniformitarian narrative marched obliviously forward.

Thick strata

The third early argument against Noah's Flood was the thicknesses of strata (sedimentary rocks) observed in the Alps. The inferred volume of strata was thought to be

too great for a one-year flood, as is still commonly argued (Reed and Oard, 2012, 2017). Spectacular exposures of strata are stark reminders that humans are tiny when compared to the scale of such geological features. Early naturalists conflated large size with great time, perhaps as a rhetorical device rather than a real argument.

Present knowledge helps to constrain estimates that the average thickness of strata is about 1,800 m (6,000 ft) on the continents (Reed and Oard, 2012), and much thinner, on average, in the ocean basins. Igneous and metamorphic rocks are exposed at around 30% of the earth's surface, and the deepest sedimentary basins still contain over 20,000 m (65,617 ft) of sediments or strata—for instance, the Belt Supergroup in western Montana (Harrison et al., 1974). Even limited modern examples of rapid deposition (Reed and Oard, 2017) demonstrate that a one-year global flood could easily account for this volume of sediments.

Early naturalists knew none of this, but were still willing to pontificate with great confidence that what they saw invalidated the Flood:

Much more persuasive was a third class of evidence: the huge piles of Secondary strata [most sedimentary rocks] that were being described in certain parts of Europe. A century earlier, when such rocks had yet to be studied closely, it had been quite plausible to suppose—with Steno, Woodward, and many others—that the entire pile of sediments could have been laid down all at once, perhaps in a violent Deluge, although even then this entailed taking great liberties with any literal reading of the story of Noah's Flood. However, once the sheer thickness of the Secondary formations was fully appreciated, and detailed fieldwork suggested that many of them must have been deposited layer by layer under tranquil conditions, that kind of diluvian interpretation was quietly abandoned by most savants. (Rudwick, 2005, p. 123)

Brushing aside the obvious ignorance that a global Flood would be “taking liberties” with Scripture, there is another argument hidden within this quote. It is the assertion that the presence of fine-grained rocks and sedimentary structures demand “tranquil conditions.”

Geologists had long insisted that phys-

ical features of strata, and muds and clays indicate very low energy conditions. Thus, thick accumulations of mud would show vast time. This is still argued by secularists and old-earth Christians. Davis Young, a retired geology professor, and Ralph Stearley, the current geology professor, at Calvin College, state (2008, p. 217):

One of the earliest arguments for the antiquity of the Earth stemmed from the evidence contained within accumulations of sedimentary rock. Thick piles of layered, fossil-bearing sedimentary rocks, such as sandstone, shale and limestone, cover large portions of the continental land masses.

In a recent book on Grand Canyon by old-earth Christians (Hill et al., 2016), this argument was repeated. However, it ignores the recent decades of creationist research and demonstrates an unwillingness to consider reasonable options (Woodmorappe, 2016). The argument usually boils down to maintaining the narrative of uniformitarianism in the face of mounting evidence to the contrary, like Ice Age megafloods. Both catastrophic, large-scale erosion and rapid, complex sedimentation have been demonstrated (Oard, 2015). The Lake Missoula flood eroded 205 km³ (50 mi³) of rock and deposited huge gravel bars and rhythmic layers up to 40 m (130 ft) thick in tributary valleys—all within a few days (Oard, 2004; 2013b).

A smaller-scale example was seen in Iceland in 1996. Flooding from beneath a glacier, caused by volcanic heating, spread into a small valley, rapidly forming sedimentary layers (Russell and Knudsen, 1999). Although the flow volume was only 0.2% of the Lake Missoula flood, the Icelandic flood managed to deposit 15 m (50 ft) of sediment as 200 layers in just 17 hours! The individual layers were not caused by slow, long-term processes, but simply by variations in flow velocity in the flooding.

It takes little extrapolation to understand that these limited, local examples demonstrate the amazing power of the biblical Flood to generate the rock record, and how small changes in a high-energy flow of water would produce a complex sedimentary record. The problem is the circular reasoning of 200 years of uniformitarianism that grinds any and all data into the same anti-biblical mold. In the same way, internal features of sedimentary rocks thought to show deep time can form

quickly. Mud and clay can settle rapidly by flocculation (Walker, 2008) and form thin layers (Berthault, 2002; Oard, 2013c). Other “uniformitarian” features can be explained in a Flood context with very little trouble (Oard and Reed, 2009).

