

CREATION RESEARCH SOCIETY



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- The background of the cover is a photograph of a rustic log cabin nestled in a dense forest of tall evergreen trees. A large, thick tree trunk is visible on the left side of the frame. The cabin has a stone chimney and a stack of firewood in front of it.
- THE ORIGIN OF GRAND CANYON--PART V
 - THE ORIGIN OF TREES
 - THE SEARCH FOR EVIDENCE
CONCERNING THE ORIGIN OF FISH

Creation Research Society Quarterly

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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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CRSQeditor@creationresearch.org or to
Kevin L. Anderson, Van Andel Creation Research
Center, 6801 N. Highway 89, Chino Valley, AZ 86323.

Send book reviews to the Book Review Editor:
Don B. DeYoung, 200 Seminary Dr.,
Winona Lake, IN 46590, dbdeyoung@grace.edu.

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Editorial

Guilty as Charged

The deadliest contagion is majority opinion.

—Unknown

Members of the Creation Research Society readily recognize that neither their Biblical nor their scientific position represents a majority view—not even close to a majority view. Nonetheless, holding a popular opinion about anything should never be a quest for Christians. While not all majority-held ideas are wrong, Christ warned that many are clearly wrong (Matt 7:12–15).

The popular perspective today is that galaxies, stars, and planets naturally formed over the course of billions of years. On some of these planets (e.g., earth), life spontaneously arose and transformed to its present state of complexity and diversity. Apparently, many Christians assume the popularity of this view makes it true. Thus, they work to accommodate this non-creation perspective into some fabric of their Christian worldview (so-called). What they have failed to understand is that the Biblical teaching of creation could never be popular in a lost and fallen world.

Sadly, this accommodation extends to much of the widely read Christian literature as well. This, in turn, influences countless additional Christians to think they too should somehow accommodate this “truth by majority opinion” into their own Biblical understanding. Rarely, if ever, is the young-earth biblical creation (YEC) position mentioned, except in a derogatory manner.

On occasion, I (or the society) have been invited by a major Christian publication to submit a short article supporting the YEC position. It is almost as if somehow the occasional token invitation will balance the ledger sheet. But as rare as these invitations are, actual publication of any YEC article is even rarer—virtually nonexistent.

Below is one such article, which I submitted upon invitation by a popular Christian magazine. The article was never published, and no specific reason was provided. Subsequently, I was offered a similar invitation from a different publication with the same outcome. Since both these magazines have previously published several anti-YEC articles, it is rather revealing that they ultimately could not bring themselves to publish even one affirmative article. This is an unfortunate indication of how much evolution/anti-YEC has become entrenched in our secularized Christian culture.

The title of the following article is *Guilty as Charged*, and I still remain guilty.

Moron! Idiot! Imbecile! These are some of the “printable” names I have been called. My crime? I am a young-earth creationist (YEC for short). As such, I am guilty of two unpardonable “sins”—rejecting the popularly-held view that evolution is the only valid and accurate scientific theory for life and not accept-

ing the earth’s age as some 4.5 billion years. In most scientific and theological circles, this makes me someone deserving of ridicule. In fact, in some so-called Christian intellectual circles, YECs are viewed as a type of illegitimate stepchild they are forced to tolerate. This tolerance is then viewed as both embarrassing and intellectually insulting, hindering the church’s ability to attract intellectuals or appeal to “educated” people of the twenty-first century.

So be it. I am not inclined to change my thinking, at least not until some of my questions and challenges are addressed far better than anyone has so far. Let me explain.

Admittedly, the dominant thinking in “scientific circles” is that all life originated by a process of evolution over a period of several hundred million years. Thus, many Christians simply take for granted this is the only scientifically valid explanation of life (and assume God somehow used this process). However, to discuss evolution first requires a clarification of what even is “evolution.” This is unfortunate, since as a scientific concept, evolution should be clearly defined and described. Instead, textbooks often merely give vague descriptions such as “change” or “change in gene frequency,” and evolutionists have typically maintained that virtually any biological change is an evolutionary change. However, mere changes can also fit succinctly within a YEC framework, so this “vanilla” definition of evolution fails to distinguish itself from creation.

More precisely, the theory of evolution proposes that all life on earth had a common origin and shares a common evolutionary ancestry, i.e., the “common descent” of life. In his *Origin of the Species*, Charles Darwin summarized this concept: “All animals and plants are descended from some one prototype.” In other words, we and oak trees share a common ancestor from which we both evolved. Through this process of common descent, evolution claims to account for the origin and diversity of all life. Thus, evolution is more correctly defined as “common descent,” and this becomes a key distinction between the evolutionists’ and creationists’ positions. Within this parameter, scientific and Biblical concepts should be considered, and many of the arguments for evolution should be challenged. Mere change does not necessarily give you common descent. It certainly does not give you humans evolving from non-humans. In fact, “common descent” requires specific types of biological change—changes that can account for the origin of specialized functions such as flight, vision, or cognition. It is these specific types of changes that evolutionists have failed to demonstrate (my public challenge continues for evolutionists to provide an adequate genetic mechanism for common descent).

Another critical aspect of this controversy is the manner by which much of the public (and many scientists) receives information. Sitting on my desk is a newspaper clipping with the headline, “New Ancestor to Humans Found; Bridges Evolutionary Gap.” What most of the public will not be told are all the assumptions and questionable conclusions often involved in such proclamations. A case in point: The 1970s saw the very loud proclamation that *Australopithecus afarensis* AL 288-1 (more popularly known as “Lucy”) was virtually the ‘perfect’ fossil link between humans and our prehuman ancestry. In other words, she was the so-called missing link.

Anyone disagreeing, especially those Bible-thumping YECs, was just simply too ignorant to tolerate. Not nearly as well known were the serious and persistent questions about Lucy’s reconstruction—questions so serious that some of her leading supporters finally concluded that her fossilized pelvis needed to be reshaped. Why? Its form would not have allowed Lucy to walk upright. Since the popular opinion was that she did walk upright, then there must be a problem with the shape of her pelvis. Perhaps it had been damaged. Thus, it needed to be cut and reshaped to make it more like a human pelvis. Do I exaggerate? Watch the October 11, 1994, episode of *Nova*, and hear the admission first hand.

Like a master magician, evolutionists constantly keep the public eye mesmerized with continual claims of new evidence, with little hint that last year’s evidence needs to be repackaged or discarded. This unending barrage of so-called new evidence creates the popular illusion that the scientific evidence for evolution is consistently mounting, ultimately making it overwhelming. In fact, in some evolutionist circles, the cry of “overwhelming evidence” has almost become a mantra.

However, my experience has been that when asked for specifics of this overwhelming evidence, evolutionists recite such examples as peppered moths, finch beaks, and antibiotic resistance. A quick check of most college biology textbooks also reveals this as typical evidence. This brings me back to the earlier discussion of how evolution is defined. The examples of moth coloration and shape and size of bird beaks actually represent transformations of physical features associated with environmental conditions. If these conditions revert back to their previous state, so do the animals’ characteristics. Such an oscillation hardly represents evidence of common descent. What is more, mutations that cause bacterial resistance to antibiotics do so by eliminating features, such as

regulatory proteins or transport systems. Elimination of such systems cannot be offered as evidence for common descent, since common descent requires the *creation* of new systems (not their elimination). In fact, these “evidences” are readily explained by creation, and they demonstrate the inherent design within life to adapt to ever changing environmental conditions.

Writing in the *National Review*, noted microbiologist Dr. James Shapiro remarked, “There are no detailed Darwinian accounts for the evolution of any fundamental biochemical or cellular system, only a variety of wishful speculations.” This is hardly a statement consistent with claims of “overwhelming evidence.”

Other Christians reject many of the tenants of evolution (for some of the reasons I have cited), yet accept the great ages (i.e., billions of years) commonly assigned to the earth. Part of this disagreement among “creationists” centers on the frequent claim of “overwhelming evidence” for an old earth. But what does it mean to say the earth is old? The earth is old compared to what? Indeed, the initial conclusion that the earth is old was derived simply from the perception that it “looked old”—mountains, canyons, rivers, and oceans must take far longer to form than a mere 6,000 years.

In the twentieth century, certain analytical methods (especially radiometric ones) were claimed to objectively demonstrate great ages for the earth. But are such analytical methods truly objective, and do such methods give unambiguous results? Another case in point: In 1972, a fossilized skull was discovered that has since been identified merely as KMN-ER 1470 (this is its museum designation; it was never favored with a special nickname such as Lucy or Java Man). The African lakebed where this discovery was made had previously been dated at 2.6 million years using several different (supposedly independent) techniques, including radiometric. (Interest-

ingly, initial radiometric dating of the lakebed had placed it at over 200 million years, but this age was rejected since the lakebed contained fossils “known” to be far younger.)

However, radiometric dating is expensive and tedious, so samples from local regions are generally not analyzed until there is a specific reason (e.g., a significant fossil discovery). In this case, though, a significant fossil discovery was made after a radiometric age of 2.6 million years had already been assigned to the lakebed. Using this preassigned age, the 1470 fossil was then given an estimated age of 2.9 million years.

The problem was that physical features of KMN-ER 1470 were far too modern to have evolved so long ago, and immediately the assigned age was challenged. Claims of sample contamination, poor method calibration, and inaccurate sample collection were made, and new dating analysis of the lakebed soon began. Ultimately, using certain fossils found in the lakebed as a guide, a new age of 1.8 millions years was given to KMN-ER 1470. This new age was far more palatable for evolutionists, and the controversy passed.

Ironically, though, this new date required rejecting ages given by the very same so-called independent and analytical methods that many insist are a key proof that the earth is “old.” Instead, fossils “trumped” the radiometric methods. These fossils, used to guide dating techniques, are known as “index fossils.” They served as the basic tool for dating geologic strata long before the establishment of any radiometric methods (this concept was originally suggested by William Smith in the late eighteenth century and subsequently used in the nineteenth century to help establish the geologic column). But it is very reasonable to ask how we know the ages of these index fossils? Where is the independent verification? Where was

the independent verification for the age assigned to KMN-ER 1470? The answer? Ages of index fossils were assigned based upon their alleged evolutionary history. Thus, paradoxically many people find themselves rejecting the main tenants of evolution, but still accepting their application in geologic dating.

So, when some creationists challenge the assumptions and conclusions of the various dating methods commonly employed by evolutionists, it is not merely because of their “religious” beliefs or scientific ignorance. You do not have to check your brain at the door to support a YEC position. Nor is YEC merely a contrivance of twentieth-century fundamentalists, as some suggest (apparently ignoring the writings of eighteenth- and nineteenth-century geologists, such as George Young and William Rhind). There are serious (but often ignored) problems with the popular dating techniques. Attempts to date “young” samples with the uranium/lead technique or to date “old” samples with carbon-14 are known to give erroneous results. Yet, what criteria are used to establish a date for samples in order to know which method to use to establish a date for the samples? The circularity is unavoidable.

In addition, the ubiquity of carbon-14 provides evidence of an earth much younger than billions, or even millions of years. In less than one million years, radioactive decay will deplete every atom of carbon-14 from any fossil. Yet, a study by a group of creation scientists (presented at the 2003 Conference of the American Geophysical Union) reported that detectable levels of carbon-14 could still be found in a variety of samples taken from many different geologic periods. All of these samples are allegedly far older than one million years, including diamonds presumed to be over a billion years old. The results were both consistent and conclusive.

Detectable levels of carbon-14 were found in all samples—fossils, coal, and diamonds—regardless of their alleged age. Using the very same reasoning as evolutionary geologists, carbon-14 data provide clear evidence that these samples are all far less than a million years old.

Critics have yet to offer a significant response to this work. But ultimately I suspect they will reason the study must be flawed (even if they cannot determine how), because it is so well established that the earth is some 4.5 billion years of age. But, this brings us back to the initial question. How was an age of 4.5 billion years established, and why is this more scientifically acceptable than the earth being only a few thousands years of age?

As a final note, physicist, Dr. H. Lipson’s comments (*Physics Bulletin*, 1980) can serve as a warning in this controversy: “Evolution became in a sense a scientific religion; almost all scientists have accepted it and many are prepared to ‘bend’ their observations to fit in with it.” I have briefly offered some examples of how observations are bent to fit an evolutionary paradigm and how this affects various scientific conclusions, including geologic dating.

I have not attempted to offer a final word on this topic and have not even dealt with any of the Biblical aspects, such as the recent statement by some Catholic bishops that we should not expect Scripture (esp. Genesis) to be either scientifically or historically accurate. But I do offer the challenge that we Christians should fully evaluate what we believe about origins and not merely parrot the popular opinions expressed in our textbook or a TV program. Instead, perhaps all of us can be brave enough to be guilty as charged.

Kevin Anderson, Ph.D.
Editor

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CPRSQ

The Origin of Trees

Tom Hennigan and Jerry Bergman*

Abstract

According to Genesis, trees were created on the third day of the Creation Week. Within a Biblical worldview, this suggests that they are discontinuous with other plant forms. Naturalists posit that trees arose by random processes from simpler photosynthetic organisms. Fossil evidence for tree evolution from putative non-tree precursors is evaluated. It is concluded that the fossil record does not support an evolutionary origin for trees from non-tree plant forms. The earliest trees found in the fossil record were well developed, and no plausible explanation exists to overcome the enormous odds against their evolutionary origins from single-celled ancestors. It is concluded that when the fossil record, tree ecology, global Flood, and complex biochemical systems are analyzed within a Biblical worldview, the data are consistent with the Genesis account that God directly created trees.

Introduction

Trees have been powerful life symbols throughout history and across cultures. For example, Tu B'Shevat is Jewish Arbor Day and takes place on the fifteenth of Shevat, sometime between mid-January and mid-February. Shevat is the name of the Jewish month when spring begins in Israel and trees come to life again after the winter. According to Jewish tradition, Tu B'Shevat celebrates trees because they symbolize the Torah and represent beauty and vitality. The psalmist paints the analogy that those who trust and live by God's precepts are likened to solidly rooted trees that have steadfast, fruitful, and vital lives because

they are tapped into the source of life.

