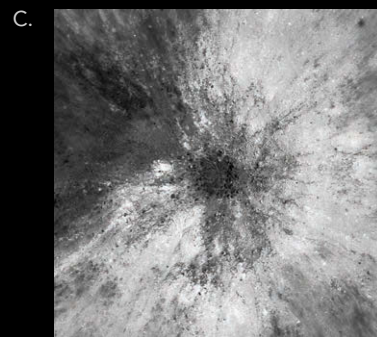
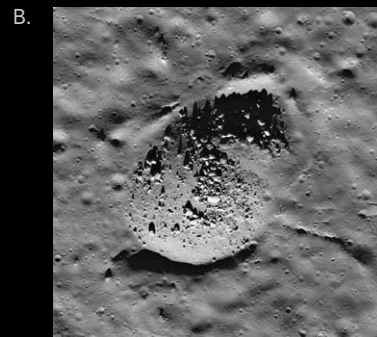
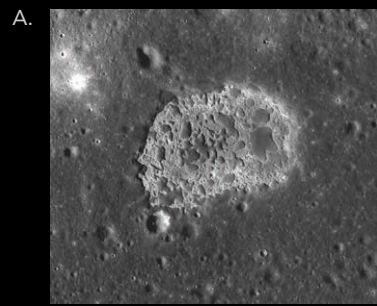




QUARTERLY

Volume 51 Summer 2014 Number 1



Cover: Clementine Observes the Moon and Solar Corona

Above: Full Color Composite Moon

A: Ina 'D-calera'

B: Impact Melt in Anaxagoras Crater

C: Mare Smythii

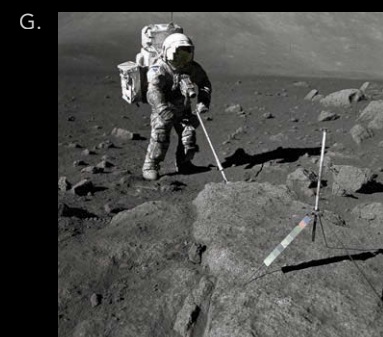
D: Van De Graaf Crater

E: Lunar Farside, As Seen By Apollo 8

F: Apollo 17 Rover

G: Sample Gathering

Credits: NASA



- **EXTRATERRESTRIAL SEARCH FOR THE ORIGIN OF HOMOCHIRALITY**
- **BEYOND ORIGIN AND OPERATION SCIENCE — PART II**
- **THE LITTLE ICE AGE — PART VII**
- **ANOMALOUS IMPRESSIONS IN TAPEATS SANDSTONE**

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Haec Credimus

For in six days the Lord made heaven and earth, the sea, and all that in them is, and rested on the seventh. —Exodus 20:11

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Editorial

The Recent Meeting of the Creation Research Society

I recently took over as editor of the *Quarterly* from Kevin Anderson. Kevin had an editorial in most issues, and some have asked if I plan to continue this practice. Perhaps, but until now, I did not think I had anything to say. For my first editorial, I would like to share news about the Creation Research Society Conference this summer. The Society had its fourth conference August 8–9, 2014, at the Creation Museum in northern Kentucky (suburban Cincinnati). The purpose of our conferences is to allow members to share new ideas and present works in progress. For instance, at our conference this year, Creation Research Society board member Mark Armitage gave presentations on intact dinosaur soft tissue. The interaction at our conferences is valuable, for it permits evaluation and criticism of research prior to formal submission for publication. Since the presentations are not intended to be finished projects, we do not record them, nor do we publish proceedings. However, we do publish the abstracts of the presentations, and you will find the abstracts from this summer's conference in this issue of the *Quarterly*.

Another benefit of attending Society conferences is the social interaction. I have enjoyed putting faces with many of the people whose articles I've read in the *Quarterly* or with whom I've interacted on the CRSnet discussion group. At the conferences, we can eat together, and we usually try to arrange a field trip the day following the meeting, and these opportunities for socializing have been pleasurable too.

This year's conference undoubtedly was the best yet. The meeting got off to

a great start when Answers in Genesis' Georgia Purdom gave the first plenary session on "Design in DNA." Not only was it a wonderful talk, but several people also told me that it laid a good foundation for presentations given later in the parallel sessions. That evening, Frank Sherwin of ICR delivered the Henry M. Morris Memorial Lecture. Frank was entertaining, informative, and engaging. The next morning, Russ Humphreys gave an excellent update on his plenary session entitled, "New Views of Gravity Advances Creation Cosmology." I learned some things from Russ's talk, and even people with limited understanding of cosmology were able to follow most of the talk.

We had 120 people in attendance, far more than at any of our previous three conferences. We had 42 presentations. At previous conferences we had 28 presentations spread over two parallel sessions. To accommodate the 42 presentations this year, we went to three parallel sessions. If our conferences continue to grow, we either must go to four parallel sessions, or we will have to extend the meeting to a third day. The day after the conference, some of those who remained took a field trip up into Ohio. We ate lunch at Maplewood Park in Fairborn. When I was in fourth grade 50 years ago, I played in this park nearly every day. Other than lunch, the purpose of visiting the park was to examine two glacial erratic boulders in the middle of the park. After lunch, we hiked through Clifton Gorge, on which creationists and evolutionists agree—the stream is there because the canyon is there. The canyon was scoured out by glacial melt shortly after

the Flood. We capped off a near-perfect day with dinner and ice cream at Young's Jersey Dairy near Yellow Springs.

This year's conference also had a different feel to it. It seemed more like a science meeting than the previous conferences did. That may have had something to do with the improved quality of the presentations this year, due in large part to the increased participation of the staff from the Institute for Creation Research (ICR). Eight people from ICR spoke at the Society conference. In addition to Frank Sherwin's Friday evening lecture, ICR staff accounted for 13 of the presentations. We could have had a parallel session just for them.

ICR, in fact, will host next year's conference in Dallas. That meeting promises to be even better than this year's. It will provide a good opportunity for those who have not attended one of our conferences to combine it with a visit to ICR. To encourage more social interaction, we're planning a few small changes to the format of the conference. We want to have a reception dinner at ICR the evening before the conference gets underway, and we hope to have a closing reception right after the sessions end the second day. That reception will feature light refreshments, and we hope people will choose to go out to dinner together afterward. Attendance at our conferences is just one way you can show support for the Society. I hope to see many of you there.

Danny R. Faulkner, Ph.D.

Editor

Creation Research Society Quarterly

The Extraterrestrial Search for the Origin of Homochirality

Charles McCombs*

Abstract

For many years, naturalistic scientists have assumed that chemical evolution is the pathway by which life first originated. However, chemical evolution has not been able to explain how chemical reactions could have produced homochiral biomolecules outside a laboratory setting using only natural processes. The search for the origin of homochirality has presented itself as a mystery to the evolutionists because in chemistry there is no known chemical procedure or natural process that can generate new homochirality without preexisting homochirality already present. The need for preexisting homochirality to produce new homochirality and the inability of natural processes to explain the formation of new homochirality has caused evolutionists to take their search for the origin of homochirality into outer space. Some evolutionists now propose that amino acids of deep-space origin were deposited on the surface of rock fragments, irradiated, and enantiomerically enriched with circularly polarized ultraviolet light from starlight and that these newly enriched left-handed amino acids were brought to earth on meteorites. However, the evolutionary explanation for the origin of homochirality is not supported by the current scientific literature, and a critique of their proposed explanation is presented. Ultimately, the mystery of the origin of homochirality vanishes when we accept God's creative design on life.

Introduction

In Genesis 2:7, the Bible tells us that God made man from the dust of the ground. God then blew into man's nostrils the breath of life, and man became

a living soul. The phrase "dust of the ground" perhaps refers to the chemical elements created on Day 1 of Creation Week. Creationists and evolutionists alike recognize that living organisms

are made of chemicals, but the disagreement is on how life originated from those original chemicals. Genesis 2:7 clearly states that God brought man to life from the dust of the ground, but evolutionists claim that life originated from those original chemicals by natural processes. If evolutionists are correct, the formation of every aspect of living organisms should be explainable by chemical (natural) processes; but if

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creationists are correct about a supernatural creation, then we should see evidence for unnatural happenings or occurrences not explainable by chemical or natural processes. The presence of homochirality in living organisms is such an example in favor of supernatural creation. *Chirality* is a term meaning *handedness*. When a carbon has four different attached groups (a chiral carbon), the molecule containing that chiral carbon has two (or more) possible mirror image configurations in which it can exist. The term *homochirality* refers to that molecule, which, when found in living organisms, exists only in one of those mirror image configurations (e.g., DNA, proteins, amino acids, etc.). For a review of homochirality, see Coppedge (1971), Helmick (1976), and Murphy (2013).

Amino acids, proteins, DNA, RNA, and polysaccharides are the major biochemical molecules responsible for maintaining life in plants, animals, and humans. All of these biomolecules (and others) possess unique homochirality. Living organisms cannot exist with mixed or random chirality (Breslow, 2012). The homochirality observed in each of these biomolecules is 100% specific for that molecule without any evidence of racemization or mixed chirality. Although some mutations are known to change the amino acid sequence of a protein or the nucleotide sequence of a DNA strand, these mutations never form chiral mistakes; and even the mutated portion of the protein or the DNA strand maintains the correct homochirality for that protein or DNA sequence.

The fact that chirality is different in every chiral biochemical molecule makes it impossible for evolutionists to establish an origin, because the word “origin” implies a single initial source, cause, or event responsible for all subsequent occurrences. For the evolutionist, there cannot be a single source, cause, or event that explains why these biochemical molecules have different chirality, why some molecules

have carbons with the “S” configuration while other carbons have the “R” configuration, or why only one unique configuration of chirality (out of many) is present in these chiral molecules. For these reasons, the “origin” of homochirality in living organisms has been a mystery to scientists searching for a naturalistic (atheistic) explanation. Cairns-Smith (1982) pointed out that the origin of homochirality was what he called the “nub question” because until that date, “there was no generally accepted answer to this question.” Cohen (1995) quotes W. A. Bonner, who, at the February 1995 “Physical Origin of Homochirality in Life” conference at Santa Monica, California, argued that there is a “gap between the origin of homochirality and the origin of life,” and after 25 years of searching, he could not find any evidence to bridge that gap. Cohen has remarked that “the origin of this handedness is a complete mystery to evolutionists” (Cohen, 1995, pp. 1265–1266). Even recent articles citing Pizzarello (Arizona State University, 2008; Astrobio, 2008) and Fukue and Tamura (2010) still acknowledge the presence of homochirality in biochemical molecules as a mystery. Today scientists have a better understanding of molecular biology and biochemistry,

better technology and equipment, and newer research techniques than did Cairns-Smith, Bonner, and Cohen, but the origin of homochirality is still a mystery, and the gap acknowledged by Bonner is as wide and deep as ever.

Although some skeptics wish to equate the chance formation of left-handed amino acids from a chemical reaction with the chance occurrence of heads from a coin toss, the presence or lack of homochirality in a molecule is not a chance happening. All chemical reactions creating a chiral carbon, regardless of mechanism, force the chiral carbon to exist as a symmetrical intermediate or to go through a planar transition state as it forms the fourth bond to carbon. Before the fourth bond is formed, the carbon’s molecular structure is deficient in electrons, causing the molecular orbitals to change hybridization, creating a plane of symmetry. Once symmetry is formed, the capability for generating new homochirality at that carbon atom is immediately and permanently lost. If life’s biochemical molecules were formed by natural chemical processes, each chiral carbon would be a 50/50 mixture of chiral isomers (Figure 1), but that is not seen.

Equally troubling for the evolutionist is that there is no known chemical reac-

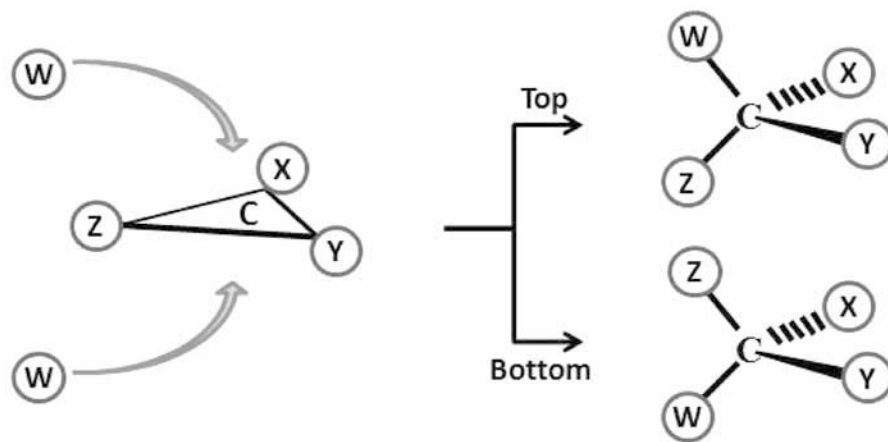


Figure 1. Planar transition state forming racemic mixture. Note that the mirror image products (top and bottom) cannot be superimposed onto each other.

tion capable of forming new homochirality without preexisting homochirality. In all living systems, chiral molecules are formed by specific enzymatic reactions, but enzymes are also molecules containing chirality. Enzymes, like proteins, are polymeric chains of left-handed amino acids, and in all living systems, left-handed amino acids are made from other chiral enzymes. In the laboratory, organic chemists can prepare homochiral organic molecules, but in these processes, the starting materials, the catalyst, or the environment of the chemical reaction must contain preexisting homochirality. When preexisting homochirality is present, the carbon atom never has a plane of symmetry, new homochirality can be generated, and existing homochirality will not be lost at that carbon.

Here is the dilemma for evolutionists: because chirality is a physical property, the factors responsible for a chemical reaction to occur are different than the factors responsible for generating new chirality. In the laboratory, the formation of new chirality in a molecule would require a chemical controller to direct and control the chemical reaction, select reactants that contain preexisting homochirality, and perform the reaction so that the creation of a plane of symmetry is avoided. In a natural setting (the evolutionary hypothesis), there is no chemist, and there is no preexisting homochirality, meaning that life with homochirality cannot ever form by natural processes. By their explanation, first life allegedly came into existence by chemical reactions, but we also know that even the simplest one-celled organisms possess unique homochirality. Being unable to find a naturalistic explanation for the origin of homochirality on earth and unwilling to accept that life was supernaturally created, some scientists have taken their search for the origin of chirality into outer space, apparently hoping that the laws of chemistry are different there.

The Extraterrestrial Search

Daniel Glavin of NASA's Goddard Space Flight Center in Greenbelt, Maryland has reported, "We found more support for the idea that biological molecules, like amino acids, created in space and brought to Earth by meteorite impacts help explain why life is left-handed" (Astrobio, 2009). Ronald Breslow stated that "meteorites delivered the seeds of Earth's left-handed life" (Peplow, 2008). At the 235th National Meeting of the American Chemical Society, Breslow proposed that circularly polarized light is a type of energy that could be found in the radiation emitting from a neutron star; and as this circularly polarized light struck amino acids on the surface of a passing rock fragment, the right-handed amino acids on that rock were partially destroyed, leaving an enantiomerically enriched sample of left-handed amino acids on that rock fragment. According to these claims, the left-handed amino acids present on earth today exist because the right-handed amino acids present on those rock fragments were destroyed by space radiation (McKee, 2005), by circularly polarized light formed from Rydberg matter (Holmlid, 2009), or by a neutron star as they traveled through outer space (Peplow, 2008). Since it is claimed that left-handed amino acids are found in the carbonaceous material of some meteorites, some evolutionists claim that meteorites transported left-handed amino acids to earth.

These claims were based on a report that the amino acid isovaline was found to be enriched in its left-handed isomer in the carbonaceous material of the Murchison meteorite. Pizzarello (2006) and Pizzarello and Cronin (1997) have looked for enantiomerically enriched amino acids in the carbonaceous material of other meteorites, and similar findings were observed in the Orgueil meteorite. The finding of amino acids on a meteorite has led many evolutionists to believe in an extraterrestrial origin of amino acids, and the finding of isovaline

enriched in its left-handed isomer in some meteorites supports (according to evolutionists) the claim that some kind of enantiomeric enrichment occurred in outer space. These findings, in addition to a report that circularly polarized light destroyed right-handed amino acids (McKee, 2005), provided the evidence evolutionists wanted for a naturalistic explanation for the existence of the chirality found in all living organisms.

Breslow (cited in Peplow, 2008) and Glavin (cited in Astrobio, 2009) were eager to suggest that amino acids have an extraterrestrial origin, but their explanation only shows how some amino acids could have come to earth. In addition, Glavin showed only that a "landed meteorite" contained amino acids; it is just as possible that those observed amino acids could have been transferred to the meteorite after the meteorite landed on earth. Many scientists are quick to accept Breslow's and Glavin's explanation for the origin of left-handed amino acids, even though the extraterrestrial origin of amino acids has not been fully established or even accepted by all evolutionists (Peplow, 2008). If we assume that the extraterrestrial origin and enrichment are valid explanations, then the scientific literature should be able to validate the following four points of their extraterrestrial hypothesis: (1) Circularly polarized ultraviolet light of the correct wavelength must be present in outer space. (2) This circularly polarized ultraviolet light must be able to destroy or remove right-handed amino acids. (3) The enantiomeric enrichment of meteoritic amino acids is real and extraterrestrial. (4) Meteorites must be a valid mechanism of transport for extraterrestrial amino acids to arrive on earth. These four points will now be examined.

Point 1: Presence of Circularly Polarized Light

Circular polarized light (CPL) has been detected in starlight, and is thought to

be formed in outer space as starlight is scattered from elongated interstellar dust grains whose long axes tend to be oriented perpendicular to the galactic magnetic field (Fosalba et al., 2002). From this scattering of starlight as a source of CPL, these authors believe that in a star-forming region such as that found in the Orion Molecular Cloud, low-mass young stars could experience strong CPL of a single handedness when externally irradiated by light from a massive star. Since our sun is a low-mass star and the Orion molecular cloud is the closest star-forming cluster with both low-mass and high-mass stars, it is assumed that amino acids on a meteor passing through Orion or a similar nebulae brought amino acids with enantiomeric excesses to Earth. However, not just any circularly polarized light will provide the necessary enantiomeric enrichment in amino acids.

In the laboratory, enantiomerically enriched amino acids have been isolated after irradiation with circularly polarized ultraviolet light (UV-CPL) (Meierhenrich, 2005). However, UV-CPL has never been detected in outer space. Although Bailey et al. (1998) have discovered circularly polarized infrared radiation in a nebula, they admit that they have not discovered the required circularly polarized ultraviolet light or any evidence that amino acids are produced in nebulae. It is important to understand that the only existing UV-CPL light is a man-made “narrow band” UV light used in the laboratory (wavelength < 200 nm). Scientists have looked for UV-CPL at wavelengths less than 200 nm in outer space, but UV-CPL has never been detected at these wavelengths due to light scattering off of the dust particles (Fosalba et al., 2002). Furthermore, Chown (1999) has reported that light from stars covers a wide range of wavelengths (meaning broadband irradiation), and the overall effect of “broadband” irradiation on the handedness of amino acids (meaning

enantiomeric enrichment) should be zero, a conclusion also reached by Bailey et al. (1998). Since the existence of “narrowband” circularly polarized ultraviolet light has not been observed outside the laboratory or in outer space, the requirement for an appropriate source of UV-CPL has not been established.

There is another problem. In the laboratory, circularly polarized light is used to measure the optical rotation of a chemical molecule, a measurement accomplished in a polarimeter using a monochromatic sodium vapor lamp (589 nm). The light source in a laboratory polarimeter must be in very close proximity to the sample, but any UV-CPL possibly present and shining on an extraterrestrial rock fragment would not be in close proximity. If CPL is created by scattered light from dust particles in space, and these same dust particles prevent the long distance detection of UV-CPL, how close does a passing rock fragment have to be to the UV-CPL source in order to receive enantiomeric enrichment? The inverse square law of physics would tell us that the intensity and effectiveness of a light source irradiating a passing rock fragment would be inversely proportional to the square of the distance of the rock fragment from the source of irradiation. If there is such a light source capable of irradiating a passing rock fragment and providing enantiomeric enrichment to amino acids, that CPL light source would have to be extremely intense to overcome the large distance separation. However, there is no evidence of such a strong CPL light source. Serkowski, Mathewson and Ford (1975) measured the circular polarization of 180 stars. The maximum fraction of CPL (all wavelengths) found in the light from those 180 stars was 6×10^{-4} (0.0006), and the fraction of CPL from our sun is on the order of 10^{-6} (Kemp et al., 1987). Based on this data, the CPL that is present is weak, and there is no proof that circularly polarized ultraviolet light (UV-CPL) of sufficient intensity is

even present in the measured CPL of starlight.

Point 2: Destruction of Right-Handed Chirality by UV-CPL

Meierhenrich (2005) reported that when a solid film of racemic leucine was irradiated with circularly polarized light at a wavelength of 180 nm, the product had a meager 2.6% excess of the left-handed leucine. Meierhenrich then concluded that the circularly polarized ultraviolet light selectively destroyed the right-handed leucine, leaving an excess of left-handed leucine. Chemically, it is interesting that a 2.6% enantiomeric excess of the leucine amino acid exists, but there was no evidence provided to support that (1) right-handed amino acids were physically destroyed or (2) that a chemical reaction created the slight excess of left-handed leucine. Whether any amino acids were physically lost or destroyed in this experiment could have been determined. Labeling studies could have been performed to determine if a portion of the original right-handed amino acids were no longer present. These experiments were not done. When we take into consideration the inverse square law, the anticipated enrichment for amino acids on a rock fragment passing a few million miles from a weak CPL source would be significantly less than the 2.6% enrichment observed in a polarimeter with a strong, monochromatic and proximal CPL light source. Although many scientists have accepted Meierhenrich's work as a general explanation for the origin of homochirality in amino acids, there is another possible explanation.

Circular dichroism can explain the small enantiomeric excess observed in Meierhenrich's experiment (Cerf and Jorisson, 2000). In circular dichroism experiments, it is known that left-handed and right-handed chemical molecules absorb circularly polarized light differently. The claimed 2.6% enrichment in

Meierhenrich's experiment may only represent a 2.6% difference in the ability of the different chiral isomers of leucine to absorb circularly polarized light. If the different chiral isomers of leucine are absorbing CPL differently, the observed 2.6% difference is not from extraterrestrial enantiomeric enrichment but from how the chiral isomers of leucine react to CPL light in the polarimeter. This makes the 2.6% difference a false positive result, putting it in the category of experimental error.

Even if Meierhenrich's conclusion is correct, this is but a small enantiomeric enrichment of one amino acid out of 20 naturally occurring amino acids. However, not all amino acids will respond to wavelength 180 nm CPL in the same manner. Cerf and Jorissen (2000) have shown that the amino acids tryptophan and proline do not show any enantiomeric enrichment when irradiated with right-handed or left-handed CPL. Tryptophan contains an additional aromatic group, and proline contains an extra carbonyl group. Chown (1999) has also reported that some wavelengths of UV-CPL preferentially destroy right-handed amino acids, while other wavelengths destroy left-handed amino acids. Since all naturally occurring left-handed amino acids could not have been formed by the same process or with the same origin, Meierhenrich's work is only an isolated example that works minimally for leucine. Based on all available evidence, the ability of UV-CPL to effectively destroy right-handed amino acids has not been established or proven.

Point 3: Enantiomeric Enrichment of Amino Acids

The evidential basis for the evolutionary origin of homochirality rests on the observation that unequal ratios of d- and l-isovaline were found in the Murchison and Orgueil meteorites. Glavin and Dworkin (2009) analyzed several meteorites and reported that l-isovaline ap-

peared to be enriched over d-isovaline by about 18% in the Murchison meteorite, and about 15% in the Orgueil meteorite. All other analyzed meteorites landed in Antarctica where d- and l-isovaline were found with equal ratios. Although there could be several reasons for the unequal ratios, the authors propose that some kind of extraterrestrial enrichment such as described by Meierhenrich is responsible for the observed unequal ratios of d- and l-isovaline on those meteorites, even though l-isovaline is not a naturally occurring amino acid. The authors did not address the nonuniversal occurrence of unequal ratios of isovaline but instead suggested that enriched isovaline had implications for understanding the origin of life. To evolutionists, these

findings confirmed their assumption that amino acids originated in outer space, as, for the first time, there appeared to be evidence for the extraterrestrial generation of new homochirality in those amino acids. However, proposing a universal explanation for the origin of homochirality on questionable results from only two studied meteorites is risky.

The evidence for alleged enrichment in these meteorites is based on a GC-MS chromatogram, where the peaks for d- and l-isovaline (peaks 9 and 11 in Figure 2, after derivatization and fluorescence detection) appear to be present in unequal amounts, unlike the peaks of racemic amino acids that would appear as two peaks of equal ratio. Although the GC-MS peaks for d- and l-isovaline are

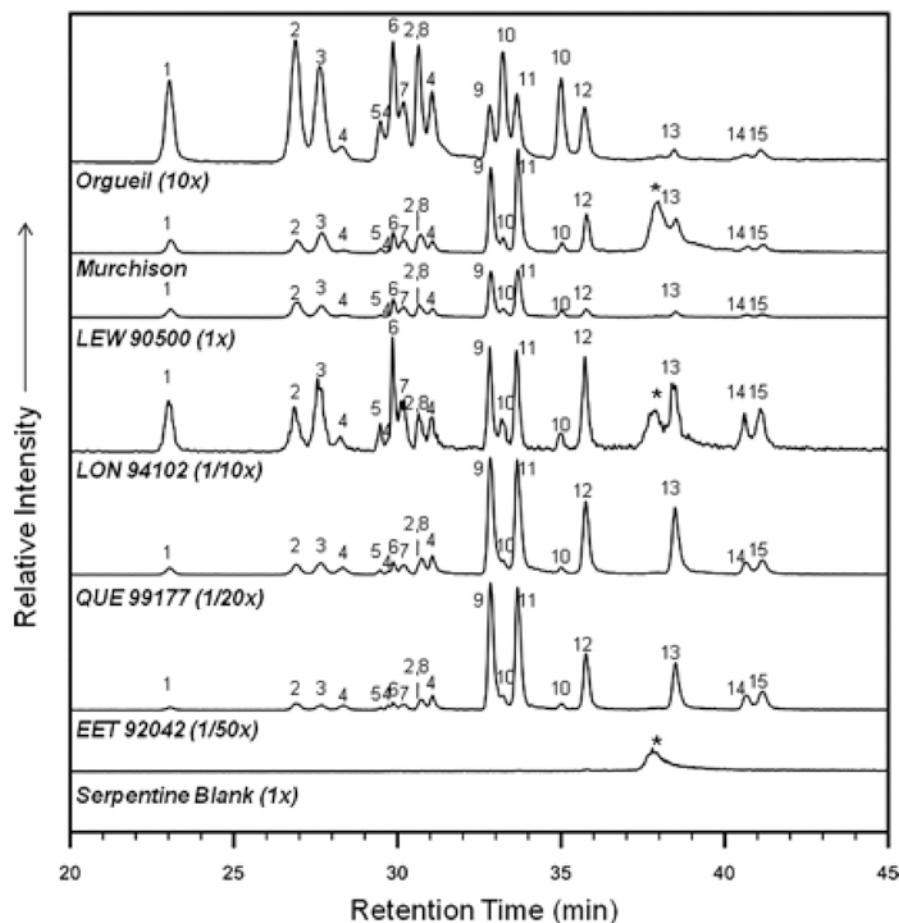


Figure 2. GC-MS Chromatogram of meteoritic C-5 amino acids

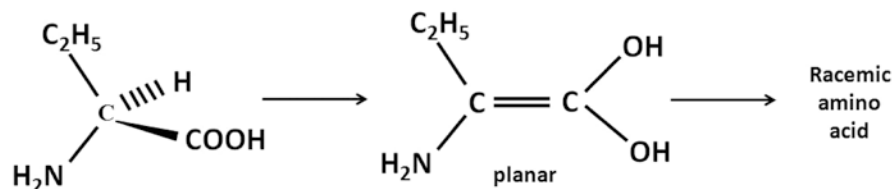


Figure 3. Racemization of amino acids via enolization.

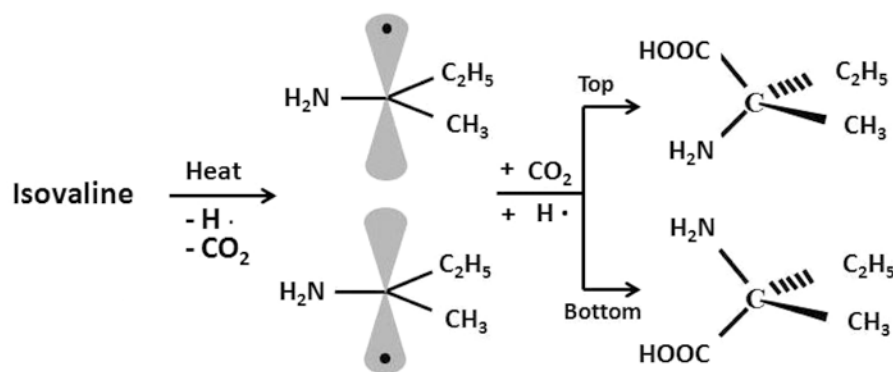


Figure 4. Racemization of isovaline with a planar intermediate indicated.

clearly separated from each other and the GC-MS peaks are identified, the authors could not rule out the possibility of amino acid contamination during collection, storage, or handling of the samples. Since isovaline is present only in parts per billion concentrations (or less), potential contamination of the sample is a major concern. Even if there is an unequal ratio of peaks 9 and 11 in the GC portion of the chromatogram, the presence of unequal ratios for isovaline does not prove an extraterrestrial enrichment of isovaline or for any naturally occurring amino acid. The presence of unequal ratios of isovaline isomers may sound like it supports the evolutionary assumption of extraterrestrial enrichment, but isovaline has a very different structure than all of the other naturally occurring amino acids; l-isovaline is

an amino acid that has a methyl group bonded at the alpha carbon, where all natural amino acids have one C-H bond. The authors acknowledge that isovaline is difficult to racemize, but then they use this difficulty to racemize to suggest that the other natural amino acids were enantiomerically enriched prior to entering earth's atmosphere. To claim that isovaline's difficulty to racemize is the rationale for the presence of other enantiomerically enriched amino acids in meteorites is just plain wrong for three reasons: First, extraterrestrial enrichment has not yet been proved. Second, isovaline is not an amino acid found in natural proteins, and its inability to racemize does not automatically mean that enantiomeric enrichment was present in natural amino acids. Third, isovaline does not racemize the same way as other

natural amino acids. Natural amino acids racemize at the alpha carbon by enolization of the carbonyl group, starting at temperatures of about 100°C (Figure 3). Isovaline cannot racemize without breaking a bond at the chiral carbon; and once that bond is broken, the chiral carbon atom of isovaline becomes a free radical. These free radicals can only form racemic isovaline, if it reforms at all (Figure 4). Therefore, the discovery of unequal ratios of isovaline does not support the theory that isovaline was racemized from an originally enriched form, which leaves open the possibility that isovaline was racemic and contaminated.

Glavin and Dworkin (2009) tried to dismiss earthly contamination because the d- and l-isovaline in the Murchison meteorite did not display any significant difference in their $^{12}\text{C}/^{13}\text{C}$ isotopic ratios (see also Pizzarello, Zolensky, and Turk, 2003). The claim of no earthly contamination is based on the assumption that isovaline was originally extraterrestrial and any earthly contamination would have changed the $^{12}\text{C}/^{13}\text{C}$ ratio of the enantiomers. The claim that d- and l-isovaline have the same isotopic ratio only confirms that both enantiomers have the same source, which does not disprove earthly contamination. In order to validate the authors claim, scientists would have to acquire isovaline of provable extraterrestrial origin, and that has not been done! These authors also try to show that very little terrestrial contamination could have occurred because valine, a natural amino acid, is found in many meteorites to be racemic. The presence of racemic valine in a meteorite does not automatically mean that valine had an extraterrestrial origin. The presence of racemic valine could have resulted from earthly contamination if the earth-based l-valine was racemized by the residual heat from the meteorite. Meteorites have been reported to be hot, warm, or cold to the touch after landing. Carter (2002) mentions

that meteorites have singed grass and burned people upon contact, but it is not known whether the Murchison and Orgueil meteorites were hot, warm, or cold upon landing. Furthermore, the heat resulting from the kinetic energy of a meteorite impacting earth should cause some racemization of the natural source amino acids hit by the meteorite. These authors may want to believe in an extraterrestrial enrichment of l-isovaline based on this discovery, but all they found were two peaks of unequal ratio. Whether these two peaks were unequally formed by enantiomeric enrichment or by some other process has not yet been established. Even if the claim of enantiomeric enrichment is valid, this only shows that isovaline became enriched, not where or how it became enriched.

Until we understand the true reason for why unequal ratios of isovaline exist, we cannot assume that racemic isovaline was extraterrestrially enriched by any process. Unfortunately, Glavin and Dworkin have assumed the enrichment of l-isovaline to be a fact and have proposed that this extraterrestrial l-isovaline was the source of the original homochirality that sparked life on earth. Because of such claims, there are now publications showing how l-isovaline can induce chirality into left-handed amino acids (Breslow, Levine, and Cheng, 2010) and how left-handed amino acids can induce chirality to make right-handed sugars (Pizzarello and Weber, 2006). Since the extraterrestrial enrichment has not been established, further research is clearly needed to understand the reason for the unequal ratio of isovaline enantiomers in those meteorites.

Point 4: Meteoritic Transport

In order for extraterrestrial amino acids (including isovaline) to come to earth on meteorites, those amino acids must have survived the very high temperature of those rock fragments as they entered

Earth's atmosphere. Although the meteorite may start out very cold (being from outer space) and requires only seconds to enter earth's atmosphere and land, we know that the surface of meteorites is burned away during entry. The temperature of meteorites at the time of atmospheric entry has been estimated to be about 1650° C, which is much higher than the temperatures needed to burn amino acids. Whether enriched or not, or whether burned or not, any amino acid present on the surface of an extraterrestrial rock fragment would be stripped away, along with the surface of the meteorite, during its entry into our atmosphere. This fact creates a problem for extraterrestrial thinkers. Amino acids found in a meteorite (assuming no earthly contamination) could have been present only inside the original extraterrestrial rock fragment, not on the surface of the rock fragment, while it was in outer space. If amino acids were inside the rock fragment while traveling through outer space, the question remains how those extraterrestrial amino acids got to the inside of a rock fragment and how circularly polarized ultraviolet light could have irradiated the inside of a rock fragment while it was traveling through outer space. More importantly, how could enriched isovaline have any impact on the origin of life on earth if it is only present inside a meteorite? The known information about meteorites makes it difficult to believe that meteorites are a mode of transportation to bring life to earth.