A closer look at sedimentary rocks reveals numerous exceptions (Oard and Reed, 2017). Many layers are thick—a hundred meters or more—and can be traced for hundreds of kilometers. Ancient strata reveal layer upon layer with little sign of erosion. In spite of this physical reality, secular scientists infer millions of years at the contact. These flat gaps provide a powerful argument for Noah's Flood and against deep time (Roth, 2009). Many layers seen in Grand Canyon can be traced 1,000 km (625 mi) north into the southern Teton Mountains of northwest Wyoming. The layers have different names because different geologists analyzed the same rock sequence before realizing they were connected. Three geologists wrote of this 600-m (2,000-ft) sequence:

The regularity and parallelism of the layers in well-exposed sections suggest that all these rocks were deposited in a single uninterrupted sequence (Love et al., 2007, p. 42).

But, no. To secular geologists, these rocks represent 200 million years of uniformitarian time because of their presuppositions.

Noah's Flood stands tall

The secular anti-biblical narrative established between 1750 and 1850 assumed uniformitarianism and deep time, and conflated that belief with science. That uniformitarianism is a narrative is demonstrated by the changing arguments that are only a façade for the underlying belief system. Early “powerful” arguments against the Flood are seen today as quaint at best, and deceptively ridiculous at worst.

A few hardy souls (e.g., Ager, 1973; Gould, 1987) have pulled back a small part of the uniformitarian curtain, but there remains within geology a core of bias that is only explained by fear and animus towards Christianity and its biblical history. Such a view is entirely consistent with geology's history, as shown by the failure to acknowledge past errors, or consider implications of them. Even though the claims of uniformitarianism fail, the option of the Flood is *never* considered. Even the strongest early argument—the volume of sedimentary rock—can be turned against uniformitarianism; e.g., given 4.5 billion

years, why do we not see vastly more? In other words, present processes and deep time do not explain the rock record (Oard, 2018).

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Speaking of Science ...continued from page 6

brain are firing to make this possible. Then think about the instrument he is playing, developed by careful research centuries ago (before modern technology) that craftsmen selected to get the best raw materials and organize them into this finely-tuned device, built for pure aesthetic appreciation rather than survival. Then think about the composer who conceived the music in his mind and transmitted it to paper, so that musicians decades later could play it. The products of sheer dumb luck?

Truly we are fearfully and wonderfully made! Use your equipment for good (Matthew 22:34–40).⁵

³⁴ But when the Pharisees heard that he had silenced the Sadducees, they gathered together. ³⁵ And one of them, a lawyer, asked him a question to test him. ³⁶ "Teacher, which is the great commandment in the Law?" ³⁷ And he said to him, "You shall love the Lord your God with all your heart and with all your soul and with all your mind. ³⁸ This is the great and first commandment. ³⁹ And a second is like it: You shall love your neighbor as yourself. ⁴⁰ On these two commandments depend all the Law and the Prophets."

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The New Flat Earth Society

by Jerry Bergman, PhD

I have recently become aware that the flat earth movement has been resurrected. My interest in this topic 30 years ago was mainly because creationists were being frequently labeled “flat earthers.” As a result, I published a few articles on them (Bergman, 2008). One example of such labeling was that by Eugenie Scott, the former president of the leading anti-creationist/Intelligent Design organization, National Center for Science Education, who called flat earthers an example of

...extreme Biblical-literalist theology: The earth is flat because the Bible says it is flat, regardless of what science tells us (Scott, 1997).

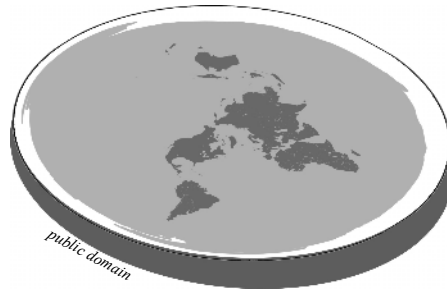
She published a diagram in a leading, peer-reviewed anthropology journal illustrating the special creation continuum. Scott began with flat earthism, then on to geocentrism, and, lastly, to young-earth creationism. She then added six forms of old-earth creationism, from the gap theory to, six steps later, theistic evolution.

Another of many examples is a *Nature* article that illustrated the use of parody to “fight creationism in a school board election in Kansas.” This example was that the *round earth* theory should be questioned by teachers because, in Revelation 7:1, the Bible refers to the earth as having four corners (Dalton, 1999).

In researching this subject, I also became acquainted with the founder of the American branch of the flat earth movement, Charles Johnson. Johnson was, from 1972 until his death in 2001, the president of the International Flat Earth Research Society. He and his wife ran the organization from their spare bedroom in their home in California. In short, they believed that the world was actually a flat disk floating on primordial waters, instead of a spinning ball that orbits the sun in space.