The word "tree" [Heb. *ēts*; Gr. *déndron* (*xýlon*)], also "timber" or "wood," is referenced nearly 300 times in Scripture and is a major feature of God's creation (Tenney, 1967, p 869). The Bible specifically names at least 30 species of trees. (See Table I for a sampling of these tree species.) Linguistic difficulties, such as translating Hebrew and Greek words that are more like local common names, and a lack of direct one-to-one correspondence between species and Bible words, make it difficult to identify exactly what tree species is being discussed (Oberpriller, 2011, personal communication). For example, because

of the above linguistic challenges, trees identified as pine, juniper, cypress, and cedar often preclude a precise identification. The Genesis account suggests that trees are discontinuous from other vegetational growth forms and did not originate from simpler precursors. Trees were created on Day 3 according to their kinds, or baramin (Gen. 1:11–12; 1:29; 2:9; 2:16), and Genesis chapters 6–9 revealed a historic worldwide Flood that helps explain the world's massive graveyards. It is upon this foundation that creationists can develop scientific models of the origin of trees and fossil strata.

Alternatively, neo-Darwinian evolutionists assume that trees arose by random, natural processes through descent with modification. When discussing the term "evolution," it is important that it be carefully defined because it can be a slippery and confusing word. For

* Tom Hennigan, Georgetown, New York, tdhennigan@citlink.net

Jerry Bergman, Northwest State College, Archbold, Ohio, jerrybergman30@yahoo.com

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Table I. A sampling of trees mentioned in the Bible

<u>Biblical Name & General Taxonomy</u>	<u>Scientific Name</u>	<u>Growth Form</u>	<u>A Sampling of Scripture References</u>
Acacia (Magnoliophyta - dicot)	<i>A. tortilis?</i> <i>A. albidia?</i> <i>A. radianna?</i>	Tree 6-30 m	Exodus 25:10,23
Algum (almug) - Grecian juniper?, Lebanon cedar? Pinophyta	<i>Juniperus excelsa?</i> <i>Cedrus libani?</i>	Trees, 20m, pyramidal shape	2 Chronicles 2:3,4,7-9
Almond (peach family - Magnoliophyta)	<i>Amygdalus communis</i> (<i>Prunus dulcis</i>)	Tree, 4-10 m	Genesis 43:11; Numbers 17:8
"Almug" (red sandalwood) Magnoliophyta - dicot	<i>Pterocarpus santalinus</i>	Small tree up to 8 m	1 Kings 10: 11,12
Aloes ("Agar/Agarwood") Magnoliophyta - dicot	<i>Aquilaria agallocha?</i> <i>A. mallaccensis</i> (New Testament <i>Aloe vera?</i> or <i>A.saponera?</i>)	Evergreen tree up to 21 m	Numbers 24:6; Psalm 45:8; Proverbs 7:17
Apples (Magnoliophyta - dicot - may also refer to apricots)	<i>Malus domestica?</i> <i>Prunus armeniaca?</i>	Tree 3-12 m	Song of Solomon 2:3
Box tree ("ashur wood") Magnoliophyta - dicot	<i>Buxus longifolia?</i> <i>B. balearica?</i>	Tree or shrub, very hard wood	Isaiah 41:19; 60:13
Edible Pistachio (Magnoliophyta - dicot)	<i>Pistacia vera</i>	Tree up to 10 m	Genesis 43:11
Cedar - mentioned 72 times in the bible- Cedar of Lebanon - Pinophyta	<i>Cedrus libani</i>	Large tree up to 40m	Ezekiel 31:3,5; Psalm 92:12
Cypress - (Pinophyta)	<i>Cupressus sempervirens</i>	Large tree up to 35 m	Isaiah 44:14
Date Palm (Magnoliophyta - monocot)	<i>Phoenix dactylifera</i>	Tree 15 to 25 m	Judges 4:5
Ebony (Magnoliophyta - dicot)	<i>Diospyros ebenum</i>	Tree 20-25 m	Ezekiel 27:15
Common Fig - Magnoliophyta - dicot	<i>Ficus carica</i> ; <i>F. sycomorus</i>	Shrubs to small trees 7-10 m Medium size trees 20 m	Genesis 3:6,7; 1 Kings 4:25; 1 Samuel 25:18 Amos 7:14; Luke 19:1-4
Frankincense (aromatic resin) (Magnoliophyta - dicot)	<i>Boswellia sacra</i> , <i>B. thurifera?</i> , <i>B. carterii?</i> , <i>B. papyrifera?</i>	Small trees or shrubs 2-8 m	Exodus 30:34; Matthew 2:10,11
Oak (Holly/Valonia Magnoliophyta - dicot)	<i>Quercus ilex</i> and/or <i>Q. aegilops</i>	Medium size tree 20 m	Genesis 35:8; Zechariah 11:2;
Oriental Plane Tree ("chestnut") Magnoliophyta - dicot	<i>Platanus orientalis</i>	Tree 20 m	Genesis 30:37
Olive (Magnoliophyta - dicot)	<i>Olea europae</i>	Shrubs but mostly small trees 8-15 m	Exodus 23:11, 27:20; Deut. 28:40
Willows (Magnoliophyta - dicots) Aspens (Magnoliophyta - dicots)	<i>Salix</i> sp. (Palestine willows)? <i>Populus euphratica</i> and/or <i>P. alba</i> (aspens)?	Medium size tree 10-30 m Medium size tree 15 - 27 m	Judges 16:7-9; Job 40:22; Isa. 15:7, 44:4 Psalm 137:2

Sources: Tenney, 1967; Musselman, 2003; Oberprillar, 2011

? = linguistic analysis unclear about species identification

example, processes such as natural selection, mutation, genetic drift, speciation, and changing allelic frequencies have each been termed evolution. Though the details and magnitudes of importance of these processes may differ in the minds of creationists and evolutionary naturalists, all agree that each of them has been observed. For the purposes of this paper, neo-Darwinian evolution is defined as the random and undirected natural process in which mutation and natural selection are thought to have produced trees from non-tree photosynthetic precursors over billions of years.

Relatively little has been published in creation publications about the evolution of trees. Most creation articles on

trees have been related to the issue of chronology (see Lammerts, 1975; 1983; Kreiss, 1985; Bergman and Doolan, 1987; Aardsma, 1993; Beasley, 1993; Lorey, 1994; Bates, 2003; Williams, 2004, and Woodmorappe, 2003). Coppedge (2003) covered the intelligent design of the tree fluid-pumping system. Howe (1987b) argued the importance of creationist explanations for plant biogeography from the perspective of Flood and post-Flood geological influences on mountain formation. It is well known that mountains are a big factor in determining weather patterns that influence plant and animal associations all over the world. Because both creation and evolution begin with differing presup-

positions, we examine which presuppositional worldview is most consistent with the data.

The Importance of Trees

Trees cover at least 27% of the terrestrial landscape (Petit and Hampe, 2006, p. 188) and are called *groves* (*copses*) if they grow in small groups and *forests* when they are in high densities over large areas. They are extremely diverse and numerically successful. Over 80,000 known species are found in locations ranging from the tropics to the Arctic Circle (Ennos, 2001, p. 5).

Trees play a crucial role in life. They are critical to the biosphere in maintaining biodiversity through a complex

of symbiosis sets including sheltering organisms, absorbing carbon dioxide, preventing erosion, producing oxygen, regulating climate, cycling and distributing crucial nutrients, providing raw materials, and cleaning the air. Tudge concluded that trees are required for the very existence of the world as we know it (2006, p. 56).

Morphology and Biosystematics

Trees are not a single taxonomic entity, and their characteristics are very diverse. They comprise many families and differ in reproductive systems, leaf morphology, stem growth, and bark characteristics. These differing traits correspond to the environment in which they live. Complicating their taxonomic status is the tree and shrub differentiation. Trees are defined as single stemmed, perennial, woody plants with secondary branches emanating from the trunk above the ground (Figure 1). Mature tree morphology is characterized by apical dominance, where the main stem dominates the lateral stems (Harlow and Harrar, 1969, p. 2; Ennos, 2001, p. 7).

In contrast, shrubs are defined as small diameter woody plants with many basal stems (rather than a single bole) and many branches off multiple stems (Figure 2). Because there is no apical dominance, their appearance is bushy. Some species, such as pomegranates (*Punica granatum*) and olives (*Olea europaea*), depending on environmental factors, can have both shrub and tree morphologies (Musselman, 2003).

Trees tend to be long lived, often reaching hundreds of years of age. The oldest non-clonal extant tree is Methuselah, a Great Basin Bristlecone pine (*Pinus longaeva*) estimated to be over 4700 years of age, assuming each growth ring represents one year (Schulman, 2010; Woodmorappe, 2003). To be classified as a tree generally the plant must reach a minimum height of 3–6 m. The tallest extant tree is a giant coastal



Figure 1. Eastern white pine (*Pinus strobus*). Division: Pinophyta. Historically it was used for ship masts and continues to be used as lumber, Christmas trees, and in medicine. It is an ecologically important tree for many reasons, including food production for many organisms, structure for nesting birds such as the American bald eagle (*Haliaeetus leucocephalus*), and refuge trees for American black bears (*Ursus americanus*). Notice the single bole and apical dominance. (Photo by Tom Hennigan)

redwood (*Sequoia sempervirens*) topping out at 116 m (Gymnosperm Data Base, 2010).

The major tree organs consist of a woody trunk, roots, leaves, and branches.

These critical design features allow them to survive on land by solving the difficulties of staying vertical, not breaking in the wind, drawing water up to the canopy, and avoiding desiccation. Growth



Figure 2. Tartarian honeysuckle shrub (*Lonicera tatarica*). Division: Magnoliophyta. An invasive species common through much of North America, its shrubby characteristics include many small-diameter, woody basal stems (rather than a single bole) and many branches off multiple stems. (Photo by Tom Hennigan)

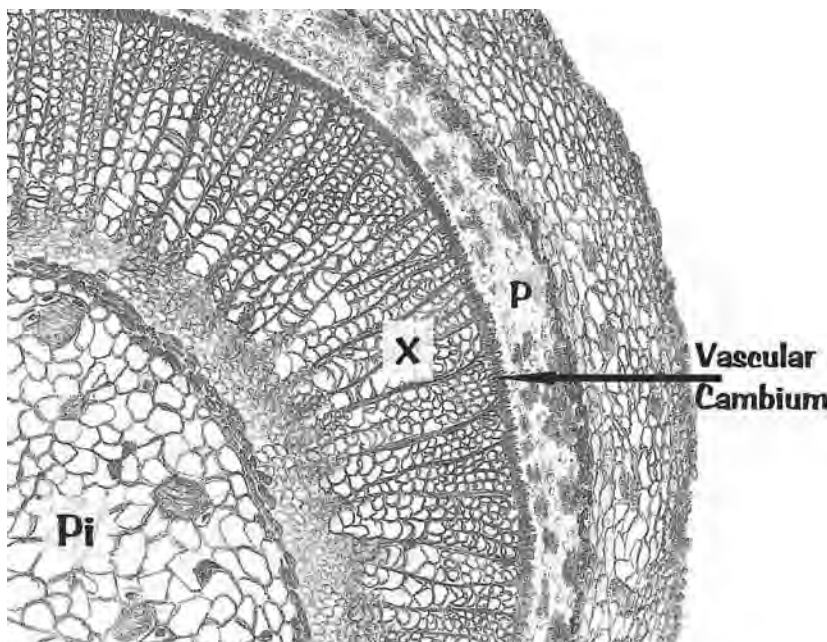


Figure 3. Diagram of woody dicot (*Tilia sp.*) shown with secondary xylem (X), which conducts water and minerals up the plant, and secondary phloem (P), which conducts organic compounds throughout the plant. Both phloem and secondary xylem tissues are produced by meristematic cells in the vascular cambium and grow outward in exogenous trees. Pith (Pi) is involved with nutrient storage and transport. (Drawing courtesy of Jennifer Hennigan)

rate and longevity will vary and depend on the existence of secondary tissue.

Trees are vascular plants and have two major types of transport tissue: phloem and xylem (Figure 3). Phloem is the mostly living tissue of the innermost layer of bark. It transports organic nutrients wherever they are needed. Primary and secondary xylem is the water and mineral transport tissue, made mostly of dead cells. Primary xylem is the xylem formed during primary growth when cells elongate, mature, and cause the plant to grow taller. Trees have secondary xylem (wood), which produces secondary growth causing an increase in diameter of the bole.

Both phloem and secondary xylem tissues are produced by meristematic cells in the vascular cambium (Figure 3) and grow outward in exogenous trees. Exogenous trees make up the majority of tree species and include conifers and broadleaf trees in which growth rings are added as tree girth increases. These are distinguished from endogenous trees (palms and other plants like cacti) where stem diameters grow inward and do not produce growth rings.

With few exceptions, and depending on the source, trees are generally classified as either Gymnosperms or Angiosperms (Figure 4). *Gymnosperm* literally means “naked seed” and refers to the characteristic of uncovered ovules in their unfertilized state. Gymnosperm Divisions include; Pinophyta (conifers like the spruces, pines, firs, redwoods, cedars, and hemlocks), Ginkgophyta (Ginkgos), Cycadophyta (Cycads), and Gnetophyta that consists of small trees or shrubs like “paddy oats” (*Gnetum gnemon*) with vessel elements and flowers that look very much like flowering plants (Gymnosperm Data Base, 2010).