Biblical Creation Is Affirmed

Although the extraterrestrial existence of racemic isovaline cannot be ruled out from the data in these articles, this information only suggests that racemic (not enriched) isovaline might be present in outer space. However, the presence of amino acids in outer space does not necessarily validate the theory of evolution. It is well known that certain gases

and other chemicals are present in outer space (certain comets, the rings of Saturn, planet atmospheres, etc.), and there is no debate on this point. However, the presence of chemicals in space and the formation of life from those chemicals are two totally different statements; only the former is fact. Since the origin of homochirality is directly tied to the origin of life, one origin cannot be known without knowing the other. Evolutionists may claim that amino acids are the precursors to life, but scientists have never scientifically proven that life could have originated from any amino acid from any source! Although the presence of homochirality in chiral biochemical molecules is difficult for evolutionists to explain, homochirality is not the only evidence that rejects the evolutionary hypothesis. There are other laws and facts of chemistry that literally prevent the formation of proteins from l-amino acids (even if they were present on earth) because the chemical reactions needed to accomplish the formation of proteins do not work as evolutionists propose. Amino acids do not exist in solution in a form where they can react to form proteins, and the physical properties of proteins do not allow their formation in a primordial watery soup (McCombs, 2014). Evolutionists may propose gradual changes over millions of years as a mechanism to form life, but these hypothetical changes cannot change the laws and facts of chemistry or allow otherwise impossible chemical reactions to occur. Since the evolutionist explanation cannot satisfactorily explain the presence of homochirality in living organisms, the best explanation for the origin of homochirality and the origin of life is creation *ex nihilo* by the word of our almighty God.

Conclusion

Four points were presented that would have to be true for the evolutionary explanation to be validated, but not one of

the discussed four points has any precedent in the chemical literature, and the validity of these four points was never demonstrated or scientifically proved. If space radiation and circularly polarized light can destroy right-handed amino acids—if circularly polarized ultraviolet light is even present in outer space—and if meteorites brought these left-handed amino acids to earth, these articles have done nothing to prove their claims. The authors of these articles have extrapolated well beyond the observed evidence to establish their conclusions, and for this reason, the origin of homochirality has not been shown to be extraterrestrial. The key point to explain the different ratios of isovaline as being the result of extraterrestrial enrichment was never established. The one point that could add validity to the evolutionary model was never proven, only accepted as fact by the authors.

As evidenced by these articles, there is a growing and alarming trend by some scientists to believe that symmetry-breaking processes are permitted and possible concerning the generation of new homochirality. Symmetry is part of the laws of math, chemistry, and physics, and as a law of science, there cannot be exceptions to these laws. Nothing in the scientific literature would suggest that the laws of chemistry and science are different in outer space, and nothing in the scientific literature supports the claim that a symmetry-breaking process is even possible. The need for symmetry-breaking exceptions in order to explain the origin of homochirality should never be part of a “natural process,” and any explanation incorporating such exceptions cannot be considered as validated or proven! It is only intellectual stubbornness that prevents evolutionary scientists from evaluating a creation hypothesis (or even any other hypothesis) for the forming of the unequal ratios of isovaline by processes that do not break symmetry.

The Bible tells us that God made man from the dust of the ground. It

was God who made the man living, not the dust of the ground. Everything about living organisms—how they are designed and how they function—is truly a miracle of God-sized proportion; and to believe that the creation of all life, along with the homochirality life possesses, could have originated by “natural processes,” as suggested by these authors, is only wishful thinking. If life’s chiral biochemical molecules truly originated by natural processes as suggested by evolutionists, then every aspect of life, including homochirality, must be explainable by those natural processes; but the scientific evidence does not show that to be true. If natural processes actually formed the chiral carbons of the biomolecules, then every chiral carbon would be a 50/50 mixture of the two possible diastereomers, but the scientific evidence does not show that either. Biblical Creation is the only model of origins that can explain why every chiral biochemical molecule in every living organism contains only one unique configuration of homochirality, even though there are many other possible configurations. Indeed, 100% homochirality is a required property of all living organisms, and life would not exist if these chiral biochemical molecules were formed by purely natural processes.

When all of the facts are considered and the evidence is properly interpreted, there is no mystery concerning the origin of homochirality. The only possible way for unique homochirality to exist in the chiral biochemical molecules found in living organisms is for those biomolecules to have been created with unique homochirality when that organism was first created. Just as a fingerprint identifies its creator, God created all plant, animal, and human life with His fingerprint of homochirality. God intended for His creation to be clearly seen, not explained by natural processes! More than any other evidence, the presence of homochirality in living organisms did more to convince me of the reality of an

all-powerful Creator. I hope it will do the same for you.

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Anomalous Impressions in Tapeats Sandstone (Cambrian), Grand Canyon

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Abstract

A group of 32 impressions is documented in the top of the Tapeats Sandstone at Plateau Point, Grand Canyon. These may be biological in origin, and a brief history of relevant local research is reviewed. This analysis assumes the rapid deposition shown in earlier work, and the implications of that model are explored. One is that thixotropic mobility in the sand when the impressions were formed adversely affected their clarity. Evidence of an original, thin, clay-sheet substrate is explored, as are its implications for preservation. This clay diminished the details of the impressions but served as a mold to faithfully preserve forms in the more mobile sand. Organic and inorganic explanations are considered, and the recognition of regular, linear groups suggests a possible biogenic origin.

Introduction

Plateau Point is a common destination along the Bright Angel Trail in Grand Canyon National Park and a popular side trip from Indian Gardens (Figure 1). Situated on the Tonto Platform of the South Rim, it provides majestic views of the geological succession to both rims (Figure 2). This detached promontory of upper Tapeats Sandstone (Figure 3) has been a popular overlook of the Colorado River below since the arrival

of tourism. Decades ago, loose rubble was removed from the northwestern section of the promontory to provide a safe path to a section of pipe railing. The lesser eroded sandstone exposed in this pathway (Figure 1 insert and Figure 3) contains trackways left by a multitude of invertebrates on many layers, and one sandstone layer contains 32 larger impressions this paper will explore.

The impressions may be biogenic, or they may be inorganic features such

as percussion marks, erosional marks, or tool marks. Unique sedimentary conditions add to difficulties in identification. However, the location is public and accessible, and the author encourages others to examine the evidence and add to the conversation.

Tapeats Sandstone

Barnhart (2012b) described the Tapeats as a vast sand plain of rapidly depositing sediment. From Plateau Point on the Tonto Platform, isolated outcroppings of the Tapeats can be examined for tens of km in all directions and show little change in the depositional structure. Outside of the canyon, exposures of the Tapeats in central, western, and eastern

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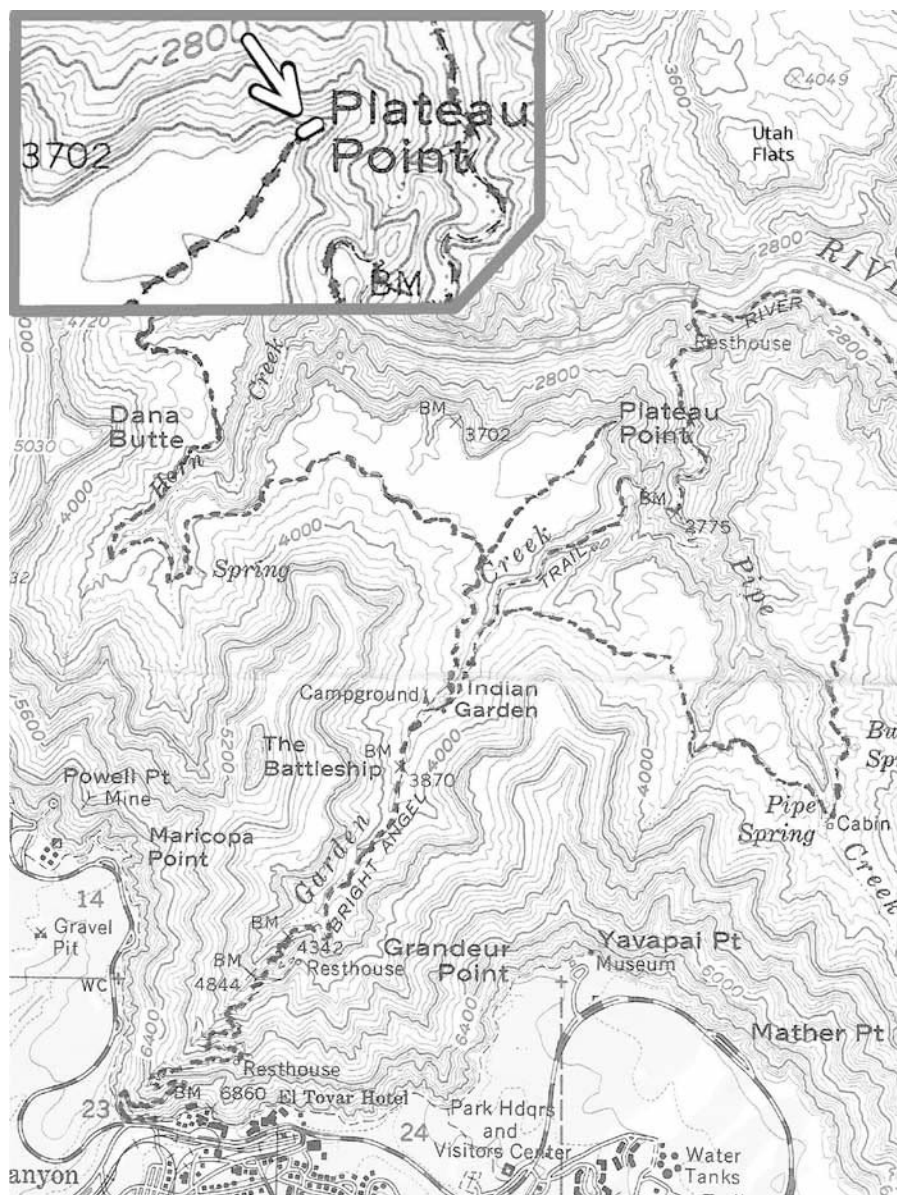


Figure 1. Bright Angel Trail from Grand Canyon village to the Colorado River. Plateau Point is on the southern edge of the Tonto Platform (the relatively flat eroded top of the Tapeats) between Indian Garden's campground and the river. Insert shows the location of Layer 21 on Plateau Point, giving its approximate orientation NE to SW. (U.S. Geological Survey, 1964).

Arizona (Barnhart 2012a) extend the same depositional model several hundred km.

Monadnocks would have provided the only high ground during deposition. They served as sources for loose rubble and potential refuges for animals. But they are sparse; there are few protruding

above the Tapeats northwest of Plateau Point. Chadwick and Kennedy (2001) documented one in Ninety-One Mile Canyon (Figure 1) that rises 250 m above the contact with the Precambrian basement and 34 m (112 ft) above the top of the Tapeats into the Bright Angel Shale.

Monadnocks are isolated, rounded hillocks, remnants of the erosional surface of the Great Unconformity. Known examples in the area form a roughly linear arrangement that crosses the area around Plateau Point. Rather than representing ancient receding highlands, they are simply erosional remnants of a massive sheet erosion event (Barnhart 2012a, 2012b). Rubble from these mounds is found in the Tapeats, primarily at its base. Ninety-One Mile Canyon is 2 to 3 km northwest of Plateau Point. At the time the impressions were formed, the top of the Tapeats was a relatively flat sheet of rapidly accumulating sand, broken only by the 34-m-tall hill about 2 to 3 km away.

The layer containing the impressions is just over a meter below the contact between the Tapeats and overlying Bright Angel Shale. Both are dated by trilobites (McKee and Resser, 1945) as "late Early Cambrian age for the upper parts of the Tapeats Sandstone in the Grand Wash Cliffs in the western part of the canyon and an early Middle Cambrian age for the formation in the eastern canyon" (Middleton et al., 2003, p. 94). Thus, the top of the Tapeats is considered progressively younger from west to east; Plateau Point is midway between in location, and presumably in age, about the transition from early to middle Cambrian. The base of the middle Cambrian is placed at about 500 Ma by Beuss and Morales (2003) and 509 Ma by Gradstein et al. (2012).

History of the Find

The impressions were first reported by Mackay (1985). He described five impressions (numbers 2, 3, 4, 6 [or 8], and 9 in this paper). While he did not recognize their groupings, he did propose a biogenic origin based on their size and association with invertebrate ichnofossils. At least one—number 9—he suggested was produced by a three-toed foot. This author visited the site



Figure 2. Plateau Point seen from the Kaibab Trail as a detached promontory of rock situated in the center of the Canyon.

on numerous occasions, spending more than three days there on at least three occasions between 1986 and 1995. Field photos were taken using a 12-in-square string grid for scale. In addition, latex molds were made of impressions 2, 3, 4, 5, and 9, which were used to produce plaster casts.

Local Trace Fossils

Ichnofossils are common throughout Grand Canyon, both vertebrate footprints and invertebrate traces. Gilmore (1926, 1927, 1928) documented tetrapodal trackways in the Coconino Sandstone, Hermit Formation, and Supai Group (Figure 4). McKee (1982, p. 100, as cited in Blakely, 2003, p.150) noted that vertebrate trackways and ac-



Figure 3. Trail across Plateau Point as seen from the approach. Surface of Layer 21 is indicated by the arrow.

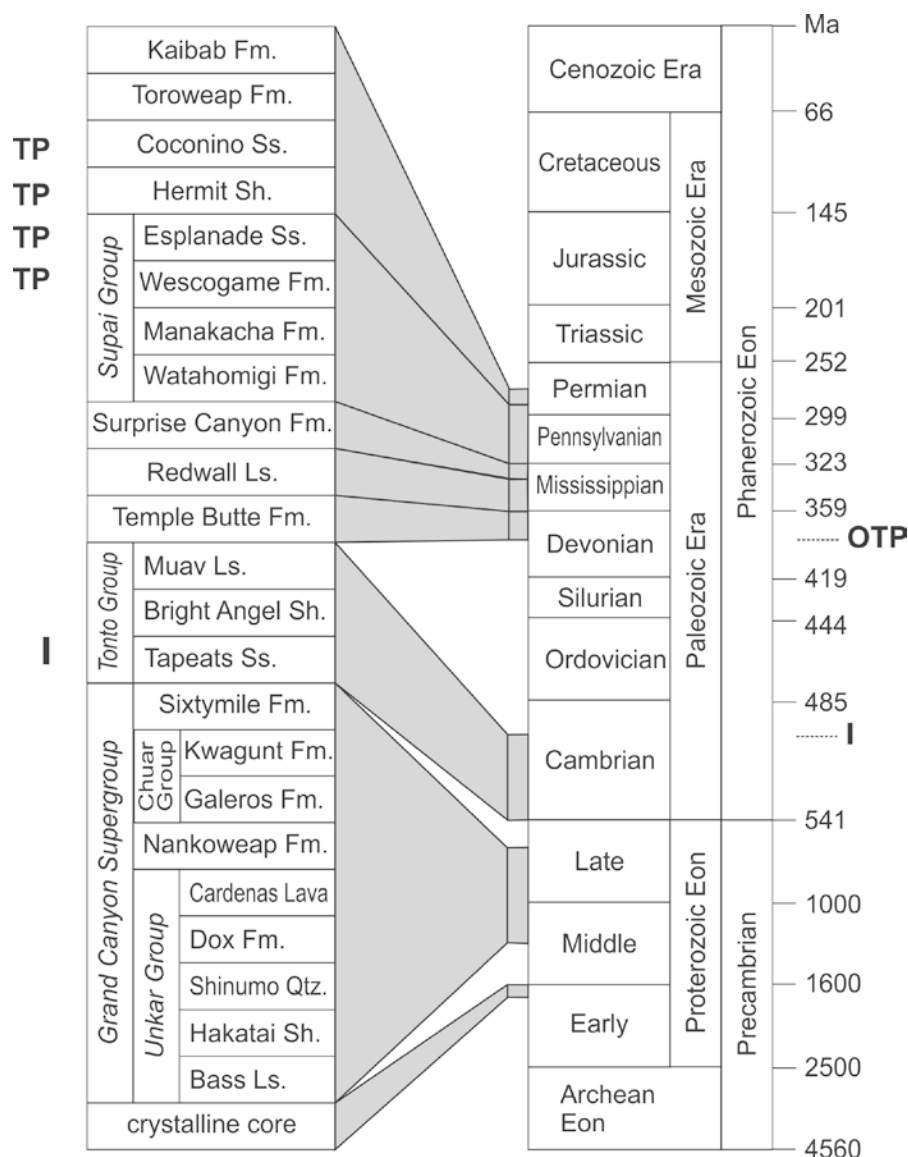


Figure 4. Comparison of the Layers of the Grand Canyon and the geological timescale modified from Beuss and Morales (2003, p. 7). Dates from Gradstein et al. (2012). Placement of tetrapodal prints (TP), oldest tetrapodal prints (OTP), and the impressions described in this paper (I) are shown in the margins.

companying plant debris “suggest the presence of broad floodplains developed during times of regressing seas and semiarid-to-arid climates” in the Supai. In the Coconino, segments of trackways generally move up lee faces of dunes and are ascribed to heat-tolerant vertebrates moving over “Sahara-like dunes [that] were part of an enormous desert that

once extended north into Montana” (Middleton et al., 2003, p. 163). Brand and Tang (1991), however, attributed these tracks to aquatic vertebrates because the trackways “exhibited several features that imply that these trackways were not made in subaerial conditions. The animals were swimming in the water part of the time and at other times

were walking on the substrate” (Brand and Tang, 1991, p. 1201).

Invertebrate traces are common in many local formations, especially the Bright Angel Shale. In Layers 21 to 28 of the Tapeats (terminology of this study), invertebrate traces are ubiquitous and varied (Figure 5) but appear to form a pattern. Invertebrate traces occur both within the sand and at the sand-clay interface. Some trails that appear to begin and end abruptly may simply represent vertical migration between clay and sand. Some appear to be escape structures, burrowing down into the already-deposited sand. There is a shallow depression in the middle of the study area that may have been a small channel. This is supported by the decreasing number of traces approaching it, suggesting the creatures may have reacted to differences in hydrostatic pressure or moving water. Careful observation in Layer 21 shows that invertebrate traces are not found in the channel, possibly due to increased thixotropy there.

Invertebrate traces are found in association with the other impressions, sometimes overprinting them (#9 and #10) or sometimes being overprinted by them (#24). In short, the invertebrate traces and larger impressions were produced at the same time, both in the clay portion of a sand-clay couplet. This helps us reconstruct a sequence of deposition and trace making.

The varying distribution of invertebrate traces, relative to both the channel and impressions, suggests a rapid response to changing conditions, and effort to cope with a hostile environment. Similar patterns found in Layers 22 to 28, suggest a single population of these invertebrates were restricted to single couplets. If the couplets represent individual waves of a wave train, then each one would bring a new population reacting to a harsh environment, rather than representing multigenerational communities that developed and grew in situ.

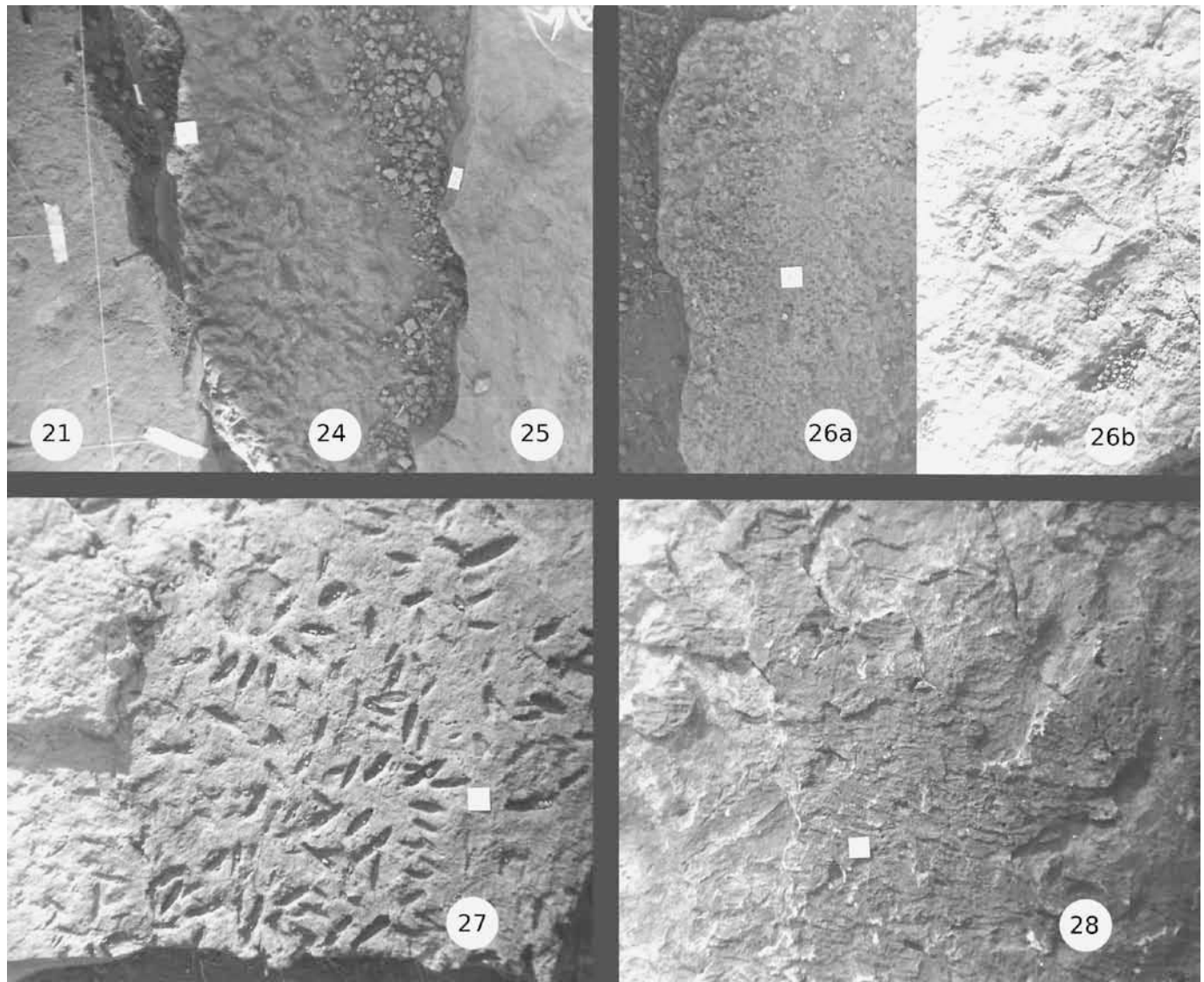


Figure 5. Layers above Layer 21, showing typical invertebrate traces for each layer. Traces are not uniform over entire layer. Layer 26 shows some of the differences that can be seen over short distances. Small white squares for scale are one inch square.

The Impressions

All identified impressions were measured in the field along their greatest diameter. As no lines of impressions had been established at that time, no standardized pattern was used. That was corrected by using the photographs as surrogates and remeasuring the impressions, using the string grid for scale (Table I). These measurements, taken

from the photos, are considered more closely associated with the original size of impressions and will be used as the standards for further analysis of these lines. A conversion factor of 185 pixels per inch was used. Significant size differences exist in lines of impressions. If this represents initial conditions, then it would be an argument against the groupings representing trackways. If they

are trackways, then a reason for the size discrepancies must be feasible in the sedimentary context.

Sedimentary Setting

The layer containing the impressions is named Layer 21 for this study and is one of a series of alternating shale and sand couplets. Layer 21 is 18 to 25 cm (7–10 in) thick in the study area. The pattern

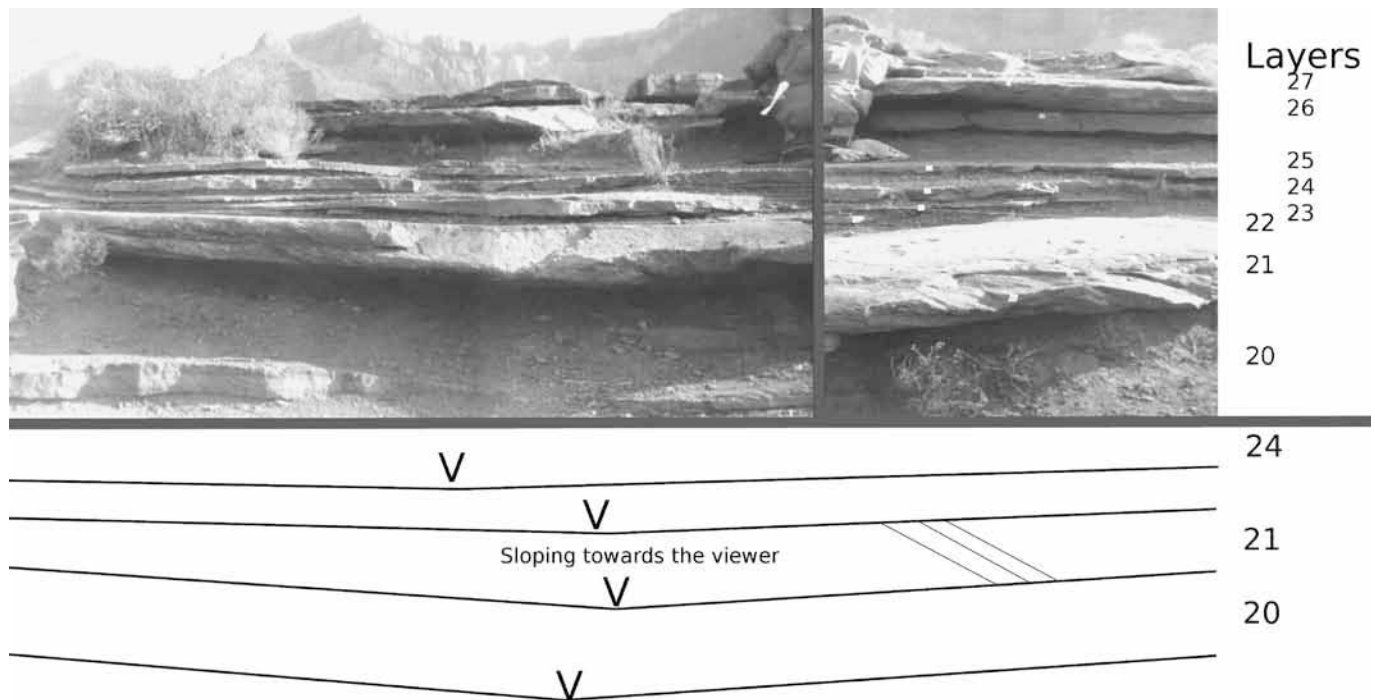


Figure 6. Composite view of Tapeats layers described here. Camera angle in the far right photo was shifted to show above layers more distinctly. Numbering of layers and location of thalweg (V) in each layer is indicated. Lee slope depositional direction is visible in several locations in photo and indicated in diagram.

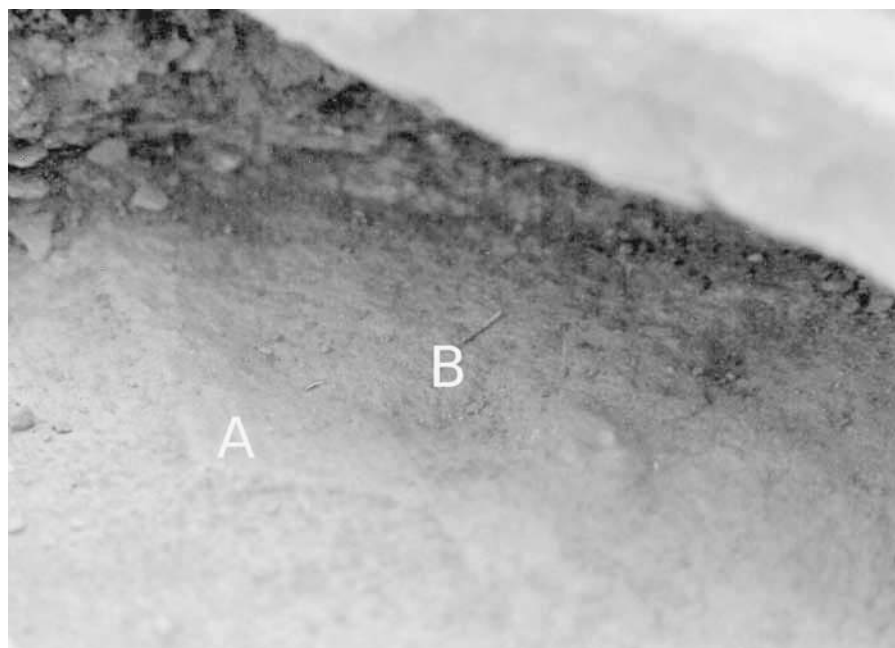


Figure 7. Impression 22, showing the thin layers between Layer 21 and Layer 22, as well as the consistent association of (A) push-up and (B) depression with most impressions.

of bedding planes suggests relatively narrow tongues of sediment were deposited from the east (Barnhart, 2012b), centering on a continuing shallow channel, or thalweg. The presence of the thalweg up into the overlying layers suggests the continuing presence of a channel, which emphasizes the rapidity of sedimentation. Figure 6 is a view of the lee slope depositional surface retained in the lithified stone in both the far right of the photograph, where fracture and spalling have exposed it, and in Layer 21 of the sketch. The alternating sand and shale continues at a finer level, seen in the details of Impression 22 (Figure 7). The impression is only partly visible, with overburden still covering the remaining portion.

Alternating layers of sand and clay is often called *flaser bedding* and is attributed to fluvial or tidal deposition. But

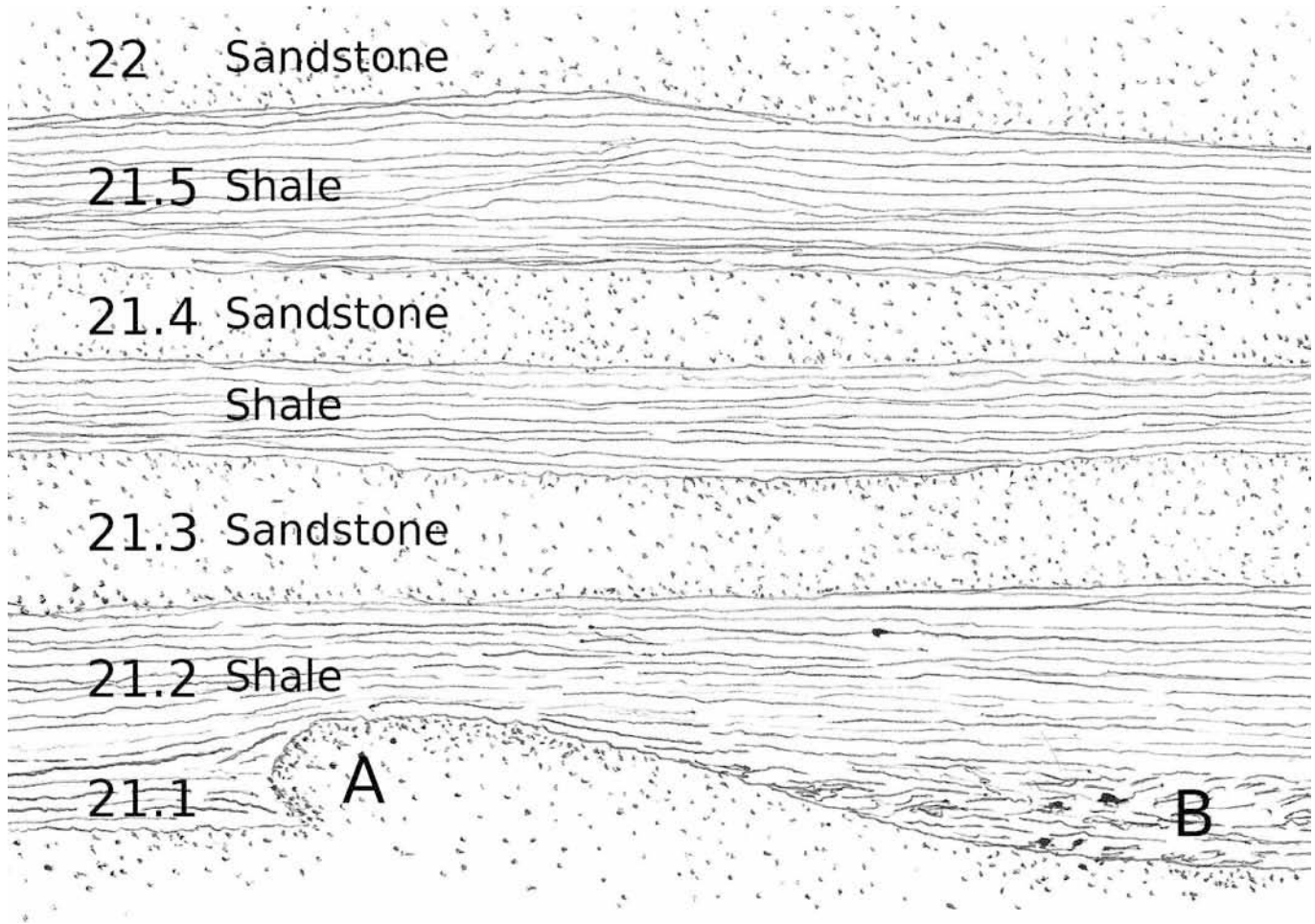


Figure 8. Cross section of small lamina between Layer 21 and Layer 22 through Impression 22, showing (A) the overhanging push-up and (B) distortion of shale layers in the impression and around the push-up. Thin lamina of sandstone, 21.3 and 21.5, 5–7 mm and 3.5 mm thick, respectively, show impressions were made prior to the smaller follow-on waves.

this style of bedding, even with clay, also can be formed at higher flow velocities, a weakness of facies models. Barnhart (2012a) suggested that deposition in the Tapeats occurred in a succession of waves. Each wave deposited a layer of sand in its more turbulent front and clay in the rheologically smoother train. Schieber et al. (2007), in the lab, and Barnhart (2011), in the field, showed that clay can be laid down in higher flow velocities because of its tendency to clump together into sheets. A sedimentary approach is needed to explain

flaser bedding that accounts for grain size, flow velocity, depth, bed thickness, wave height, and current direction and continuity.