Because he had no interest in my view, I focused on understanding his. The three major proofs he gave included:

1. Johnson noted that his wife was from Australia, and would have fallen off the earth if it was round because Australia was, accordingly to round-earth supporters, below the United States,



or at the least she would have existed upside down.

2. Water in a swimming pool is perfectly flat, as it is in a lake and the oceans as well.
3. Land in the desert is flat without any evidence of curvature.

The Johnsons were billed as the last of the “true Christian” flat earthers (Mitchell, 1999, p. 31). When the couple died, flat-earth watchers assumed that the movement had finally died—only to be resurrected a few years later.

The modern flat earth society

The first recent, large, flat earth society conference was held in Raleigh, North Carolina on November 9–10, 2017. It was so successful that a second international conference has been scheduled in Denver on November 15–16, 2018. A dozen speakers are prepared to present talks at this conference, including Zen Garcia of Sacred Word Publishing, whose talk is titled “Getting deep into the bible and what it has to say about the true creation.”¹ Their website includes some of their current arguments for a flat earth, such as:

[The] heliocentric globe model explanation of our cosmology ... contends that: The earth spins at 1,040 miles per hour while traveling around the sun at 66,000 miles per hour; meanwhile, the entire solar system moves through the milky way galaxy at 490,000 miles per hour as the milky way galaxy darts through infinite space at over 1 million miles per hour.²

Yet, the website adds that, in spite of moving at these fantastic speeds, our perception is that we are perfectly still and do not feel any evidence of movement. They

then ask, who do you trust, the scientists or your own personal experience? The supporters add:

...the earth is flat and stationary, but we weren’t born into this way of thinking. ... we grew up believing in a heliocentric globe-earth model. After extensive experimentation, analysis, and research, we have come to know the truth of our cosmology.³

As to the falling-off-the-edge argument, they note that different models exist in the flat earth community, but the most commonly depicted model is that the earth is a circular disk, with Antarctica serving as an ice wall barrier all around the earth, preventing humans from falling off (Garwood, 2008). They also believe that the “government space agencies are taking creative liberties with your tax dollars and producing misleading materials.” For example, images of the earth that show a

...spherical shape are Computer Generated Images (CGI, proven with photoshop programs and analysis), Artistic Renderings (acknowledged by NASA), or Captured via fisheye/wide-angle curved lens (producing a curved appearance).⁴

The many flat earth websites (I found several score) attempt to explain their view and sell their literature. One explains gravity by the view that the earth is constantly *accelerating upward* at a rate of 32 feet per second squared. The example given is that sitting in a car which never stops accelerating will forever push you back into your seat. As they explain, the earth

...is constantly accelerating upwards being pushed by a universal accelerator (UA) known as dark energy or aetheric wind.⁵

In answer to the doubters who claim it is impossible for the Earth to accelerate forever, because no object can ever exceed the speed of light, the website answers that because of:

...special relativity, this is not the case. At this point, many readers

³ [ibid.](#)

⁴ [ibid.](#)

⁵ https://wiki.tfes.org/Frequently_Asked_Questions

¹ <http://fe2018.com/sessions/biblical-cosmology/>

² <http://fe2018.com/about/about-us/>

will question the validity of any answer which uses advanced, intimidating-sounding physics terms ... The relevant equation is $v/c = \tanh(at/c)$. One will find that in this equation, $\tanh(at/c)$ can never exceed or equal 1. This means that velocity can never reach the speed of light, regardless of how long one accelerates for and the rate of the acceleration.⁶

Although I taught college level physics for close to a decade, I am unable to follow the reasoning here. If acceleration continues forever, the object must eventually reach and surpass the speed of light. There also exist other flat earth ideas that maintain that the earth sits on an infinite plane, with the sun moving overhead. Gravity works much like it does in a round-earth model, but the flat earth will never form a sphere, even though gravity is pulling the entire surface of the flat earth downward because the plane extends forever.

Other indications of flat earth popularity

Another evidence of the flat earth's current popularity includes the results of an Amazon search, which located over 20 books on the topic, most all supporting the flat earth idea, and most selling better on Amazon than many creation books. One title alone, the 756-page book titled *The Greatest Lie on Earth: Proof That Our World Is Not a Moving Globe* is in its 9th edition (Hendrie, 2016). It had 117 reviews, 80 percent of which assigned this book a 5-star rating, and only 12 percent assigned one star.