Most trees are Angiosperms (Division Magnoliophyta) because the majority of trees produce flowers and have covered ovules in their unfertilized state. They can be further classified into dicots (seeds having two cotyledons, or

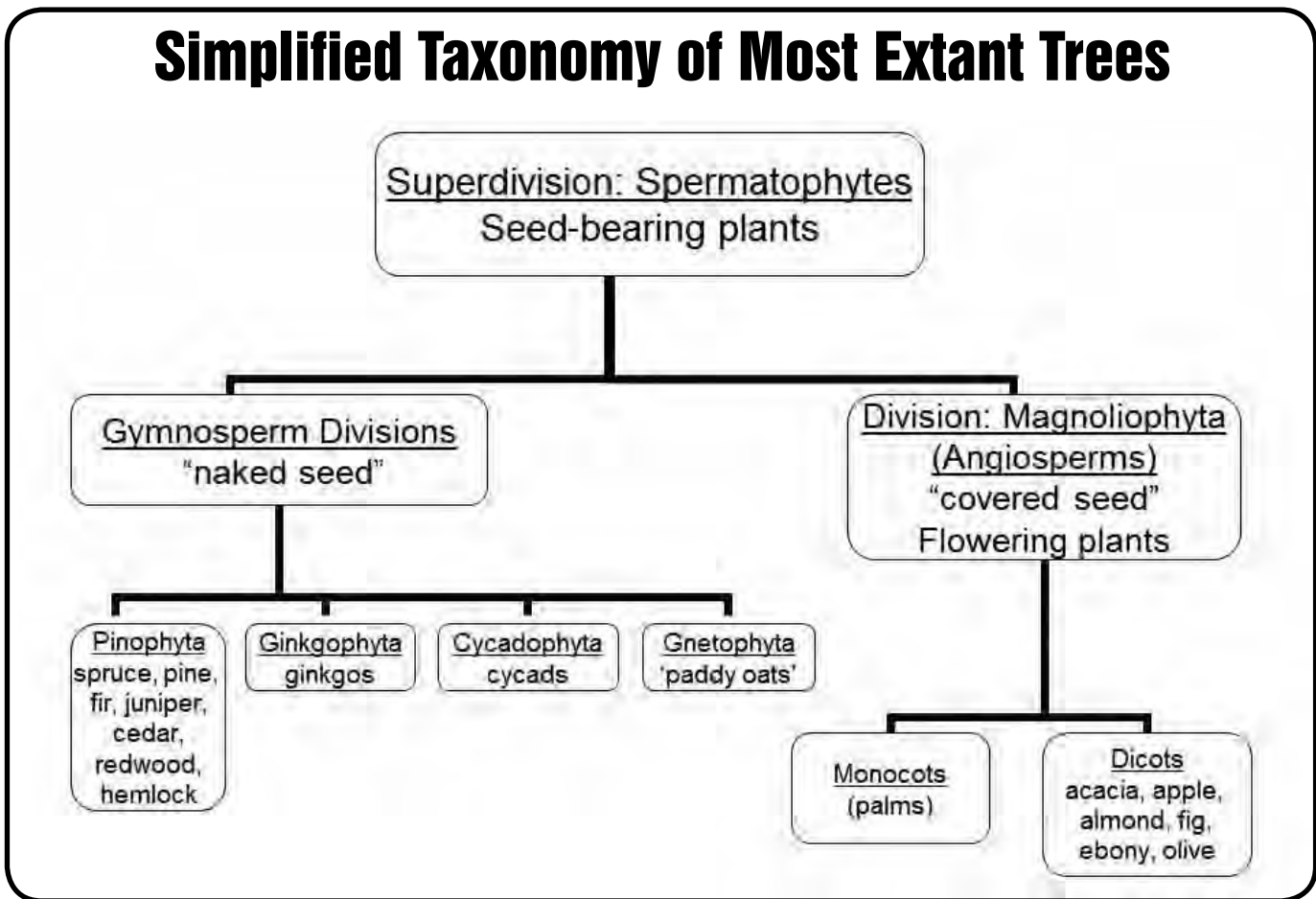


Figure 4. With few exceptions, and depending on the source, trees are generally classified as either gymnosperms or angiosperms. Figure 4 shows the major gymnosperm and angiosperm divisions with example species for each.

embryonic seed leaves such as broadleaf trees) and monocots (seeds having one cotyledon such as palms).

Origin of Trees and the Fossil Record

Evolutionary predictions of general plant evolution, from simple to complex, are highly correlated with rock stratigraphy as one travels up the geologic column. This suggests there is a mechanism generating fossil order in the strata (Wise, 2003). The question discussed later is whether evolution is the only explanation for that order.

Many of the Carboniferous strata

contain fossil remnants of extinct forests consisting of tree ferns (Order Cyatheaales), horsetails (Order Equisetopsida), and lycopsids (Division Lycopodiophyta). The Carboniferous is characterized by most of the world's coal seams and takes place from the mid Devonian period to the Permian, roughly 410–250 million years ago (Mya), according to evolutionary presuppositions. Remnants of fossil forests are observed in these layers and much of their evolutionary history comes from the interpretation of these fossils. Evidence suggests that some lycopsid species grew in large floating forests (Scheven, 1996). While tree morphologies in Equisetopsida and

Lycopodiophyta are extinct today, tree ferns still exist (Smith et al., 2006).

Extant members of Equisetopsida genus *Equisetum* include unique plants like the horsetails. These plants and diatoms share the unique trait of cell walls impregnated with glass (SiO_2). Because of the SiO_2 , horsetails have a rough texture and were used by Native Americans to scrub pots clean. Horsetails, including tree forms, appear abruptly in the fossil record and some extinct forms have more complicated and advanced spore-bearing organs than extant plants in the family (Howe, 1987a). These observations are not predicted by evolutionary presuppositions.

According to evolutionary interpretations of the fossil record, cyanobacteria were the first photosynthetic organisms and arose 3.5 billion years ago. True algae (Kingdom Protocista) arose 2.4–1.8 billion years ago, the first land plants evolved from Protocista and appeared 460 Mya (McLamb and Hall, 2010), and trees evolved from those early herbaceous land plants. Paleobotanists claim that trees have dominated terrestrial ecosystems for over 370 million years, which implies that their evolution should be well documented in the fossil record (e.g., Petit and Hampe, 2006, p. 204).

The first forests are widely cited to comprise fernlike trees called *Cladoxylopsids*. A tree in this group, *Wattieza*, is thought to be the earliest tree and is interpreted to have arisen in the later Devonian 380–360 Mya (e.g., Stein et al., 2007; Jannot, 2009, p. 82). In the 1870s, an intact crown was discovered in New York, and its reconstruction suggests that it was at least 8m tall, fernlike, with a trunk bearing long branches and having a root system with complex vascular tissue. Currently, specimens of *Cladoxylopsidi* have also been found in Venezuela and Belgium, indicating that this tree type was widespread.

Another tall and extinct tree was *Archaeopteris*. It had fernlike foliage, secondary xylem, and was a major vegetative component of the Devonian/Lower Mississippian strata (Muriel and Leponce, 2001; University of California Museum of Paleontology, 2010). Such trees are grouped as Progymnosperms because their secondary xylem had circular bordered pits similar to, but not identical with, modern gymnosperms (University of California Museum of Paleontology, 2010). Because of this, many evolutionists believe that these trees are a distant relative of modern-day gymnosperms. Before *Wattieza* was discovered in 2007, *Archaeopteris* was thought to be the earliest tree. *Archaeopteris* lived about the same time as *Cladoxylopsidi* but was so different morphologically



Figure 5. Fossil tree (Genus *Cordaites*) from the Upper Carboniferous period, Joggins Fossil Cliffs. This tree had secondary xylem, conelike strobili with either seeds or pollen sacs, and advanced sporing systems that produced male and female sex cells. Fossil evidence suggests that they are far more diverse than previously thought and may have occurred in various habitats. Their discontinuity with both gymnosperms and other plant forms continues to be problematic in determining their phylogenetic position with other trees but is consistent with creationist predictions based on the presupposition of direct design. (Photo courtesy of Ian Juby)

that no claims have been made that *Cladoxylopsidi* was an evolutionary link to *Archaeopteris*.

About the same time extinct gymnosperm-like trees, genus *Cordaites* (Figure 5) thrived during the upper Carboniferous. These large trees had secondary xylem, conelike strobili with either seeds or pollen sacs, and “advanced sporing systems that produced male and female sex cells much like those contained in seeds” (Jannot, 2009, p. 82. Also see Palaeobotanical Research Institute, 2010). Fossil evidence suggests they are far more diverse than previously thought and may have occurred in various habitats. Their discontinuity with both gymnosperms and other plant forms continues to be problematic in determining their phylogenetic position

with other trees but is consistent with creationist predictions based on the presupposition of direct design.

Division Lycopodiophyta (Lycopphyta) is considered the oldest living vascular plant division, dated by evolutionists at about 410 Mya (McElwain et al., 2002). Extinct carboniferous trees from Lycopodiophyta, such as the genera *Lepidodendron* (Figure 6) and *Sigillaria* (Figure 9) are common fossils in coal beds around the world and date from the late Devonian (Wang et al., 2002). *Lepidodendron*, also called scale trees because of diamond-shaped leaf scars on the trunk, reproduced by spores, could grow over 30 meters tall, and produced trunks greater than one meter in diameter (Stewart and Rothwell, 1993, p. 128). To some observers

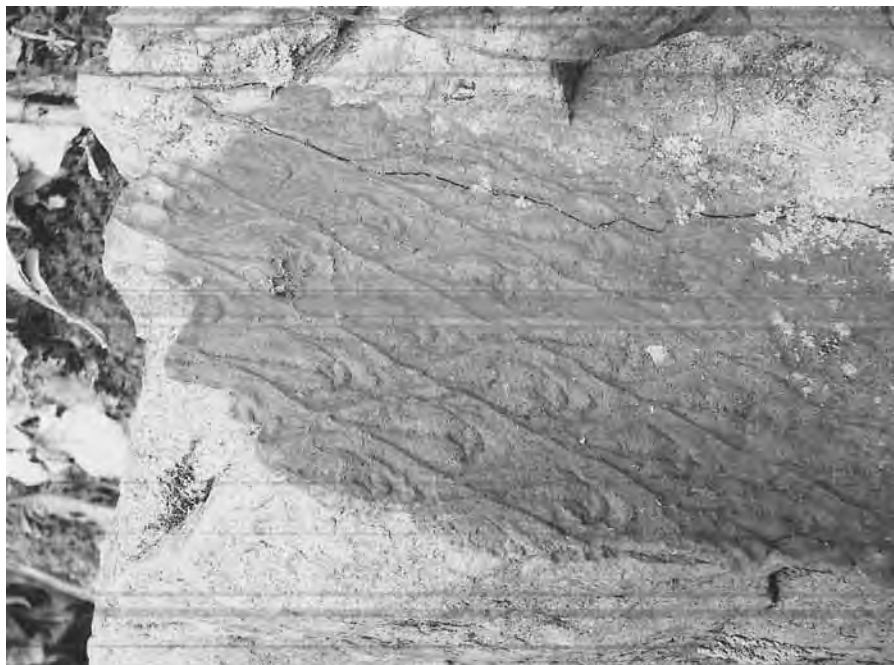


Figure 6. Flattened fossil cast (Genus *Lepidodendron*), Joggins Fossil Cliffs. These are common fossils in coal beds around the world and date from the late Devonian. Also called scale trees because of diamond shaped leaf scars on the trunk, they reproduced by spores, grew over 30 meters tall, and produced trunks greater than one meter in diameter. They seemed to have vanished overnight, geologically speaking, and no evidence exists that they evolved into modern tree types. (Photo courtesy of Ian Juby)

they look like giant forms of modern-day lycopsids (club mosses and quillworts) and are for this reason interpreted to be evolutionarily related. They produced little if any wood and apparently were supported by a barklike region that grew in diameter as the tree aged. The “leaves” of this forest giant looked like pine needles on top of a tall, straight, telephone pole. Raven noted that these trees largely “vanished almost overnight, geologically speaking” and no evidence exists that they evolved into modern tree types (Raven et al., 1986, p. 324).

Problems with Naturalistic Explanations for Tree Evolution

One classic text on tree evolution included illustrations of a large number

of ancient trees, all of which are either extinct, or nearly identical to fully modern trees, and none indicate evidence for tree evolution (Berry, 1923). Even the seeds of ancient trees are virtually indistinguishable from their modern counterparts. Professor Berry wrote that his large collection of pinecones from the Lower Cretaceous are morphologically “almost exactly like those of the existing redwood [trees that are]... found in abundance in the coulees of the present arid badlands of Western Dakota” (Berry, 1923, p. 41).

Another example, the Wollemi pine (Figure 7), was thought to have gone extinct with the dinosaurs until it was discovered several years ago in Australia (Bardell, 2006; Wieland, 2003, pp 8–9). The Wollemi pine was long thought to be extinct for 200 million years. Scientists concluded that it is marvelous

that the Wollemi pine has survived unchanged for 200 million years, but in fact it is only one of thousands of so-called living fossils known today.

For the above reasons, the “evolution of trees can only be diagrammatically represented in the most tentative way” (Johnson, 1971, pp. 24–25). Although taxonomy and phylogeny have both progressed since Darwin’s day, continuity of trees arising from single-cell precursors through evolutionary processes has not been supported by the fossil evidence (e.g., Johnson, 1973, p. 24).

Though the fossil record clearly shows a major discontinuity between trees and non-trees, the naturalistic assumption is that they must be continuous because of their assumed phylogeny and highly correlated fossil order, suggesting an increase in organ complexity through time. Traveling up the strata is assumed to be traveling through evolutionary time. Among the numerous problematic assumptions inherent in date calculations for fossil trees, not the least is the absolute requirement of deep time for evolution to occur (Baumgardner et al., 2003; Humphreys et al., 2004; Vardiman et al., 2003; Woodmorappe, 2001).

Tree Origins and the Fossil Record

Extant trees are highly diverse and contain designed systems that enable them to operate in diverse environments. For example, xylem anatomy varied structurally with trees depending on the ecological zone (i.e., coastal, bog, desert) in which they grew (Howe, 1978). Though they have similarities, depending on their environmental circumstances, trees are more often morphologically unique from each other. Because of the many important ecological roles they play in the biosphere and fossil discontinuity with non-trees, the scriptural account is consistent with the fossil record. When vascular plant groups are compared, vascular tissue patterning is found distributed throughout most plant taxa, making it difficult to determine



Figure 7. “Living fossil” — Wollemi pine (*Wollemia nobilis*) was discovered several years ago and has changed little from its fossil ancestors. Long thought to be extinct for 200 million years, scientists concluded that it is marvelous that it has survived unchanged for 200 million years. In fact, it is only one of thousands of so-called living fossils known today and does not support evolutionary fossil predictions. A shows the needlelike leaves at the end of a branch, and B is a close-up of the main trunk. (Photos courtesy of David Oberpriller)

what vascular pattern is ancestral (Howe, 1965, p.16). Therefore, a compelling alternative view to the evolution hypothesis is that xylem and phloem are “controlled by physiological laws within genetic limits originally established by the Creator” (Howe, 1965, p. 17).