The timing of the impressions is constrained by the irregular fracturing and displacement of the shale of Layer 22.1 (Figure 8) relative to the continuous sheets above it (Layer 22.2). This suggests that sheets of flocculated clay were broken up by whatever made the impressions after deposition by the front part of the wave. The impression was made after the passage of the initial

larger wave (cf. Barnhart, 2012a) but before the passage of the following wave train that deposited thinning couplets of sand and clay (Figure 8). In other words, given the depositional model of Barnhart (2012a), the impression was formed, buried, and preserved in a matter of seconds.

Based on that model, Layer 21 would have been deposited by a single wave 1.6 to 2.0 m (5–6 ft) high, based on a ratio of deposition-to-flow depth of 1:6 to 1:8 (Allen, 1976; Rubin and McCulloch, 1980). The thickness of Layers 22 through 26

indicates a succeeding, shallower wave train. Then the next sequence of a larger wave and follow-on train deposited Layer 27, 1.0 to 1.4 m (3–4 ft) high (Figure 6). The lesser thickness of couplet 21.3 and 21.4, but with the same ratios of sand to shale laminae, suggest the smaller waves were a few cm to tens of cm high (Figure 8). The shale layers are lenticular, not continuous. Layers 22 and 23, while separated by shale in the study area, merge to a single layer to the east (Figure 6). This is consistent with deposition upward continuing in lenses by merging patterns of smaller waves.

The impressions in Layer 21 are unique to Plateau Point to date. Layer 20 contains abundant oxidized iron nodules and can be traced west as far as Horn Creek and as far east as the South Kaibab Trail (Figure 1). No similar impressions have been found in Layer 21 outside the study area. Nor were any observed north of the Colorado River in the Phantom Creek Drainage area of Utah Flats at the same approximate level.

Inferred Conditions at the Time of Deposition

Impressions 1 through 22 were best identified in the field by an associated push-up. Figure 8 shows how the clay layers were fractured and displaced by the push-up (A) but continued above it unbroken. This suggests that the clay layer, approximately 0.25 to 0.5 cm (0.125–0.25 in) thick, had already covered the sand when the impression was made, creating a space between the sand layer and the source of the impressions that was originally occupied by clay (Figures 8 and 9). This sedimentological inference explains the poor detail of the impressions in the sand—that detail was lost when the thin clay layer was removed (Figure 10).

While the absence of the clay obscures some details, much information is preserved in the sand. Small round marks in the sandstone of Impression 9 appear to be air bubbles, perhaps



Figure 9. Impression 9 in an orthographic view showing relative depth of impression and height of push-up. Rollover edge of push-up is visible as shadow around outer right hand edge. Push-up is about 0.8 cm high, and impression is measured as 19.5 cm in width, upper left to lower right (dime for scale). Note sloughing along the edge of Layer 21 to the upper right is at the angle of deposition of strata, showing tangential contacts at both top and bottom of strata.

generated by impact and trapped in the clay. Afterwards, the more mobile sand migrated into the bubbles. This suggests that the clay was sufficiently rigid to act

as a mold for the impressions, which the relatively mobile sand filled and then lithified. If so, this sand mobility indicates thixotropy.

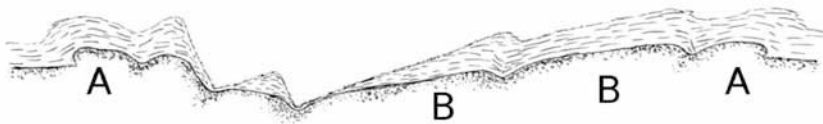
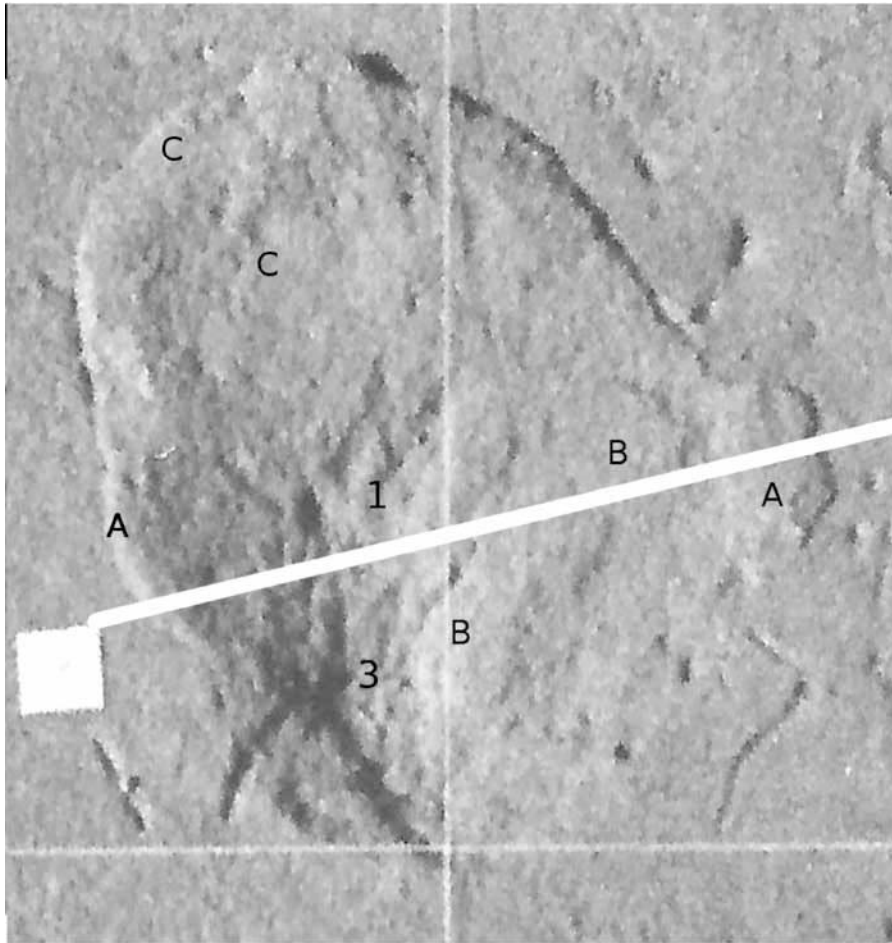


Figure 10. Cross section of Impression 9, showing (A) original push-ups produced by shear, (B) secondary push-ups, and (C) push-up suspended and relocated by moving water.

Most impressions show a sand push-up to one or more sides (Figure 10A). These border push-ups were likely produced by the original downward impact on the clay-covered sand. Additional push-ups inside the impressions (Figure 10B) lack the overhangs and may show the effect of shear forces originating from the impressions' centers. Impres-

sion 9 contains two distinct interior push-ups. They are not aligned and may therefore represent separate impact events. Both are to the left of crescent impressions (Figure 10, 1 and 3), which are the deepest part of the impression. The push-up shown by Figure 10C appears to have been realigned by water flow. The sketch under Figure 10 shows

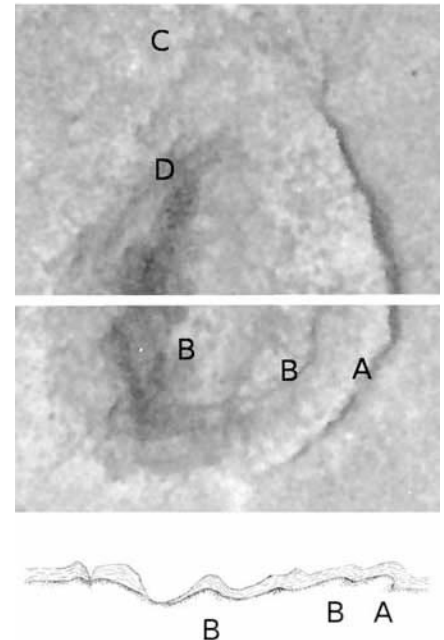


Figure 11. Impression 2 with cross section, showing (A) original push-up produced by shear action, (B) secondary push-up, (C) push-up relocated by moving water, and (D) the multiple layers affected.

how the clay could have blurred details when the impression formed.

Impression 2 (Figure 11) shows similar features, yet in this impression, the two internal push-ups (B) are aligned to the left of the deepest point. This suggests pressure from two points in a line. Impression 2 consists of the impression, a primary push-up, a secondary push-up, and slumping sand back into the depression. The slumped area increased the diameter at the top of the track; the deeper part probably reflects the original size. Slumping may help explain the variation in impression diameters shown in Table I.

Thixotropy and Clarity

The facies-model style of interpretation can often mask uniformitarian bias,

Impression	Measured in field		Measured from photos		
	Max Dimension		Max Dimension		
	cm	in	pixels	cm	in
1	12.0	4.7	135.0	11.3	4.4
2	10.5	4.1	93.3	7.8	3.1
3	9.5	3.7	84.2	7.0	2.8
4	7.8	3.1	87.5	7.3	2.9
5	7.5	3.0	76.2	6.4	2.5
6	7.5	3.0	84.4	7.0	2.8
7	17.8	7.0	178.2	14.9	5.9
8	5.0	2.0	62.8	5.2	2.1
9	19.5	7.7	193.0	16.1	6.3
10	9.0	3.5	113.0	9.4	3.7
11	8.5	3.3	105.2	8.8	3.5
12	7.5	3.0	76.0	6.3	2.5
13	4.5	1.8	50.2	4.2	1.7
14	5.0	2.0	50.0	4.2	1.6
15	11.5	4.5	100.8	8.4	3.3
16	6.3	2.5	77.2	6.4	2.5
17	11.8	4.6	177.0	14.8	5.8
18	13.5	5.3	136.1	11.4	4.5
19	9.3	3.7	96.0	8.0	3.2
20	8.5	3.3	99.5	8.3	3.3
21	7.0	2.8	88.5	7.4	2.9
22	7.0	2.8			
23	7.0	2.8	83.7	7.0	2.8
24	5.8	2.3	71.1	5.9	2.3
25	6.5	2.6	58.9	4.9	1.9
26			88.2	7.4	2.9
27			62.2	5.2	2.0
28			46.7	3.9	1.5
29			50.0	4.2	1.6
30			70.3	5.9	2.3

Table I. Maximum width of prints taken in the field and from photographs using 12 in. string grid as a standard.

and sedimentary rocks are often better understood by a hydraulic interpretation (Barnhart, 2011). When rapidly deposited sediments of a rare event are assumed to have formed slowly, comparison to a modern depositional environment will probably miss the point. This is true of the Tapeats, which is often interpreted by uniformitarian geologists as a shore or nearshore environment, when sedimentary features suggest rapid, catastrophic deposition (Barnhart 2012a, 2012b). Understanding the actual depositional situation points to implications of the event. For the Tapeats, deposition by large waves, depositing sand at a rate of as much as 15 m per hour (Barnhart 2012b), implies several consequences. One pertinent to this study would be the presence of thixotropic conditions.

Thixotropy occurs when an impermeable layer is deposited over sand with a high volume of interstitial water. Increasing overburden pressure causes the hydrostatic pressure of the water in the sand to also increase and migrate toward low-pressure zones. Under the right conditions, sand grains will be suspended in the water, not supporting each other. A break in the overlying layer will cause the release of water and the compaction of the sand. If that were the case where the impressions were made, water moving up into the fractured clay would further diminish details, and the sand would be forced into the overlying mold of the fractured clay.

The rapid deposition of Layer 21.1 atop Layer 21 (Figure 8) could have created this condition. When the impressions were made, excess water could have moved laterally and then upward to relieve the increasing pressure in the sand. Hydrostatic pressure would have been high, allowing the shock of impact that made each impression to also break the clay, resulting in localized liquefaction.

This laterally moving water flowed across the top of the sand and eroded some shallow invertebrate traces. Im-

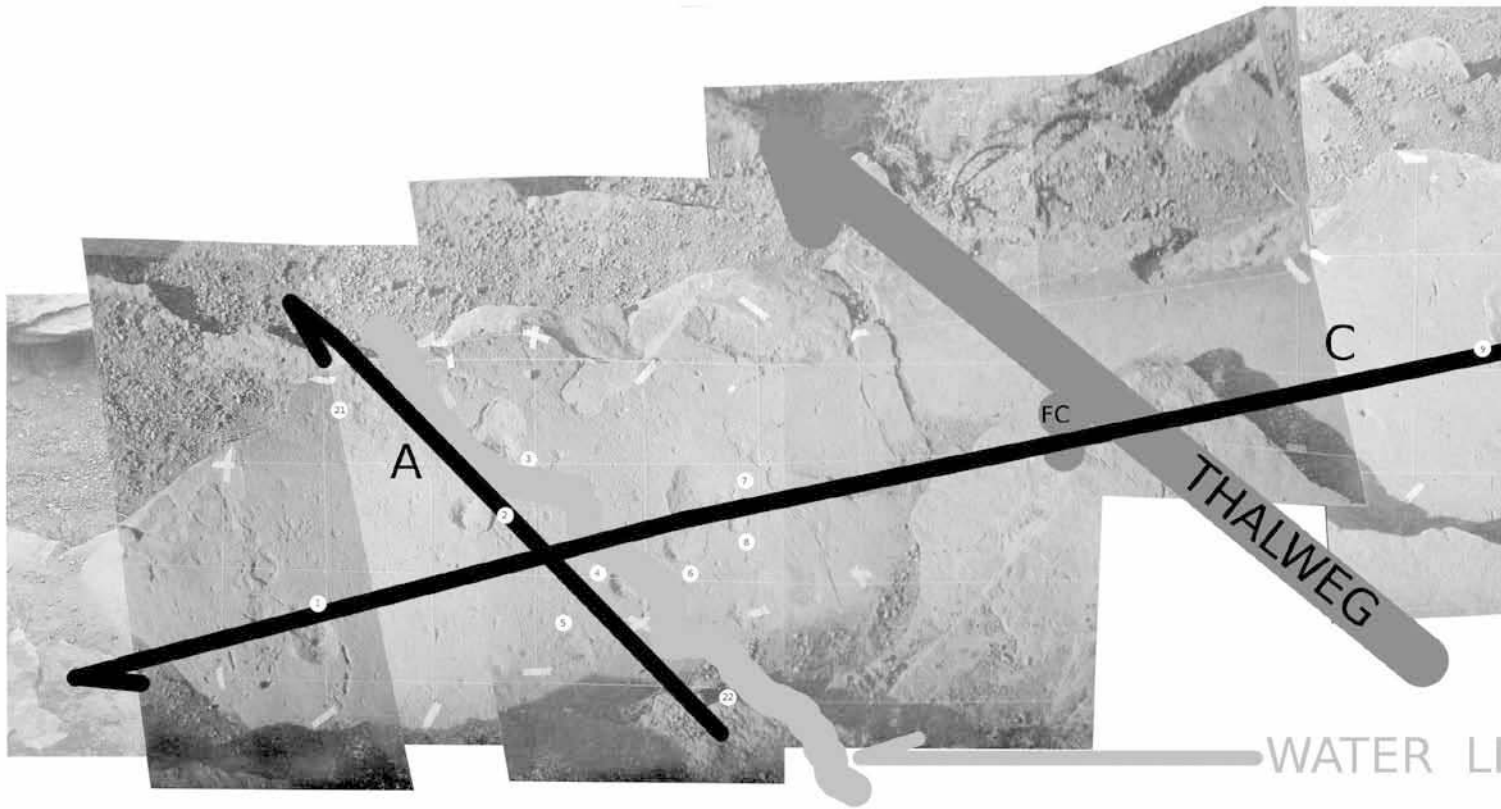


Figure 12. The Plateau Point impressions associated into 6 lines of similar shape and size.

pressions 4 and 5 also appear to have been affected; they are shallower and less distinct than others. Impression 26, on the other hand, is surrounded by invertebrate traces. But it was nearly obliterated before the invertebrate traces, although after the deposition of the original clay sheet. It is so shallow that it was identified in photos only because of its position relative to a line of other impressions. However, Impressions 6, 7, and 8 have few invertebrate traces around them, suggesting the impression disturbed the sand after the tracemakers and that water released from the sand actively obliterated them.

Another reason the impressions are shallow and unclear could have been the firmness of the sand substrate, like walking on wet versus dry sand. Might it be possible to distinguish the relative contribution to the lack of clarity of the

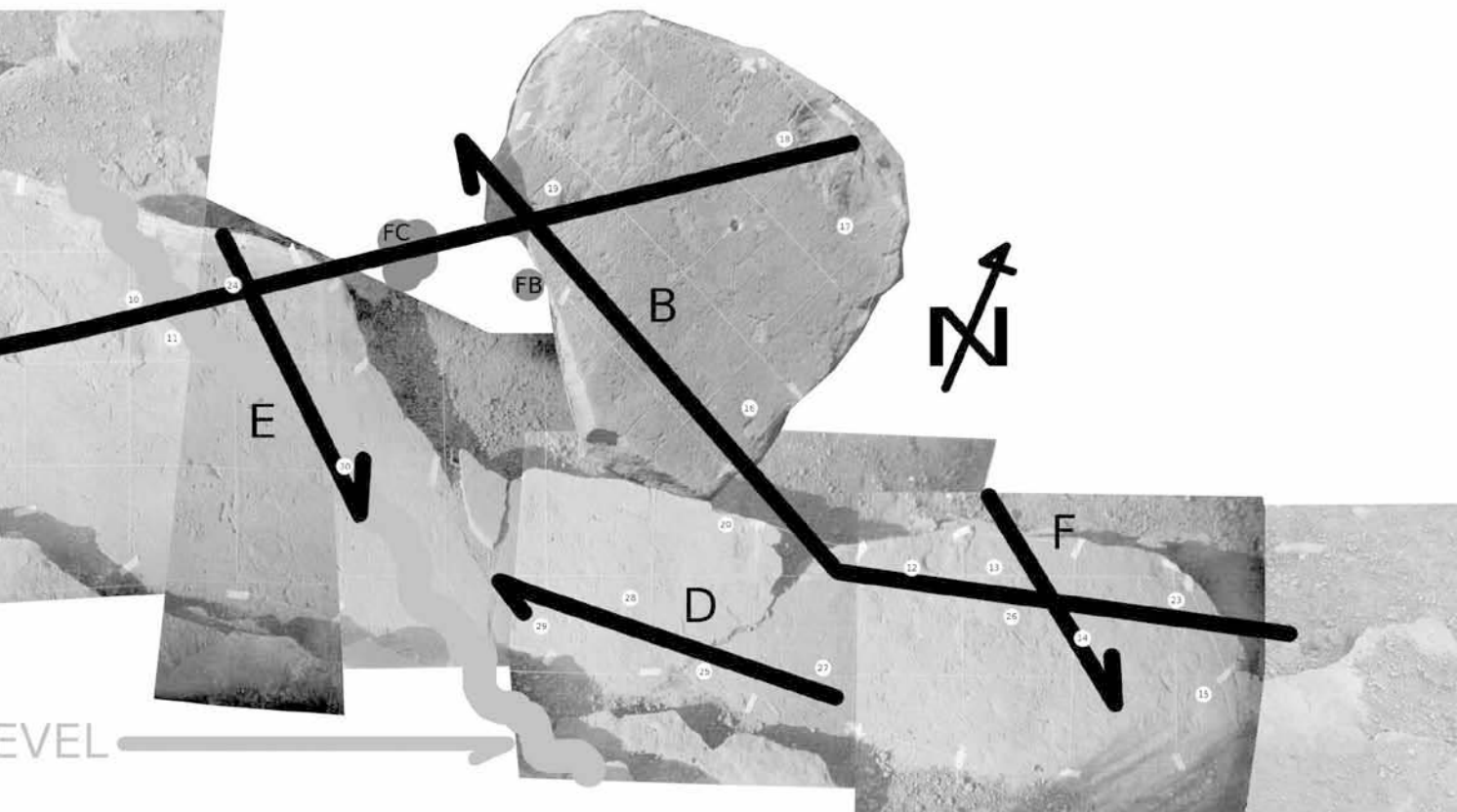
impressions to these causes? Thixotropy would preserve detail, but the depth would be shallow. A firm substrate would capture less detail. Impression 26 is a good example of a very shallow but detailed impression. This, along with the evidence from the loss of invertebrate traces, supports a thixotropic explanation for loss of details.

Possible Causes of the Impressions: Arguments for a Biogenic Origin

There are several possible causes for impressions in sedimentary rock, both organic (tracks) and inorganic (e.g., tool marks, erosion marks). To confirm biogenic trackways, Sarjeant (1975) felt a minimum of at least three sequential impressions should be found. Frey (1975) noted that quadrupeds regularly show

an alternation of right and left feet and this should be reflected in the impression pattern. Loope (1986), in discussing Holocene hoof impressions from the Nebraska Sand Hills, confirmed them as biogenic based on a linear arrangement of 3 to 5 prints that showed an alignment indicating alternation between front and back or left and right.

With the Plateau Point impressions, one indication of a biogenic origin is the ability to group them into linear series, based on similarities in size and shape (Figure 12). While there is considerable size variation between impressions (5–19.5 cm), none of them are too small or too large to fit within the size range of known taxa, especially if some impressions reflect multiple impacts. The grouping in Figure 12 and Table II combines impressions of similar, but not exact, sizes. Disparities in size are



Line A			Line B			Line C			Line D			Line E			Line F		
Imp.	cm	in	Imp.	cm	in	Imp.	cm	in	Imp.	cm	in	Imp.	cm	in	Imp.	cm	in
2	7.8	3.1	12	6.3	2.5	all avg.	10.0	3.9	29	4.2	1.7	24	5.9	2.3	13	4.2	1.7
3	7.0	2.8	15	8.4	3.3				28	3.9	1.5	30	5.9	2.3	14	4.2	1.7
4	7.3	2.9	16	6.4	2.5				25	4.9	1.9						
5	6.4	2.5	19	8.0	3.1				27	5.2	2.0	avg.	5.9	2.3	avg.	4.2	1.7
21	7.4	2.9	20	8.3	3.3												
22	7.0	2.8	23	7.0	2.8				avg.	4.6	1.8						
			26	7.4	2.9												
avg.	7.2	2.8															
			avg.	7.4	2.9												

Table II. Maximum width of prints grouped by lines as taken from photo measurements.



Figure 13. Montage of impressions found in Layer 21 in the study area. String grid was laid out at 12 in (30.5 cm) intervals in both directions, and images were processed to remove keystone affect prior to assembly. Picture of loose rock (Figure 14) with impressions 16–19 was moved and rotated to likely original position.

attributed to multiple impacts and post-impression slumping of the perimeter.

Another indication is the internal geometry, particularly the sediment push-up associated with many impressions. Although percussion marks would also involve the downward pressure of an object on the sediment substrate, that would not be expected for tool marks or erosional features.

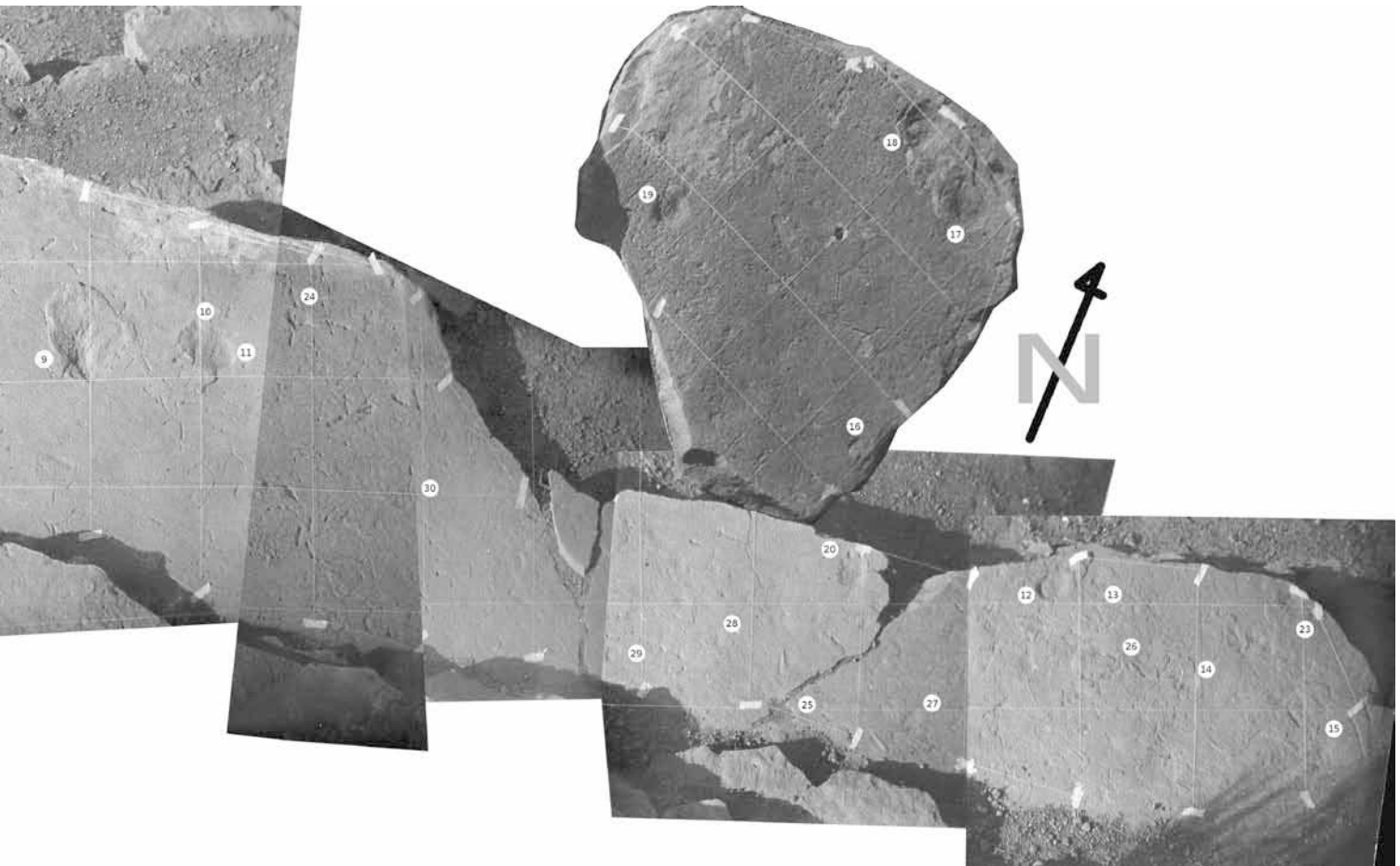
Possible Inorganic Causes

There are several possible inorganic causes, including erosional remnants, percussion marks, currents marks, tool marks, and overburden compaction. If the Plateau Point impressions were

erosional remnants, their origin should be visible in the three-dimensional framework shown at the outcrop. Figure 9 shows erosion of the outer edge of the layer to the upper right. This is a fracture surface aligned with the depositional lee-slope surface that fractured across the surface toward the viewer. The transition between layers is easily recognized. Invertebrate traces are common over much of the top of Layer 21 and in overlying layers but are largely absent on surfaces of the lee slopes. The ability to see this level of detail of later erosion suggests that if the impressions were erosional, their nature would be visible in the field. If they were erosional remnants,

the entire surface probably would show evidence of erosion, including the removal of the invertebrate traces. More important, the “push-ups” could not be erosional features because they then would belong to the overlying layers, not Layer 21.

Another possibility is that they are random percussion marks, caused by larger cobbles or boulders bouncing off the sand substrate during catastrophic deposition or dropped from rafts of ice or vegetation in lower energy conditions. Neither seems likely. There is no evidence of cobbles or boulders in the surrounding sediment above the Lower Tapeats (100+ m below). There are no



other percussion marks in the surrounding sediments.

Finally, Barnhart's (2012b) model of the Tapeats would preclude the presence of such cobbles. The entire area shown in Figure 1 was a broad sand plain, except for a single monadnock several km to the northwest. Given this model, we would not expect percussion marks to be associated with smaller waves but only with the larger waves at the front of the wave train. Evidence around Impression 22 (Figures 7 and 8) indicates deposition by smaller waves carrying sand and clay.

Another possibility is tool marks. These are typically caused by debris car-

ried in currents or eddies that impact the substrate and leave marks. But there is no evidence of tools or tool marks in the surrounding sediments. Furthermore, the depositional model proposed and continued singular location of the small channel indicates sediments deposited by currents and waves moving west without currents or eddies in this area. Several of the lines of impressions are aligned in other directions.

Another inorganic cause might be diagenetic changes after deposition, including differential compaction. This would require localized pressure points. Again, the impressions are extremely rare for this area; a process like differ-

ential compaction would be expected to leave more widespread evidence. Furthermore, the layers of overburden shown in Figure 6 show it to be just as flat as Layer 21, just as the underlying layer, Layer 20, is also.

Although McKey et al. (1971) were able to produce pseudomorph concavities at the bottom of the lee slopes of prograding sediments that appear to mimic a biogenic origin, Sarjeant (1975) recognized that those occurring on bedding planes are more likely to be biogenic. Since Layer 21 is a bedding plane, not the base of a lee slope, McKey et al.'s (1971) pseudomorphs are not a likely explanation either.

Implications of a Biogenic Origin

Tracks and trackways in the Tapeats Sandstone would be of significant interest. Footprints and trackways are definitive time stamps in a rock and are useful in discerning animal behavior and geographic range (Lockley and Hunt, 1995), even in the absence of corresponding body fossils (Brand and Florence, 1982). Some have questioned how tracks and trackways could have been left during the Flood (e.g., Aufdenberg, 2004; Whitmore, 2009). Others have used footprints to help define its progress (Froede, 2010; Oard, 2001, 2011; Snelling, 2010).

The main reason prints would be of interest is that the oldest documented tetrapod footprints occur in Devonian strata in Poland (Niedzwiedzki et al., 2010), dated between 391.8 and 397.5 million years ago (Ma). Other Devonian tetrapod prints have been documented in Australia, Brazil, Greenland, Scotland, and Ireland (Murphy, 2006). Prints in the Cambrian Tapeats would call for a fundamental reassessment of our understanding of evolutionary history. For that same reason, great caution must be used in the further study and conclusions from these impressions at Plateau Point.

Extent and Characteristics of the Plateau Point Impressions

Their occurrence in “Cambrian” strata argues against a biogenic origin within the standard uniformitarian/evolutionary history. But that limitation is not as severe in a biblical history. It seems unlikely, as noted above, that inanimate objects or physical processes could have produced six lines of such similar but diverse impressions at such regular intervals. To better assess their origin, we must understand the nature of these impressions carefully.

A montage of Layer 21 (Figure 13) provides a photographic replication of Plateau Point at the time the fieldwork was originally done in the late 1980s. The only change was the photographic



Figure 14. The loose rock in Figure 13B as it now lies. Gap is approximately 0.5 m (about 18 in) and 2 m (6 ft) west of its original position.

relocation of a single rock slab to its position prior to its breaking off and sliding a short way downhill when the trail was constructed (Figure 14). The shape and position of the slab make the relocation relatively simple. Figure 13 shows 30 identified impressions. Another two were found just outside the study area and are shown in Figure 15.

The ability to group these impressions into the aligned segments (Figure 12) suggests a biogenic origin. Further work is needed. Will the patterns stand up to mathematical analysis and compare with recognized biogenic causes? These are questions for further research.

Discussion

Invertebrate traces and body fossils in the lower Paleozoic sequence at Grand Canyon show better preservation in the clays rather than in the sands like the Tapeats. The overlying Bright Angel Shale has abundant *Cruziana* trackways, although their body fossils are found only on separate parting surfaces. This

makes more sense in a catastrophic model; invertebrate trace makers would have begun creating traces wherever they were carried by waves.

Associated body fossils would also be helpful in confirming a biogenic origin, but tracks and trackways are commonly accepted as viable fossil evidence by paleontologists. Woolfe (1990) recognized that traces alone were enough evidence to redefine an entire facies attribution, and Froede and Cowart (1996) used trace fossils to evaluate differing depositional environments between uniformitarian and young-earth Flood interpretations of the Dougherty Gap. In the case of these impressions at Plateau Point, further research is encouraged.

Conclusions

Based on fieldwork done between 1986 and 1990 and subsequent examination of field photographs, the 32 impressions at Plateau Point can be logically grouped into six tentative trackways, A to F (Figure 12 and Table II). Inorganic causes

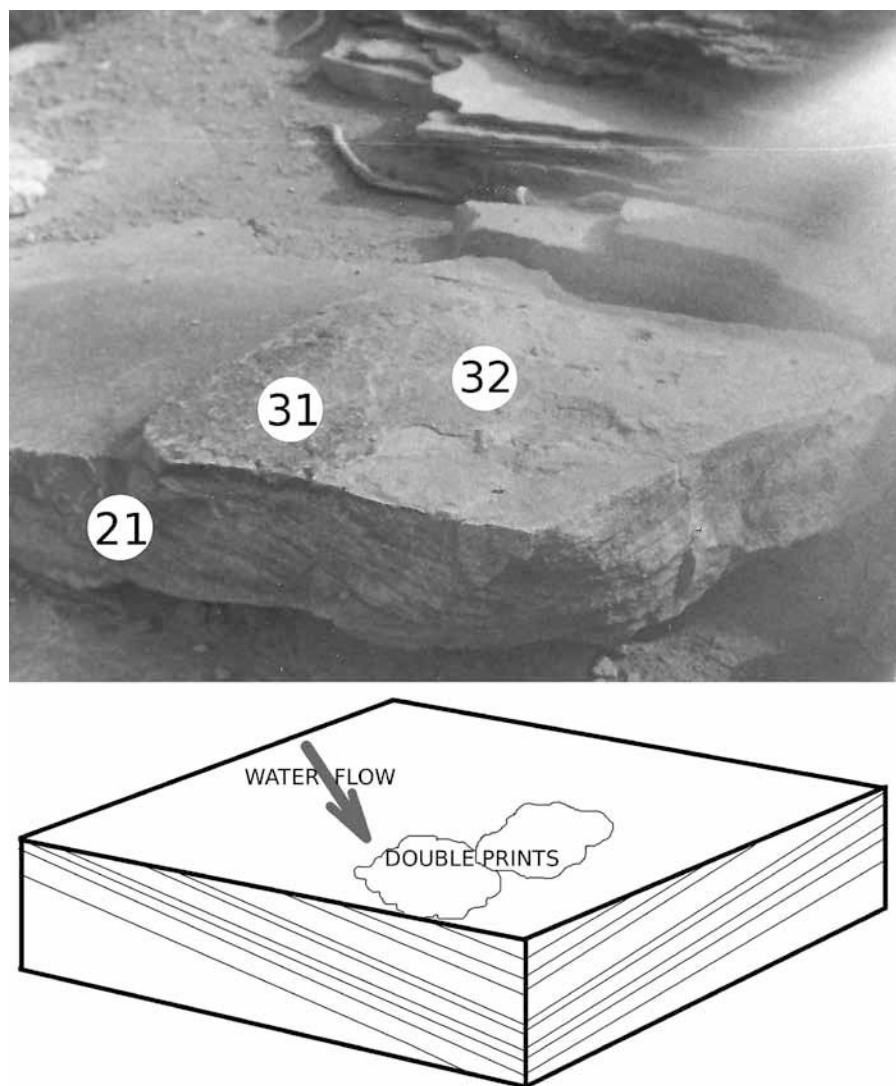


Figure 15. Impressions 31 and 32 are approximately 30 feet west from Figure 13. Block diagram (below) shows sedimentary layers and direction of current (parallel to thalweg, Figure 13). These are the only two impressions not found in Layer 21 but in the overlying layer. However, they appear associated with one of the potential lines, C, indicating a high rate of deposition.

for these features do not appear to fit the existing evidence, given the depositional model of Barnhart (2012b). Further fieldwork should be carried out at Plateau Point, especially if the Park Service ever excavates additional overburden to improve the trail. However, sufficient data exist here for more detailed quantitative analyses that may strengthen or weaken hypotheses regarding origin.