The author, Edward Hendrie, a lawyer, has written at least 6 other books, all on Christianity. He claims that he relies totally on the Bible as the inspired and inerrant word of God for his conclusions. For his *Greatest Lie...* book, he

...sets forth biblical proof and irrefutable evidence that will cause the scales to fall from your eyes and reveal that the world you thought existed is a myth.⁷

Of the 12 books that I reviewed supporting the flat earth, all were overtly Christian and openly used the Bible to defend their positions. Furthermore, as far as I could determine, all the authors were creationists.

Today, evidence against the flat earth is overwhelming for, among other reasons,

⁶ *ibid.*

⁷ From the book's cover.

the astronauts have viewed and photographed the earth while orbiting it. Johnson claims that these scientists are

...pulling off a gigantic hoax so as to replace religion with science. He based his own ideas on the Old Testament references to a flat earth and the New Testament saying that Jesus ascended into heaven (Martin, 2001).

However, there are many who personally know those who have seen, with their own eyes, the earth's shape from outer space. In my case, this includes James Irwin who has walked on the moon, as well as others. In addition, I have worked on projects with those who were employed directly in the space program. And, as the space program has involved thousands of persons, my experience is not unusual.

The Bible's claims about the earth's shape have been masterfully evaluated by Faulkner (2016, pp. 236–241). The main point of Faulkner is that not one scripture *directly* teaches the flat earth view. It has to be *inferred* from scriptures such as I Samuel 2:8; Isaiah 11:12; Isaiah 40:22; Job 26:7; Job 26:10; Job 28:24; Job 37:3; Matthew 4:8; Proverbs 8:27; Psalm 75:3; Psalm 93:1; Psalm 104:5; and Revelation 7:1.

Reasons behind the resurgence

One reason for the resurgence of the flat earth view is the internet, especially social media outlets that encourage the spreading of fringe ideas. A problem is that it is sometimes difficult to know if those who propound the idea of a flat earth are serious. Some are not, such as Canadian St. Thomas University philosophy Professor Leo Ferrari (1927–2010). Others are very serious, such as the group planning the next conference as noted above.

The internet allows these proponents to reach an enormous number of people, which would otherwise have been impossible to achieve. Few periodicals would carry or support their literature or programs, and if they somehow were able to purchase advertising space or direct mailings, the costs would have been enormous. The free internet, on the other hand, can spread their message for close to no cost.

Final thoughts

Due to the apparent recent popularity of the flat earth movement, or at least the growing visibility of it on the internet, it is incumbent on creationists to respond

with effective reviews of their claims. At the least, our responses will document that the mainline creation movement, as a whole, not only does not support the flat earth movement, but openly opposes it. This, and the fact that many, if not most, adherents to this position are also creationists, would no doubt be used by those who oppose our worldview, in an attempt to blunt our credibility and effectiveness.

If Eugenie Scott was effective 20 years ago when the flat earth movement, as far as we know, consisted of only a few hundred supporters, how much more effective will anti-creationists be with the alleged association of today's much larger and apparently more sophisticated flat earth movement? Their use of scientific-sounding formulas and terms, such as "universal accelerator," will no doubt confuse, as well as influence those who are naïve in science to be attracted to them.

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All by Design

by Jonathan C. O'Quinn, D.P.M., M.S.

Plant Immunology

There is a complex interplay between mechanisms protecting plants from bacterial infections (for examples, *Pseudomonas* and *Xanthomonas*), and counter-measures that bacteria use to defeat plant immune systems. It is as if a sophisticated war is being waged between these two opposing forces. In some cases, when a plant detects certain bacterial proteins, it registers this as a sign of infection. Subsequently, the plant contains the infection by inducing rapid cellular death of the infected plant tissue; i.e., infected leaves turn brown and die. However, some bacteria, in an apparent effort to circumvent this defensive tactic, produce special proteins that add chemical “tags,” known as acetyl groups, to some of the plant’s immune molecules, masking their presence from detection by the plant’s immune system.

One plant protein, known as SOBER1, counters the counter-attack, in some cases. It has a chemical structure that allows it to snip off the acetyl groups which are added to the plant immune molecules by the bac-

teria. By doing this, SOBER1 prevents the plant from recognizing bacterial proteins as foreign. This reduces plant-mediated destruction of infected tissue, allowing, if you will, some degree of bacterial infection, which plants sometimes appear to “prefer” over killing off their infected tissue completely.

Researchers do not fully understand under what circumstances some plants will tolerate infection instead of destroying their infected leaves. It does demonstrate, however, how very complicated living things are. I submit that these complex biochemical interactions are not products of random genetic mutations, as evolutionists would have us believe.

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