Instead of interpreting the rock strata as moving through billions of years of time, creationists interpret them an effect of a global Flood (Genesis 6–9). If a great Flood occurred, then billions of fossils would have been produced and evidence of vast continental sedimentation and upheaval would be common (Snelling, 2008). Careful studies of

large areas of fossil wood that underwent silicification and charcoalification are evidence consistent with a diluvialist model of the fossil record (Williams and Howe, 1993; Williams, 1993; Williams et al., 1993; 1993b Williams et al., 1995; Howe et al., 2003).

Scheven (1996) argued that the fossil evidence suggested a continent-sized, floating forest ecosystem primarily composed of arboreal lycopods. These lycopods had unusual hollow stigmarian roots or rhizophores (Figure 8). They contained numerous scars spirally distributed around the surface of their rootlike cylinder called a *stigma*.

Instead of typical root systems that grow downward in the soil, these secondary roots spiraled around a cylinder and were similar to roots found in water plants today. The arrangement suggests that these plants lived in an aquatic ecosystem. Rather than being interpreted as an early primitive tree, lycopod anatomy is better understood as an arboreal plant designed to thrive in an aquatic ecosystem. Scheven further hypothesized that at the outset of the Flood, this large biome was torn apart and left to drift. As the Flood receded, these massive mats were buried under large amounts of sediment, producing much of the Carboniferous strata observed today. The burial of these massive log mats was also consistent with a creationist explanation for coal formation on a global scale (Austin, 1979).

Polystrate trees (Figures 9 and 10), found all over the world, are another example of rapid burial on a large scale, consistent with both the global Flood and log-mat models. Polystrate trees are fossil trees that span more than one layer of strata (Oard and Giesecke, 2007). Rupke (1966) used polystrate fossil observations to argue that these provided evidence that there was a unique “cataclysmal” sedimentation process that occurred in the past. Polystrate tree and animal fossils have been found erect and at various angles with fossils varying 6–9 meters long and intersecting two to twelve different strata (Rupke, 1966). These trees are commonly just as well preserved at the bottom as they are at the top and their internal microscopic structure is often well preserved, indicating that they were buried quickly and sealed off from decay organisms. Two of the many global example locations are the Joggins formation in Nova Scotia and Gingko Petrified Forest State Park in Washington. The Joggins formation is classified as early Pennsylvanian strata and has numerous lycopoid trees and casts 5–6 meters tall that span several coal seams. These coal seams are often



Figure 8. Unusual and hollow stigmarian root (right) with radiating rootlets (left). Numerous scars are spirally distributed around the surface of the rootlike cylinder called a *Stigmaria*. They are similar to roots found in water plants today. Rather than being interpreted as an early primitive tree, lycopod anatomy is better understood as an arboreal plant designed to thrive in an aquatic ecosystem. (Photo courtesy of Ian Juby)

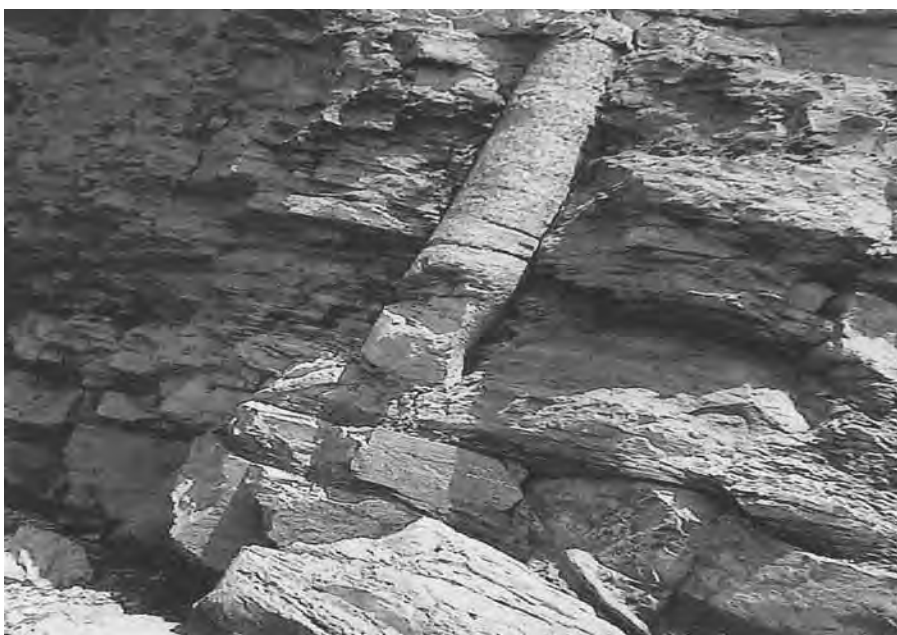


Figure 9. Polystrate fossil Lycopsid (Division Lycopodiophyta, Genus *Sigillaria*) Joggins Fossil Cliffs. This is a treelike plant, with occasional forked trunks, tall stature, and no wood. Polystrate trees, found all over the world, are another example of rapid burial on a large scale, consistent with both the global Flood and log mat models. Polystrate trees are fossil trees that span more than one layer of strata and are commonly just as well preserved at the bottom as they are at the top, indicating that the tree was buried quickly and sealed off from decay organisms. (Photo courtesy of Ian Juby)

interbedded with sandstone and sandy slate, another indication of rapid burial on a large scale (Rupke, 1966). The polystrates of Ginkgo Petrified Forest State Park consist of over 200 species of trees from widely divergent climatic zones (tropical to northern temperate), and span through layers of Miocene basalt (Oard and Giesecke, 2007). Trees discovered include eucalyptus (*Eucalyptus* sp.), teak (*Tectona* sp.), spruce (*Picea* sp.), and birch (*Betula* sp.).

Wise (2003) took Scheven's hypothesis further, using the modern-day analog of a bog. Acknowledging that evolutionary predictions for the fossil record of plants were highly correlated with global stratigraphy, he proposed that ecological zonation, rather than evolution, explained the fossil order better. He suggested that rather than seeing an evolutionary progression from simple to higher plants, what is observed is an ecological progression from plants growing close to the water to plants growing inland. These would include the progymnosperms, herbaceous lycopods, and arborescent lycopods of the inland forest canopy.

In general, creationists predict that all major tree families were present in their respective environments since the beginning and that evidence such as the polystrate trees found in Washington will continue to be found. Another recent example is the finding of fossil tree resin in carboniferous coal assumed to be 320 Mya. At this time lycopods are assumed to have ruled the swamps and forests before angiosperms evolved (Oard, 2010). However, the chemistry of the resin is consistent with angiosperm chemistry, something creation predicts, not evolution.

Complex Biochemical Systems

Many evolutionists have been forced to conclude that trees have evolved several times from many ancestors through convergent evolution (Ennos, 2001, p. 5). The highly complex genetic systems



Figure 10. Polystrate fossil tree (Division Lycopodiophyta, probably Genus *Lepidophloios*), Tennessee coal mine. (Photo courtesy of Ian Juby)

involved in the production of the intricate and diverse machinery driving trees to function in a diversity of habitats and climates falsifies the view that random chemical events could produce such features even once, not to mention many times. No analogue exists to draw such conclusions. Genetic systems and machinery go well beyond human innovations, and experience informs us that complex, interdependent systems require an intelligent designer.

Consider the photosynthetic system in the chloroplasts that trees depend on daily (Figure 11). This system breaks up water molecules into hydrogen and oxygen (Sarfati, 2008, p. 125). Breaking up water requires a tremendous amount of energy and must be accomplished

without destroying leaf structure (2008, pp 126–127). Tree leaves contain a series of protein complexes called Photosystem II. A photon strikes this complex and is guided into a P680 chlorophyll. An electron is knocked out to build sugars from the CO_2 obtained from the environment. P680 must replace the lost electron or photosynthesis would cease and the plant would die. The replaced electron comes from a catalytic core made up of uniquely arranged atoms of manganese (Mn), calcium (Ca), and four oxygens (O) attached to a single Mn. This molecular cube is designed to build up energy in four stages to allow Mn to remove an electron needed for the photosynthetic process from a water molecule. The four stages help to concentrate the energy in controlled amounts so that the leaf is not destroyed in the process.

Once the Mn removes the electron, hydroxide (OH) and hydrogen (H^+) are produced. This fourth stage is where Mn has enough energy to break the OH into O and H^+ . It is here that the Ca atom plays its crucial role. Ca holds another water molecule in the right location so that the single O atom chemically reacts with it, producing O_2 , two more H^+ atoms, and two electrons. This unique Mn_3CaO_4 -Mn cube is present in all plants, algae, and cyanobacteria. This irreducibly complex photosynthesis process will not function unless the entire system is in place. Such a system could not be produced in stages by neo-Darwinian processes once, let alone several times through the many common ancestors of the variety of plants existing today.

Conclusions

The first trees existing in the fossil record were clearly trees. Furthermore, an enormous gap exists between trees and all other plant forms. Trees are unique creations and a critical part of the biosphere designed for life as we know it (Bergman, 2002). When the fossil record

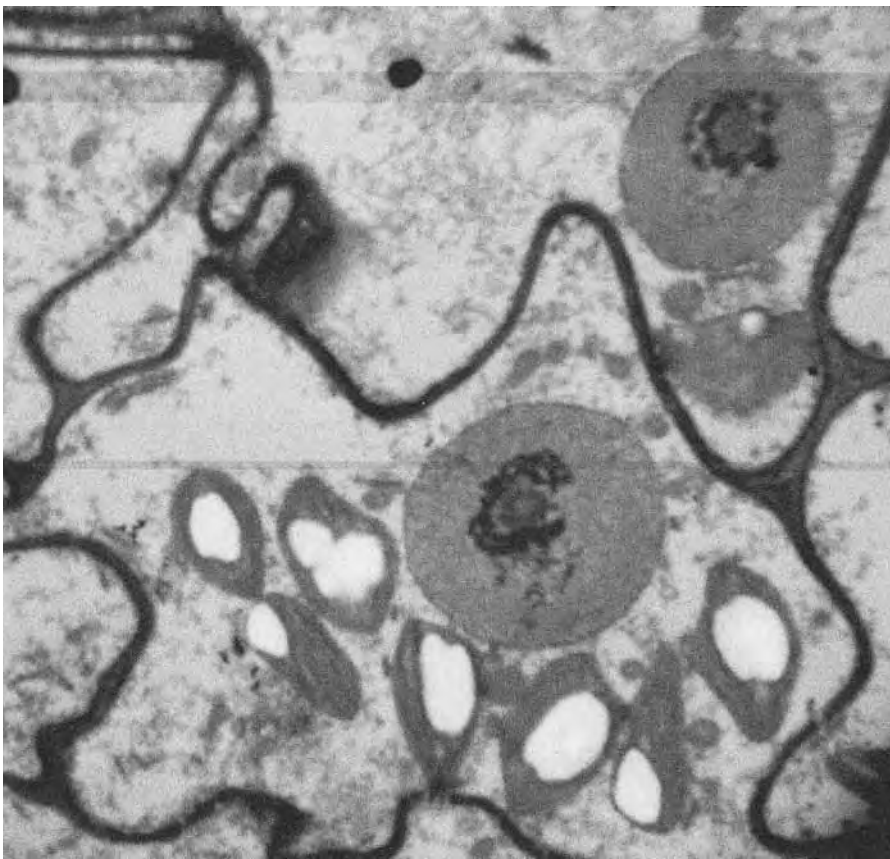


Figure 11. Cell chloroplasts (2500x). The genetic systems and machinery found in chloroplasts go well beyond human innovations. Experience informs us that complex, interdependent systems like these require an intelligent designer. (Photo courtesy of Mark Armitage)

is critically examined, the origin of trees is consistent with the Biblical record. Building our scientific understanding helps us to better understand our world and the one who created it.

There is still much research to be done, with numerous intriguing questions yet to be investigated, such as the genetic mechanisms that allow trees to persist and respond to changing environmental disturbances. Assuming that God has designed His creatures to persist, how did genetic and ecological mechanisms combine to allow trees to rapidly diversify? What is the role of symbiotic relationships with mycorrhizal fungi and trees in the context of forest health, tree diversification, baraminology, and ecosystem functionality (Loucks, I.S., 2009; Hennigan, 2009)? Baraminology, from the Hebrew *bara* (create) and *mîn* ("kind"), refers to the "created kind" and was coined by Frank Marsh in 1941. The word *mîn* is poorly understood, and many Hebrew scholars disagree on its meaning (Turner, 2009). It may be defined as a region of biological attributes within which any combination of these attributes could produce healthy offspring, at any point or period of history (Wood and Murray, 2003). What, then, constitutes the tree baramins that God created in the beginning? For example, a fascinating venue of future creationist research would be to compile tree hybridization data. There are many trees that can hybridize with each other, including species within the conifer taxa and species within the poplar taxa. In baraminology the ability to hybridize suggests a close biochemical relationship between tree taxa and is an important additive evidence for ancestry within a "kind" in the identification of the baramin.

Much devotional insight can be gained by considering specific trees that God has used to teach man about life with our heavenly Father (George Howe, 2011, personal communication). For example, He implanted the principle

of choice in a perfect world by creating the tree of knowledge of good and evil (Genesis 2:16–17) and has used them as powerful analogies for how we should live in this life. Like solidly rooted trees, our lives should be rooted in Christ that they may reflect His strength and fruitful purpose.

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The Origin of Grand Canyon

Part V: Carved by Late Flood Channelized Erosion

Michael J. Oard*

Abstract

Following the Great Denudation by sheet erosion, the Great Erosion ensued. Deep canyons, including Grand Canyon, were carved during this latter time by channelized currents flowing toward the west. A late-Flood channelized hypothesis is presented. The cutting through of the Kaibab Plateau was first initiated by the convergence of two currents, one from the northwest and the other from the southwest. The southeast Kaibab Plateau thus presented an obstacle in the flow, resulting in a horseshoe-shaped erosional pattern that persisted, carving Grand Canyon along the southwest edge of the Kaibab Plateau. That convergence of currents caused Grand Canyon to be cut toward the west of the Kaibab Plateau. The channelized current was diverted toward the south by volcanism on the Shivwits Plateau. Rising volcanic mountains to the south and southeast and the rapid sinking of the Grand Wash trough may have been responsible for the current turning 135° around the southern Shivwits Plateau. The Esplanade, Tonto Platform, Little Colorado River Canyon, and Marble Canyon would have been carved by narrowing currents.