The impressions are quite anomalous, in any case, simply because of their rarity in the region and their stratigraphic location and deserve further study.

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Beyond “Origin & Operation” Science,

Part II: An Alternative

John K. Reed and Peter Klevberg*

Abstract

Because the concepts behind the terms “origin science” and “operation science” are deficient in defending a Christian view of science and history from secular positivism, an alternative scheme is suggested that accommodates a traditional Christian view of truth. In contrast to origin and operation science, we suggest that: (1) *origins* (properly defined) is a question of metaphysics, (2) the study of the *past* is the domain of history, and (3) *science* addresses present phenomena and timeless rules of nature. Interdisciplinary investigations like *natural history* or *historical science* are best addressed as “mixed questions.”

Introduction

Trials in Arkansas (MacLean vs. Arkansas, 1982) and Louisiana (Edwards vs. Aguillard, 1987) about teaching creation in the public schools were decided in favor of secularists primarily based on claims that evolution was “science” and creationism was “religion.” In response, several Christian thinkers (Geisler, 1983; Geisler and Anderson, 1987; Thaxton et al., 1984) proposed different kinds of science, including origin, operation, historical, and supranormal (Figure 1) and that evolution and creation both fall within the bounds of origin science. This approach has become popular among creationists, although they typically

use only two of the proposed types of science—origin science and operation science (OS²). In Part I of this series (Reed and Klevberg, 2014), we critiqued this scheme and found it deficient in several areas. At its foundation, proponents of OS² looked for an answer *within* science, rather than using theology and philosophy to define the proper sphere of science as well as its relationship to truth and to other relevant disciplines.

If the main problem between Christian and secular worldviews concerns the nature of truth and knowledge, particularly the secular epistemology of positivism, then looking for an answer inside science implicitly grants that positivism

to some extent. This leads to a number of other problems. These include the weakness of the criteria that support origin science, the inferiority of the dual dichotomies (past vs. present and regularities vs. singularities) that define the four sciences, the mistaken belief that science can address primary cause (God’s creative acts) or singularities in the past, an insufficient understanding of uniformity and uniformitarianism, and a mistaken support of methodological naturalism and the “god-of-the-gaps” fallacy. Finally, while the authors emphasized the history of science, they did not adequately reflect recent work (e.g., Stark, 2003, 2005) that has shown that many of the secular accounts of the history of science consist of anti-Christian myths centered on a narrative of a “war” between “science and religion.” In reality, Christianity gave birth to science, not in a seventeenth-century “revolution,”

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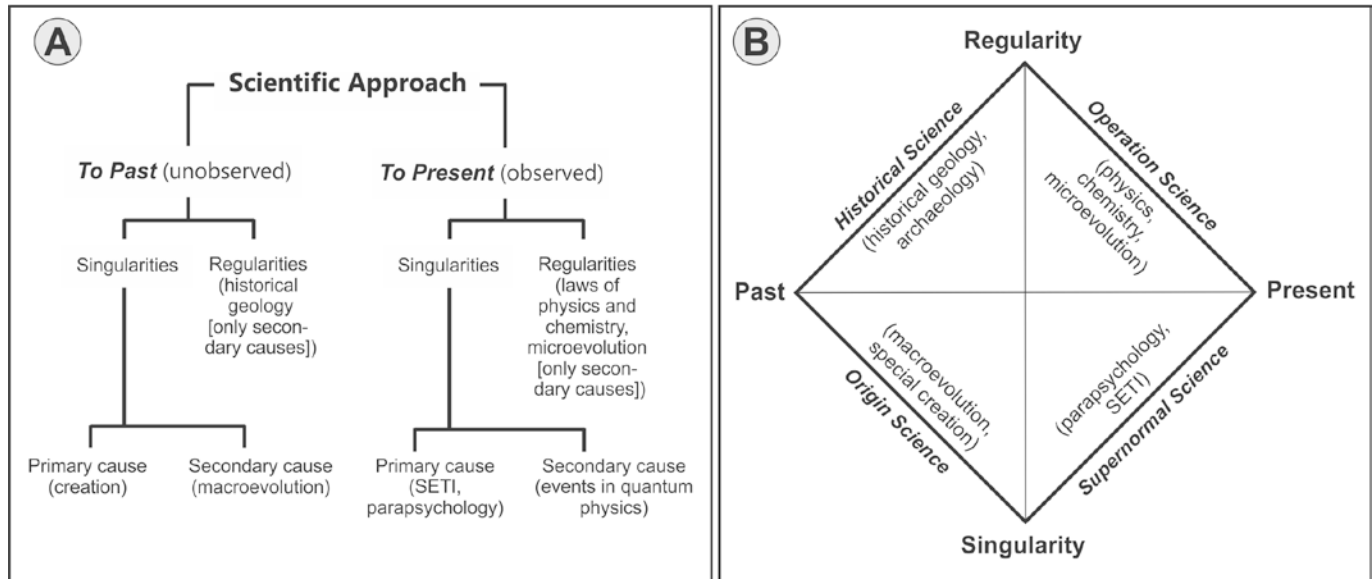


Figure 1. Geisler and Anderson (1987) derived four kinds of science based on their classification criteria of past vs. present and regularity vs. singularity. Modified from Geisler and Anderson (1987, their figures 1 and 2).

but in the medieval university system of the church (Glover, 1984; Stark, 2005).

If OS² is not the best answer to one of the most enduring secular strategies in the origins debates, then another is needed. It must look beneath the history and philosophy of science to the competing worldviews that supply essential axioms of truth and reality. Because Christianity and naturalism are contrary in their metaphysics, epistemology, and philosophy of history (Reed, 2001), then we must dig deeper to define science (and other disciplines) in a way that is consistent with Christian worldview axioms, acknowledging, in particular, the primary source of truth as being revelation rather than science.

An Alternate View of Science and History

Because science is the child of Christianity, it is like a fish swimming in those life-giving waters. Remove the water, and the fish dies. Enlightenment secularism dragged science part way out of

the water, and the part that remained was due only to the unconscious retention of Christian presuppositions, such as the intelligibility of nature to man (Reed, 2001). That was why there was common ground between creationists and evolutionists during the twentieth century. Though they could not agree on origins, they could agree that science was a means of discovering objective truth about nature. But recent decades have seen the rise of postmodern relativism and nihilism. Those variations of secularism will complete the task of destroying science as it has been known. They present a window of opportunity for Christians to demonstrate that truth is possible and can be known in part by science. But that involves putting it back in its rightful place—undergirded by revelation and surrounded by other disciplines that can know truth inside their own boundaries. Science thus faces the options of humbling itself or being destroyed. We propose a means to achieve the former, consistent with Christianity.

First, truth must be guaranteed. Christianity does so by revelation from an omniscient God who cannot lie. If naturalism and postmodernism are self-refuting (Lisle, 2009, 2010; Reed, 2001, 2012), revelation is the only alternative. The Bible was the foundation that built the West and its science (Mangalwadi, 2012). Debates over methods, boundaries, and practical uses appear less daunting if truth is the focus. Second, Christians must restate the foundational links between science and theology (e.g., Reed and Williams, 2011, 2012), despite secular dismissals of theology and faith. Only theology can justify the axioms and ethics necessary for science. Secularists have always wanted the benefit without the intellectual or ethical costs, but that happy inconsistency will not survive postmodernism.

Since science is not the autonomous benchmark of truth, it must recede to its rightful role. It is an amazing branch of knowledge—no more and no less—a discipline with its own distinct methods, questions, and objects of inquiry. Many

Adler

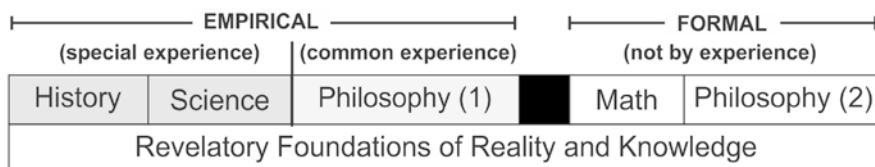


Figure 2. Adler's (1965) definition of the disciplines provides better demarcation criteria than OS². He distinguished history, science, mathematics, first-order philosophy, and second-order philosophy. When combined with the assertion that all true human knowledge rests on revelation, this scheme provides a workable alternative to positivism.

clever schemes to define science as something more have come and gone. They all fail at the point of rejecting revelation as the basis for truth. Furthermore, most were unnecessary; it seems to have been a characteristic of modern thought that every generation wishes to jettison the past and build a new system from the ground up.

We propose a tentative alternative that fits the Christian worldview and avoids the pitfalls of secular philosophy of science. It is based on the work of

Adler (1965) and modified to explain its implicit Christian presuppositions. It avoids many unnecessary quandaries of positivists and relativists. Better options may exist, and we welcome that discussion. But no solution can work that does not recognize (1) God is the source of truth; (2) man, created in God's image, can find truth; (3) the world, created by God, can be comprehended by man; (4) fallen man has an innate bias against truth; and (5) truth is grounded in revelation.

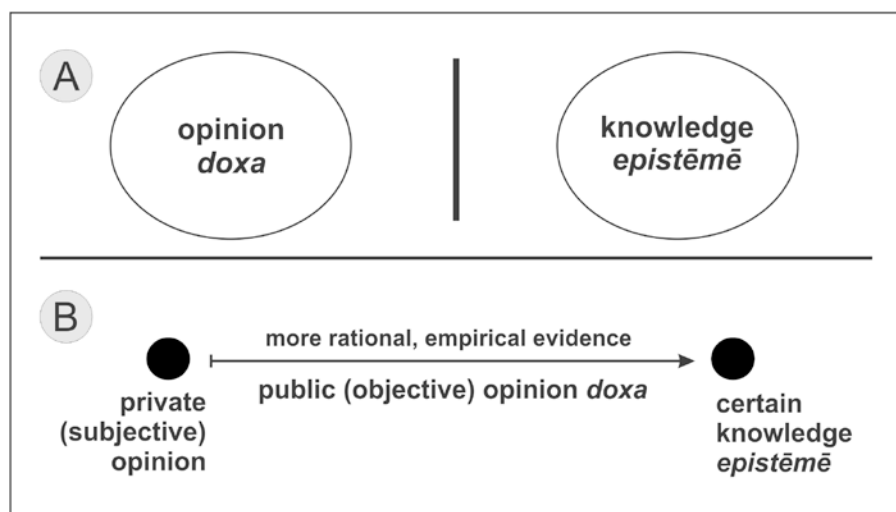


Figure 3. Knowledge and opinion are not mutually exclusive, true and false capacities of the mind (A) but can be seen as a spectrum of public increasing truth, distinct from both private opinion and sure and certain knowledge (B). See Adler (1965) for an extended discussion. From Reed and Klevberg (2014).

There is no objective ground for science apart from Christianity. This was the crucial point missed by Geisler and Anderson (1987). In the three decades since OS² was proposed, continued secular attacks (often irrational) against biblical truth in any form (YEC or ID) have demonstrated the need for a more robust Christian response.

How Science Fits

With this added explicit foundation of revelation, Adler's (1965) division of knowledge (Figure 2) is superior to OS². It provides better criteria for defining disciplinary boundaries, it notes crucial distinctions missed by Popper and other traditional secular philosophers of science, and it proposes a simple way to address exceptions and avoid the tendency to rebuild the house at the first sign of a leak. Finally, its more modest definition of science begins solving the demarcation problem and other "intractable" issues of secularism.

Adler (1965) wrote about philosophy, but his criteria for successful philosophy can be applied to science. He said that philosophy (or science) should:

1. Be an "autonomous branch of knowledge in the form of testable, falsifiable *doxa*" (p. 79). Both *doxa* and *epistēmē* are valid knowledge (Figure 3). The latter is "certitude beyond the challenge of skeptical doubts ... finality beyond the possibility of revision ... necessary truths" (pp. 23–24), while *doxa* is a more moderate knowledge. It is "testable by reference to evidence ... subject to rational criticism, and either ... corrigible and rectifiable or ... falsifiable" (p. 28).
2. Propose "theories or conclusions [that] should be capable of being judged by a standard of truth, to which appeal can be made in adjudicating disagreements" (p. 79).
3. Conduct inquiries as a "public enterprise" (p. 79) with ground rules to guide debate toward truth.

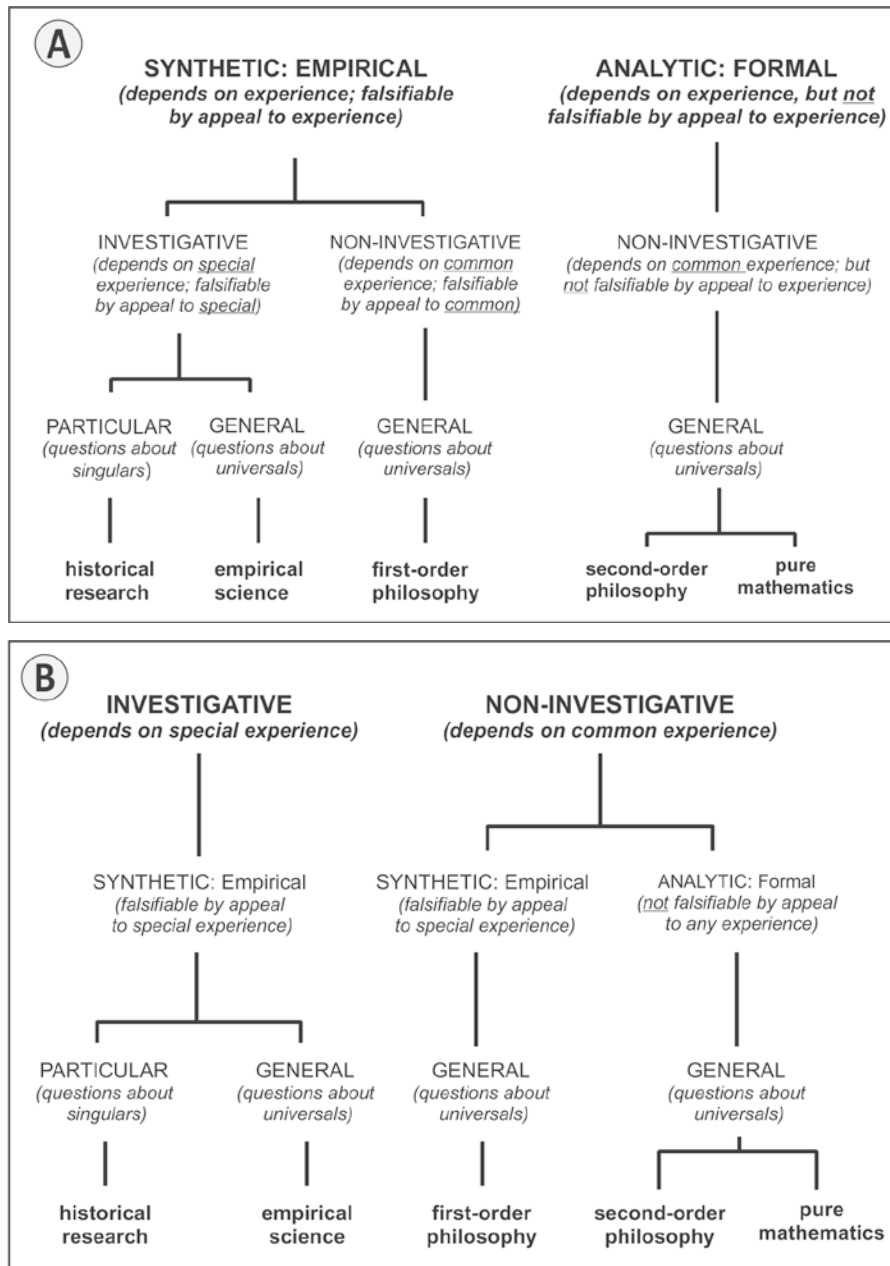


Figure 4. Adler (1965) subdivided human knowledge based on two sets of criteria: synthetic vs. analytic (A) and investigative vs. non-investigative (B) to emphasize the crucial distinction between common experience and special experience. Though primarily concerned with the role of philosophy, his division of human knowledge is superior to that of OS².

4. Be a branch of knowledge with “questions of its own (on which its autonomy is based)” (p. 79). These “questions” are conjoined with its own “objects of inquiry” and “methods.”

Adler (1965) uses two primary dichotomies to differentiate disciplines (Figure 4). The first is *synthetic* (empirical) vs. *analytic* (formal) knowledge. Math and second-order philosophy are *analytic*, while science, history, and

first-order philosophy are *synthetic*. Empirical knowledge is further divided by *special experience* vs. *common experience*. The former is “experience we have as the result of investigative efforts on our part, and *only as the results of such efforts*” (Adler, 1965, p. 102, emphasis his). Common experience includes “all the experiences we have without any effort of investigation on our part. These are the experiences we have simply by virtue of being awake—with our senses alive and functioning, with an awareness of our inner feelings or states, but *without* asking any questions, *without* trying to test any conjectures, theories, or conclusions, *without* making a single deliberate effort to observe anything” (pp. 102–103).

The second primary dichotomy is that between *investigative* knowledge—based on special experience—and *non-investigative* knowledge—based on common experience (Figure 4B). Investigative knowledge leads to science or history, depending on whether the questions answered are specific or general, and non-investigative knowledge includes philosophy and mathematics. This is quite different from OS², which uses the dichotomies of past/present, and regularities/singularities. These do not explicitly distinguish science from history but only “operation science” from “origin science” and “historical science” (Figure 5).

History and science are both deliberate investigative knowledge, but science is the present-day investigation of “natural law,” while history investigates singular past events. Recent developments of geohistory, biohistory, and cosmo-history challenge this arrangement. Positivism claims all are “sciences,” with no distinction between past and present (e.g., Cleland, 2013). OS² answered this challenge by subdividing science. Adler (1965) assigned science per se to the present but recognized that there were questions that required a cooperative effort of two or more disciplines. Instead

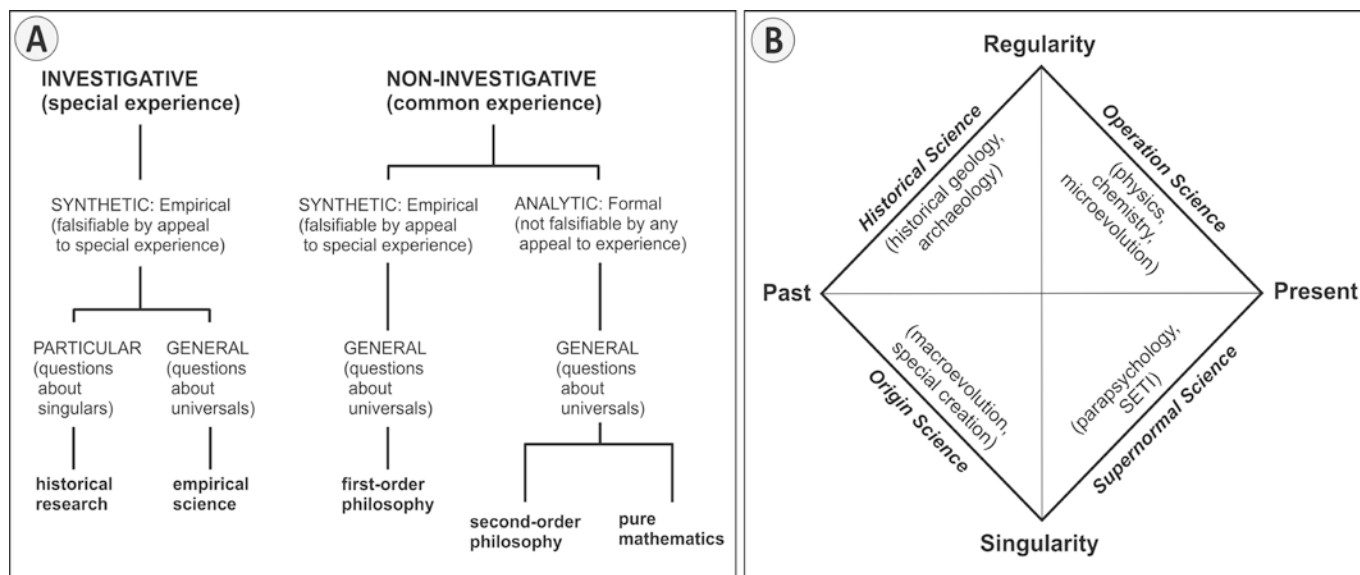


Figure 5. Comparison of Adler's (1965) criteria for defining disciplines (A) and Geisler and Anderson's (1987) divisions into four types of science based on "past vs. present" and "regularity vs. singularity." Note that Adler rejects the possibility that science can be defined as investigation of particulars.

of trying to rearrange the basic divisions, he treated them as a separate category, which he called "mixed questions." But before we discuss them, we must show where the topics included in OS² fit within this proposed scheme.

It is worth noting an important difference between the objective and subjective definitions of science. Starting with Kuhn (1962), a number of philosophers of science have advocated eliminating objective, ideal definitions of science and concentrating instead on defining science by the practice of scientists. This has led some (e.g., Bauer, 1992) to assert that there is no scientific method or that it is impossible to determine demarcation criteria (e.g., Laudan, 1983). This is a problem for secular thinkers, who have no absolute basis for normative truth or for normative standards of ethics. Christianity recognizes that mankind lives in the tension of existing both in the image of God and as fallen creatures. It explains why we can have normative standards and yet not live up to them. In a similar way, it

explains why there is the *potential for*, but not the *guarantee of*, objective truth in science. The diminishing influence of Christianity on intellectuals parallels the rising relativism of the postmodern age.

An ability to define science is essential to a correct understanding of how it interacts with history, philosophy, theology, and revelation. These, in turn, correct the misunderstandings inherent to secular positivism, as well as those in OS². Therefore, we will explore the place of origins and earth history relative to science. While OS² would have us think that these areas are amenable to their individual arenas of science, we suggest that they are not.

Study of Origins Is Theology/Metaphysics

Metaphysics is "the study of being or reality" (Geisler and Feinberg, 1980, p. 432). The term is associated with Aristotle—his *metaphysics* are the heart of his work (McKeon, 1941). The word originated in the first century BC with

Andronicus and means literally "after physics" or "beyond physics."

Aristotle himself described his subject matter in a variety of ways: as 'first philosophy', or 'the study of being qua being', or 'wisdom', or 'theology.' (Cohen, 2012)

Over time, the term acquired shades of meaning from different schools of philosophy, and finally, following Hume, it was widely rejected as valid knowledge. But the claim that metaphysics was not valid knowledge did not magically make its questions disappear. Adler thought that metaphysics included

philosophical questions about that which is and happens in the world ... the nature of being and existence; the properties of anything which is; the modes of being and the types of existence; change and permanence in being or mutability and immutability; the existence of that which changes; change itself and the types of change; causation and the types of causes; necessity and contingency; the material and the

immaterial; the physical and the non-physical; freedom and indeterminacy; the powers of the human mind; the nature and extent of human knowledge; the freedom of the will. (In addition to such purely philosophical questions, there is a host of mixed questions—questions about the nature of man, about society, and about history—the answer to which depend in part upon scientific and historical knowledge). (Adler, 1965, p. 43)

Clearly, the topic of origins is included. The dead ends of modern philosophy have not eradicated metaphysics; they show only that man moving away from revelation loses confidence in the truth he does know. Since the Bible describes origins, it is at the heart of the issue. Contrary to atheists' assertion that their view is pure science, *denial* of God as the Creator is also a metaphysical statement.

What do we mean by *origins*? On one hand, it refers to the ultimate source of existence, whether through *ex nihilo* divine creation or a materialistic big bang. But it is commonly misused as shorthand for a whole range of questions and debates about earth history, human history, and cosmology. This equivocation is not helpful, and so we propose to use *origins* in its most definite sense—ultimate beginnings. Origins answers the famous question, “Why is there something, instead of nothing?”

In that sense, it is metaphysics, not “origin science.” It deals with the ultimate origin of matter, energy, space, and time, as well as the rules that govern them and their axioms. Is matter eternal, self-existing, or an artifact? Is there a universal mind? If so, is it intrinsic to matter, or does it transcend the physical? What rules govern the behavior of matter and energy in space and time? How do we justify them? These are all questions that have to do with “the nature of being and existence; the properties of anything which is ... change and permanence in being ... causation and the types of

Options	Implications	True or False	Consequences
(1): Phenomena are illusions	Science and history are unreliable.	Falsified by both logic and experience; ends in solipsism	Rejected by Christianity & naturalism since solipsism is contrary to both
(2): Universe is self-created	Logic is unreliable, thus science is impossible	Falsified by logic	Implied by Big Bang and naturalism, but impossible if logic tests truth
(3): Universe is eternally self-existent	Thermodynamics contradicts an absolute continuity & uniformity	Falsified by logic and experience	Implies extreme systems of uniformity or falsifies science and common experience
(4): Created by eternally self-existent entity	No violations of logic or experience; contrary only to naturalism	Does not violate logic or experience	Excludes naturalism for theism. Biblical version provides foundation for science and history.

Figure 6. Sproul et al. (1984) presented four options for the origin of the universe. The first two are excluded by logic, leaving the views of naturalism and Christianity competing for acceptance of explaining ultimate origins.

causes ... the material and the immaterial” (Adler, 1965, p. 43).

Christians should be comfortable in this mode of thinking. God’s completed work of Creation and His ongoing work of providence mean that the supraphysical permeates reality, something taken for granted in the early days of science. Today, questions of origins have degenerated into arguments for or against God’s existence, arguments Christians have faced for millennia. Classical arguments from Creation to Creator, justified by Romans 1:20, include the cosmological and teleological arguments for God, often associated with Thomas Aquinas (1225–1274), and the ontological argument of Anselm (1033–1109). These were largely abandoned after Kant, although Paley (1802) restated the teleological argument, and a few theologians and philosophers have argued against Kant (e.g., Sproul et al., 1984).

These debates seem out of place in “origin science.” But the question of ultimate reality—God or matter—underlies

any “scientific” discussion of origins. One of the problems with “origin science” is that it (1) accepts the broader, equivocal use of the term and (2) violates the spirit of Christian theology by restricting basic questions about beginnings to scientific specialists. God can be known by *everyone* through creation.

Ultimately, there are a limited number of logically valid explanations for the origin of the cosmos. Sproul et al. (1984) presented four contemporary ideas but eliminated two as logically invalid (Figure 6). Thus, the choices are special creation or the eternity of matter/energy.

A few centuries ago, asserting that the origin of the world was a metaphysical question would have been met with a yawn. Hume and Kant began a successful war to eliminate theology and first-order philosophy. Philosophical systems replaced theology, and then science replaced philosophy. Now, postmodern nihilism scoffs at all three. Only Christian revelation stands firm, even when

individual Christians do not. We reject both positivism and nihilism. Christian revelation built Western culture, and those who would condemn its faults never consider the actual (as opposed to fantastical) alternatives (Mangalwadi, 2012; Stark, 2005). Adler's (1965) proposal sets metaphysics (his "first-order philosophy") as an empirical branch of knowledge, distinct from science in its use of common experience rather than special experience. But in terms of its truth potential, it is every bit as valid as science.

Study of Past Events Is History

On the surface, secularists accept history as a distinct discipline but use a unique definition to set it in a position inferior to science. Until the late 1700s, it was assumed that history was the study of man's past, and since man was assumed to be coequal in age to Earth, little thought was given to "natural history." In the 1700s, Enlightenment secularists who rejected the Bible began assuming Earth was much older. This challenged the chronologies that were at the heart of history, and secularists resorted to the inelegant, arbitrary, and imprecise solution of dividing "history" from "natural history" by the point in time at which human civilization appeared. History was no longer defined by its distinct questions, methods, and objects of inquiry. The older, prehuman past became the subject of science.

OS² retains this confusion; their creation of "historical science" (to investigate past regularities) and "origin science" (for past singularities) still assumes "scientific" prehistory, which is the basic flaw. In contrast, we assert that history is a separate branch of knowledge, defined by its unique questions, methods, and objects of inquiry. History includes *all* of the past, not part. For creationists, this is less of a problem because man is essentially coequal in age to the cosmos. Thus, natural history is merely a subset of history or a mixed question (see be-

low), parallel in time to human history (Reed, 1999). Past singularities belong to empirical history; although historians often *speculate* about generalities, their historical "regularities" remain less certain than those of science.

Significant differences exist between science and history. One is the method. Instead of things that can be repetitively observed under controlled circumstances, knowledge of the past is indirect, based on eyewitness accounts (Deuteronomy 19:15) and forensic evidence. Regular processes can be inferred assuming uniformity but cannot be proven. Furthermore, the eyewitness accounts of the Bible testify to miracles of creation and providence. Thus uniformity is not absolute. Most historical knowledge is *doxa* (Figure 3B) and relies on logical and empirical evidence. Because scientific knowledge is based on repeated confirmation and the testing of variables, it often moves higher on this scale. The conclusions of history are usually less certain (though not necessarily less true), and history faces interpretive bias, especially when speculative templates built on bias (e.g., the "Dark Ages") are unquestioned. However, Geisler's (1983) four criteria of "origin science" causality, uniformity, consistency, and comprehensiveness, are all equally applicable to history outside of OS².

The issue of certainty should drive Christians back to revelation. It imparts truth to history through (1) meaning and purpose, (2) a framework, and (3) sufficient accounts to provide a baseline for empirical studies (Reed, 1999). Recognizing the greater certainty of science, secular intellectuals set the two in opposition to each other to attack the Bible. They did so indirectly at first, advocating a prehuman prehistory. Once deep time was accepted, the challenges became more direct, to the point of outright dismissal of the Bible and its God in the twentieth century. Today's secular venom toward Creation illustrates that

a biblical history attacks the foundation of secularism (Mortensen, 2004).

The line between science and history has grown admittedly more difficult to draw. Recent decades have seen a rise in technology applied to forensic methods in history. Eyewitness accounts are dismissed, while forensic data are glorified (Reed, 2008). Although ephemeral success cannot mask axiomatic failures, how are Christians to view natural history?

First, and foremost, we must stand firm on revelation. We reject the path of OS² for two reasons. The first is the distinction between the *tools* of an investigation and its *domain*. For example, a statistical study of census data using a computer and spreadsheet is done. Is it computer science, statistics, or anthropology? It has elements of all. But the object of inquiry was political redistricting based on population gains or losses. Even though statistical and computing *tools* were used, the *domain* of the investigation was politics.

In the same way, forensic tools are often used to answer historical questions. While the forensic work per se may be scientific, the domain of the investigation is history. This is because the objects of inquiry are physical phenomena in the present, and the questions the data are being marshalled to address are questions about events in the past. This raises the question of how to proceed when *questions* of science and history both seem involved. Positivism defaults to "science." OS² agrees but calls it a different kind of science. Both are awkward, and we propose that Adler's (1965) commonsense suggestion of "mixed questions" can minimize the problems these questions raise.

Mixed Questions

Secularism succeeded in capturing the West largely because its epistemology of positivism was able to define natural history as science. Most of the church has agreed; only biblical creationists fight for Genesis. Geology, evolutionary

biology, and cosmology are the bulwarks of secular natural history. It seems odd, then, that creationists would promote a scheme that leaves the basic positivist assertion in place.

If the primary concern is that of truth, then apparent conflicts between revelation and science must be addressed, and not on the playing field of positivism. That allows the quantity of data or some initially compelling narrative to give science the victory. But if science itself is dependent on revelation for its very existence, a different perspective emerges. While the cliché that “all truth is God’s truth” is based in fact, the corollary of the priority of special revelation (the Bible) over general revelation (nature) is often lost. Creationists have shown that many of the so-called conflicts between the Bible and science are easily resolved by simply reexamining the evidence or the logical chain of interpretation.

With these caveats in mind, we recognize that natural history (among other questions) is neither strictly historical nor strictly scientific. It is one of Adler’s (1965) “mixed questions” in which history, science, philosophy, theology, and revelation all play roles. Mixed questions may at first appear to blur the boundaries of the disciplines, but they actually preserve them, by preventing unnecessary and complicated redefinitions of the boundaries:

Just as philosophy has pure and mixed questions, so do history and science. The solution of a problem that is a mixed question for science and history may involve a combination of scientific and historical knowledge and a combination of the methods of both disciplines. This would hold true for most of the problems in “natural history” which occur in such sciences as geology and paleontology. (Adler, 1965, p. 107)

Human knowledge is as complex as human beings. It does not always fit into simple templates. Mixed questions (Figure 7) provide a way to address

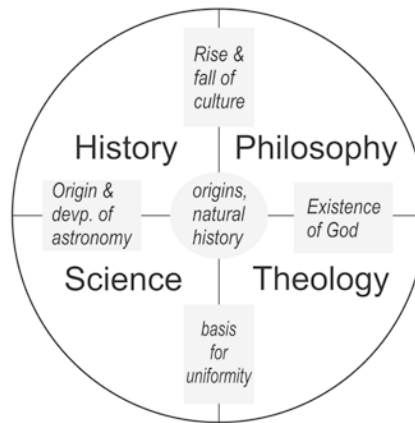


Figure 7. Allowing mixed questions (shaded areas) as distinct areas of investigation allows investigations at the boundaries of various disciplines without wasteful, confusing battles of demarcation criteria. Such questions are common and typically handled as a matter of course. However, the rise of positivism usually resulted in science taking over, rather than contributing to, such investigations. Origins (wide sense) and natural history are both mixed questions; origins in the narrow sense is metaphysical. Earth’s history overlaps all four of these disciplines, as well as being addressed by revelation.

complications at disciplinary boundaries without scrapping everything and starting over. Positivism rejects mixed questions because if everything worth knowing is some kind of science, then there are no boundaries to worry about. Drawing boundaries also raises the question of the basis for doing so, allowing revelation to reenter the picture.