Introduction

Part I of this series (Oard, 2010a) demonstrated that uniformitarian hypotheses for the origin of the Grand Canyon do not hold water—even after 150 years of speculation. This leaves a catastrophic mechanism for its formation, and two have been presented by creationists. In Part II (Oard, 2010b), I analyzed the currently popular dam-

breach hypothesis and demonstrated that it suffers from many geological problems, two of which seem fatal. Starting in Part III (Oard, 2010c), I developed the case that the origin of Grand Canyon needs to be placed at the end of the Flood, during the channelized-flow phase (Walker, 1994). In Part IV (Oard, 2010d), I reinforced this timing by discussing the Great

Denudation, an obvious great erosional event that would conform to the sheet-flow phase early in the retreat stage of the Flood. It is widely recognized from the geomorphology of the Colorado Plateau that after the great horizontal erosion of the Colorado Plateau, vertical dissection occurred during which Grand Canyon was carved. Uniformitarian geologists call this the Great Erosion, which fits well with the phase following the sheet-flow phase, and that is the channelized-flow phase.

In this part, I will attempt to flesh out how Grand Canyon was eroded during

* Michael J. Oard, M.S., Bozeman, MT, mikeoard@bridgeband.com
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Figure 1. Peach Springs Canyon, 12 miles from the top (view northeast). The Hurricane Fault is shown with basement igneous and metamorphic rocks to the right of the road uplifted relative to sedimentary rocks to the left.

the channelized-flow phase of the Flood. Such an endeavor is speculative and open to future revision. The origin of Grand Canyon can be approached by the necessity to solve several problems: (1) the flow reversal from east-flowing sheet currents to west-flowing channelized currents, (2) the initial canyon cutting through the Kaibab Plateau at an intermediate altitude, (3) the great erosion along the southeast edge of the Kaibab Plateau, (4) the formation of Grand Canyon along the southwest edge of the Kaibab Plateau perpendicular to the southwest topographic slope, (5) the diversion of the Canyon south along the eastern Shivwits Plateau, and (6) the

canyon's 135° turn around the southern Shivwits Plateau.

The Great Erosion

As stated in Part IV, the Great Denudation was the first of two erosional events on the Colorado Plateau recognized by geologists (Oard, 2010d). The Great Denudation eroded great sheets of sediment but left few canyons. On and near the Hualapai Plateau, there are a few generally northeast-trending canyons, partially filled with sediments, cobbles, and boulders deposited by northeast-flowing water. The Hualapai Plateau is located south of western Grand Canyon.

These canyons could have been carved by the first erosional event, representing local channelization during the Great Denudation. Peach Springs Canyon is possibly one of these canyons (Figure 1). It is also possible that these canyons were carved at the same time as Grand Canyon.

Following the Great Denudation, most canyons were cut during the next erosional event, which Clarence Dutton called the *Great Erosion*, an event that exhibits very little sheet erosion. Ironically, the successive events that are so congenial to the Flood paradigm continue to frustrate mainstream geologists. As quoted in Part IV, Ran-

ney (2005, pp. 67–68, emphasis mine) stated:

He recognized that strata composing the Grand Staircase (a name he invented), once covered the Grand Canyon region, only to be stripped away in what he called the Great Denudation. He theorized a later period of canyon cutting, which he termed the Great Erosion. Dutton therefore, was the first geologist to differentiate between two cycles of erosion: one that created the Grand Staircase by the *lateral* stripping of strata and one that created the Grand Canyon through *vertical dissection*. These two very different periods of erosion led to the landscape seen today.

Ranney (2005, pp. 24, 47, emphasis mine) puzzled over Dutton's two different erosional processes that occurred in the same area but at different times.

It may not be readily apparent to the non-geologist that these flat, highly elevated plateaus [of the Grand Staircase] are worthy of discussion but it is likely that they formed at a *different time* under *different erosional processes* than the deep canyons that dissect them. What sequence of geologic events could have produced such a strikingly different set of landforms so close to one another? ... Erosion at that time [during the first phase] must have been *much different* than what we see today. Broad, planar erosion most likely removed thick sheets of sedimentary strata that used to sit upon the plateau surface above Grand Canyon.

The Carving of Grand Canyon

But how exactly did Grand Canyon form? We will probably never fully understand every detail because no one observed it, and it cannot be replicated in the laboratory. But now that we understand that it was most likely carved

at the *end* of the Flood by high-velocity flow in confined channels, we can begin to add detail to our model.

The Tide Turns

As shown in Part IV, paleocurrent indicators make it clear that the Great Denudation was accomplished by broad sheet currents flowing toward the east to northeast and eroding thousands of feet of sedimentary rock across the region (Oard, 2010d). The Rim Gravel probably represents the last strong east to northeasterly current, since it covers the planation surface on the southwest rim of the Colorado Plateau.

Grand Canyon is distinct in two ways. First, it was carved by currents flowing west, and second, the erosion was focused downward, and not spread across a broad area. Therefore, there had to be a paleocurrent *reversal* in the Floodwater flow. Such a reversal would fit well with the transition from sheet flow to channelized flow. What caused that turnaround?

Geologist Elliot Blackwelder (1934) proposed that the uplift of the Rocky Mountains was the key factor leading to the carving of Grand Canyon. Powell (2005, p. 169) wrote:

Without the Rocky Mountains, there would be no Colorado River and no Grand Canyon. Thus, prior to the uplift that created the Rockies, the river could not have existed. Blackwelder saw evidence that the final uplift of the Rockies, which brought them above the elevation necessary for a perennial snowcap, had happened relatively recently.

In typical uniformitarian fashion, Blackwelder, and most geologists after him, thought that the rising Rocky Mountains caused precipitation to increase on the western side of the mountains. Increasing rain and snow led to large rivers that carved Grand Canyon. So, the northeasterly flowing streams during the Great Denudation, according to uniformitarian belief, were reversed

and perhaps enlarged by the rise of the southern Rocky Mountains.

While Blackwelder is probably correct that the rising mountains helped create Grand Canyon, he failed to comprehend just how it worked. He was thinking in uniformitarian terms, while Grand Canyon was catastrophically eroded. In the Flood, the rising Rockies created a flow barrier that caused the broad Flood currents to reverse themselves, and flow back toward the Pacific Ocean (Figure 2). As the flow reversed, there was a period of time when the current energy diminished, much like slack water between tides. For a brief time, the Colorado Plateau would have appeared to be a giant lake or inland sea with mountain ranges rising out of the Floodwater, mainly to the east. At this time, practically all the southwest United States was still underwater.

Through the Kaibab Plateau

How did the Colorado Plateau “lake” lead to a breach in the Kaibab Plateau and channelized flow that carved Grand Canyon? For simplicity, let us assume that the relative topography of the Colorado Plateau was similar to that of today. With the uplift of the Rocky Mountains, Floodwater began to turn west towards the subsiding Pacific basin (Psalm 104:6–9). It seems reasonable that the Colorado Plateau was rising beneath the rapidly shallowing waters without major deformation at this time. Compared to other geomorphological provinces in the western United States, the Colorado Plateau is little deformed.

Given similar topography, the submerged Kaibab Plateau would have been already higher than the Marble Platform and would thus become a *barrier* to westerly flow. The fact that the Colorado River runs parallel to the Butte Fault and the East Kaibab Monocline between Nankoweap Canyon and the canyon of the Little Colorado River verifies this deduction (Oard, 2010b, Figure 2). This coincidence could not occur

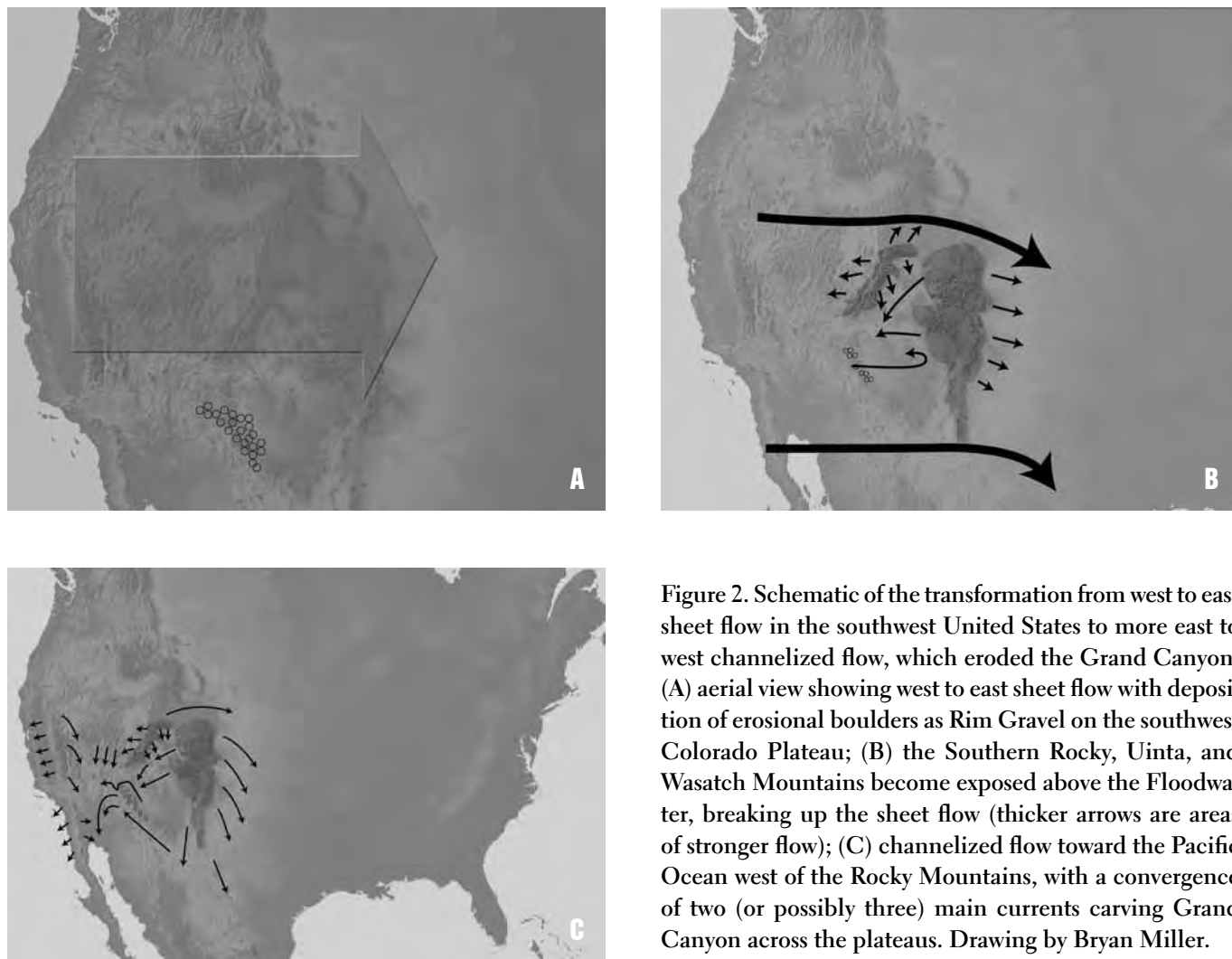


Figure 2. Schematic of the transformation from west to east sheet flow in the southwest United States to more east to west channelized flow, which eroded the Grand Canyon: (A) aerial view showing west to east sheet flow with deposition of erosional boulders as Rim Gravel on the southwest Colorado Plateau; (B) the Southern Rocky, Uinta, and Wasatch Mountains become exposed above the Floodwater, breaking up the sheet flow (thicker arrows are areas of stronger flow); (C) channelized flow toward the Pacific Ocean west of the Rocky Mountains, with a convergence of two (or possibly three) main currents carving Grand Canyon across the plateaus. Drawing by Bryan Miller.

unless the Kaibab Plateau uplifted *before* the Grand Canyon in order to guide the path of the eroding current.

The relative topography of the Colorado Plateau (Figure 3) helps us visualize Floodwater runoff. As the plateau began to emerge, water would form two broad channels converging on the southern part of the Kaibab Plateau. Current 2 would have been flowing toward the southwest, from south of the Uinta Mountains and the western slopes of the southern Rocky Mountains. This current would have been diverted from its westerly path by the rising Wasatch Mountains and the high plateaus of south central Utah. Current 1 would

have been flowing northwest through the Little Colorado River Valley from high terrain in New Mexico. The Mogollon Rim would have formed the southwest perimeter of the channelized flow. Current 1 was probably stronger because there was nothing to slow and/or partially block its flow. Current 2, however, had to adjust to a number of terrain features perpendicular to its flow.

As these two currents set up, their convergence would have produced incredibly powerful flows. This maelstrom probably initiated the scour of the shallow Kaibab Plateau. The unique combination of these factors at that point in the Flood caused erosion to begin

where the flow velocity was the most powerful, at the intermediate altitudes of the southward sloping Kaibab Plateau (Figure 4).

Once an initial erosional notch formed, that bathymetric irregularity would cause water flowing through it to *accelerate*. As the notch grew, that tendency would increase, and so would erosion, increasing a perpetuating cycle. Thus, the initial erosion occurred at intermediate altitudes on the Kaibab/Coconino Plateau, 1,200 to 2,000 feet (366 to 610 m) above the low points. It does not matter what the depth of low spots was on the Kaibab/Coconino Plateau, when the area was

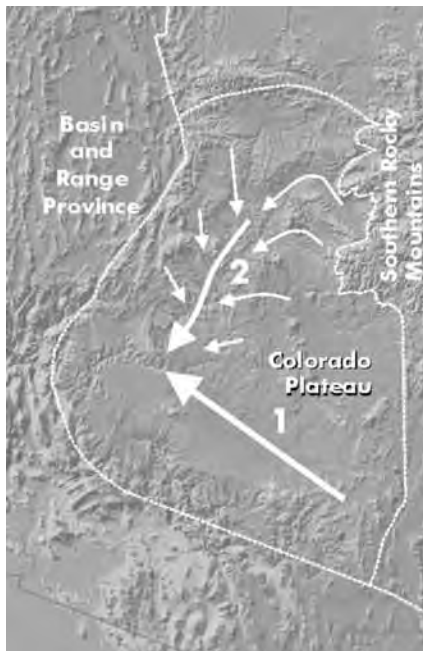


Figure 3. Topographic map of Colorado Plateau and southern Arizona showing two broad channels converging on the southern Kaibab Plateau with northwest flow in the southern Colorado Plateau (current 1) and southwest flow in the northern Colorado Plateau (current 2). Map background provided by Ray Sterner and drawn by Peter Klevberg.