Creationism is the practical application of mixed questions to natural history. It admits knowledge from the Bible, theology, philosophy, science, and history. Positivism is a simplistic attempt to displace truth with science. OS² fails to address this anti-Christian aspect of positivism and is thus not suitable as a creationist explanation of science. Christian foundations must be restored.

Clarifying the nature of science and the distinct roles of history, philosophy, and theology is a start. From these, the practical development of a better basis and method in all areas of knowledge can proceed.

Conclusions

Although superior to the pure positivism of the secular worldview of naturalism, the Christian alternative of OS² advocated by Geisler, Thaxton, and Anderson is not a satisfactory alternative. It does point to a necessary emphasis on the history and philosophy of science, but it fails to follow to conclusions in both areas that invalidate naturalism. Since science is the child of Christianity, its axioms are justified only by a biblical worldview. This requires more fundamental revision than OS². Furthermore, the idea is flawed in several key areas. Its attempt to divide science into different disciplines to study both primary and secondary causes is shortsighted because science is methodologically capable of investigating primary cause. Philosophy and theology are better suited to answer metaphysical questions.

Furthermore, OS² is built on dual dichotomies (*past/present* and *regularities/singularities*) that do not provide a sufficient foundation for science. Geisler’s (1983) criteria for “origin science” fail to distinguish that proposed science from any other investigative branch of human knowledge. Finally, OS² fails to address the problem of positivism in aggressively biblical categories, especially the relevant doctrines of creation and providence. For these reasons, we: (1) affirm that ultimate origins of the universe and life is a metaphysical question, and we believe, (2) that questions about unique past events are the domain of history and (3) that science is essentially what OS² advocates would call “operation science.” Therefore, we recommend that creationists avoid that terminology and work to reconstruct valid, biblical criteria for

science and history. We also commend Adler's (1965) mixed question concept as a fruitful way to conduct and justify natural history research.

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The Little Ice Age in the North Atlantic Region

Part VII: Constraints on the Great Ice Age

Peter Klevberg and Michael J. Oard*

Abstract

Earlier papers in this series introduced methods of studying past climate change, the historicity of the Medieval Warm Period and Little Ice Age, importance of the Little Ice Age in understanding climate change and constraining climatic models, and the importance of the North Atlantic region in understanding and applying constraints on climatic and glacial models. Earlier papers included summaries of the effects of the Little Ice Age in Iceland, Norway, and Greenland, and how the data obtained from the Little Ice Age should constrain our study of climate change. This paper presents an application of Little Ice Age data to our understanding of the inferred postdiluvial Great Ice Age.

The Great Ice Age— A Major Geologic Inference

Much attention in the past thirty years has been paid to the “Great Ice Age,” as we refer to it. Uniformitarian scientists believe in multiple ice ages, over 50 in the past 2.6 million years (Pillans and Gibbard, 2012) and four major ancient ice age periods, lasting tens to hundreds of millions of years, from 250 million to 2.2 billion years ago (Oard, 1997). The former ice ages are called the “Pleistocene ice ages,” although they supposedly started in the late “Pliocene,” and are believed to be caused by the astronomi-

cal hypothesis of the ice age, also known as the Milankovitch mechanism.

The Great Ice Age is a major geologic inference of the relatively recent (postdiluvial) past based on similar features observed around glaciers today, but found over large areas of the middle and high latitudes. These features from the past show the likelihood that there was a recent ice age (Oard, 1990; 2004)—very recent in comparison with traditional beliefs about earth history. Can we learn anything about the Great Ice Age from the characteristics of the Little Ice Age?

Modern glaciers produce a variety of deposits and landforms. These were produced in even larger scale and greater abundance during the Little Ice Age. Similar deposits and landforms that appear subdued by age are found in these same areas, but also across wide parts of the Northern Hemisphere and some parts of the Southern Hemisphere. It is only natural to surmise that at least one ice age of even greater extent than the Little Ice Age occurred during postdiluvian time (Figure 1).

The Little Ice Age as a Model for the Great Ice Age

For a model to be useful, it needs to mimic the properties of interest in the prototype. At the same time, the model needs to differ significantly from the prototype in the properties that cause

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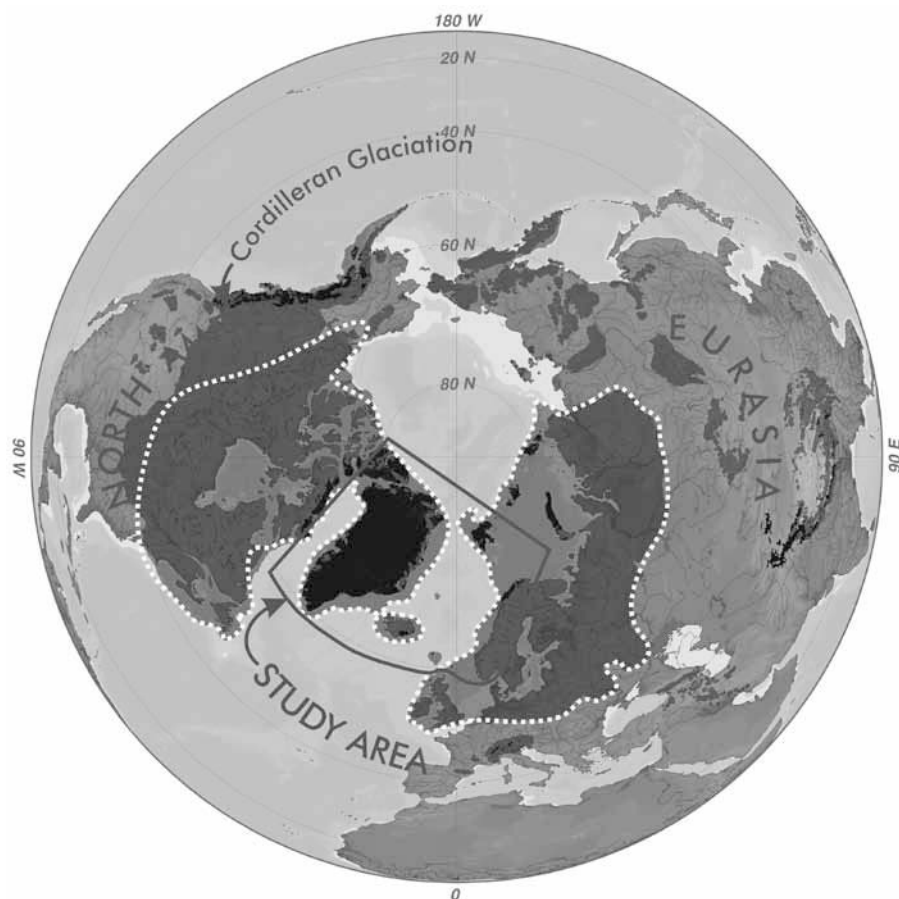


Figure 1. Estimated extent of ice during the Great Ice Age. Dashed white line is approximate extent of continental glaciation. During the Little Ice Age, mountain glaciers (cordilleran ice) increased, but the continental glaciers have never recurred and are therefore inferred from field evidence. Maximum extent indicated in some areas is dubious. Base image from Wikipedia Commons.

difficulties in research, such as scale or time. So, for example, a scale model of a ship or airplane or other vehicle can be made and placed in a flume or wind tunnel where the current speed is proportionately higher than for the prototype; as long as the Reynolds number (which relates key physical proportions) stays the same, the model provides very useful data in evaluating the prototype.

The usefulness of the Little Ice Age in the North Atlantic region (Figure 2) as a model for the Great Ice Age is shown in Table I. While we lack specific climatic data for the Great Ice Age, we have such data for the Little Ice Age (Table II). As a model, it is imperfect: other than the Greenland ice sheet, nothing resembling a continental ice sheet of the type imagined during the early postdiluvian period (or by uniformitarians during the “Pleistocene”) is available. Another defect of the model is that it requires *extrapolation* rather than *interpolation*, with the changes in temperature, precipitation, and resulting equilibrium line altitude (ELA—see glossary) being greater for the inferred Great Ice Age than for the observed Little Ice Age. The scale of the glacia-

Measurements Relative to Late 1900's	Little Ice Age	Great Ice Age
Change in Equilibrium Line Altitude	0 to 400 m lower than today	Approximately 500 to 2,000 m lower than today
Drop in Average Summer Temperature	0 to 4°C lower than today	Approximately 4°C to possibly 30°C lower than today
Precipitation	similar to today	greater (probably much greater) than today's values
Sea Surface Temperatures	similar to today to slightly colder	initially greater (probably much greater) than today's values, cooling with time
Volcanic Activity	greater than today with notable eruptions at several times	likely significantly greater than present levels
Insolation	similar to today except for volcanism and several notable periods of low solar activity	solar output unknown, but there was much less reaching earth's surface due to volcanic activity

Table I. Comparison of Little Ice Age and Great Ice Age characteristics. The Little Ice Age provides a very useful but imperfect model for the Great Ice Age.

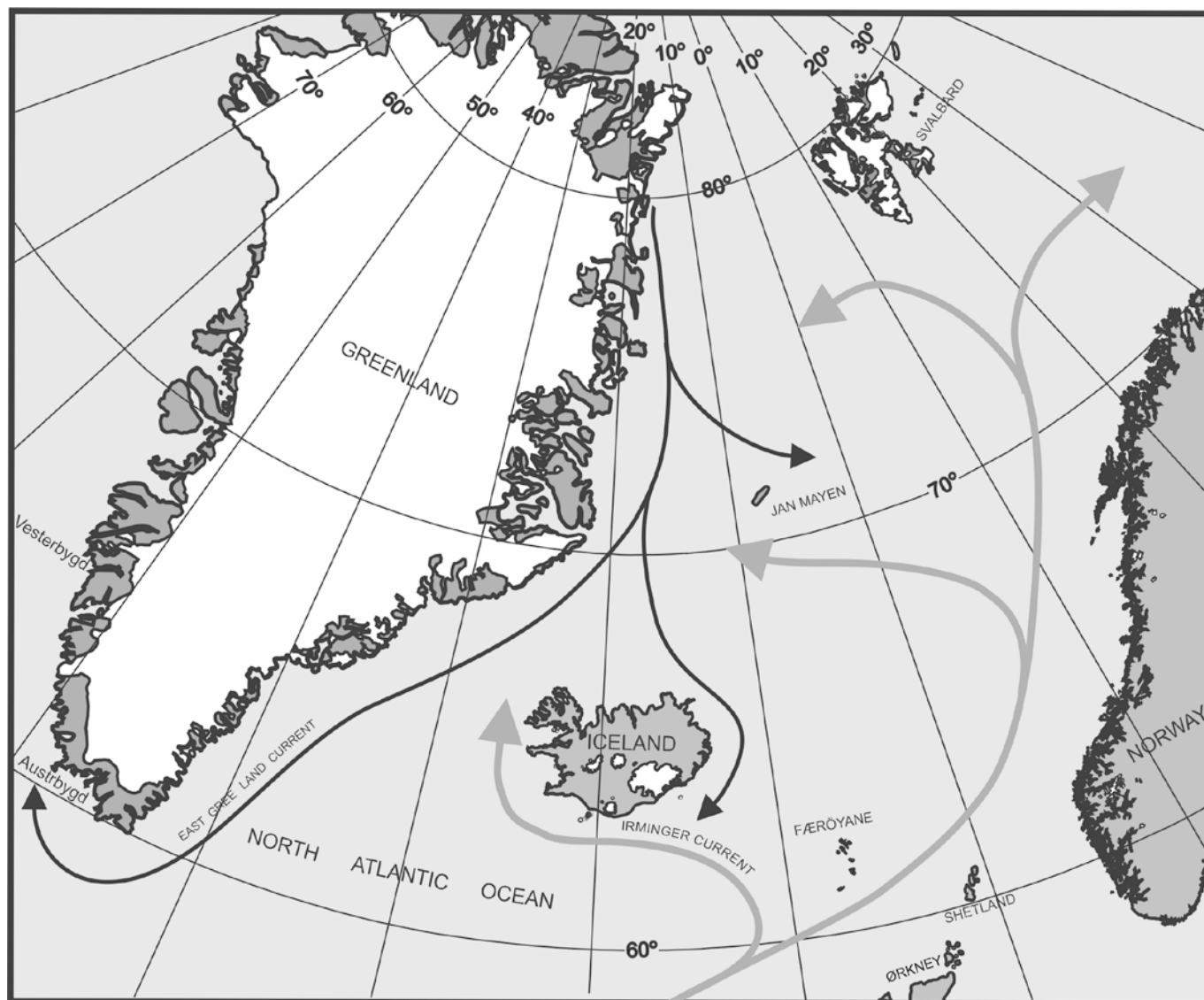


Figure 2. Map of study area. The focus of this series has been Iceland, Norway, and Greenland.

tion and resulting geologic processes is much less for the events of recent centuries, too. However, those data accumulated from paleoclimatology and glaciology do lie between present conditions and the postdiluvial climate we are trying to evaluate. Also, as shown in Table III, observations from the study region have great relevance for evaluating the role of scale and further refining glacial models.

Constraints Provided by the Little Ice Age

Effects of the Little Ice Age in the North Atlantic region were most pronounced in Iceland, a relatively small landmass surrounded by the North Atlantic Ocean, and proportionately least in Greenland, a very large and nearly completely ice-covered arctic landmass surrounded by colder water (Table III). Norway, the coastal side of the Scandinavian Penin-

sula washed by relatively warm currents, saw proportionately intermediate glacial growth which was more closely linked to winter precipitation than summer temperature. These differences indicate the importance of elevated sea surface temperatures to the creation of vast ice sheets during the Great Ice Age (Oard, 1990).

One of the key variables in studies of glaciation is ELA. Changes in ELA,

Little Ice Age Inferences				References	
Glacier/Region	Year	Temperature Difference	E.L.A. Difference	Base Year(s) *	Author
Sólheimajökull	ca. 1800	-1.6°C		1960–90	McKinze et al., 2005
Eiríksjökull	ca. 1875	-1.5°C	-250 m	ca. 1990's	Guðmundsson, 1998
Tröllaskagi	pre-1925		-200 m?	post 1925	Caseldine, 1987; Björnsson, 1980
Tröllaskagi-Hörgárdalur	1800's		-5 m		Häberle, 1991
Tröllaskagi – observed		-2°C	-50 m	1925–1960	Caseldine & Stötter, 1993
Tröllaskagi – theoretical			-300 m		
Iceland in general	1600–1920	-3 to -4°C	ca. 200 m/°C	clima optima	Björnsson, 1980
			-400 m	1960–90	Grove, 2001
Western Norway	<i>clima optima</i>	+2°C		1980–2005	Bjune et al., 2005
	1886	-0.4°C		1940	Grove, 1988
	1886	0	0	1950	Grove, 1988
Northern Norway	1600		ca. -150 m	1300	Grove, 1988, p. 414
	1886	-1°C		1940	Grove, 1988
	1910		-100 to 250 m	1960–90	Bakke et al., 2005
Spitsbergen	1886	-2°C	-110 m	1940	Grove, 1988

* Little Ice Age values in columns to left are compared with indicated base years.

Table II. Summary of some changes in temperature and ELA estimated from Little Ice Age data.

Feature	Iceland	Norway	Greenland
Climate	Temperate/Polar	Temperate	Polar
Setting	Maritime	Maritime and Interior	Maritime and Interior
Landmass	Islands	Large Peninsula	Subcontinent
Glaciers	Europe's largest ice cap, outlet glaciers, small ice caps, mountain glaciers	Small ice caps, mountain glaciers	Second largest ice sheet, voluminous outlet glaciers, limited mountain glaciers
Forcings and Feedback Mechanisms	Sea ice provided very important feedback to enhance lower temperature.	Sea ice not important. Precipitation more important than temperature to mass balance. Temperature drop, but response complex.	Sea ice cover important to temperature drop.
Little Ice Age Advances	<i>Significant</i> : most glaciers approached maximum extent of Great Ice Age.	<i>Moderate</i> : glaciers advanced but did not overrun previous maximum extent	<i>Moderate</i> : ice sheet thickened, outlet glaciers advanced but did not overrun previous maximum extent

Table III. Comparison of features of the land areas emphasized in this study relative to glaciation.

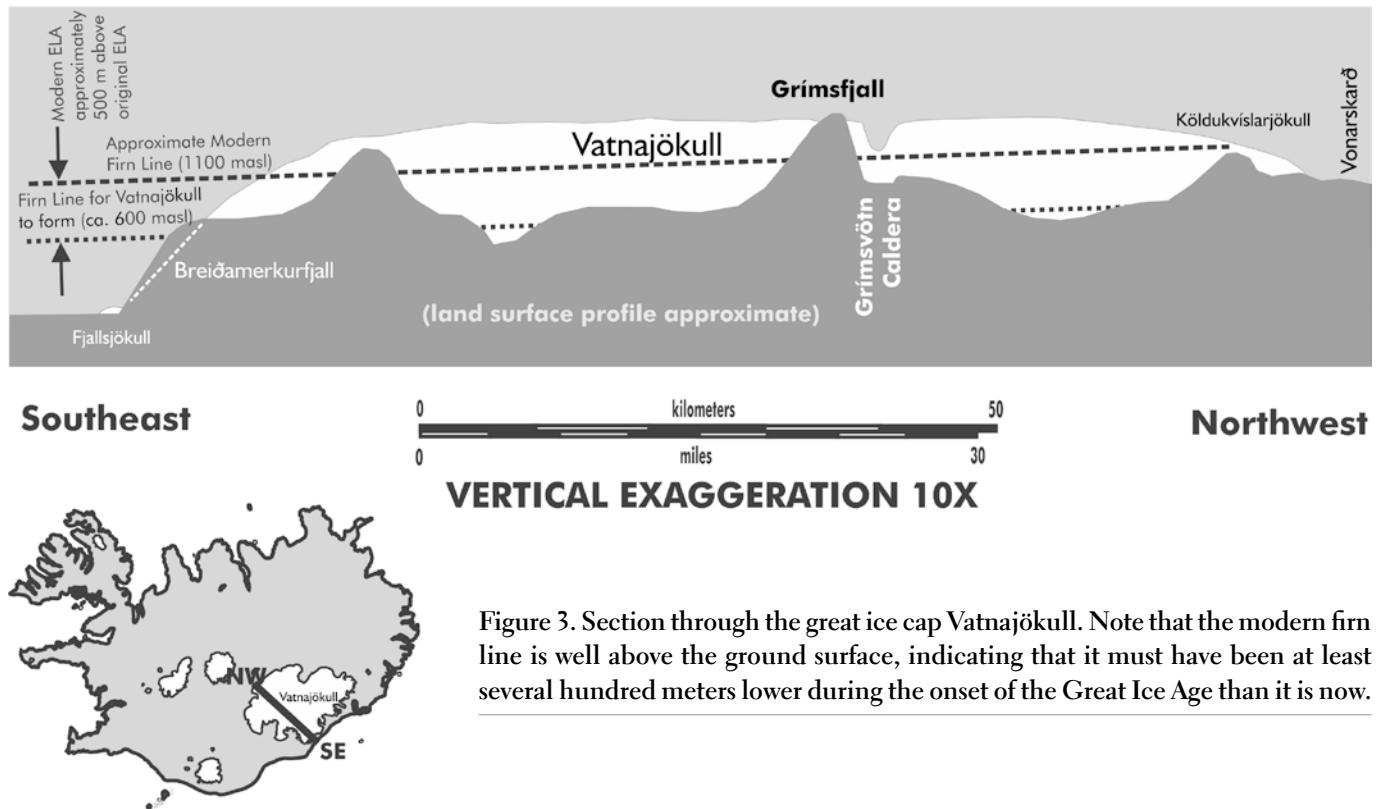


Figure 3. Section through the great ice cap Vatnajökull. Note that the modern firn line is well above the ground surface, indicating that it must have been at least several hundred meters lower during the onset of the Great Ice Age than it is now.

during and since the Little Ice Age, have been estimated for Iceland and Norway (Klevberg and Oard, 2012a; 2012b), as well as other places. Estimating changes in ELA from any unrecorded Great Ice Age(s) is not as simple, as these must be estimated from features inferred to result from “prehistoric” (i.e. unrecorded) glaciation(s). Some key ELA estimates are shown in Table II.

As shown in Figure 3, the firn line (and by extension, the ELA) must have been significantly lower in the Great Ice Age for Vatnajökull to have formed. While the Little Ice Age produced a marked drop in ELA and growth of Vatnajökull, the topography beneath the ice is too low for ice to have formed initially under similar climatic circumstances. The firn line (or at least the ELA) must have been at least 500 m (1,500 ft.) lower than at present to initiate the glaciation that would come to form Vatnajökull.

That Icelandic outlet glaciers typically reached their terminal moraines during the Little Ice Age suggests that

conditions did not need to be drastically colder to bring on the Great Ice Age in Iceland. If relatively warm oceans existed (Oard, 1990), then melting near the coast would have been enhanced. The result would tend to be fairly distinct termini and a great deal of glaciofluvial activity. The cold, dry climate of today’s Arctic does not promote this kind of aggressive glaciation, either.

Inferences for changes in ELA provide the basis for inferring temperature changes. Some believe the Great Ice Age (“Pleistocene ice ages” in uniformitarian reckoning) resulted from a 2 to 3°C (3½ to 5°F) drop in average global temperature (Mann, 2002). If the Little Ice Age represents a drop of only 0.5°C (1°F) relative to the past century (Luterbacher et al., 2004), then its applicability to any previous ice age is less than if it represents a drop of 1 or 2°C (2 to 3½°F)—or if the Great Ice Age temperature drop were less.

Climate change, not merely reduced temperature, is necessary for the onset

of an ice age. Both northern Iceland and western Norway show how glaciers may be more sensitive to precipitation changes than temperature changes, and Appendix A in Part II of this series shows how various climatic variables—average summer temperatures, average winter temperatures, cloudiness, winter precipitation, ELA, etc.—impact glaciers. The Little Ice Age did not result from a simple reduction in global average temperature, nor can global average temperature be accurately inferred from a simplistic approach to that glacial event. Likewise, mere cooling cannot produce large-scale ice ages, as will be shown in the next section.

A Multiplicity of Milankovitch Mistakes

The Milankovitch mechanism or Astronomical Theory of the ice ages is based on slight cyclical changes in sunlight caused by differences in the Earth’s orbital geometry. Summer temperature

changes at high latitudes of the Northern hemisphere are believed to drive ice ages. Because of the Milankovitch mechanism, secular scientists believe in multiple ice ages with a supposed cycle every 100,000 years for the past 900,000 years and every 40,000 years between 900,000 and 2.6 million years ago. However, the changes in summer sunshine are too weak to cause ice ages (Klevberg and Oard, 2014b), and the 100,000-year eccentricity cycle hardly changes the sunlight intensity at all (Oard, 1984a; 1984b; 1985; 2004; 2006a)! The Little Ice Age was much too short to have been influenced by the Milankovitch mechanism, which operates on scales of tens of thousands of years.

As has been described previously (Klevberg and Oard, 2012a; 2012b), multiple glacial movements have been documented during relatively brief periods during the Little Ice Age in both Iceland and Norway. Many of these advances and retreats occurred on an annual or decadal basis, sometimes over significant distances; these clearly resulted from climatic variability with no connection with the Milankovitch Mechanism whatsoever.

A Single, Relatively Short, Postdiluvial Ice Age

The causes of the postdiluvial Great Ice Age were warm ocean temperatures and abundant volcanic aerosols in the stratosphere left over from the Noahic Deluge and reinforced by copious postdiluvial volcanism (Oard, 1990; 2004). The warmer the sea surface temperatures, the greater the evaporation. Evaporation would be especially strong above the mid and high latitude oceans and be available for strong storms to rapidly dump snow on the adjacent land masses. The time for the Ice Age would depend on how fast the ocean water cooled, which can be roughly estimated by adding up all the heating terms and cooling terms that result in a change in temperature

with time. Estimating the postdiluvial change in ocean temperatures from the Genesis Flood to glacial maximum and solving for time resulted in 500 years to reach maximum (Oard, 1990). Based on the energy balance over a snow or ice cover, the melting of the ice sheets in places other than Greenland and Antarctica would have taken less than 200 years. Thus, the total time for the postdiluvial Ice Age was probably only about 700 years.

Although secular scientists believe in multiple ice ages, based mostly on the Milankovitch mechanism, there are many evidences of only one ice age (Oard, 1990; 2004). First, it is meteorologically difficult for even one great ice age to occur under uniformitarian conditions, so the idea of multiple ice ages stretches credulity. Second, most glacial debris is from the “last” ice age. Third, practically all the wind-blown silt (loess) associated with the ice sheets is from the “last” ice age. Fourth, glacial debris is thin and coarse-grained in interior areas of past ice sheets. Fifth, two driftless areas, one in southwestern Wisconsin and one in northeastern Montana and adjacent Saskatchewan, make more sense interpreted in terms of one ice age that missed a few peripheral areas rather than multiple glaciations that consistently missed these areas. Sixth, most of the animal extinctions were at the end of the “last” ice age. Multiple ice ages should have produced multiple extinctions, not just the last. These reasons for rejecting the multiple ice age idea in favor of a single, relatively short, postdiluvial ice age have been provided in greater depth elsewhere (Oard, 1990; 2004; see also references in Appendix A).

Comparing the Little Ice Age and Great Ice Age

While imperfect as a model for an ice age of the scale that most geologists envision, the Little Ice Age is probably the best model available for such a Great

Ice Age. A comparison of the Little Ice Age with the inferred Great Ice Age is provided in Table I.

Temperature difference at sea level in Iceland between the Little Ice Age *minimum* and 20th Century *maximum* is about 3°C (Eiríksson et al., 2000). The difference in Scandinavia was at least half that in Iceland (Hass and Kaminski, 1995; Klevberg and Oard, 2012b). A difference of 1°C is roughly equal to about a 25% change in annual precipitation for a given mass balance (Oerlemans, 2005). This means the same ELA could be maintained with a slight warming if precipitation increased, and likewise, if precipitation and temperature both decreased, little or no change in the ELA might result. A rise in winter precipitation concurrent with increasing temperature resulted in only about 50 m changes in ELA for northern Iceland mountain glaciers from their Little Ice Age minima to levels observed in the 1980s (Stötter et al., 1999; Caseldine and Stötter, 1993).

We believe the Great Ice Age was much greater than the Little Ice Age because much warmer sea surface temperatures occurred after the Deluge of Genesis 7–8 than occurred during the Little Ice Age. This would have produced far more evaporation in early postdiluvial time, at the same time that volcanism would have been greater (Oard, 1990; 2004). The volcanism would have resulted in greater summer cooling worldwide, especially at high latitudes and continental interiors in middle latitudes.

The belief that extreme weather events have increased over the past few thousand years (NORPAST, 2001, Appendix 1) may well represent the “stretching” effect of uniformitarian assumptions, attributing greater and greater periods of time to earth history with increasing age. Transfer functions may require revision to meet the constraints of diluvial models based on the accurate historiography of the Bible and

The assumption of “deep time” exaggerates the antiquity of some data and results in false smoothing of climatic changes in the past.

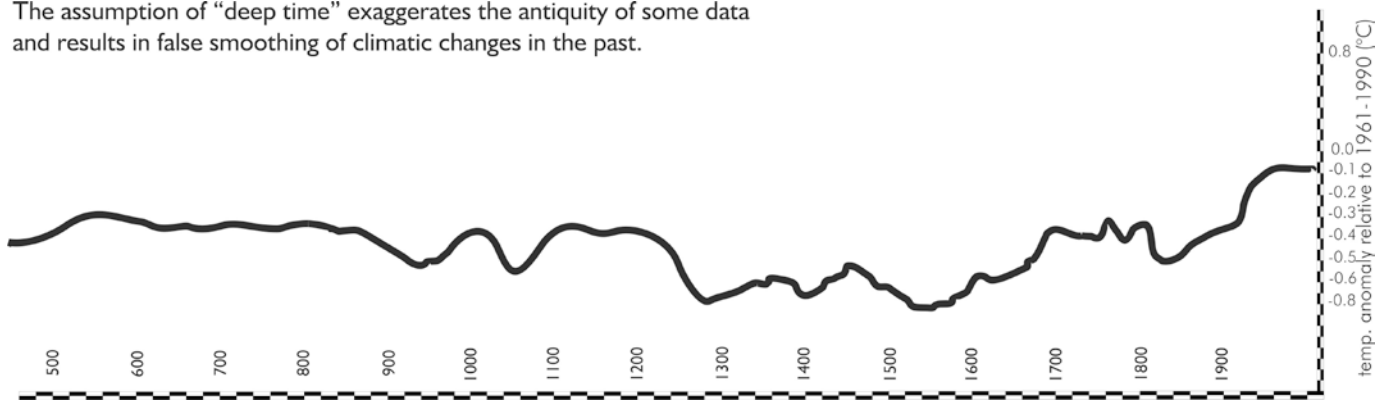


Figure 4. Uniformitarian assumptions may provide a false sense of increasing frequency of extreme weather due to the “stretching effect.” Inflation by the assumption of “deep time” tends to get worse the further from the constraints of known history it is, with the result that extreme weather events in the distant past tend to be interpreted as having occurred with more time between them than was actually the case.

the Little Ice Age. This stretching effect is illustrated by Figure 4. In reality, their position makes previous ice ages even less likely when they refer to conditions during the Little Ice Age as “extreme.” Thus, while the traditional multiple ice age view is beyond the rescue of Milankovitch, the case for a single, relatively short, postdiluvial ice age with less extreme conditions is robust.

Early Postdiluvial Climate in the North Atlantic Region Was Significantly Warmer

Fossil and pollen paleoclimatic evidence in Iceland for at least one period earlier and warmer than the Medieval Warm Period is strong. Just when and how this occurred is not certain (see Appendix B), but the idea of warmer periods is widely accepted. Evidence for warmer periods in Norway and Greenland has been presented previously (Klevberg and Oard, 2012b; 2014a).

The traditional uniformitarian scenario for Icelandic glacial history includes virtually complete coverage of the island group by ice during the “Pleistocene” and several glacial advances

and interglacial periods since, the most recent being the Little Ice Age (Björns-son, 1980). At least 13 glaciations have been inferred from the Esja sediments in Iceland (Sæmundsson, 1980). “Stratigraphical studies in Iceland indicate at least 10 glaciations during the Upper Pliocene and about as many during the Pleistocene” (Símonarson, 1980, p. 174). A similar scenario is proposed for the Scandinavian Peninsula (Lillehammer, 1994).

Post 1920s climate in northern Iceland has been about 2°C (3½°F) warmer, principally in winter, and precipitation has increased with increasing temperature, especially in winter; the presence of sea ice particularly reduces precipitation (Stötter et al., 1999). This illustrates the crucial role of moisture supply in maintaining glaciers in Iceland. Similar conditions exist for Norwegian maritime glaciers, though with less dramatic differences in sea conditions and resulting precipitation (Klevberg and Oard, 2012b). An increase in precipitation along with temperature is often (though not always) inferred for paleoclimates in the study area (Klevberg and Oard, 2012b).

Important Climatic Differences between the Ice Ages

As has been shown, the Little Ice Age climate in Iceland was only a few degrees colder than at present, but glaciers generally advanced to near their Great Ice Age limits in our study area. Yet paleontological data, at least some of which are possibly postdiluvial, indicate significantly warmer ocean temperatures (and thus sea surface temperatures) than at present. This would produce considerably more atmospheric moisture and resulting precipitation, which is in keeping with the prevailing model for the postdiluvial Great Ice Age (Oard, 1990; 2004). Some have estimated that Little Ice Age sea surface temperatures were 3 to 5°C (5 to 9°F) cooler than at present (Balling, 2005). However, it should be noted that modern studies have found that meltwater input to the adjoining ocean did not reduce precipitation, though sea ice, of course, did (Bakke et al., 2005). Thus, it would be reasonable to suppose that significant precipitation would have continued until sea ice cover became adequate to greatly reduce the source of moisture (Klevberg and Oard,

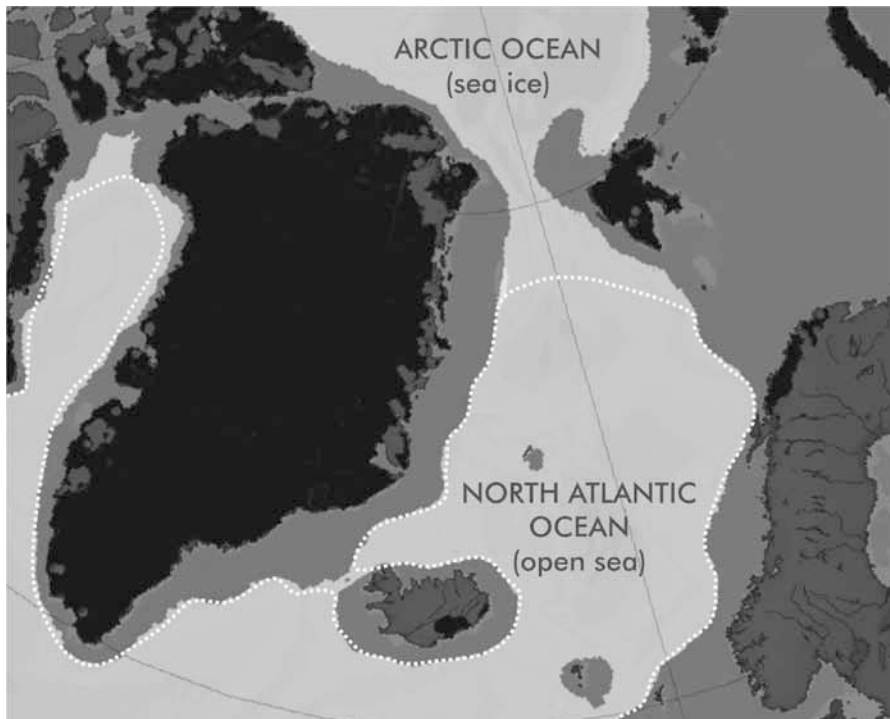


Figure 5. Estimated maximum extent of snow and ice in study area during the Great Ice Age indicated by dashed white line. Relatively warm sea surface temperatures and low albedo from snow and ice over a large area would provide a powerful combination for rapid ice accumulation.