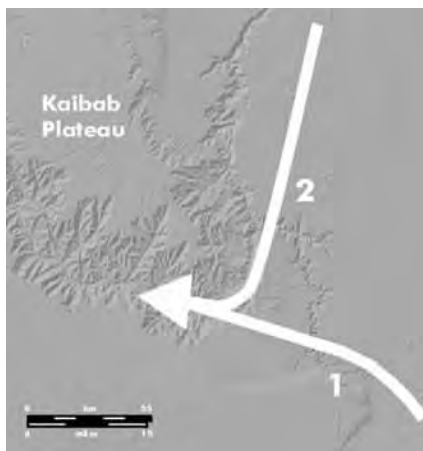


Figure 4. The converging currents eroding a notch at intermediate levels of the Kaibab Plateau. Map background provided by Ray Sterner and drawn by Peter Klevberg.

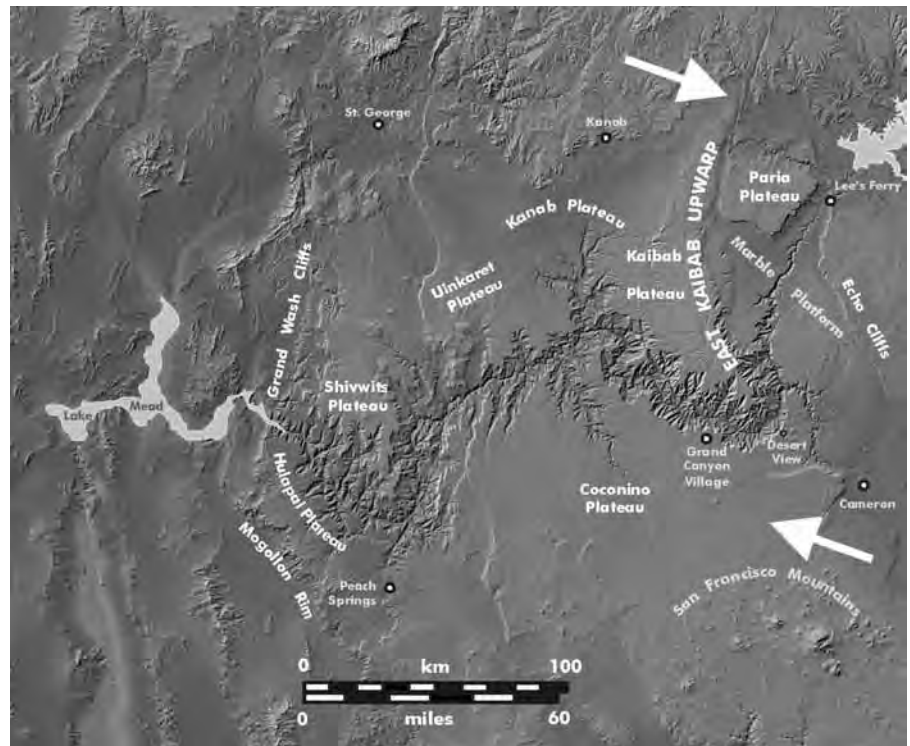


Figure 5. The Grand Canyon and the surrounding area with the main plateaus and prominent topographic features. The low point of about 5,750 ft (1,753 m) of the northern Kaibab Plateau and the low point a little above 6,000 ft (1,829 m) on the eastern Coconino Plateau marked by arrows. Map background provided by Ray Sterner and drawn by Peter Klevberg.

almost entirely flooded; low spots are not necessarily favored for erosion and the carving of a canyon. Low altitudes on the Kaibab Plateau would have only weak, westward-flowing currents. Of the catastrophic models available, I believe this one provides the most reasonable explanation for the location of Grand Canyon on the Kaibab Plateau.

This phenomenon is not restricted to Grand Canyon. Other water gaps are commonly cut at *intermediate elevations* or *at the top* of the highest point in a barrier, for instance, the Arun River that cuts through the Himalaya Mountains along the axis of a former north-south anticline (Oberlander, 1985). The initial breach dictating the location of a water gap depends on a complex interplay of flow, topography, uplift, rock type, initial

configuration of the barrier, and faulting in the area.

Hydraulics Solves Two Major Problems

Take a close look at a map of the Grand Canyon and the topography (Figure 5). Once past the barrier of the Kaibab Plateau, the canyon was not eroded down the topographic slope, which is to the southwest. If a river really had carved Grand Canyon, its course should have run southwest toward Havasu Canyon. Instead, the present canyon is oriented *perpendicular* to the topographic slope, “hugging” the southwest edge of the Kaibab Plateau and trending northwest. As we noted earlier, this course was not controlled by faulting. If it was neither faulting nor topography, then what did

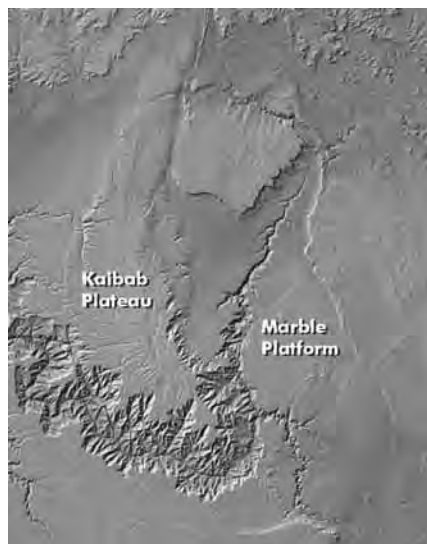


Figure 6. Close up of topo map showing great erosion of southeast Kaibab Plateau and little erosion of adjacent marble Platform. Map background provided by Ray Sterner and labeled by Peter Klevberg.

control the path of the canyon? This is the second major problem that must be solved by any successful model.

A third problem is the significant erosion of the southeast Kaibab Plateau (Figure 6), which is an area showing only minor drainage today. Hardly any erosion occurred along the edge of the adjacent Marble Platform. None of the uniformitarian hypotheses or the creationist dam-breach hypothesis can answer these mysteries.

However, the late-Flood model can and does provide reasonable answers to both problems. The secret lies in underwater hydraulic processes; when water is diverted around a solid object, such as a large rock, it is typical for the flow to accelerate at the *upstream* end of the obstacle and along its edge. You can observe this by watching the water flow around a piling or rock in a stream. Like the airflow around an airplane wing, the obstacle increases the flow path, causing the water to flow faster (Karcz, 1968; Richardson, 1968; Russell, 1993;

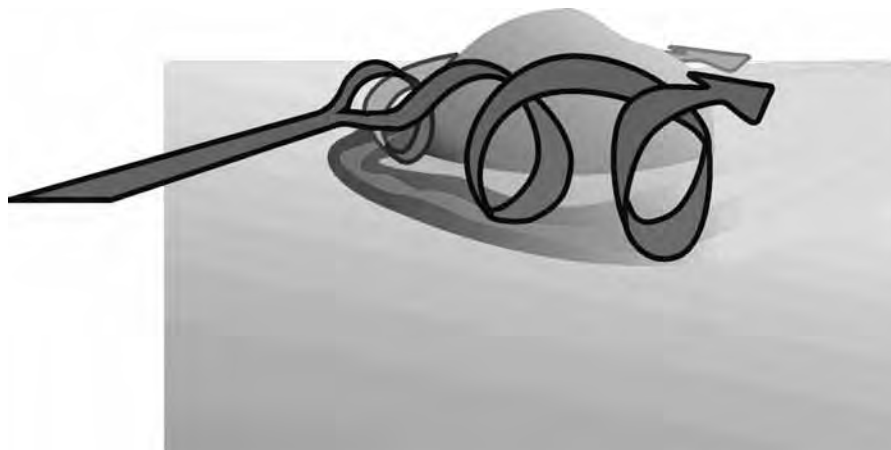


Figure 7. Diagram of spiraling vortices causing a horseshoe-shaped furrow around a rock in a current. Drawn by Mrs Melanie Richard.

Tinkler and Stenson, 1992; Werner et al., 1980). If you watch carefully, you will see a horseshoe-shaped furrow form in *front of and along the sides* of the obstacle (Figure 7).

Figure 8 shows lens-shaped erosion on the southeastern Kaibab Plateau and Grand Canyon cut along the southwest edge of the plateau. Picture the Kaibab Plateau as an obstacle in a giant stream flowing northwest. After the initial breach caused an erosional notch (Figure 4), the fastest currents were directed northwest since there were no barriers in the direction of the Little Colorado River Valley. With the acceleration of the northwesterly flow, a horseshoe-shaped erosional pattern formed on the southwest side of the Kaibab Plateau “obstacle.” The erosion at the northeast side of the Kaibab Plateau was less energetic and died out quickly going along the northeast edge of the plateau, likely because the second major current converging from the northeast would have disrupted erosion (Figure 8). So both the orientation of Grand Canyon and the erosional pattern on the southeast end of the Kaibab Plateau are consistent with hydraulic-flow principles operating at a very large scale, like that of the Flood.

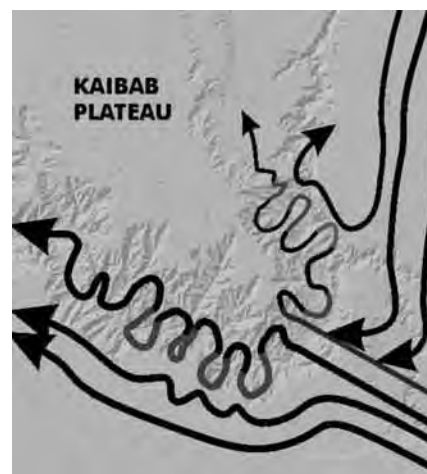


Figure 8. Similar to flow around a rock, turbulent flow impinging on the southeast Kaibab Plateau erodes a “furrow” on either side. Because of interference from current 2 coming from the north, the strongest flow and erosion will be on the southwest edge of the Kaibab Plateau. Map background provided by Ray Sterner and drawn by Peter Klevberg and Mrs Melanie Richard.

The Grand Canyon Just West of the Kaibab Plateau

The Flood hypothesis has already provided reasonable solutions to several insurmountable problems for the other

hypotheses. Now it must address the orientation of Grand Canyon west of the Kaibab Plateau. In order to do so, we must consider other Flood processes that would have influenced landforms in the southwestern United States.

The Flood was a complex event, and our model must reflect that complexity. First, we must note that volcanism was ongoing in many parts of the western United States, including the edge of the Colorado Plateau and the Basin and Range Province. Volcanism may have formed barriers that would have diverted retreating Floodwater. Second, rapid topographic changes were underway, with mountain ranges rising and basins sinking. The southwestern edge of the Colorado Plateau lies about 0.6 mile (1 km) above the sediment-filled Grand Wash trough and is separated by the Grand Wash fault (Oard, 2010a). If we exclude the sedimentary fill of Grand Wash trough, the actual throw on the fault is closer to 2.5 miles (4 km) (Faulds et al., 1997). This fault had the most displacement associated with any fault on the Colorado Plateau by far. In addition to the Grand Wash Fault, the Hurricane Fault displaced rocks by 1,300 to 1,640 feet (396–500 m) down to the west, and Toroweap Fault did likewise by 580 to 1,200 feet (177–366 m) (Karlstrom et al., 2007). These north-south faults mark the transition zone between the Colorado Plateau and the Basin and Range Province. These faults were probably active when the Imperial Valley rift zone was subsiding—more than 20,000 feet (6,096 m)!

So, at the time Grand Canyon was forming, Grand Wash trough and the whole area of southeast California was rapidly sinking, creating a rapidly changing bottom and influencing the flow of water off the Colorado Plateau. As the Colorado Plateau continued to become more exposed above the Floodwater, the currents would have become more and more channelized and their flow more energetic for a time. Because of these

complexities, any model of the origin of western Grand Canyon is certainly open to further refinement, but we can make an educated guess as to why the Canyon follows its present course.

Figure 9 shows a convergence of currents from the east, north, and south, just to the west of the Kaibab Plateau. The channelized current from the north flowed off the Grand Staircase of south central Utah, eventually forming the deep Kanab Canyon. The channelized current from the south was caused by water flowing north down the topographic slope of the Coconino Plateau, eventually carving the deep Havasu Canyon tributary. These two currents collided with the channelized current forming the Grand Canyon on the southwest Kaibab Plateau. Furthermore, the Grand Wash trough was sinking. These converging currents would combine and force the water to flow toward the west between two high areas to the north and south. The high area to the north was due to volcanism on the Uinkaret Plateau (Oard, 2010a, Figure 5).

The tributary Kanab and Havasu Canyons are typical of tributaries that formed at the same time as the main channel, in this case Grand Canyon. It is typical for water eroding into a flat surface to carve a main trench as well as tributaries that intersect at the same level (Thornes, 1990). So the pattern of Grand Canyon fits observed drainage patterns but at a much larger scale.

What role did volcanism play? Little volcanism was occurring during the Great Denudation because few if any volcanic rocks are found in the true Rim Gravel. However, volcanic activity must have increased afterwards because volcanics are common as exotic rocks mixed in with the reworked Rim Gravel later deposited at lower altitudes (Oard and Klevberg, 2005). This was still late in the Flood, given the scale of the redistribution of the Rim Gravel and its occurrence on Flood-eroded pediments below the Mogollon Rim (Oard,

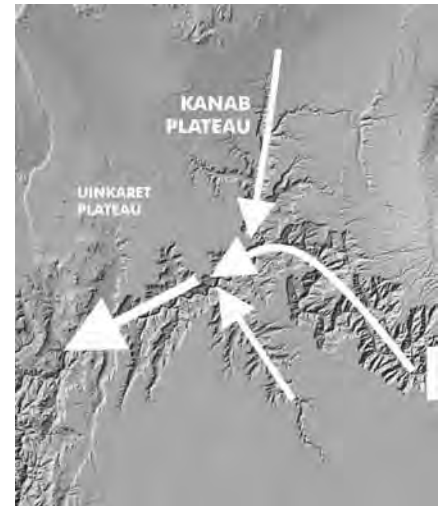


Figure 9. Convergence of currents west of Kaibab Plateau, from Kanab Plateau, and Coconino Plateau overlaid on current relief. Map background provided by Ray Sterner and drawn by Peter Klevberg.

2004). Faulting and volcanism would be expected to occur at the same time; tectonic disruptions in the crust would encourage magma migration to the surface. Thus it is likely that both volcanism and faulting were ongoing while Grand Canyon was being carved. Volcanism continued after the Floodwater drained off the area, as shown by basalt flows that cascaded down into the canyon (Figures 10 and 11).

Grand Canyon around the Shivwits Plateau

Volcanism on the Shivwits Plateau could have forced the main channelized current to change directions from flowing west to flowing south (Figure 12). Another high area of sedimentary rocks, the northern extension of the Aubrey Cliffs and the southwest edge of the Coconino Plateau, would lie east of this southerly flow. This path is west of the Hurricane Fault, the southern extension of which is Peach Springs Canyon (Figure 1). It is interesting that Grand Canyon did not follow the Hurricane Fault.



Figure 10. Basalt lava that has descended the northwest wall of Grand Canyon clear to the Colorado River.



Figure 11. Basalt lava flow remnant at river level to the left.

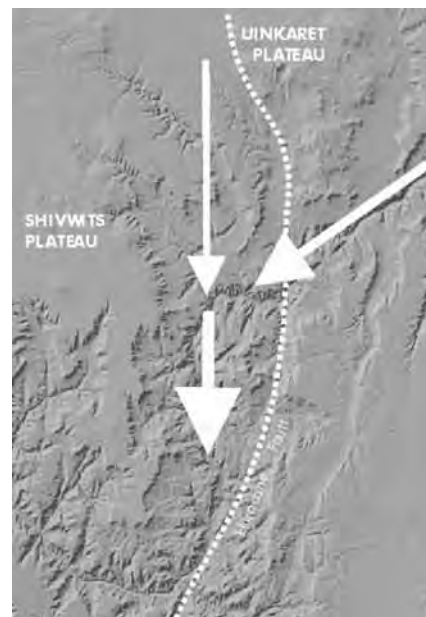


Figure 12. The main channelized current is diverted south between the high volcanic area on the Shivwits Plateau and the high northern extension of the Aubrey Cliffs. The path of the Grand Canyon was not carved in location of Hurricane Fault, shown to the east of the Grand Canyon. Map background provided by Ray Sterner and drawn by Peter Klevberg.

The next question to answer is why Grand Canyon took a 135° turn around the southern Shivwits Plateau. Why didn't the Grand Canyon continue southwest through the Peach Springs Canyon and Truxton Valley to enter the Basin and Range Province? This never happened, since Peach Springs Canyon and Truxton Valley contain deep debris fills in places with northeast-directed paleocurrents, just like other canyons on the Hualapai Plateau (Young and Brennan, 1974; Young, 2001).

There are two possible factors that could have turned the main Flood current to flow toward the northwest. One factor could have been the rise of the terrain south and southeast of Peach Springs Canyon, such as the Aquarius Mountains, Cottonwood Mountains,

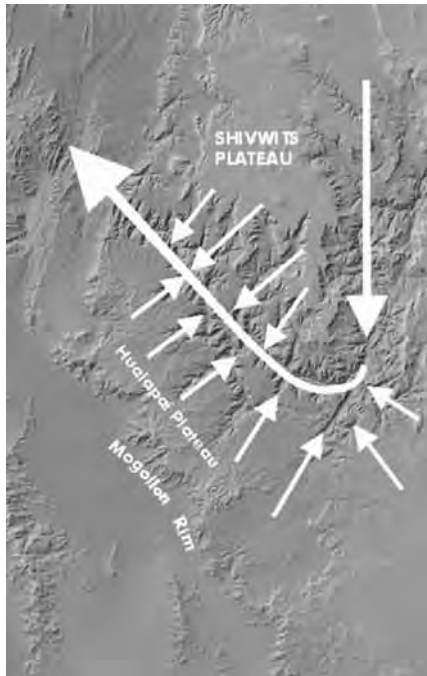


Figure 13. The diversion of the channelized flow toward the south to flowing northwest because of volcanism and the rise of higher terrain south and southeast of Peach Springs. Northwest flow enhanced by the sinking of the Grand Wash trough and the uplift of the southwest edge of the Hualapai Plateau. Map background provided by Ray Sterner and drawn by Peter Klevberg.

and other mountain ranges (Figure 13). Since these are volcanic mountains, volcanism could have blocked the current flowing toward the south between the Aubrey Cliffs and the Shivwits Plateau, causing it to flow west. Some of these mountains are over 6,500 feet (1,981 m), while the town of Peach Springs at the top of Peach Springs Canyon is only 4,800 feet (1,463 m).

A second factor could be an increasing current flowing northwest between the Shivwits Plateau and the southwest Hualapai Plateau. As mentioned above, the rapid sinking of the Grand Wash trough and the tilt of the Hualapai Plateau toward the northeast could have

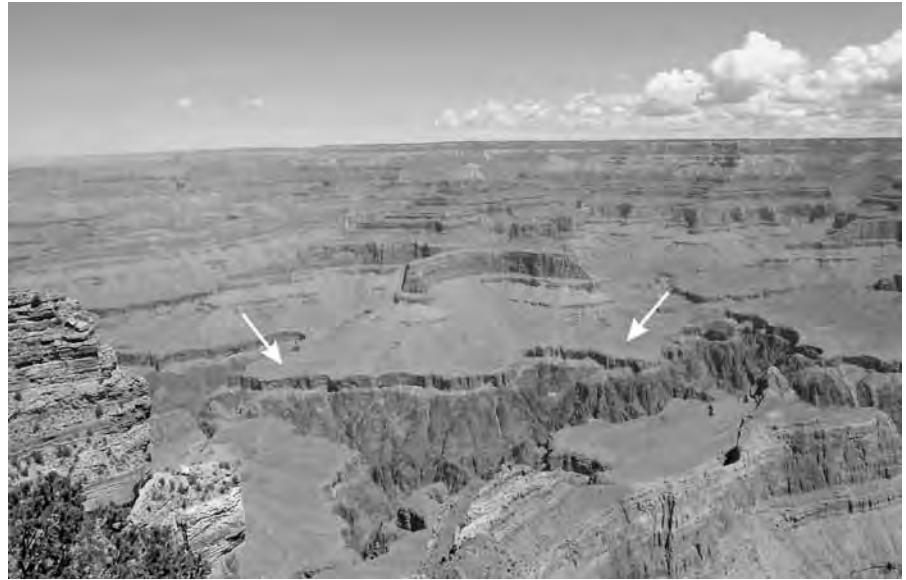


Figure 14. Picture of Tonto Platform (arrows) from Powell Point, South Rim.

started a local channelized flow toward the northwest (Figure 13). Channelized tributary flow would also have flowed off the Shivwits Plateau and the southwest Hualapai Plateau to add to the northwest-flowing current speed. It could be at this time that other canyons, such as Milkweed and Peach Springs Canyons that trend northeast, were carved on the Hualapai Plateau (there are complications with this interpretation, however).

Once the channelized current spread west past Grand Wash Cliffs, the current would have entered the tectonically active Basin and Range Province. The westward momentum of the water could have resulted in the several water gaps observed through north-south mountain ranges west of the Grand Wash Cliffs. Eventually, the current would have been diverted to flow south because of the deep rifting of southeast California and adjacent Arizona.

Narrowing of the Canyon with Depth

Besides the path of Grand Canyon, a few other questions remain to be answered by any successful model.

In viewing Grand Canyon, one notices that it is wide at the top and very narrow at the bottom. There are two wide benches eroded in the canyon. One is the Esplanade (Roy, 2004; Scarborough, 2001) in the western Grand Canyon, and the other is the Tonto Platform in the eastern Grand Canyon (Figure 14). The narrowing with depth and the formation of benches could easily be explained by narrowing channelized currents as Floodwater drained off the continent. It is typical of channelized currents in floods to narrow with depth; this occurred in the Lake Missoula flood in the forming of Palouse Canyon (Figure 15; see also Oard, 2010c, Figure 7). Erosion began as a broad current over the top of the ridge between Washtucna Coulee and the Snake River Valley, resulting in wide erosion. As the canyon deepened, it also narrowed.

The Tonto Platform could have formed by the wide erosion that reached the resistant Tapeats Sandstone, which forced the current to erode a narrow Canyon through the Tapeats Sandstone and the igneous and metamorphic rocks

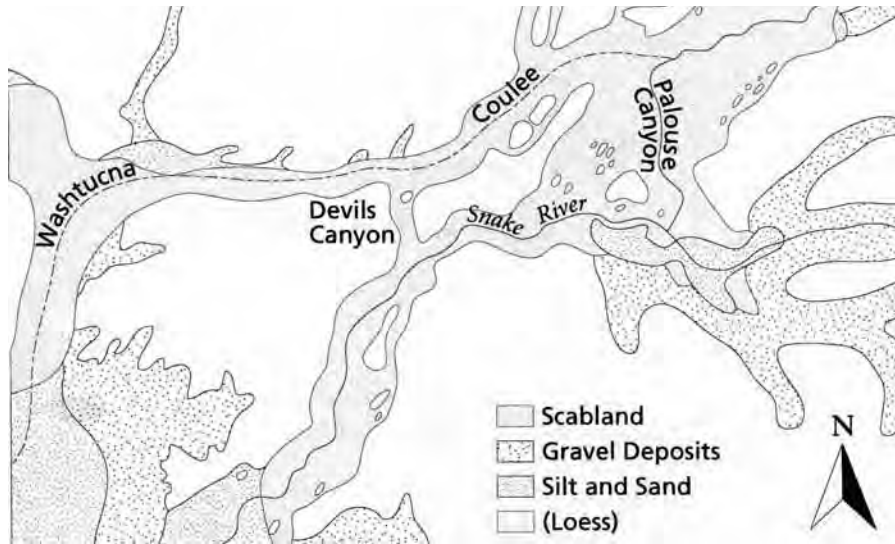


Figure 15. Map of ridge between Washtucna Coulee and the Snake River, showing Palouse Canyon and Devils Canyon carved during the Lake Missoula flood (redrawn from Bretz, 1928, p. 205 by Mark Wolfe).

below. The current flowing in an arc around the southern Shivwits Plateau could account for the wide erosion that created the Esplanade platform (Roy, 2004). During erosion, the unresistant Hermit Shale could easily have been eroded, but erosion could have been arrested when the harder Esplanade Sandstone of the Supai Group was reached just below the Hermit Shale.

Meanders

During erosion of Grand Canyon, the channelized current could create the meanders we observe in the canyon's course. Meanders are common features of channelized flow, forming in everything from rivers to submarine fans (Oard, 2008). Many rivers, valleys, and canyons across the globe exhibit meandering, and many of these (especially in water gaps) formed late in the Flood (Oard, 2008). Gentle meandering also formed when Palouse Canyon was eroded during the Lake Missoula flood (Figure 16). Meanders normally form during low current velocities. It is probable that the meanders in the

Grand Canyon were caused by the lower current velocities while flowing over the plateaus west of the Kaibab Plateau. These plateaus are generally at the same elevation and so would favor slower currents.

The Formation of Marble Canyon

Remember that there were two converging channelized currents that cut the initial notch through the Kaibab Plateau (Figure 9). As the water level fell, these two currents would become more channelized and end up carving a deep, narrow canyon west of the Kaibab Plateau. As the eroding current narrowed in the closing stages of the Flood, the northwest-flowing water (current 1 in Figure 4 from the Little Colorado River Valley) would be forced to cut a narrow notch through the Blue Moon Bench, forming the present narrow canyon in the lower Little Colorado River (Oard, 2010b, Figures 7 to 10). Current 2 coming from the northeast would also narrow and erode a narrow canyon in the Marble Platform, despite the fact that this platform slopes northeast. This is the

main extension of the Grand Canyon through the Marble Platform.

As the depth of water continued to decrease east of the Kaibab Plateau, channelized currents would tend to form, flowing downslope east off the Kaibab Plateau and northeast off the Marble Platform. Such currents would end up causing side canyons to the Colorado River on the Marble Platform that would enter the Grand Canyon at an angle greater than 90°. Tributaries normally enter a main channel at angles less than 90° because both the slope of the river and the terrain are in the same direction. So, the tributaries to Marble Canyon are considered "backwards" but are a result of the downward slope of the Marble Canyon toward the northeast.

Summary

Uniformitarian geologists have studied Grand Canyon for over a century and have failed to credibly explain its origin with any of their hypotheses. None of those ideas account for all of the field data, and none of them can even provide reasonable answers to the major enigmas surrounding the canyon. The scientists in question are intelligent, they have received ample funds to conduct numerous studies, and more than enough time has passed to work the problem. The most reasonable explanation for their failure is that they are trapped in a paradigm that cannot be squared with observations in the field.

Creationists offer a better paradigm; a catastrophic origin offers a better framework to resolve many longstanding mysteries. But initial efforts to explain Grand Canyon as an artifact of a post-Flood flood caused by the failure of natural dams falls short of the full potential offered by the paradigm. A model that utilizes the full power and energy of the Flood offers a much more reasonable explanation. A global flood, especially one receding from the continents, would have supplied more than enough water



Figure 16. Entrenched meander and underfit in Palouse River in a 500-foot (150 m) deep gorge downstream from Palouse Falls, southeast Washington, formed during the Lake Missoula flood.

for the sheet erosion of large regions and for the channelized erosion of deep canyons. A rapidly sinking ocean bottom and the tectonic uplift of the continents would have added tremendous energy to that water. The mystery of the two-stage erosion event, the Great Denudation followed by the Great Erosion that formed the canyon systems, is entirely congruent with the two phases of the retreating stage of the Flood.