2014b). Inferred sea ice extent at glacial maximum is shown in Figure 5. Features that appear to be glacial in origin are even found on the sea bottom and suggest that at least a portion of the area we have indicated was completely frozen and not just surface ice (Mattingssdal et al., 2007).

“In the maritime Icelandic climate glacier mass balance is very sensitive to variations in air temperature,” states Björnsson (1980, p. 206); “a drop in the annual air temperature by 1°C may lower the firn line by as much as 200 m. Any lowering of the firn line will greatly increase the accumulation areas of the ice caps in Iceland.” The average air temperature during the period 1600 to 1920 (during the Little Ice Age) was probably 3 to 4°C lower than during the warmest period in postdiluvian time, based on data from Björnsson (1980). It must have been significantly lower at

some point before Iceland’s settlement for ice to begin accumulating and thus generate Vatnajökull. As shown in Figure 3, Vatnajökull today is largely above the firn line, but the land surface is well below the firn line—as much as 1,000 m. To generate the ice cap would require lowering the firn line hundreds of meters until ice could build up to today’s elevation. A similar situation on a much larger scale exists for Greenland and Antarctica as well (Oard, 1990; 2006). Large areas of these land masses are low topographically, some even below sea level, and only the thickness of the ice raises the modern surface to high elevations.

Mass balance is primarily a function of winter precipitation and summer temperature. To some extent, warmer summer temperatures can be compensated for by increased winter precipitation. This relationship has been found

to be roughly a 25% increase in annual precipitation to overcome a 1°C (2°F) increase in average temperature (Oerlemans, 2005). As has been documented (Klevberg and Oard, 2012b), precipitation has been shown to be very important and sometimes dominant in Norwegian glacier mass balance. Precipitation must also have been the key variable in the growth of the ice sheet on Greenland during the Little Ice Age; based on isostatic measurements, most of this recent ice has yet to melt (Klevberg and Oard, 2014a).

Enhanced precipitation is a key element in the postdiluvian Ice Age model (Oard, 1990; 2004). If this model is correct, then the relatively dry continental interiors should have been least affected by the Little Ice Age, with its limited supply of moisture. This has been observed to some degree in the North Atlantic study area (Klevberg and Oard, 2012a; 2012b; 2014a). As shown in Table III, Iceland was proportionately most affected by Little Ice Age, and an important difference from Norway and Greenland is the relatively small land mass surrounded by ocean. This difference has also been observed in other parts of the world. For example, while ice advances were observed in the Northern Rocky Mountains, Little Ice Age advances apparently fell short of previous glacier positions, more so north than south (Grove, 1988). Temperature, while important to both the Little Ice Age and Great Ice Age, is not the only variable. Increased precipitation is essential for an ice age to form, something the diluvial model predicts and the Milankovitch mechanism is powerless to provide.

Model Results

Table IV presents a comparison of the Little Ice Age as an analogue for evaluation of the Great Ice Age. Temperature is an important variable, though not adequate in itself to explain an ice age. Tem-

perature is a dynamic variable and often differs greatly across regional boundaries. Summer temperature has a greater effect than winter (since melting versus freezing is the deciding factor for ice volume), and averages are more important than extremes. The Great Ice Age estimate in Table IV is largely a guess based on the proportional change in ELA and would apply to the glaciated areas, not global average temperatures. The ELA is also not a single number: in arctic regions, where the ELA began nearly at sea level, it would hardly change, but at the southern extent of glaciation, a dramatic drop in ELA would occur during the glacial period. As described above, precipitation at the onset of the Great Ice Age was likely significantly higher than it is today across our study area due to the warmer sea surface temperature that could be expected following the great cataclysm of the Deluge. Insolation would likely have been reduced much more so than during the Little Ice Age;

while there is no way of knowing solar irradiance during early postdiluvian time, much greater volcanism would have provided ash and aerosols over a large area to reflect much of the solar radiation back to space. If these factors differed from modern values by merely two to three times as much as during the Little Ice Age, the observed difference in ELA between these two ice advance periods could be explained. A large area of ice and snow cover would provide a powerful positive feedback mechanism to increase the extent, severity, and duration of the Great Ice Age. This leaves no role whatsoever for the Milankovitch mechanism, and there is neither need nor evidence for “deep time.”

Physical Evidence for a Great Ice Age

No written record of a Great Ice Age has been discovered, though there may be hints of notable climate change compat-

ible with the idea (e.g. Job 38:29–30). Thus, the Great Ice Age is largely inferred from geologic features that appear to be glacial in origin, as first popularized by the famous creationist Louis Agassiz (Imbrie and Imbrie, 1979). The Little Ice Age provides a documented analog that demonstrates the reasonableness of the postdiluvian model for the Great Ice Age (Oard, 1990). The Little Ice Age and modern glaciers have also provided a wealth of data for evaluation of these features, and this will be the topic of Part VIII of this series.

Summary

Paleoclimatology is a complex field with significant limitations resulting from limited historiography and the vicissitudes of proxy data. One of the applications for paleoclimatology is speculation regarding past continental glaciation. The best model available for evaluating such large-scale glacia-

Variable	Great Ice Age (Inferred)	Little Ice Age (Observed)	Current (Observed)
Land Surface Air Temperature Compared to Today	0 to roughly 12°C * cooler than current	0 to 3°C (0 to 5°F) cooler than current	Based on 1960 to 1990 average
Precipitation	enhanced	near current	
Insolation	reduced	reduced	
Sea Surface Temperature	elevated **	near current	
Volcanism	significant	occasional	low
Difference in ELA Compared With Today	0 to -1,000 m? (-0 to -3,000 ft.)?	0 to -300 m (0 to -1,000 ft.)	Based on 1960 to 1990 average
Continental Ice Sheets	significant	absent	absent
Ice Caps	significantly enlarged	slightly enlarged	reduced
Outlet Glaciers	advanced	advanced	receding
Mountain Glaciers	significant	advanced	receding

* Many variables affect temperature, including regional and dynamic ones, and this is therefore a rough, or order-of-magnitude, estimate only.

** Elevated temperature would be expected immediately after the Deluge with cooling occurring throughout the ice age.

Table IV. Comparison of degree or extent of important variables between Great Ice Age, Little Ice Age, and present conditions.

tion is the Little Ice Age. As shown in this series:

- The Great Ice Age is not documented historic fact but reasonable inference, one for which there is a wealth of evidence. Thus, nearly all geologists, both creationist and evolutionist, believe that at least one large-scale glaciation occurred in the past.
- The Little Ice Age, being documented historic fact, is the best model available for use in evaluating a Great Ice Age, though it is imperfect, particularly in scale.
- Both energy balance calculations and the Little Ice Age indicate that the Milankovitch mechanism is woefully inadequate to explain continental glaciation.
- Evidence does not support the idea of multiple great ice ages. Observations of modern glacial fluctuations show features traditionally attributed to multiple glaciations (as will be shown in Part VIII of this series).
- Evidence strongly supports a single, relatively recent, postdiluvial Great Ice Age.
- Data from the Little Ice Age indicate that moderately greater cooling and enhanced precipitation could generate an ice age much larger in scale than the Little Ice Age.
- Topography, particularly in Iceland and Greenland, indicates that cooling in the past was several times greater than the drop in temperature observed between the Medieval Warm Period and Little Ice Age in order to lower the ELA enough for glaciation to begin.
- In general, glacier mass balance in the study area appears to respond more to increases in precipitation than reductions in temperature, though both would be needed to generate the Great Ice Age.
- The postdiluvial ice age model provides mechanisms for both lower

temperature (greater volcanism than during the Little Ice Age) and greater precipitation (initially warmer sea surface temperatures than during the Little Ice Age). Whereas the traditional, Milankovitch-based models are incapable of explaining continental glaciation, the Great Ice Age is readily explained by the postdiluvial ice age model.

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Glossary

Deluge – a common deluge is intense rainfall (and typically flooding) over a short period of time. When capitalized, it normally refers to what the Hebrew Bible calls the *mabbul*, the unique, global flood of Noah's time.

Diluvial – pertaining to the Deluge.

Equilibrium line altitude (ELA) – the altitude above which more snow accumulates than melts during the year, and below which more ice (or snow) melts than accumulates.

Firn line – the altitude above which precipitation falls as snow and beneath which it falls as rain. It is usually close to the ELA but often differs from it (ELA is based on mass balance).

Mass balance – the balance between the amount of ice that forms and ice that is lost from a glacier in the course of a year. A positive mass balance results in growth of the glacier; a negative mass balance results in retreat.

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Appendix A: Bibliography of Ice Age Research

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Appendix B: Icelandic Paleoflora

Fossil and pollen paleoclimatic evidence in Iceland for at least one period warmer than the Medieval Warm Period is strong. “The global cooling that has occurred on the earth since the Miocene [“oldest” Icelandic fossils] is well documented in the record of fossil floras, owing to the regular spacing apart of plant bearing horizons within the lava pile” (Símonarson, 1980, p. 173). He continues, “Icelandic Tertiary floras older than 8 m.y. are warm-temperate and show close affinity with the recent flora in the Eastern Deciduous forests of North America.” “The water temperature (annual mean temperature) in the Tjörnes area during the Lower Pliocene, when the marine *Tapes* and *Macra* Zones were deposited, was at least 10°C, or about 5°C higher than the present one, as indicated by the presence of

Glycimeris glycimeris (Linné), *Abra alba* (Wood) and other warmth-loving mollusc species” (Símonarson, 1980, p. 174). Skammidalur fauna (“Upper Pliocene” molluscs) indicate 2–4°C warmer water temperatures than at present (Símonarson, 1980). “A general cooling throughout the whole period [4,500 years of their tephrochronologically-calibrated, radiocarbon-dated sediment core], is indicated by both the benthic and planktonic foraminifers” (Eiríksson et al., 2000, p. 579). All of these evidences are, of course, referenced to the evolutionist natural history scenario; we generally interpret most of them to be of either diluvial origin or of early postdiluvian age (Klevberg, 2007). If the latter, they would be evidence of a warm climate in early postdiluvian time. More detailed investigation of Icelandic paleoflora and its geologic context is warranted but beyond the scope of this paper.



Conference Reports

CRS Conference Abstracts

August 8–9, 2014 • Creation Museum • Petersburg, KY

On August 8–9, 2014, the Creation Research Society held its fourth conference at the Creation Museum in Northern Kentucky (suburban Cincinnati). Below are abstracts of the presentations given during this two-day conference. Voting members of the CRS were allowed to author or coauthor abstracts and sponsor submitted abstracts from non-voting members. The purpose of these conferences is to provide a forum for the free discussion of a wide variety of cutting-edge ideas pertaining to the creation model of origins.

*Coordinating Committee:
Danny Faulkner and Kevin Anderson*

Plenary Presentations:

Design in DNA Georgia Purdom

DNA bears the stamp of being designed and created by God. In human DNA these designs include hidden codes, regulatory information that used to be considered “junk” DNA, and epigenetic information that is outside the sequence of the DNA. The complexity of DNA greatly constrains the ability of evolution to make the changes necessary for molecules-to-man evolution. DNA is not the result of evolutionary processes and

disorder but of the creative processes of the Creator God.

New View of Gravity Advances Creation Cosmology D. Russell Humphreys

Here I give a new picture of how gravity works, depicting space as a membrane being greatly accelerated in a fourth spatial direction. The Unruh effect, which connects acceleration with a black-body temperature, could then explain the cosmic microwave background radiation. The scriptural phrase “stretching out the heavens like a tent curtain”

might not mean a manifold extension (expansion) of the membrane but rather an increase of the tension within it. A stepwise increase of the tension on the second day of Creation would make the gravitational potential of the cosmos slowly increase even until now, without significant expansion. This results in a new redshift-versus-distance relation. It is slightly nonlinear, providing an alternative explanation for an “accelerating universe” without need for “dark energy.” The new redshift result also gives a more satisfying expression for the anomalous deceleration of the Pioneer 10 and 11 spacecrafts, as I hope to show in a later paper.

Presentation Abstracts:

The Flood/Post-Flood Boundary Is in the Late Cenozoic

Michael J. Oard

Based on the geological column for sake of discussion, 32 criteria demonstrate that the Flood/post-Flood boundary is in the Late Cenozoic, defined as the Miocene, Pliocene, and Quaternary. The reason why the time is so vague is because we cannot rely on evolutionary/uniformitarian dating schemes, including biostratigraphy and radiometric dating, but must examine each location on its own merits. The 32 criteria come from a wide variety of earth sciences, including evidence from sedimentary rocks, organic remains, tectonics, geomorphology, climatology, and miscellaneous.

Examining many areas on their own merits, I have discovered that the boundary is in the early to late Pleistocene at most areas, especially in the western United States. The Pleistocene is the general Ice Age timeframe, but many areas show no connection to the Ice Age in the early to middle Pleistocene.

The 60-Parsec Break in the Cumulative Distribution of Sizes of Supernova Remnants in the Milky Way and Several Nearby Galaxies Is the Expected Signature of a Recent Creation 6000 Years Ago

Keith Davies

Each well-surveyed supernova remnant population in the local group of galaxies reveals a break of about 60 parsecs in the cumulative distribution of supernova remnant sizes. A study of archival cata-

logs of the Milky Way shows that this pattern has been maintained despite the increasing sensitivity of surveys. Using published values for relevant SNR expansion parameters, it is shown that a break of 60 parsecs is expected for any SNR population whose development is limited to 6,000 years.

Evolution of Religion?

Mary Beth De Repentigny

Charles Darwin believed that religion evolved mentally as biological forms evolved physically. In fact, this founding father of evolutionary theory believed that human "mental faculties ... led man to believe in unseen spiritual agencies, then to fetishism, polytheism, and ultimately to monotheism." Edward Tylor, known as the father of anthropology, extended Darwin's progression of religion. He reasoned that the idea of one supreme God is as far as religion can evolve. Once man reaches the level of intellect that can study history to see how religion came about, science then replaces religion as a way to explain physical phenomena. According to researchers, including Andrew Lang and John Mbiti, the fieldwork data from cultures around the world do not support this evolutionary progression of religion. That religiosity has evolved along with our brains is not based on sound scientific research, as can be established by analyzing the claims made by Dean Hamer on the god gene or by Michael Persinger with his god helmet. Despite this, contemporary anthropologists such as Lionel Tiger and Steven Pinker assert it in their evolutionary narratives. Instead of corroborating evolution, a study of religion through time and across cultures points to a devolution from monotheism to polytheistic belief systems. This is recognized even among many of the academics who vehemently oppose the

God of the Bible, as seen in the number of anthropologists who embrace shamanism and occultic practices.

iDINO—Investigation of Dinosaur Intact Natural Osteo-Tissue

Mark Armitage

This presentation focuses on the recently launched CRS initiative to collect and quantify soft tissues in dinosaur bones. During excavation of a fossil site at the Hell Creek Formation, Glendive, Montana, in May 2012, the largest *Triceratops horridus* supraorbital horn ever recovered from Glendive was jacketed and transported to CA for microscopic analysis. The horn was discovered to be highly vascular, filled with moist matrix and featured both permineralized and unfossilized material. Subsequent to decalcification with EDTA, soft and hard remains were thin-sectioned and examined by light and electron microscopy. Permineralized vascular vessels that remained after decalcification exhibited internal spherical structures consistent with size and shape of blood cells. Soft tissues collected from deep within the horn yielded heavy populations of layers of osteocytes. Osteocytes featured delicate filopodia and internal structures consistent with nuclei and other organelles. Soft sheets of fibrillar bone examined under scanning electron microscopy were characterized by groupings of tightly aligned osteocytes, widely connected via filipodia with widths approaching 500nm. Results of this study conform to previous soft tissue studies in ancient materials and strongly suggest that this is endogenous dinosaur tissue. Reaction to this discovery has been mixed.

See <http://www.sciencedirect.com/science/article/pii/S0065128113000020>

Defying the Ancient W UMa Binary Scenario: The Strange Story of the Short-period Binary, HR Boo

Ronald G. Samec and Travis Shebs

HR Boo is an extreme mass ratio binary (EMRB) with a mass ratio of only $q=0.25$. However, the binary has an unusually low Roche-lobe fill-out. This is contrary to the idea that EMRBs are thought to be the final stage of solar type binary-star evolution—they are considered among the oldest objects in the universe. These stars are thought to have been in contact for billions of years, undergoing continuous magnetic braking, steadily coalescing and increasing in fill-out. The result of their age is a high fill-out combined with an extreme mass ratio. However, this light-curve solution defies the common scenario. The fill-out is shallow—much like the young W-type W UMa systems that have freshly come into contact. And its component temperatures, however, do not fit this idea since they are virtually identical. This is what you would expect in old A-types W UMa's. The high inclination of 83° results in a total secondary eclipse, some 34 minutes. This allows us to give an unambiguous, final model that cannot be contested. The spot, whose existence further supports the idea of magnetic braking, has settled on the L1 point of the primary component. In addition, the period study of 13-year time duration indicates that the period is steadily decreasing. This further affirms that the system is coming into deeper contact due to magnetic braking. We conclude that the binary was evidently created in this state. This research was supported by the Creation Research Society.

Alleged Human Chromosome 2 Fusion Site Definitively Encodes a Transcription Factor Binding Site in the First Intron of the DDX11L2 Gene

Jeffrey P. Tomkins

A major argument for humans evolving from a common ancestor with chimpanzees is the proposition that ape chromosomes 2A and 2B fused end to end, forming human chromosome 2. Allegedly supporting this idea is the apparent presence of a 798-base degraded “fusion site” on human chromosome 2. However, in 2002, an analysis of 614,000 bases encompassing the site discovered that it was located in a gene-rich region bearing no synteny to chimpanzee, and the fusion sequence was positioned inside a putative pseudogene. In 2013, I expanded upon this data and published a report showing that the alleged fusion site is not a genomic fossil at all but a functional domain inside an active and highly expressed gene (ARJ 6:367–375). In fact, the sequence encodes a transcription-factor binding site in the first intron of the *DDX11L2* long noncoding RNA gene. The gene contains three exons, and its transcripts are alternatively transcribed and/or spliced to create two classes of transcripts—one set contains two exons and the other three. Based on the two-exon transcript variants, some evolutionists have errantly attempted to debunk the data, claiming that the fusion site is not actually inside the *DDX11L2* gene—disregarding the first exon and the three-exon transcripts. I will review the research and present additional data further bolstering the already-clear evidence negating fusion.

The Grand Canyon Was Carved by Late Flood Channelizes Runoff

Michael J. Oard

The origin of the Grand Canyon is a major mystery of uniformitarian earth science, mainly because Grand Canyon is carved at an intermediate altitude on the East Kaibab Plateau. There are two creationist theories on the origin of Grand Canyon: the dam-breach theory and the late-Flood channelized erosion theory. Evidence will be presented that there are numerous problems with the dam-breach theory—three that seem fatal. The origin of Grand Canyon is a problem in geomorphology, namely having to do with the origin of water gaps, of which there are thousands across the earth that can easily be shown to originate during channelized late Flood runoff. Based on geomorphology and using Walker's biblical geological model, the Grand Canyon was first eroded by sheet flow moving toward the east and northeast. Erosion of 6 to 10,000 feet of widespread sedimentary rocks from the whole Grand Canyon area occurred *before* Grand Canyon was eroded. This is called the *Great Denudation* by secular geologists. Then Grand Canyon was carved by channelized flow from currents generally moving toward the west. A view of each segment of Grand Canyon will be presented on how Grand Canyon was carved.

Further Studies of the Oscillations of the Earth's Magnetic Field

Bob Hill

Gaussian coefficients of the earth's magnetic field were obtained from the International Geomagnetic Reference Field website. Hill (2013) and Humphreys (2011) found that some of the harmonic components of the earth's magnetic field have sinusoidal oscillations. These

were the dipole, quadrupole, octupole, fifth, and sixth harmonics. This paper is a preliminary investigation of how the individual Gaussian coefficients contribute to the oscillations of those harmonics of the earth's magnetic field. It was found that some of the Gaussian coefficients contribute to the sinusoidal oscillations, but others did not. Preliminary studies of the periods of the oscillations of the components will be presented. This paper will contribute to the continuing development of a creationary model of the earth's magnetic field.

On the Overdue Course Correction in Intelligent Design Science: Engineered Adaptability

Randy J. Guliuzza

If organisms reproduced clones of themselves across generations, then theories of evolution may never get going. However, populations do change over time. A key question about this origin of life's diversity is, when organisms change (the effect), what is the proximate *cause* of that change? Answers include: design-based, organism-driven ones; naturalistic, environment-driven ones; or some combination. A follow-on question is, what cause explains any environmental condition becoming a stimulus to an organism? Accurate identifications of causality undergird true explanations. Reverse engineering analysis of organisms demonstrates that engineering principles underlying how human-designed things self-adjust to changing environments is the most accurate way to explain causality of how organisms adapt. Engineering analysis shows environmental conditions facing organisms as only nonsentient exposures that organisms detect and possess 100% innate designs to potentially solve. Seven design principles explain an organism's self-adjustment, particularly, (1) systems (innate, integrated, information-

based, intrinsically regulated, and interdependent components) produce self-adjustment in organisms; and (2) sensors comprise the essential system component at organism-environment interfaces—the principle trigger within an organism's self-adjusting systems. Examples across taxa reveal that resilient systems regulate variable expression of DNA, facilitating limited multigenerational self-adjustments in offspring that can fill changed environments. Design analysis clarifies that an organism's innate information that prescribes the sum total of their physical being, i.e., their “nature,” produces the capability to accumulate results of self-adjustments to their exposures, i.e., their “nurture.” Sole causality belongs to a creature's designed nature conferring the capacity to be nurtured—environmental challenges are not designing creatures; rather designed creatures solve environmental challenges.

Report of Soft Tissues from a Triceratops Horridus Frill

Mark Armitage

Newly conducted research on samples of *Triceratops horridus* frill collected at the Hell Creek Formation in Montana have yielded interesting and previously unreported findings of the presence of soft tissue. A review of previous *Triceratops* soft tissue discoveries will be discussed and new findings performed by Creation Research Society scientists will be presented.

Are Redshifts Quantized? Analysis of Selection Effects in Sloan Digital Sky Survey Data

Jake Hebert and Jason Lisle

Creation scientists have long suspected that galaxies may exist at preferred distances from our solar system, as if

our solar system were surrounded by a series of concentric shells of high galaxy density, with lower densities of galaxies in between these shells. Does such a pattern exist, and if so, is it real and statistically significant? Analysis of the problem is made more difficult by selection effects inherent in the biases of galaxy surveys. Using data from the Sloan Digital Sky Survey (SDSS), we describe and investigate possible selection effects, including Malmquist Bias (the preferential detection of brighter galaxies with increasing distance). Other selection effects stem from the filters used in the SDSS, the criteria used for selection of spectroscopic targets, the *k*-correction, and galactic extinction. We describe methods of compensating for these effects, in particular the Malmquist Bias, including a proposed new method of de-convolving the luminosity function from a target selection function. We discuss some preliminary results and describe some directions for future research.

Incomplete Lineage Sorting for Diverse Protein-coding Genes Among Humans, Chimpanzees, Gorillas, Orangutans and Macaques

Jeffrey P. Tomkins

In 2013, I published a research paper with Jerry Bergman on the evolution-negating concept of incomplete lineage sorting (ILS) in metazoans (*JOC* 27:84–92). In brief, numerous reports show that depending on the type of gene or DNA sequence being used to construct a phylogenetic tree, the topology of the tree varies widely. In essence, the inferred (predicted) evolutionary phylogeny is often discordant with the experimentally derived tree obtained from using DNA sequence. Evolutionists explain this as ILS, which is a rescuing device to explain away the discordant data. While a variety of studies have demonstrated the

ubiquitous occurrence of discordance in alignments of DNA sequence among humans and great apes, all reported efforts have involved extensive cherry-picking of data and sequence manipulation prior to the application of multiple alignments. Thus, the true levels of discordance are essentially obfuscated in these efforts despite the fact that their outcomes still frequently negate common ancestry—violating the evolutionary paradigm. I will be presenting data from a research project aimed at determining more accurate and unbiased levels of discordance among humans, chimpanzees, gorillas, orangutans, and macaques using protein-coding genes in various categories, along with other important genomic features of interest.

The Genesis Flood and Floating Log Mats Solving Geological Riddles

Michael J. Oard

Although Flood geology has answers to many challenges on the global Genesis Flood, there still are numerous challenges left to go. Some of these challenges will take many years of research, and because there are many unknowns still in earth science, some challenges will not have answers for a long time or on this side of eternity. Reasonable answers to seven challenges will be presented by employing the creationist log-mat model developed by other creationists. The specific problems that the log mat model addresses are: (1) the origin of vertical, polystrate trees found at many locations around the world; (2) the so-called fossil forests at numerous levels in Yellowstone National Park; (3) paleoflora sites that show several mysterious features assuming the uniformitarian paradigm; (4) amber and insects in amber; (5) fresh-looking insect fossils; (6) coal; and (7) some aspects of post-Flood biogeography that are now very contradictory to the uniformitarian model.

A Creation View of Comets

Wayne Spencer

This presentation will report on research on comets with the aim of coming to an understanding of all comets in a young-age creation view and to critique the Oort comet theory. Though young-age creationists have addressed short-period comets for years, there is a need for a creationist approach that explains all the comets and brings in up-to-date information from the scientific literature. Wayne Spencer will address the various types of comets to critique the Oort comet theory as today's scientists understand it. Wayne will suggest some basic ideas on how young-age creationists can understand how comets relate to God's creation of the solar system and God's judgment in the Noahic Flood. Several conclusions are drawn from this study. First, the "lifetime" of both Jupiter-family comets and Halley-type comets are consistent with a young-age timescale. Second, secular science has experienced difficulty explaining the origin of the Halley-type comets. Third, long-period comets could be on their first trip toward the sun, and they may have been simply created along their current orbits. Fourth, secular scientists have expressed some puzzlement over the question of why no extrasolar interstellar comets have been observed.

Atheistic or Theistic Selectionism: Rigorous Design Analysis Shows That Both Are Mystical Beliefs

Randy J. Guliuzza

Even though natural selection has conflicting definitions, many atheistic naturalists and theistic creationists believe in one nuanced "process" connotation as a cause of organisms' evolution or adaptation. Accurate identifications of causality undergird true explanations. Rigorous reverse engineering of organisms does identify measurable *internal*

processes with steps tied to tangible *innate* systems observed to cause organisms to self-adjust to different environments. Regarding natural selection, engineering analysis exposes that essential process elements are outside the realm of human detection or understanding—mystical. Specifically, no one has detected a real environmental "selection event," quantified an environmental "selection pressure," or identified corresponding selective elements legitimizing natural selection's equivalence to a real "artificial" selection process. Design analysis reveals a misleading mental construct fueled by mystical projections of causal credit into scenarios invoking "favored" dog fur, "selected" cavemen, or false analogies of natural selection to conscious human agency. Thus, two mystical features have been true of selectionism regardless of definition: (1) invalidly ascribing selective/volitional attributes to inanimate environments and (2) affirming idolatrous positions that environments can exercise agency—the materialist's substitute for God's agency. Mystical ascriptions empower "natural selection" used as materialism's credit-stealing label for results actually caused by an organism's God-designed innate processes, i.e., "selection processes" are claimed to "work on" shaping organisms as external environmental agents. Design analysis results force precise, descriptive, scientific language of biological processes that bring clarity to apologetics discussions. They expose fallacious "selection"-based origins talk and are the most powerful argument against death-and-survival-driven naturalistic evolution and for the Bible's beneficent intelligent Designer.

Triangles as Evidence of Intelligent Design in Nature

Mark Armitage

A general survey of plant and animal morphology illustrates the paucity of tri-

angular shapes as morphological norms in biology. In this study, the microscopic shapes of diatom frustules, which exhibit stunning equilateral triangles and complex geometric forms are explored and elucidated. Three-dimensional triangular diatom shapes are shown to be somewhat governed by the two-dimensional mathematical superformula popularized by Gielis in the *Journal of Botany* in 2003, yet no mathematical basis has been proposed to account for the three-dimensional geometry of diatoms. A case for the presence of diatoms based on intelligent design will be tendered.

A New Hermeneutic Methodology

Gorman Gray

Every expositor knows that context is critical for Bible interpretation and translation. I have expanded that truth into a *tool* by including multiple contextual constraints, sometimes involving additional analysis of the structure of an entire thought division before determining translation choices. LOCATE is an acronym for “Literal Overview Corrects Assumptions and Tests Everything.” It is a new interpretive method that limits the options and mandates the proper renditions.

The big four of critical Creation scriptures are: Genesis 1:2, Exodus 20:11, Genesis 1:16, and Mark 10:6. LOCATE clearly determines translation options for the “big four.” In this paper, I demonstrate this method of Bible interpretation as a positive means of determining word choices. It is especially new as applied to the origins texts. It is simple, not requiring extensive expertise in Hebrew, and makes the text understandable even to children.

The King James 1611 version described the earth as “without form and void.” Wycliffe and Tyndale chose “idel and voide” or “voyde and emptie” (which in pre-Elizabethan days meant

“unoccupied and empty”). But the KJV and its many derivatives are widespread and influential, dominating English translations and, to some degree, non-English as well.

LOCATE forces and proves (strong words) that Wycliffe and Tyndale had it right, whereas the KJV translators erred. The “big four” critical renditions can *all* be determined by using this powerful tool. The result makes Genesis chapter 1 into a beautiful, supernatural-wonder chapter, even superior to the breathtaking wonder and beauty of microbiology and astronomy.

Systematic Comparison of Human Chromosomes and Their Known Gene Space to the Chimpanzee Genome

Jeffrey P. Tomkins

In 2013, I published a report asymmetrically comparing the chimpanzee genome chromosome by chromosome to the human genome, using the technique of optimized sequence slicing and the BLASTN algorithm to ascertain overall DNA sequence similarity (ARJ 6:63–69). On average, the chimpanzee genome was 70% similar to human with individual autosomal similarities varying between 66 and 78%. I will be discussing a new research project in which the human genome is asymmetrically compared to chimpanzee using the same bioinformatic techniques. In addition, I have downloaded all known human genes (including 1000 bases of promoter sequence) from the UCSC genome browser for each chromosome. Since many known genes also contain regions of high dissimilarity with chimpanzee in promoters and introns, all protein-coding exons for each chromosome were also downloaded for comparison. Thus, comprehensive levels of overall human chromosome similarity, known gene-space similarity, and protein-coding exon similarity to the chimpanzee genome

will be presented. These results will also be discussed within the context of other data I have recently published comparing the transcribed intergenic regions of the human genome to chimpanzee (CRSQ, in press).

Why the Spanish Flu Went Extinct

Robert Carter and John Sanford

Despite claims from evolutionists, it is very difficult to analyze evolutionary trajectories due to a simple lack of data. We have abundant genetic data for extant species and only sparse data for extinct species or ancient individuals from living species. Most available diversity data is for humans, for obvious reasons. Thus, any claim about chimpanzee-human ancestry, for example, is by necessity based on the assumption of common ancestry. As a model for the evolutionary mutation/selection paradigm, we chose to examine changes in the human H1N1 influenza A lineage over time and obtained over 4,000 viral genomes, representing both human and swine H1N1 strains. After accumulating over 1,400 point mutations (>10% of the genome), the human H1N1 virus disappeared from genetic databases in 2009. Thus, we were the first to document its apparent extinction. Despite extensive evidence for natural selection, we were able to document that selection was unable to remove most mutations from the population of viruses over time and was unable to prevent a drift from optimal codon usage. When we analyzed the rate of change in the various nucleotides, we realized that each mutation type accumulated in a linear manner, as if mutation accumulation followed the laws of thermodynamics and was immune to selection pressures. This would mean that genetic change is predictable. The accumulation of slightly deleterious mutations over time in this virus should be a direct challenge to the Darwinian

mutation/selection paradigm if applied to higher organisms.

Local Engineering Applications from Large-Scale Cosmology Parameters, Part 2—Standard Cosmology's Date for the Flood

Chuck Glatt

The following math gives standard cosmology's date for the Flood, when defining standard cosmology as Einstein's General Relativity (GR) space fabric with Hubble's observed space expansion. Distance measurements that are based on current light being received (1) assuming the Hubble constant's calculation for the universe's radius, of 1.30×10^{26} m (more commonly stated as 13.77 billion light-years) and (2) assuming space expansion rate as 1.85×10^{15} m/s result in the conclusion that light left the edge of the universe 2,200 years ago. Space began expanding at twice that age, from the pre-Flood universe's 10^{20} -meter radius. That is, the Deluge occurred 4,400 years ago, or 400 years before Abraham. 1.85×10^{15} m/s expansion rate also gives a universe of today's 10^{26} -meters radius in 6,000 years. At the time of the Flood, the universe was unleashed to expand a million times in radius, creating 1,000 times less *Eddington equivalent-1000-stars* contribution to our planet's ambient environment. Our bodies heat matches entropy less than before the Flood. Space expansion rate is unlimited (except GR's gravity content pulls the universe back into a big crunch). Gravitational potential energy can exceed the strength of physical interaction, also known as (aka) GR gravitational time dilation; between galaxies speeds exceed the speed, c , of any physical interaction, aka velocity time dilation. Light carries information, to the viewer about its source. Information travels intergalactically by low en-

ergy loss, high quality factor Q , reactive power, and resonance—aka $\text{isin}(\omega)$ [$i = \sqrt{-1}$ or j in electrical engineering]—at 1.85×10^{15} m/s space fabric speed, with no wavelength stretching, aka by time dilation.

Answering Objections to Creation *Ex Nihilo* in Six Days

Suzanne Vincent

Childlike faith in God's goodness allows a straightforward understanding of Scripture with no confusion. The beginning is when God begins to count. The heavens God created [literally from the Hebrew "at the start"] were heavenly heavens, the realm of angels, spiritual powers, and principalities (Nehemiah 9:6). Angels, who teach man how to worship, were created before man. Psalm 104 tells us God lays His chambers above the waters and makes His angels spirits. God created earth—a space of unformed substance from whence God removed his "shekinah" glory. The six days and Sabbath were created for man. Jesus created all things in heaven and earth, visible, invisible, powers and thrones. He is Alpha and Omega.

Two major objections to Creation *ex nihilo* in six days concern (1) whether the nothing ("*nihilo*") was actually nothing or chaos, and (2) whether creation of heavenly realms and/or heavens of intergalactic space occurred before the six days. The second objection is given by ruin-restitution theory or by undefined-age biblical literalists. Disproof of these various theories will be given.

Chaos, or unorganized "unoriginate matter," is that hypothesized by precreation chaos theory, Greek philosophers, or heretical Gnostic sects like the Nicolaitans. Early apostles did not hold to precreated matter. Paul, who was taught by Gamaliel, grandson of Hillel, stated that God called things that are not as though they were. The argument that orthodox Hebrew rabbis of the time

before Christ or postapostolic church leaders accepted precreated matter will be discussed.

The Molecular Clock Fails

Jerry Bergman

The molecular clock, also called the gene or evolutionary clock, has influenced all areas of evolutionary biology. The technique uses genetic comparisons to estimate the number of mutational differences to determine when the postulated evolutionary divergence of two different life-forms occurred. An analysis of the data has determined that this approach is seriously flawed on several counts. One major problem is many sequences are highly conserved. A highly conserved sequence is one that has a very similar sequence in very different species. Some well-known examples of genes that are highly conserved include the histone genes, the monosaccharide sequence of glycosaminoglycan, and heparin genes; all are conserved across a wide range of species. Among the most highly conserved sequences are the active sites of many enzymes and the binding sites of protein receptors. Also existing are what are called ultra-conserved elements or sequences (UCEs or UCRs) that share 100 percent or very close identity. The results support the Creation model.

Mt. St. Helens, the Forgotten Miracle?

Richard Overman

The May 18, 1980, eruption of Mt. St. Helens provided a natural laboratory for catastrophism. This laboratory was expertly studied by Dr. Steve Austin to show the effects of the worldwide Flood described in Genesis 6–9. Upon completion of his analysis, Dr. Austin produced a slide presentation that used the Mt. St. Helens data to demonstrate

how the geologic features we see today are best explained by a the global Flood. The author has used the presentation to enhance the faith of many. Whenever this information is presented, people comment that the Mt. St. Helens information convinced them that the old-earth paradigm is not valid. However, it seems that over the years the use of this information by young-earth creationists has waned. It does not get the attention that it used to get. This paper will present the Mt. St. Helens information as a reminder to those who are familiar with it and to enlighten those who have not heard of it. The paper will also explore how to effectively use this information and what needs to be done to keep it fresh. Mt. St. Helens is a powerful tool in our box that needs to be used to glorify God.

The Genetics of Common Ancestry: New Tools for Identifying Created “Kinds”

Nathaniel T. Jeanson

The question of species’ ancestry is at the core of the creation/evolution debate. Though the Bible clearly rejects Darwin’s hypothesis of universal common ancestry and, instead, traces species’ ancestry back to the created “kinds” of Genesis 1, the scriptural text does not provide an exhaustive listing of each “kind” that God created. Within the young-earth creation community, “kind” membership has been traditionally identified by hybridization, but hybrid studies are few in comparison to the total number of extant species. Furthermore, the inability to hybridize does not necessarily exclude a species from kind membership. Hence, additional methods are needed to resolve the species’ ancestry question. The recent explosion of DNA sequence information for thousands of species provides a wealth of potential insights to this question. I demonstrate how these data yield new methods for kind

identification and bring the young-earth biology model closer to a scientifically robust, testable explanation for species’ ancestry.

Thinking within a Biblical Creation Model in Biology

Jean K. Lightner

The evolutionary model is certainly at odds with the historical account of origins presented in the Bible. Many arguments have been used to “refute” evolutionary ideas, some with more correspondence to reality than others. A serious problem arises when we just contradict what evolutionists say without investigation of the scientific literature or Scripture. Both are needed if we are to truly have a biblical view of natural history and an understanding of biological changes that do occur.

Two biblical notions are fairly well incorporated into creationist arguments: creatures were created according to their kinds, and the Curse brought death and suffering. However, other key portions of biblical doctrine and history have been less well incorporated: God continually provides for His creatures, and the genetic bottleneck at the Flood gives us a means to identify variability that has arisen within some kinds.

From a scientific standpoint, creationists often find themselves acquiring the assumptions of the naturalistic model. For example, all genetic change may be assumed to arise by chance, or different versions of a gene may be assumed to be fixed primarily by natural selection. Given the scientific and biblical data, both of these assumptions need to be seriously questioned.

This presentation will review various creationist arguments to see if they are merely antievolutionary or if they truly build the creation model. Future direction of creation research will also be covered.

Locating Sodom and the Other Cities of the Plain

Anne Habermehl

Various geographical locations have been claimed for the cities of Sodom, Gomorrah, Admah, and Zeboiim, which were destroyed by God because of their wickedness. An especially widespread belief has been that the four cities lay at the south end of the Dead Sea. However, some place them along the west side of the Sea, some along the southeast side, and others on the northeast shore. Arguments will be provided from Scripture, history, archaeology, geography, geology, and chronology to show that these places claimed by others are probably not correct.

Examination of pertinent Scriptures puts the four cities in a line from south to north along the west side of the Jordan River, starting with Sodom and Gomorrah near Jericho at the north end of the Dead Sea. The stated borders of the territory of Canaan, and the Promised Land as shown to Moses, are especially important.

The land allotments of the tribes of Benjamin and Ephraim support the western Jordan location of these cities. It is shown that Admah and Zeboiim had to have been on the eastern edge of Ephraim’s territory, leaving Sodom, Gomorrah, and Zoar at the eastern end of Benjamin’s territory. Bela, the alternative name of Zoar, provides a significant piece of this puzzle, because Bela was the name of the oldest son of Benjamin. Zoar would have been renamed Bela when the children of Benjamin took possession of their territory.

Unique Dinosaur Trackway in Middle Jurassic Rocks Poses Problems for Evolution

Terry P. Beh

While most, if not all, known dinosaur footprints are found in a single layer of

sediment, an extraordinary ichnofossil trackway at Slick Rock, Colorado, vertically traverses four bedding planes of rock, the lower two horizontal and the upper two crossbedded. Currently the host rock is identified as eolian or “a combination of tidal flat and sand dune layers” created over a roughly 150,000-year timespan. However, the track’s preservation clearly indicates rapid deposition of all four rock layers, as well as quick lithification. Toe/finger imprints in the footprints, along with mud “up-push” and deformation of the surrounding sediment strongly suggest a marine depositional environment. The vast areal extent of the host rock further indicates a massive flood. Not insignificantly, the site also marks the first known occurrence of bipedal dinosaur footprints in Middle Jurassic rocks.

Biogenetic Family History, an Underappreciated Creation Science

James Johnson

Since the creation revival began generations ago, the Creation science community has rightly emphasized origins science in general.

Lamentably, however, for at least 200 years, due largely to deism-instigated/influenced secularization of origins science, creation scientists have virtually ignored forensic science-qualified study of biogenetic family history (a specialized origins science applying forensic science methodology principles). Yet biogenetic family history can and should be a proper subject of scientific investigation and analysis, assuming proper assessment of biogenetic data by forensic evidence standards, within a biblical framework of Genesis-informed family history.

The doxological and educational importance of family history is shown from relevant Scriptures (e.g., Psalm 102:18 and Psalm 139), buttressed by illustrative apologetics/outreach ministry

applications. Family history, if forensic science qualified and authoritatively informed by Scripture, can serve not only as a valuable source of biogenetic history data, but also can serve as a practical introduction for studying personal origins from a biblical YEC worldview.

Also, biogenetic family history, as a multigenerational (and detailed-facts-sensitive) origins science, provides a learning opportunity for clarifying and contrasting complementary methodologies of the empirical and forensic sciences.

Conventional forensic evidence standards for assessing family history data are discussed. Illustrations involve biogenetic data and genealogical lineages of George Washington, King James (of KJV fame), Bill Cooper, and others. Research and findings (discussed in this paper) acknowledge and often rely upon data reported by Brian Tompsett’s research team (at England’s University of Hull) and others.

Comparison of Different Radiometric Dating Techniques

Richard Overman

This paper evaluates different radiometric dating techniques as published in secular literature. The articles are from the same collection the author used for his paper at the 2013 International Conference on Creationism. Published dates from K-Ar, Ar-Ar, Rb-Sr, and U-Pb dating for the same rock samples and the same rock formation are compared. The RATE team showed, based on a small sample size, that various radiometric dating techniques gave older or younger dates based on their atomic weight. This paper explores that relationship further with a large sample size of hundreds of published dates. A statistical analysis is performed on the published dates as a total group and then statistical analyses of selected individual rock formation is performed. The results can be used

to further explore accelerated nuclear decay theories.

Animal Extinction on the Young-Earth Timescale: Fossil Occurrence Data Uncover a New, Testable Explanation

Nathaniel T. Jeanson

Why do species go extinct? Extinction is an essential component of the evolutionary process, and evolutionists have capitalized on the fact of extinction to communicate a persuasive-sounding, survival-of-the-fittest natural history narrative to the lay public. By contrast, the young-earth creation model lacks a comprehensive explanation for the post-Flood disappearance of various kinds and therefore lacks a compelling narrative to combat the evolutionary story. Several creationist extinction hypotheses have been proposed for isolated animal groups, but a general mechanism for all animal groups has yet to be formulated. To address this problem, I quantified the scope of animal extinction using the Paleobiology Database, and I used these data in combination with the data from the Committee on Recently Extinct Organisms to plot a timeline of post-Flood extinction. Mathematical modeling revealed a new, time-dependent explanation for kind extinction over the last ~4500 years.

The Extraterrestrial Search for the Origin of Homochirality

Charles McCombs

For many years, naturalistic scientists have assumed that chemical evolution is the pathway by which life first originated. However, chemical evolution has not been able to explain the presence of homochirality in these living organisms *by natural processes*. The search for the origin of homochirality has presented itself as a mystery to the

evolutionists because in chemistry, there is no known chemical procedure or natural process that can generate new homochirality without preexisting homochirality already present. The need for preexisting homochirality to produce new homochirality and the inability of natural processes to explain the formation of new homochirality has caused evolutionists to take their search for the origin of homochirality into outer space. Evolutionists now propose that the initial source of amino acids was in deep space, later deposited on the surface of rock fragments, irradiated with circularly polarized ultraviolet light from starlight, and brought to earth on meteorites. Unfortunately, their explanation for the origin of homochirality is not supported by the current scientific literature. A critique of the evolutionist dilemma is provided to show why homochirality is a clear indication of creative design by God.

Ar Dating Statistics

Richard Overman

This paper expands on previous work presented by the author at the 2013 International Conference on Creationism. The previous work evaluated over 700 K-Ar and Ar-Ar dates published in secular literature. The initial evaluation discussed in the previous work identified interesting patterns in the data but did not include a more formal statistical analysis. This paper provides the more formal statistical analysis. In addition, the information from the previous work is updated in response to comments as well as a better understanding of the data. The statistical analysis looks at the data both without consideration of the standard geologic column and then with respect to the standard geologic column. The analysis shows that Ar dating does not support the standard geologic column in its present form but does indicate different groupings that could

assist in the evaluation of accelerated nuclear decay.

Applying Eliminative Induction to Biosphere Origin Theories

Hugh Miller and J. Michael Fischer

The origin of all living things has two basic possibilities: creation by natural causes alone without involving intelligence or by design involving intelligence. While it may not be possible to conclusively prove which produced the biosphere, it may be possible to determine which did not, leaving the other standing by the process of elimination (eliminative induction). Origin by natural causes alone is advanced by evolution theory, and origin involving intelligence is advanced by intelligent design theory.

Intelligent design theory finds design in biological creatures, notably from specified complexity and irreducible complexity that could not have come from natural causes alone. While time is not a factor in intelligent design, enormous amounts of it are required by the theory of evolution. Complexity has made long ages even more necessary; without many millions of years, evolution of the biosphere would not be possible.

K-Ar, U-Pb, and other long half-life radiometric dating methods have been crucial evidence for the geologic time-scale. We present several independent lines of evidence that contradict long half-life radiometric dates and severely shorten the geologic time scale: (1) Carbon-14 dating of Cretaceous and Jurassic dinosaur bones to ~31,000 years before present, (2) the survival of soft, flexible tissue and collagen in dinosaur bones, and (3) the simultaneous formation of multiple sedimentary strata by deposition in moving water. These have all been confirmed by other researchers. Our radiocarbon dates for dinosaur bones are original data.

Taken together, these indicate that, at least from the middle Mesozoic to the present, the putative millions of years were never there. This renders the evolution of much of the biosphere impossible, eliminating evolution theory as a solution to the question of origins.

Weaving Programming Language Theory, Fixed-point Computations, Fractals, and Quantum Mechanics into a Case for a Created Universe

Robin Snyder

Fractals are self-similar objects that allow simple rules to create seemingly complex natural objects. A deep result of programming language theory used to model the mathematics of program correctness and semantics involves fixed-point computations and continuation semantics. Together with the quantization of the time and space of the universe, the apparent implication is consistent with the claims of some secular scientists that we are living in a quantum simulation running on a quantum computer. But what is running this simulation? This talk/session will cover some background on each of these topics with emphasis on the implications for a created universe and stimulate further discussion on the topic.

Man as Message

Diane Kingsley Powell

The perspective of creative design as represented in the Judeo-Christian Bible and in the model "message theory" [ReMine] will be applied to the study of human nature. Both the biblical text and message theory are consistent in that they reflect these three key factors: explicit agency, testability, and an awareness of man's propensity for self-deception. As a result, naturalistic accounts of human behavior often fail

to acknowledge the uniqueness of man or to appreciate its significance. Various topics regarding man's essential character, rational, religious, social, and moral, will be addressed and relevant research from fields such as anthropology, sociology, and psychology will be consulted. We will find that those features that are the most unique and universal to the human species are also those that are the most troublesome for naturalistic accounts. In his review of the evidence for biological design, ReMine concluded that life was designed in such a way as to convey a message from its Designer. When the data regarding human nature has been reviewed using this process, it will become clear that man himself was designed to convey a message.

State Education Standards in Science: The Need for Objectivity and Neutrality

Robert P. Lattimer

All states have adopted standards (learning objectives) in K-12 science education. All state standards, to varying degrees, present solely a materialistic/naturalistic view of origins science (the study of the origin and development of the universe and life on earth). Teleology (the study of the evidences for design or purpose in nature) is not considered a viable alternative to unguided evolutionary processes, despite the fact that much evidence exists that infers teleological causation.

The Next Generation Science Standards is the latest attempt by science and education authorities to indoctrinate students into accepting a materialistic/atheistic worldview. NGSS was released in April, 2013, and the goal is for these standards to replace those developed by states.

The primary tool in this indoctrination is the undisclosed use of

methodological naturalism (MN), an arbitrary doctrine that restricts science to materialistic explanations. While MN has utility in experimental (operational) science, it should not be used in historical origins science.

U.S. courts have ruled in numerous cases that "religion" includes theistic, atheistic, and pantheistic beliefs. The First Amendment requires government neutrality on issues touching on religion. Thus current science standards (including NGSS) are arguably unconstitutional since they present only a single (materialistic/atheistic) viewpoint on origins.

When teaching subjects that touch on religion, public schools should disclose the religious issue and present the subject in an objective manner so that the effect of the teaching will be religiously neutral. Efforts to inject objectivity and neutrality into science education will be discussed.

Simplifying Information Theory into a Classical Statistical Argument for a Created Universe

Robin Snyder

As Stephen Hawking has stated in justifying the acceptance of some of his own work, moving a problem from the science domain to the mathematics domain (in his case, work involving black holes) makes the work and conclusions hard to refute. In the same manner, a creation debate moved to the realm of classical statistics (e.g., coin flipping) makes the work and conclusions hard to refute. This talk/session will review some secular and nonsecular work in information theory and then provide some simple rules of thumb for making and explaining the case that for coded information, there is not enough time or space for any plausible evolution argument.

Post-Flood Biogeography: Mitochondrial DNA Patterns Define the Timing and Units of Migration

Nathaniel T. Jeanson

Why do modern marsupials exist only in Australia and the Americas? Evolutionists use the geographic distribution of current and fossil species to argue for the validity of evolutionary common ancestry. By contrast, young-earth creationists know from Scripture that the geographic distribution of nonaquatic vertebrates is a result of post-Flood migration from Ararat, but the young-earth model has yet to formulate a comprehensive, testable explanation for why species exist in their current locations. To better understand the dynamics and tempo of this process, I analyzed the mitochondrial DNA differences among several well-represented mammalian kinds. In contrast to previous proposals in the creationist literature, I found evidence suggestive of a continuous, slow process of post-Flood speciation and a dynamic, kind-dependent process of migration. These data refine the taxonomic identity of the units of post-Flood migration, and they constrain potential explanations for young-earth biogeography.

Use of Geologic Columns to Develop a Comprehensive Flood Model

Timothy L. Clarey, Davis J. Werner, and Nathaniel T. Jeanson

A new, four-stage Flood model is proposed based on a study of megasequences across the continental USA. Geologic columns from 322 locations, using COSUNA and oil well data were analyzed. Lithologic information and boundaries for six Phanerozoic megasequences and one Late Proterozoic megasequence were recorded.

Results indicate the Flood was initiated by thermal uplift, volcanism, and

hydrothermal activity associated with rifting in the midcontinent and along the Eastern Seaboard, prior to deposition of the Sauk Megasequence. A second stage began with rapid subsidence of continental crust near the rift zones due to magma and water withdrawal, creating intracratonic basins. Deposition of the Sauk, Tippecanoe, and Kaskaskia megasequences kept pace with episodic crustal collapse, with the thickest sedimentation in the eastern US and in the subsiding basins. Dominant current directions were from northeast to west-southwest, subparallel to the rift zones.

A third stage began with the initiation of subduction along the West Coast, and the formation of new oceanic crust off the East Coast. Thickest deposition in the Absaroka and Zuni megasequences shifted to the south and west, likely as a consequence of rapid crustal draw-down into the subduction zone. The final stage, the Tejas megasequence, was dominated by deposition between basement-involved uplifts as the crust rebounded, forming the Rocky Mountains, during the waning of subduction and plate motion. Rapid erosion created extensive strata across the Great Plains and in the Gulf of Mexico, as Floodwaters drained off the continent.

Implications for fossil and lithologic distribution patterns will also be addressed.

Energy Estimates of a Geomagnetic Field Dynamic-decay Model during the Genesis Flood

Tim Clayton

The free-decay model of the earth's magnetic field provides a straightforward mathematical solution but does not account for evidence of pole reversals. A physical mechanism proposed by a creationist places the reversals during the Genesis Flood due to parcels of fluid in

the earth's core moving perpendicular to the magnetic field. This dynamic-decay model has movement of fluid parcels producing an electromotive force (emf) and an increase in magnetic flux leading to a new field of opposite polarity. This talk uses the physical mechanism to model a system of ordinary differential equations representing the westward and eastward motion of the currents in the earth's interior, generating the magnetic field and reversals during a catastrophic flood. The system represents the emf as a series of step functions giving an exact solution using Laplace transforms. The exact solution with corresponding energy estimates are used to provide boundaries for parameters such as fluid speed and the magnetic decay rate.

Forensic Science Insights for Creation Controversies

James Johnson

Many creation controversies, especially controversial events of the no-longer-observable past, are often erroneously analyzed according to deism-grounded uniformitarian assumptions. Even creation scientists frequently do this, unintentionally, when analyzing such controversies by empirical-science methodology, rather than by forensic-science methods informed by relevant scriptural data.

This "scientific method" misapplication of empirical-science methods (to forensic-science questions) routinely confuses the issues, invalidates data analysis, impedes creation-science progress, and short-circuits biblical creation apologetics.

This methodology misapplication problem can be remedied, but the problem must be (1) recognized, as the problem it is and (2) addressed and resolved by applying relevant forensic-science analysis practices, including conventional standards for evaluating

evidence controversies in adjudicative contexts, such as the recent-fabrication rule (used for causation analysis), the evidence-of-nothing rule (used for hypothesis falsification), and the disproportionality-relevance rule (used for disqualifying evidence and misleading terminology).

As creation apologetics illustrations, these conventional standards apply to origins controversies, including uniformitarian assumptions (applying deist epistemology), the distant starlight controversy (in a young universe), cosmology (vs. cosmogony), natural selection theory (applied to biodiversity, population dynamics, and ecosystem dynamics), and the geologic formation of Earth's major river systems (after the Flood).

Post-Flood Speciation: Which Mechanism Is Most Probable?

Nathaniel T. Jeanson

How did modern species arise from the kinds on board the ark? To date, the creationist literature contains a host of hypotheses on the mechanism of speciation, but evaluation of these proposals has been hampered by limited data and by a lack of tests that distinguish among these hypotheses. Consequently, little consensus exists among young-earth biologists, a fact exploited in the old-earth creationist literature. To address this dilemma, I review the current young-earth hypotheses, and I reevaluate them in light of the most recent data on the timing, extent, and molecular nature of speciation. I also reevaluate the heterozygous-fractionation model in light of the relevant population genetic parameters that existed post-Flood—a set of parameters that has been largely overlooked in prior young-earth discussions. Finally, I propose a new set of criteria by which the various young-earth hypotheses can be falsified or verified.

Letters to the Editor

The policy of the editorial staff of CRSQ is to allow letters to the editor to express a variety of views. As such, the content of all letters is solely the opinion of the author, and does not necessarily reflect the opinion of the CRSQ editorial staff or the Creation Research Society.

The Moon and Cratering

Solar system craters and when they occurred has been a recent topic of interest in creationist literature and conferences. The Seventh International Conference on Creationism in Pittsburgh, Pennsylvania, in 2013 held a panel discussion that debated the timing of meteoritic impacts in the solar system. There have also been a number of recent articles on the topic (e.g., Faulkner, 2014; Oard, 2013; Spencer, 2013). Two major positions are (1) that the biblical record and scientific data are best explained by most craters originating during the Creation Week, and (2) that most cratering events took place during the Flood and are related to God's judgment.

We would like to add to the discussion by looking at the original scriptural role of the moon and how a cratered surface might impact this intended role. The moon was created by God on the fourth day of the Creation Week as recorded in Genesis 1:

And God said, "Let there be lights in the expanse of the heavens to separate the day from the night. And let them be for signs and for seasons, and for days and years, and let them be lights in the expanse of the heavens to give light upon the earth." And it was so. And God made the two great lights—the greater light to rule the day and the lesser light to rule the night—and the stars. And God set them in the expanse of the heavens to give light on the earth, to rule over the day and over

the night, and to separate the light from the darkness. And God saw that it was good. (Genesis 1:14–18 ESV)

This passage gives a clear indication of several purposes of the moon: It was to be a night light, a timekeeper, and a "sign" in the skies (DeYoung and Whitcomb, 2010, pp. 47–58). Certainly the purpose of providing light is a major part of the role of the moon, as well as the sun. It is this purpose that has implications for the time of cratering.

To understand the importance of craters for the moon's reflected light, consider what the implications of a perfectly smooth lunar surface would be. The moon is nearly perfectly spherical, but with its cratered surface, the full moon looks "flat" to the observer (DeYoung and Whitcomb, 2010, p. 49). This effect is due to the rough, cratered surface that reflects incoming sunlight in many different directions. If the moon were smooth, light reflecting to earth from the sun would be focused to only the very center of the moon. The overall effect for the full moon would be a much brighter central part of the moon and darker edges. The waxing and waning crescent moon would similarly resemble a bright spot, not the even light it does now.

A possible objection to creation-related cratering would be that the original "very good" creation would exclude "destructive" events that would have destroyed the originally smooth

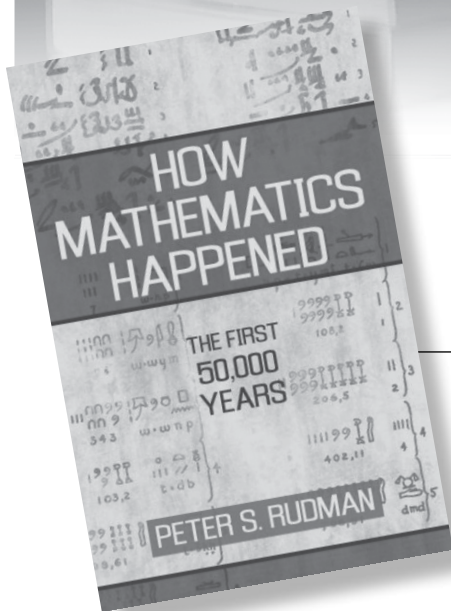
lunar surface. We suggest that if craters are a means by which the moon fulfills its God-given purpose, then they may also be referred to as "very good," just as decaying plant material forms an integral component of healthy soil. Solar System craters may have been created in place by God as part of a mature creation, or they may have formed as part of the creation process. Either way, the purpose of providing light, we suggest, is best met with a cratered surface on the Moon. Thus we submit that many craters most likely were present since the Creation week.

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Media Reviews



How Mathematics Happened: The First 50,000 Years

by Peter Rudman

Prometheus Books, Amherst,
New York, 2007, 314 pages,
\$27.00

Peter Rudman is a retired professor of solid-state physics at Technion-Israel Institute of Technology in Haifa, Israel. Professor Rudman's self-professed purpose for his book is not primarily to tell *what* the ancient people did but rather *why* they did it. His book addresses questions such as the following: Why did the Babylonians use a base-60 number system? Why did the ancient Egyptians use series of unit fractions to express a single number? Why are many mathematical discoveries, such as the Pythagorean theorem, attributed to Greek mathematicians instead of Babylonian? The answers are possible and sometimes speculative but always interesting and reasoned. This book is not written from a creation perspective, but the picture presented is consistent with and supports the notion that humans have always had mathematical ability.

There are two important premises upon which all Rudman's ideas are based: (1) Man has evolved from other animals, and in about the last 50,000 years has developed to the point of being

able to count. Mathematics, as Rudman sees it, has evolved along with humans and finally reached "maturity" (meaning the use of rigorous mathematical proof) during the time of the famous Greek mathematicians, including Pythagoras, Euclid, and Eratosthenes. (2) We share in common with the Greeks, Babylonians, Hindus, Mayans, and Egyptians a common way of thinking about mathematics that is natural and "evolved" into our brains. Unfortunately, Rudman fails to acknowledge the possibility that people were created intelligent beings, and so his assumptions take him in wrong directions at several places in the book. If he would allow only the available information to guide his thinking, he might see the clear picture of intellectually capable humans extending as far back in human history as we have evidence.

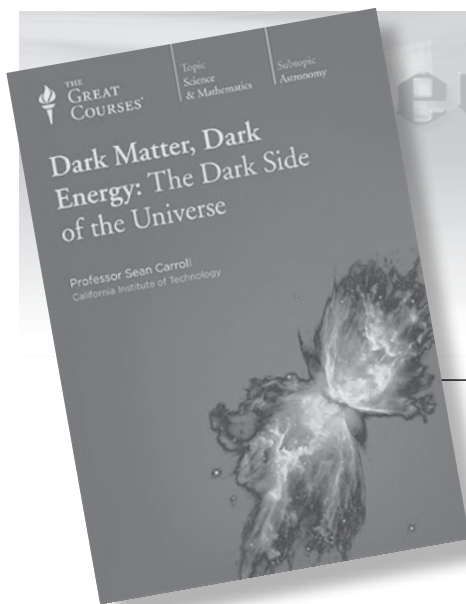
Some of the more interesting aspects of the book show how the Babylonians knew about the Pythagorean theorem a millennium before Pythagoras, the Egyptians knew how to compute the volume of a "frustum"—a pyramid with the top cut off—and how knowledge of mathematics may have diffused back and forth between Egypt, Babylon, and India, all 2000 years before Christ. Such a picture is what we might expect from a biblical worldview!

Sprinkled throughout the book are "Fun Questions" that relate to the topics at hand. Of course, how fun these questions are might be proportional to how much one enjoys solving math problems! But most of the questions are very well explained and can be solved with minimal effort based on the discussion in the main text, and answers to all questions are provided at the end of the book. Some examples are: "Prove that $ab = ba$," and "Convert 456 and 567 into hieroglyphics and add them." Many of the questions illustrate important concepts from the book and can aid the reader in understanding some of the problems mathematicians faced in days gone by.

The book is a relatively easy read, although some problems and material are more advanced. One should be prepared to "eat the meat and toss the bones," as the author is most certainly not writing from any kind of religious perspective. However, the evidence presented is very consistent with a young-earth biblical viewpoint, and the information about ancient human mathematics is both interesting and entertaining.

The book contains a very helpful list of references with annotations, answers to the "Fun Questions," and an index.

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Dark Matter, Dark Energy: The Dark Side of the Universe

by Sean Carroll

4 DVDs with 24 lectures,
The Great Courses,
Chantilly, VA, 2007, \$69.95

Sean Carroll has a Ph.D. in Astrophysics from Harvard and is a senior research associate in physics at the California Institute of Technology. His research involves theoretical physics and astrophysics with a focus on issues in cosmology, field theory, and gravitation. He is well versed in all topics related to dark matter and dark energy and how they theoretically fit into the concordance model for the evolution of the universe. His lecture style presents the material in an interesting and understandable way to a science-minded audience. This lecture series is several years old, but little has changed in its contents.

A *Course Guidebook* is provided with the DVD set, which includes a table of contents, introduction, 24 lecture guides, and 56 pages of supplemental material. The supplement contains explanations of exponential notation, measuring the universe, the standard model of particle physics, and big bang timeline, along with a glossary, biographical notes of major contributors to the theories, and a bibliography. The lecture guides summarize the major points Carroll makes in each lecture.

Dr. Carroll states that the purpose of the course is to explain what dark matter and dark energy are and why

most astronomers and physicists believe in them. This statement makes it plain that this course is about a belief system. The bases of this belief system are found in the *standard model of particle physics* and the lambda-cold dark matter parameterization of the big bang theory of cosmology. Dark matter and dark energy have been proposed to make this model consistent with observations scientists have made of the universe. In my opinion, the majority of the material covered only explains what is not dark matter or dark energy rather than what they are.

The basic facts the author presents in support of this belief system are: the big bang took place 13.7 billion years ago; the universe is composed of 5% ordinary matter, 25% dark matter, and 70% dark energy; ordinary matter is made of atoms formed by electrons, protons, and neutrons that are held together by photons; neutrons and protons are made of quarks held together by gluons; energy is proportional to particle mass times the speed of light squared; dark matter is detected only through the use of gravitational force; the *standard model of particle physics* explains only known ordinary matter particles; the big bang nucleosynthesis formed only hydrogen, helium, and lithium atoms, and other elements were formed in first generation stars; cosmic microwave background radiation was released with recombination at 370 million years after the Big Bang; dark energy and inflation are not affected by gravity; and Einstein's theory of general relativity holds throughout the

entire universe. In my opinion some of these facts are based on unproven assumptions.

Carroll presents observations that support several basic facts. For example, he notes the universe looks the same in all directions; space is growing between galaxies at the Hubble constant rate; stars are still forming from dust within galaxies; the relative age of stars can be determined from their color and luminosity; there is no center or boundary to the known universe; the speed of light is a universal constant; the laws of quantum mechanics hold for atoms and subatomic particles; gravity is the curvature of four dimensional space-time; and space-time is presently expanding at an increasing rate. In my opinion, it is the interpretation of these observations that lead to the concordance model.

Carroll explains that in general relativity three numbers characterize the simple, smooth universe at any moment in time, and the model also tells us how they change with time. The Friedmann equation is used to relate these three numbers, including the universe expansion rate, energy density, and the curvature of space at any moment in time. This equation allows cosmologists to determine how a scale factor of the universe evolves with time. For example, immediately after the big bang, radiation and matter were extremely dense and space was greatly curved. Now matter and radiation are diluted and space has been found to be flat within present measuring capabil-

ity. The assumption is that the equation can be used to determine where specific events occurred along the evolutionary timeline by applying the scale factor. However, there is no recorded history that can be used to verify the equation or the sequence of events.

Modifications to some of the lectures need to include recent discoveries from both astronomical observations and particle physics experiments. High-energy collision experiments have not been able to detect dark matter particles in a large range of energies where they were expected. The Higgs boson has been

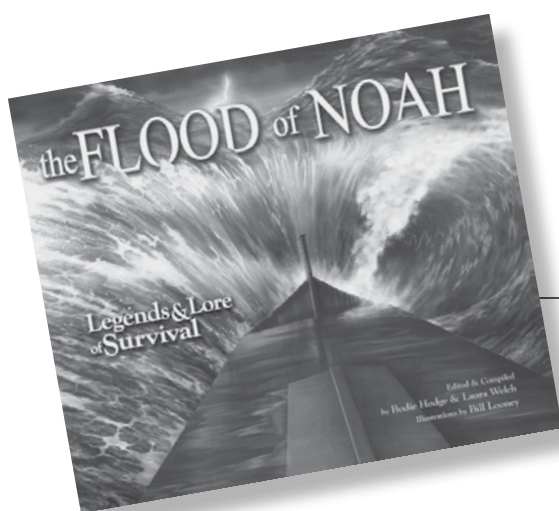
detected, but its energy only supports the standard model and reduces the possibility for super-symmetry particles. Such particles are required by all the models based on string theory. The search for dark matter particles called WIMPs (weakly interacting massive particles) from outer space passing through earth have come up empty with the most sensitive detectors available. Those searches will continue, but their direction and the theories supporting them are presently in turmoil.

In the final lecture, Dr. Carroll emphasizes that the current model of

the universe is extremely successful in explaining all the observations that have been made of our universe. But that model includes these three unidentified features: dark matter, dark energy, and the cause of inflation.

A creation model may not require these features, since God's actions during the first four days of this universe could be manifested in these observations.

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The Flood of Noah: Legends & Lore of Survival

by Bodie Hodge
and Laura Welch

Master Books, Green forest, AR,
2014, 24 pages, \$18.99

This book is short and colorful with two dozen heavy stock pages. Brief flood legends are described from 18 cultures worldwide. Although contaminated by legend and exaggeration, these legends have common features with the inspired biblical account of Noah's day. The extrabiblical accounts include 19 distinct names for Noah and 12 names for his wife. Major use

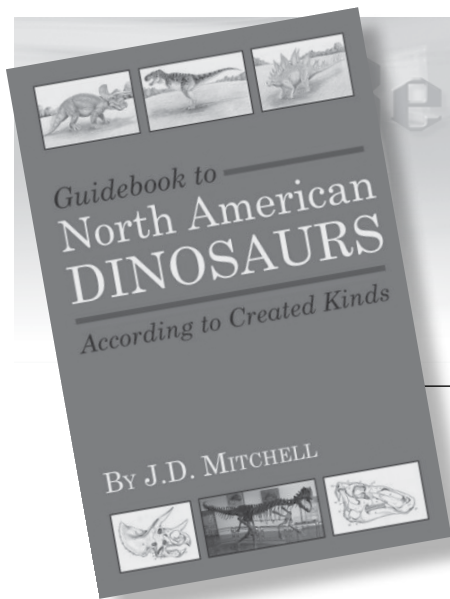
is made of the writings of anthropologist James George Frazer (1854–1941), who summarized worldwide folklore stories a century ago.

I have collected many 3-D and pop-up books, and this volume qualifies for the set. There are several page inserts to pull down and tabs to slide out. Such novel features are typically of interest to children; however, the writing in this book is on an adult level. At the same time, the color artwork is simple and captivating. This includes a diagram of

the interior of the Ark, 22 inches wide and complete with the animals. It is suggested that there may have been as few as 2000 individual animals on board during the yearlong Flood.

The book includes an ancient map, American Indian legends, and discussion of an assumed major flood on Mars by those who deny the same on earth. A clear gospel presentation also is provided.

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Guidebook to North American Dinosaurs According to Created Kinds

by J.D. Mitchell

Council for Exceptional
Children (CEC) Publications,
Gresham, OR, 2014, 241 pages,
\$23.00

With his new book, J. D. Mitchell, executive director of the Institute for Creation Science in Gresham, Oregon, seeks to establish a new—and more biblical—way of identifying dinosaurs. As its title states, Mitchell's *Guidebook to North American Dinosaurs* endeavors to categorize dinosaurs *according to created kinds*.

While Mitchell doesn't discuss baraminology, the study of biblical kinds (Frair, 2000), his book is really an attempt to apply baraminology to dinosaur evidence from the fossil record. While other creationists have estimated that there could have been as few as 55–60 dinosaur "kinds" worldwide (Thomas, 2009), as far as I know, Mitchell is correct in claiming to be the first to specify what they may have been, at least for those found in North America. Like most young-earth creationists, Mitchell views species as mere variations of the original created *kinds* of Genesis. By combing similar genera, he establishes his dinosaur kinds at the family level of taxonomy, as is a common consensus in creation science (Lightner, 2009).

Mitchell's *Guidebook* is roughly divided in half with the first part devoted to information about dinosaurs and dinosaur fossils, which should be of general interest to creationist readers. One section, "Dinosaur Museums," lists

the best places to see dinosaur bones and skeletal reconstructions throughout the United States and Canada—most, or all, of which the author visited personally over a period of 10 years in preparation for writing this book.

Another section, "Dinosaur Data by Created Kind," comprises the entire second half of the book. It is here that Mitchell introduces his new, biblical categories for these creatures, reducing over 100 North American dinosaur genus names to 15 "kinds." The criterion he uses for combining these genera into created kinds is the quality and quantity of reported fossil material available. While Mitchell admits that his method is rather subjective, his groupings loosely resemble what Lightner et al. (2011) refer to as *cognitum*, a group of organisms that are naturally grouped together through human cognitive senses.

In this manner Mitchell merges similar dinosaur genera under a broad, all-encompassing label and picks what he believes is the most appropriate genus to represent each "kind." For example, he combines all the North American genera of allosaurids and tyrannosaurids into the Tyrant Bipedal Dinosaur Kind represented by *Tyrannosaurus rex*. Each new kind is accompanied by photos of skeletal reconstructions of the various dinosaur genera it includes from Mitchell's travels to fossil museums throughout America and Canada.

The 15 dinosaur kinds and their representative genus in the *Guidebook* are as follows:

Armor-Backed (*Edmontonia*)
Bipedal Browser (*Camptosaurus*)
Club-Tailed (*Ankylosaurus*)
Duck-Billed (*Edmontosaurus*)
Horned Faced (*Triceratops*)
Horned-Nosed (*Ceratosaurus*)
Killer-Clawed (*Deinonychus*)
Lithe, Fast Running (*Coelophysis*)
Long-Necked Big-Clawed (*Anchisaurus*)
Long-Necked Boxy-Headed (*Brachiosaurus*)
Long-Necked Slender-Headed (*Diplodocus*)
Ostrich-Like (*Orinthomimus*)
Plate-Backed (*Stegosaurus*)
Thick-Headed (*Pachycephalosaurus*)
Tyrant Bipedal Dinosaur (*Tyrannosaurus rex*)

Of course, while most readers of this book will enjoy Mitchell's dinosaur information and skeleton photographs, the subjective nature of his "kinds" will just as surely lend itself to questions/criticisms about their validity. For instance, based on the observation of their bone structure or skeletal morphology alone, is there sufficient difference between Mitchell's Armor-Backed and Club-Tailed dinosaurs to justify dividing them into separate kinds? The same might also be said for his Lithe, Fast Running and Ostrich-Like kinds. Personally, I would take issue with making *Ceratosaurus* its own kind (Horned-Nosed Dinosaurs), when the only major skeletal difference between it and the other Tyrant Bipedal Dinosaurs is the horn on its nose.

All in all, the *Guidebook to North American Dinosaurs* is a quick and enjoyable read based on an intriguing premise. While many will likely disagree with Mitchell's criteria and conclusions, this book is a good first attempt to identify the "terrible lizards" according to their biblical kinds. And with the field of baraminology still in its early stages—especially when it comes to dinosaurs—it will hopefully serve to generate further discussion on this topic, especially for

those who seek to answer the seemingly undying question: "So, how could all those dinosaurs fit on Noah's Ark?"

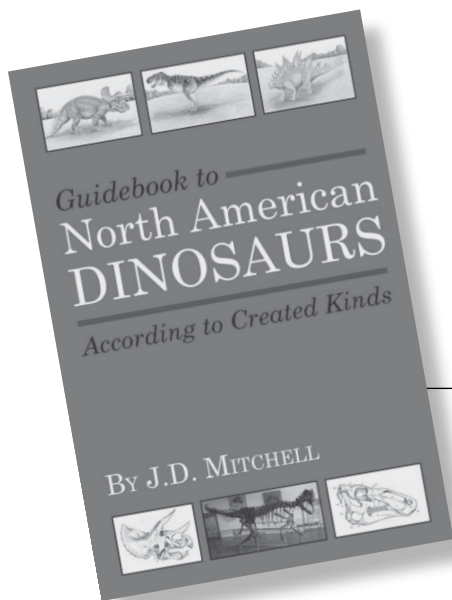
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The *Guidebook to North American Dinosaurs* is a well-illustrated, often-in-color, encyclopedic handbook. The guidebook is an invaluable resource for dinosaur aficionados, both amateur and professional, with at least a high school education. The general public also will find the book of much interest. It covers in detail, not only the topic of dinosaurs, but also dinosaur footprints, their eggs, theories of their extinction, and dinosaur terminology. The manual even includes a guide to exploring for dinosaur fossils, including discussions of the tools of the trade and the laws that govern fossil collecting (pp. 68–69). One section includes a discussion of

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the recent dinosaur soft-tissue research that has produced major problems for Darwin's theory.

The text highlights various museums that contain significant collections of dinosaurs. Most of these Mitchell has visited, enabling him to provide informed recommendations about their strong points. The museums are listed by states. Another section includes a brief biography of the major historical dinosaur paleontologists and their significant achievements.

The most important section is on a new theory of dinosaur classification. This major contribution is a system of taxonomy based on a modified Linnaean system (p. xx). Mitchell applies the system using the presupposition of the created kinds to a wide variety of dinosaurs (pp. 79–220). This section is illustrated in color to highlight the application of the Mitchell system.

This reviewer is not aware of any other dinosaur guidebook written from a creationist perspective. Furthermore, very few secular guidebooks contain the information included here.

The author summarizes and applies his system based on creationist presuppositions, using both the traditional and the creation taxonomy. He summarizes both the creation and secular paleontology presuppositions. The traditional secular system is based on the following conclusions: There is no God, or God is irrelevant. Everything came from nothing. All life-forms evolved from common ancestors over billions of years. Homology (the fact of similarities in life-forms) is sufficient proof for the evolution of all extinct and living life-forms (p. xx).

Biblical paleontology operates under an entirely different set of presuppositions, including the presupposition that all life-forms were created in groups

called kinds or baramins. Mitchell uses the creation worldview to develop a new taxonomy using the same data used by evolutionists.

Because scientists cannot carry out interbreeding studies with dinosaur fossils, they are forced to rely on the study and measurements of bones and teeth (and, occasionally, external morphology) to produce species evaluations to develop the taxonomy. As Mitchell notes, the “assignment of family categories and genus/species names to dinosaurs by secular taxonomists is a highly subjective

exercise. For this reason changes and deletions are common as new fossil materials are discovered, errors are found, and different interpretations gain acceptance” (p. xx). The same problem exists with creation taxonomy.

Only very rarely does evidence of internal morphology exist to aid in making adequate comparisons required for taxonomic comparisons. The problem in using morphology for this purpose was illustrated by a London University biologist who noted that, if a modern mammalogist were to evaluate modern

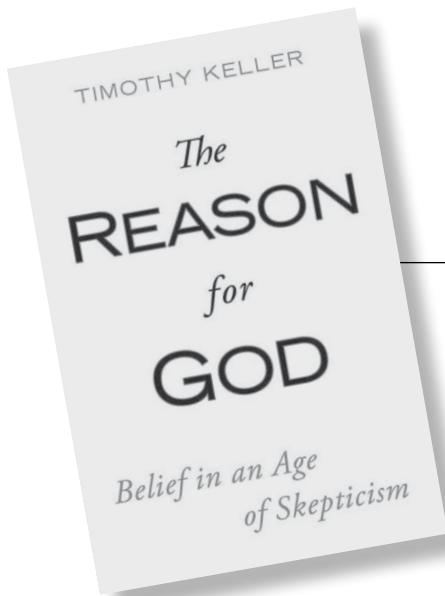
dog breeds based on morphology alone, he would classify them into “at least a score of ... well defined species” (Jones, 2000, p. 25). Mitchell’s excellent guide to dinosaur research is highly recommended.

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Jones, Steve. 2000. *Darwin’s Ghost. The Origin of Species Updated*. Random House, New York, NY.

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The Reason for God: Belief in an Age of Skepticism

by Timothy Keller

Riverhead Books, New York,
2008, 310 pages, \$16.00

philosophically deep where needed. Over the 25 years of Pastor Keller’s leadership, Redeemer Presbyterian has grown to 6,000 regular attenders (mostly young adults) and established a host of daughter churches. The inner-city ministry has become a model for urban outreach worldwide.

Some weakness is shown in Pastor Keller’s position on Genesis and origins. He states, “I think Genesis 1 has the earmarks of poetry and is therefore a ‘song’” (p. 97). Different positions on the meaning of Genesis 1 are described as an “intramural debate” that should be reserved for those well grounded in true Christianity (p. 97). There is some truth to this view since the idea of a recent supernatural creation is preposterous to many people outside the faith. Although not dogmatic, Pastor Keller leaves the door open for theistic evolution through his promotion of Francis Collins (p. 133).

The book is filled with thought-provoking statements such as the following: “Today most Christians in the world live in Africa, Latin America, and Asia” (p. 41). “No matter who performs it, every act of goodness ... is empowered by God” (p. 54). “I found no other religious text outside of the Bible that said God created the world out of love and delight” (p. 84).

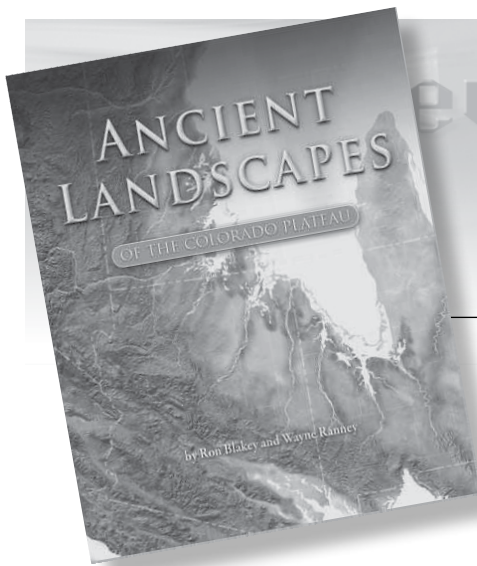
Pastor Keller shows familiarity with writers of the past and present. Key quotes and thoughts are given from Augustine, Dietrich Bonhoeffer, Albert Camus, G. K. Chesterton, Charles Darwin, Fyodor Dostoevsky, Victor Hugo, Soren Kierkegaard, C. S. Lewis, Alister McGrath, Flannery O’Connor, William Wilberforce, and a hundred others. There are 284 detailed footnotes provided. This book deserves study and rereading.

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Writer Timothy

Keller is the founding pastor of Redeemer Presbyterian Church in New York City. This *New York Times* bestseller is addressed to mature believers, seekers, and skeptics. Pastor Keller has heard many challenges to biblical faith, as shown by chapter titles such as the following three:

- There Can’t Be Just One True Religion
 - How Can a Loving God Send People to Hell?
 - Science Has Disproved Christianity
- The discussion is thorough and



Ancient Landscapes of the Colorado Plateau

by Ron Blakey and Wayne Ranney

Grand Canyon Association,
Grand Canyon, AZ, 2008.
156 pages, \$35.00

This book on the geology of the Colorado Plateau is written by two experts on geology and tectonics who are very familiar with the Grand Canyon area. This is not a creationist work; nevertheless it has value for the creationist as both a guide to the geology of the region and as a tool for the serious geology researcher. Ron Blakey is well known worldwide for his “paleogeographic” maps—maps that try to convey a simplified picture of what the world looked like at some point in the past. For the evolutionist these are invaluable in understanding how a landscape like the Grand Staircase region

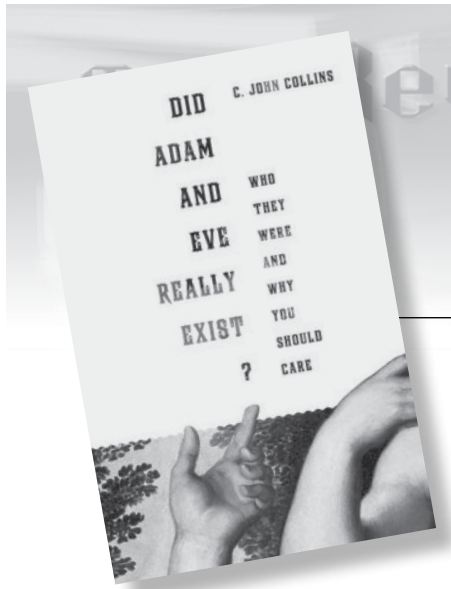
of the Colorado Plateau came to be. For the creationist they have potential as tools for thinking about the processes that took place before, during, and after the biblical Flood. This book contains numerous paleogeographic maps, as well as cross sections and photographs of modern-day landscapes, outcrops, and fossils, that the authors put together to tell what they believe is a coherent story of the plateau. There are cross-correlated diagrams that show how rock sequences at various locations are related and descriptions of where fossils such as dinosaur tracks and rock formations like Shiprock in New Mexico can be located.

This work helpfully points out that many of the locations that are good for viewing the rock layers are also recreational and vacation spots. A map on page 126 shows 20 different locations where good outcrops can be found,

many of which are located in national parks like Arches, Bryce Canyon, and Grand Canyon. This means that the creationist researcher has a good excuse to take his or her family on a working vacation! Excellent descriptions of where and what geology is to be seen at each location are also given along with cross sections.

The creationist reader will also be able to note puzzles that the evolutionist cannot explain or has difficulty understanding. The origin of the Grand Canyon and the preservation of many different dinosaur species in “fossil graveyards” are two examples. The end of the book has a description of how the paleogeographic maps are made and also includes a glossary, list of references, and index.

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Did Adam and Eve Really Exist? Who They Were and Why You Should Care

by C. John Collins

Crossway, Wheaton, IL, 2011,
192 pages, \$16.00

This book could be considered a “moderate” perspective on Adam and Eve. Collins defends the historicity of the first couple, their initial state of innocence with God, and an historical fall. He does not accept a young age for the earth or a global flood, but he argues that even those who reject these must come to grips with the significance of the first human couple and their actions. The reason for this is developed throughout the book and involves the text of Genesis itself, the perspective of the rest of the Bible, especially Jesus and Paul in the New Testament, and also the collective experience of humanity that we are

somehow different from the rest of the created world.

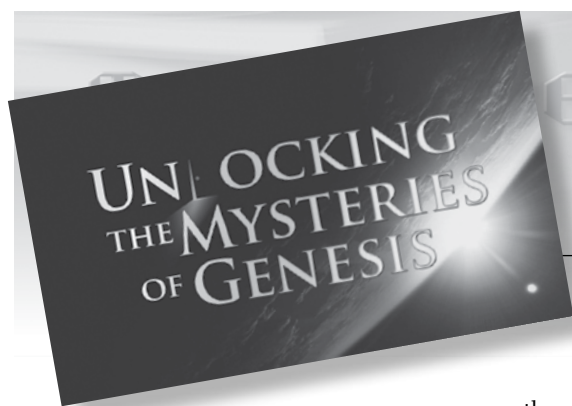
Page 120 contains a helpful summary of what is otherwise a rather verbose argument. He believes that the biblical evidence is such that it requires a historical figure like Adam, and he argues that the “origin of the human race goes beyond a merely natural process.” This is true even within a perspective that would reject a literal view of Genesis. He does suggest that perhaps Adam and Eve were the leaders of a tribe of humans, but, he says, they must have been “at the headwaters” of whatever other humans existed. He also states that the Fall must have been both historical and moral, and it must have occurred at the very beginning of the human race.

The book gives helpful arguments that show how Jesus and Paul both understood Adam and Eve to be real, historical people who experienced a

real event in the Fall. Collins stops just short of arguing that this must have taken place “at the beginning,” as Jesus said in Mark 10:6.

The book is relatively short but a little wordy, and it is sometimes difficult to follow Collins’s train of thought. He sometimes is more concerned with clarifying what he is *not* saying than what is said. The book includes several appendices, including a study of how Genesis compares with ancient Near Eastern literature and the date of its composition. It ends with a list of references and general and Scripture indices. It is recommended for anyone who wishes to understand more fully the issues surrounding the historicity of Adam and Eve.

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Unlocking the Mysteries of Genesis

DVD series

Institute for Creation Research,
Dallas, 2014, 12 DVDs, \$129.99

This DVD series has 12 discs, each approximately 22 minutes in length. This format has plusses and minuses. I would have preferred 4 to 6 episodes per DVD (thus only 2–3 DVDs) for easier sequential viewing (I viewed them all in one afternoon). However the 12-disc format allows separating the set so that individual discs can circulate. The license for the series allows not-for-admission public showing of entire episodes and is suitable for church use (per a personal communication I have had with ICR). It is not well known that most secular DVDs and many Christian-produced DVDs are licensed “For Home Use Only,” a succinct description of their intended purpose and allowed use. Public showing often requires permission and considerable expense. The 12-DVD case is a bit unwieldy, and the electronic “DVD pages” inside do not turn easily unless you realize the way to “operate” the case is to pull each “DVD page” up before turning it.

The series is very well done from a technical-production standpoint, rivaling the quality of National Geographic and PBS nature videos. Colorful and interesting sets and well-chosen locations enhance the viewer’s experience. Attention-grabbing activities and action tend to hold the viewer’s interest. Graphic simulations also are well done. The script and video shots are fast-paced and yet are understandable to viewers with limited scientific background. Marcus Lloyd is an excellent choice as host of

the series; he appears comfortable and articulate in all the venues he appears. An impressive array of scientists also appear, including over a dozen with doctoral degrees, many of whom are familiar in creation circles. The series should be effective in holding the attention of the younger, action-oriented generations, one of ICR’s purposes in producing the series.

The order of episodes is not exactly what I would have chosen, but the choice is reasonable and understandable. The episodes are mostly modular and can be viewed in any order or individually in a classroom. However there are some references to “in the previous video...” and “in the next video we’ll see....” The episode titles follow:

1. Chaos or Cosmos?
2. What Is Life?
3. What Is Man?
4. Buried Clues
5. Flood or Fiction?
6. How Old Is the Earth
7. Dinosaurs!
8. The Ice Age
9. Rise of Civilization
10. Origin of the Universe
11. Uniqueness of Earth
12. Science and Scripture

Each episode ends with direct references to God and Scripture and challenges the viewer to consider the concept of a Creator and a Savior. This makes the series a good choice for evangelistic use by churches. Churches could show this series to three audiences: first, to church members to edify their understanding of the relationship of true science and the Bible; second, to an unbelieving audience, which is immersed in today’s

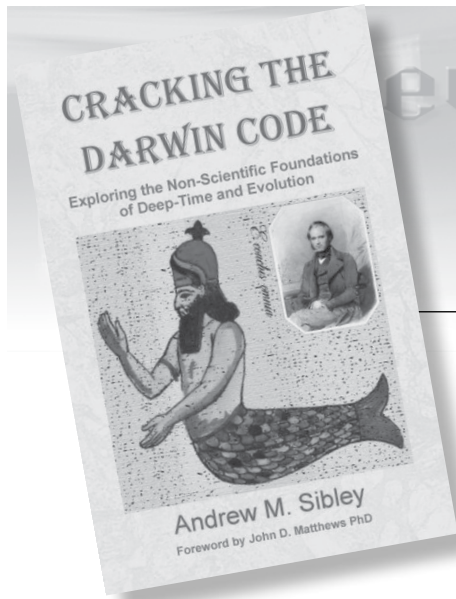
secular worldview governed by evolution, agnosticism, and atheism; and third, to the young generation, which needs to be brought back into the church.

Episode 12 provides an excellent summary of the preceding episodes and ties the whole series together in the light of the Scriptures. The evidences and the evolutionary interpretation, including problems, are reviewed. The timeline based on Genesis is clearly presented. The questions asked in the 11 episodes are all clearly answered. The point is that Genesis explains it all with a little help from the other 65 books! Viewers are left with a challenge to decide their future. The Episode 12 disc also contains a short (3.5 minute) bonus feature showing a dynamic, visual timeline of the history of mankind from Creation to Jesus Christ.

One minor criticism is that the text and titles shown on screen are sometimes a bit small to read, especially in a large classroom or auditorium environment.

The accompanying viewer guide book (112 pages) is well illustrated with colorful images. There is a chapter for each episode with material to summarize the key points, questions for further thought on the episode’s topic, a page of evolution/creation contrasts for the topic, and resource websites and print media. The guide lends itself to use as a discussion leader’s resource. My suggestion, if using the DVD series for a moderate to large Sunday school class or similar environment, is to not provide copies of the guide to everyone. But for small groups (for example, a home Bible study), a copy for each participant would be helpful.

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Cracking the Darwin Code

by Andrew Sibley

Fastnet Publication, Devon, England, 2013, 180 pages, \$9.00

The author has done a careful and detailed study of the philosophical, political, and religious origins of evolution and “millions of years” and why the concepts are widely accepted. He traces the notion of deep time to eastern mysticism, Baal worship, Hinduism, and early Greek thought (p. 5). We learn that the early church fathers accepted the literal meaning of Genesis, although many symbolically linked six days of creation with 6,000 years of earth history, since they looked forward to the return of Christ (p. 19). Nearly all accepted six literal days of Creation and did not support evolution or millions of years, which were options even then, nearly two millennia ago (p. 27).

The political situation of Darwin’s time created fertile ground for rebellion against Christianity. For hundreds of years, a monarch’s power was rooted in what the church believed was “divine right.” Monarchs thought that because of this they could do no wrong. This resulted in terrible abuses and contributed to some wanting to promote a system that discredited Genesis, realizing this would put into question the credibility of all Scripture.

Spiritually, many in Darwin’s time became interested in eastern mysticism and deism. With an uncomfortable political environment and spiritual decline, people were ready to accept an alternative to Genesis, and naturalism was waiting. The author shows how it was not science that drove the push for evolution and millions of years. At that time many scientists disagreed with Darwin’s thesis. However, there was a desire by some to destroy confidence in

Scripture and the church. This was accomplished gradually through the Royal Geological Society and more insistently by Thomas Henry Huxley and others. The book details how church opposition to this trend was crushed.

Cracking the Darwin Code has many detailed references from the original works of Darwin, Plato, and hundreds of others. The picture Sibley paints is far more complicated than this review indicates. The book is not an easy read but well worth the effort for those who want to understand why and how evolution and millions of years became the “science” of the day and remains so.

Andrew Sibley is an English meteorologist who has a penchant for research and detail. *Cracking the Darwin Code* has an extensive bibliography and a helpful index.

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Instructions to Authors

Submission

Electronic submissions of all manuscripts and graphics are preferred and should be sent to the editor of the *Creation Research Society Quarterly* in Word, WordPerfect, or Star-Office/Open Office (see the inside front cover for address). Printed copies also are accepted. If submitting a printed copy, an original plus two copies of each manuscript should be sent to the editor. The manuscript and copies will not be returned to authors unless a stamped, self-addressed envelope accompanies submission. If submitting a manuscript electronically, a printed copy is not necessary unless specifically requested by the *Quarterly* editor. Manuscripts containing more than 35 pages (double-spaced and including references, tables, and figure legends) are discouraged. An author who determines that the topic cannot be adequately covered within this number of pages is encouraged to submit separate papers that can be serialized.

All submitted manuscripts will be reviewed by two or more technical referees. However, each section editor of the *Quarterly* has final authority regarding the acceptance of a manuscript for publication. While some manuscripts may be accepted with little or no modification, typically editors will seek specific revisions of the manuscript before acceptance. Authors will then be asked to submit revisions based upon comments made by the referees. In these instances, authors are encouraged to submit a detailed letter explaining changes made in the revision, and, if necessary, give reasons for not incorporating specific changes suggested by the editor or reviewer. If an author believes the rejection of a manuscript was not justified, an appeal may be made to the *Quarterly* editor (details of appeal process at the Society's web site, www.creationresearch.org).

Authors who are unsure of proper English usage should have their manuscripts checked by someone proficient in the English language. Also, authors should endeavor to make certain the manuscript (particularly the references) conforms to the style and format of the *Quarterly*. Manuscripts may be rejected on the basis of poor English or lack of conformity to the proper format.

The *Quarterly* is a journal of original writings, and only under unusual circumstances will previously published material be reprinted. Questions regarding this should be submitted to the Editor (CRSQeditor@creationresearch.org) prior to submitting any previously published material. In addition, manuscripts submitted to the *Quarterly* should not be concurrently submitted to another journal. Violation of this will result in immediate rejection of the submitted manuscript. Also, if an author uses copyrighted photographs or other material, a release from the copyright holder should be submitted.

Appearance

Manuscripts shall be computer-printed or neatly typed. Lines should be double-spaced, including figure legends, table footnotes, and references. All pages should be sequentially numbered. Upon acceptance of the manuscript for publication, an electronic version is requested (Word, WordPerfect, or Star-Office/Open Office), with the graphics in separate electronic files. However, if submission of an electronic final version is not possible for the author, then a cleanly printed or typed copy is acceptable.

Submitted manuscripts should have the following organizational format:

- 1. Title page.** This page should contain the title of the manuscript, the author's name, and all relevant contact information (including mailing address, telephone number, fax number, and e-mail address). If the manuscript is submitted by multiple authors, one author should serve as the corresponding author, and this should be noted on the title page.
- 2. Abstract page.** This is page 1 of the manuscript, and should contain the article title at the top, followed by the abstract for the article. Abstracts should be between 100 and 250 words in length and present an overview of the material discussed in the article, including all major conclusions. Use of abbreviations and references in the abstract should be avoided. This page should also contain at least five key words appropriate for identifying this article via a computer search.
- 3. Introduction.** The introduction should provide sufficient background information to allow the reader to understand the relevance and significance of the article for creation science.
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ated by placing abbreviations in parentheses following the first usage of the term in the text, for example, polyacrylamide gel electrophoresis (PAGE) or catastrophic plate tectonics (CPT). Only the abbreviation need be used afterward. If numerous abbreviations are used, authors should consider providing a list of abbreviations. Also, because of the variable usage of the terms “microevolution” and “macroevolution,” authors should clearly define how they are specifically using these terms. Use of the term “creationism” should be avoided. All figures and tables should be cited in the body of the text, and be numbered in the sequential order that they appear in the text (figures and tables are numbered separately with Arabic and Roman numerals, respectively).

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Margulis, L. 1971a. The origin of plant and animal cells. *American Scientific* 59:230–235.

Margulis, L. 1971b. *Origin of Eukaryotic Cells*. Yale University Press, New Haven, CT.

Hitchcock, A.S. 1971. *Manual of Grasses of the United States*. Dover Publications, New York, NY.

Walker, T.B. 1994. A biblical geologic model. In Walsh, R.E. (editor), *Proceedings of the Third International Conference on Creationism* (technical symposium sessions), pp. 581–592. Creation Science Fellowship, Pittsburgh, PA.

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Submission of letters regarding topics relevant to the Society or creation science is encouraged. Submission of letters commenting upon articles published in the *Quarterly* will be published two issues after the article’s original publication date. Authors will be given an opportunity for a concurrent response. No further letters referring to a specific *Quarterly* article will be published. Following this period, individuals who desire to write additional responses/comments (particularly critical comments) regarding a specific *Quarterly* article are encouraged to submit their own articles to the *Quarterly* for review and publication.

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Creation Research Society

History—The Creation Research Society was organized in 1963, with Dr. Walter E. Lammerts as first president and editor of a quarterly publication. Initially started as an informal committee of 10 scientists, it has grown rapidly, evidently filling a need for an association devoted to research and publication in the field of scientific creation, with a current membership of over 600 voting members (graduate degrees in science) and about 1000 non-voting members. The *Creation Research Society Quarterly* is a peer-reviewed technical journal. It has been gradually enlarged and modified, and is currently recognized as one of the outstanding publications in the field. In 1996 the CRSQ was joined by the newsletter *Creation Matters* as a source of information of interest to creationists.

Activities—The Society is a research and publication society, and also engages in various meetings and promotional activities. There is no affiliation with any other scientific or religious organizations. Its members conduct research on problems related to its purposes, and a research fund and research center are maintained to assist in such projects. Contributions to the research

fund for these purposes are tax deductible. As part of its vigorous research and field study programs, the Society operates The Van Andel Creation Research Center in Chino Valley, Arizona.

Membership—Voting membership is limited to scientists who have at least an earned graduate degree in a natural or applied science and subscribe to the Statement of Belief. Sustaining membership is available for those who do not meet the academic criterion for voting membership, but do subscribe to the Statement of Belief.

Statement of Belief—Members of the Creation Research Society, which include research scientists representing various fields of scientific inquiry, are committed to full belief in the biblical record of creation and early history, and thus to a concept of dynamic special creation (as opposed to evolution) both of the universe and the earth with its complexity of living forms. We propose to re-evaluate science from this viewpoint, and since 1964 have published a quarterly of research articles in this field. *All members of the Society subscribe to the following statement of belief:*

1. The Bible is the written Word of God, and because it

is inspired throughout, all its assertions are historically and scientifically true in all the original autographs. To the student of nature this means that the account of origins in Genesis is a factual presentation of simple historical truths.

2. All basic types of living things, including humans, were made by direct creative acts of God during the Creation Week described in Genesis. Whatever biological changes have occurred since Creation Week have accomplished only changes within the original created kinds.

3. The Great Flood described in Genesis, commonly referred to as the Noachian Flood, was a historical event worldwide in its extent and effect.

4. We are an organization of Christian men and women of science who accept Jesus Christ as our Lord and Savior. The act of the special creation of Adam and Eve as one man and woman and their subsequent fall into sin is the basis for our belief in the necessity of a Savior for all people. Therefore, salvation can come only through accepting Jesus Christ as our Savior.

iDINO

Investigation of Dinosaur Intact Natural Osteo-tissue

A CRS Research Initiative

Scientists of the Creation Research Society are conducting a project to investigate the presence of intact tissue in dinosaur bones.

In the past several years, different studies have reported evidence of non-fossilized tissue (e.g., compact bone cells) and intact protein remaining inside fossilized dinosaur bones. Since these fossils traditionally have been dated at ages greater than 65 million years, the presence of this non-fossilized tissue is a direct challenge to the entire evolutionary “millions of years” time frame.

As part of the iDINO project, supraorbital horn of a Triceratops has been obtained and analyzed. This analysis revealed intact osteo-tissue containing osteocyte-like structures with detailed filipodial-like interconnections and secondary branching. The intricate detail of these observed cells offers a strong challenge to claims that the tissue is bacterial biofilm or microscopic artifacts. Instead, these results give powerful evidence that dinosaur fossils are really only a few thousand years old.

The Society is seeking funding from interested groups, churches, and individuals. This funding for the iDINO project will enable a more extensive examination of this supraorbital horn as well as other dinosaur specimens.

For more information contact us at (928) 636-1153 or crsvarc@crsvarc.com.

Also visit www.creationresearch.org for project updates and details.



Figure 1. CRS excavation team at a site in Hell Creek Formation, MT. Dinosaur specimens were obtained that have revealed the presence of intact tissue.



Figure 2. CRS team members excavated a large Triceratops horn at a the Montana site. Analysis of this horn indicates the presence of intact compact bone cells that have not yet fossilized.

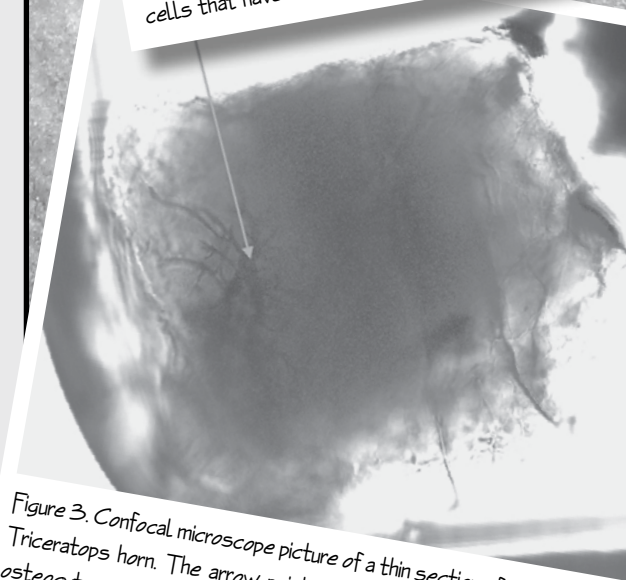


Figure 3. Confocal microscope picture of a thin section of material from Triceratops horn. The arrow points to what appears to be an intact osteocyte cell (a common cell in mature bone). The fluorescence of the cell indicates that it has not yet fossilized.