The Great Denudation was caused by sheet flow toward the east and northeast. The rise of the Rocky Mountains caused that flow to reverse and begin forming channels. Grand Canyon was carved by channelized flow to the west that increased in velocity as the relative water level fell. Strong flow from converging currents cut a notch in the Kaibab Plateau. The northwesterly current (number 1 on Figure 4) eroded the southeast Kaibab Plateau and the north-

west trending run of Grand Canyon along the southwest edge of the Kaibab Plateau. That channel continued west, then south, then back to the northwest before exiting the Grand Wash Cliffs, based on topography, volcanism, and faulting. As the water level continued to fall, the eroding currents narrowed, forming the Esplanade and the Tonto Platform and the slotlike canyon of the inner gorge. The narrowing currents also carved the Little Colorado River Canyon and Marble Canyon with its backwards tributaries.

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The Search for Evidence Concerning the Origin of Fish

Jerry Bergman*

Abstract

A review of the fossil and taxonomic evidence for fish evolution is undertaken. No empirical evidence exists for their evolution from non-fish, even though 80% of all known fossils are marine animals, mostly various types of fish. Fully formed fish appeared very “early” in the fossil record, although numerous forms have become extinct. Many fish that are claimed to be multimillions of years old are identical to those species existing today. One common theory—that fish evolved from some wormlike life-form—is critiqued, documenting that the fossil gap between worms and fish is considerable and has never been bridged by fossil or taxonomic evidence. Additional theories, such as fish having evolved from a more complex invertebrate, are also evaluated and found to lack scientific evidence.

Introduction

Over half of all known vertebrate species are fishes (Barton, 2007). The general category of fish usually includes lampreys, sharks, lungfishes, chimaeroids, and teleostomes. Unfortunately, fish do not have a unique set of features by which they can be precisely classified (e.g., Maisey, 1996, p. 10). Usually, though, “fish” is a general term referring to all gill-breathing, cold-blooded, backboned, finned, non-tetrapod (non-four-legged), aquatic animals. They all

have such effective balance in water that it enables them to swim in all six directions (up, down, front, back, left side, and right side) guided by complex undulations that are controlled by their fin system (Dean, 1987).

In this paper, I will focus only on what has traditionally been called *pisces*, a term no longer used in formal classification systems, but commonly used in lay literature. Although class *pisces* have many similarities, they are also enormously variable.

From an evolutionary standpoint, fishes have been “extravagantly successful” (Barton, 2007, p. 19). So far, 25,000 to 30,000 different species in the class *pisces* are known, and more are being discovered. Basic types of *pisces* include skates, stingrays, lampreys and hag fishes, sharks, sawfish, chimeras and ratfishes, catfishes, deep-sea lantern fish, eels, pike, flying fish, flat fishes, sailfish, swordfish, sculpins, and hundreds of other types. If macroevolution were true, then the evolution of most of these fish should be documented in the fossil record. As Darwin wrote, “If species have descended from other species by insensibly fine gradations, we should find ‘innumerable’ transitional forms in the fossil record” (Darwin, 1859,

* Jerry Bergman, PhD, Biology Department, Northwest State College, Archbold, OH, jbergman@northweststte.edu

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p. 171). He admitted that this is “the most obvious and gravest objection which can be urged against my theory” (1859, p. 280). Darwin concluded that he believed that the explanation lies in the extreme imperfection of the fossil record in 1859 (1859, p. 280). As we will document, though, the fossil record has not documented these “innumerable” transition fossils.

The variety of fish lifestyles is also enormous. Most lay eggs, while others (e.g., genus *Poeciliopsis*) give birth to their young live using a complex placenta (as do mammals) (Reznick, et al., 2002). Some fishlike animals, such as the axolotl, have gills like fish but also have arms and legs like tetrapods. Although axolotl looks very much like a fish, it is classified as an amphibian (Long, 1995).

The one trait that best defines fish is their excellent swimming ability, a design feature that reveals their entire body plan is specifically engineered for efficient swimming. The fish fin system is highly integrated into its streamlined body, which, combined with a tail that serves as a rudder, produces a well-designed, efficient swimming machine. Most fish also have an “air-bladder” that they use to regulate how deep in the water they travel, a system that evolutionists admit “we still do not entirely understand how it evolved” (Curtis, 1961, p. 123).

In terms of the large number of fossil varieties preserved, the fossil record is considered a good representation of fish that once lived back to the putative Early Silurian—and even extends into the Cambrian (e.g., see Janvier, 1999, p. 21). So many fossils exist that the Devonian period is called the age of fishes. The “extraordinary evolutionary history” (Barton, 2007, p. 19) of fish extends back to the early Cambrian, dated by evolutionists to be over 500 million years ago (Maisey, 1996, p. 9). Furthermore, “large numbers of complete specimens of soft bodied chordates from the lower Cambrian ... have been removed from

the rocks” (Chen et. al., 1999, p. 518). Although the earliest fish remains date back to the Cambrian, fish are often “preserved complete, and with a great deal of fine anatomical detail” from the Ordovician onwards, which Darwinists date from 490 mya to 443 mya (Benton, 2005, p. 39). This excellent fossil record allows us to make a valid evaluation of the claims of the evolutionists.

This “great deal of fine detail” would allow us to document their evolution in some detail—if, in fact, they evolved. As early as a half century ago, these anatomical details allowed us to document that “some fishes have survived till today with scarcely a change” (Zim and Shoemaker, 1956, p. 15). The common picture of the fish origins is that they began “as mud-sucking, armored creatures that wriggled like tadpoles across the bottom of the ancient waters” and that they

slowly evolved jaws and paired fins, which in some cases now function as legs and even wings, to become the most versatile animals of their environment. Today, existing alongside the modern species, there [exist]... holdovers from the past—fishes that are living fossils (Ommanney, 1971, p. 67).

This claim will be examined in the next section.

The Oldest Claimed Fish Ancestor

The putative oldest fish ancestor, and the ancestor of all chordates, is considered by many paleontologists to be a small wormlike fossil animal called *Pikaia* (Long, 1995, p. 30). So far, around 60 fragments and whole specimens have been found, some in an excellent state of preservation. A major reason that *Pikaia* is considered to be the precursor of all chordates is that they may have possessed a notochord (Long, 1995, p. 30). The 5-cm-long animal is dated to the Middle Cambrian and was first discovered in 1911 by Charles Walcott.

First classified as a Polychaete worm, in 1979 it was reclassified as a chordate by Simon Conway Morris (1998). Resembling a living lancet, it is believed to have swum like an eel. The most straightforward explanation is that *Pikaia* is not a primitive evolutionary link but rather a bottom-dwelling marine chordate similar to an amphioxus. *Pikaia* had a distinct head, a caudal fin, a notochord, and myotomes, all characteristics of chordates. Bond (1996, p. 78) concluded that, although no evidence exists to support the view that fish evolved from a lancelet-like animal, it is “a reasonable model for what the forerunner of the fishlike vertebrates could have been like.”

Kyle (1926, p. 2) noted that “if fishes came from the worms, as many suppose, several important changes in structure had to be made before the new arrangement could be attained.” One example he discussed is that that the worm design is far too flabby to achieve the balance in water required to swim. In order to evolve into fish, worms had to evolve sufficient rigidity while retaining the required level of flexibility to swim, which is no easy achievement (Kyle, 1926). The enormous gap that exists between fish and worms is still an enigma today. Kyle (1926, p. 3) explained that for a muscular body to move through the water on its own accord, “the head and body must be somewhat compressed or flattened; otherwise it will roll and twist.”

The Origin of Fins

Fins that extend out from the flattened sides of the fish are required to stabilize the animal to swim. Two basic types of fins exist: vertical fins on top of the fish (the dorsal and caudal fins) and paired fins located on each side. Jordan (1902, p. 536) wrote that the evolution of fins is one of the most important problems in evolution, a puzzle still with us over a century later. Concerning the lack of evidence for fin evolution in the fossil

record, Stanford University professor David Starr Jordan wrote that, although several theories exist, all are inadequate, inconclusive, or both. Jordan was hoping that paleontology would eventually provide the answer to the problem of fin evolution, but the fossil record has only presented more problems than solutions (Jordan, 1902, p. 547).

One proposed solution to this fin problem is that the paired horizontal fins evolved from what was once a continuous fold of skin along the lateral line, and the vertical fins from a median skin fold. This theory is still far from settled. Other theories include the idea that the paired fins derived from modified gill arches or septa between the gill openings. Some experts suggest that fins did not evolve from gill septa, but evolved from external gills. A major shortcoming largely ignored is the origin of the internal structure of fins, including the support system, cartilage, muscles, nerves, and bone. After extensive study of the evolution of fins in the fossil record, Ommanney (1971, pp 61–62) concluded:

When and how the paired fins originated is a matter of debate—the fossil record provides no clear answer. One theory, now largely discounted, held that they originally formed as extensions and elaborations of the gill flaps. A more likely explanation seemed for a long time to be that they are the final remnants of a longitudinal fold of skin, with an internal skeleton of parallel bars of bone or cartilage, which originally extended down along each side of the body. The answer now is believed by some to be ... paired fins first developed from folds of skin between the spines and the body—and, as they were refined still further in the fishes that followed, according to this theory, the spines from which they originally grew tended to disappear.

All of the aforementioned theories of fish evolution are based on the study of the morphology of known fish, and all

evolutionary scenarios of their origins are highly speculative.

Evolution from a Wormlike Life-Form to Fish

The changes required to evolve small round worms like nematodes to fish were enormous, because the “worm” that became a fish

did not look much like a fish. It probably had no paired fins, no real head, brain or advanced sense organs, jaws or teeth. Most likely, its body was cylindrical, with simple digestive organs, a nerve cord running its length from front to back, and below that a sort of stiffening, supporting rod which was its only skeleton, made of a soft material surrounded by a tough sheath. This forerunner of a backbone, or vertebral column, is called a notochord and from it the animals that possessed it, including all the vertebrates, derived their name—the chordates (Ommanney, 1971, p. 60).

Furthermore, to evolve a fish from a worm, the worm nervous and vascular systems would need to be flipped over, because the fish main organs are upside-down when compared to the worm organs. Furthermore, although some worms “have tiny eye-spots, ear-stones, and tactile or taste organs,” these structures are all relatively simple and microscopic in contrast to the fish’s well-developed eyes, rostrum, and a large head with an advanced vertebrate brain (Kyle, 1926, p. 3).

Furthermore, most round and flat worms lack a heart, whereas fish have a very well-developed, powerful muscular pump that lies ventrally just behind the head. Each of the aforementioned unique fish features must have evolved, and one of the easiest to document should have been the evolution of fins because they show both “early” in the fossil record and with great clarity.

In fact, no evidence exists for any

of these speculative transitions. As paleontologist Janvier (1992, p. 22) admitted, “Lacking fossils, paleontologists and anatomists have often tried to imagine the earliest vertebrates,” but, he goes on to say, even imagination has not been very helpful in postulating fish evolution. Bond (1996, p. 78) described the “typical scenario of what could have occurred” to evolve fishlike vertebrates from the hypothesized precursor. In his model, a free-swimming invertebrate with a notochord, a ventral heart, and clefts in the pharynx evolved into fish. Bond hypothesized that radical changes in the environment must have occurred to evolve fish, but the specific changes required are not present in the fossil record.

Bond’s fish evolution scenario started, not with a worm, but with a creature already very much like a fish, and he speculated: “One can imagine that there could have been ascidians or related invertebrates that remained in the tadpole larval stage, reproduced, and formed the evolutionary basis for the more complex early vertebrates” (Bond, 1996, p. 78). Bond postulated that a lancelet-like animal is “a reasonable model for what the forerunner of the fishlike vertebrates could have been like,” but he cited no evidence, fossil or otherwise, for this admittedly hypothetical scenario (Bond, 1996, p. 78). Ommanney (1971, p. 60) provides a valuable conclusion about postulated fish ancestors:

Somewhere, either in the oceans or in some fresh-water pond or stream of that far-off Cambrian period, was a creature that would eventually give rise to the fishes....What this creature looked like, how it functioned and lived, we can only surmise.... Many theories have been advanced for its origin. Some held that it evolved from some form of segmented worm, others that it developed from an arthropod, a phylum that includes spiders, insects and crustaceans. Most likely, however, on the

basis of biochemical and structural evidence, is the hypothesis that this ancestral creature arose from a form similar to the larva of an echinoderm, a group known to us today through the starfishes and sea urchins.

Next, we will look at some examples of the evolution of specific kinds of fish.

Conodonts and Calcichordates

Conodonts are extinct chordates classified in class Conodonta that date back to the late Cambrian. For decades they were known only from toothlike microfossils, now called conodont elements. Knowledge about their soft tissues still remains relatively sparse, but they are still considered primitive chordates, possessing many advanced features, including large eyes, fins with fin rays, chevron-shaped muscles, and a notochord. The fossil conodont imprints indicate they were eel-like creatures with 15 to 19 “teeth” that formed a bilaterally symmetrical head array that produced a feeding apparatus radically different from the jaws of modern animals.

The three known forms of specialized teeth are coniform cones, rami-form bars, and pectiniform platforms. The organisms ranged from around a centimeter to the 40-cm-long giant *Promissum*. The fossils indicate that conodonts are extinct chordates and do not provide evidence for evolution from invertebrates into vertebrates such as fish. Speculation that they were transitional forms based on teeth microfossils, without any other hard parts, is clearly extremely tentative. The South China examples of Cambrian conodonts appear to be very complex, fully developed fish, not primitive worm-fish transition forms (Shu et al., 1999).

Calcichordates are putative “primitive” fossils classified in phylum Chordata that have an echinoderm-type of calcite skeleton. They are found in Cambrian to Pennsylvanian marine rocks dated by

evolutionists at 530 to 300 million years old. Due to their skeletons, they have traditionally been placed in the phylum Echinodermata, but some experts argue they are chordates because of their many chordate anatomical features.

As Morris (2000, p. 4429), noted, the “highly controversial fossils known as the ‘calcichordates’...show a puzzling combination of echinoderm and chordate characters.” Their calcite skeletons are used to speculate that echinoderms and chordates are closely related. The calcichordate theory of the origin of chordates, though, is controversial. Lefebvre (2000, p. 359) concluded that a detailed analysis of numerous internal and external structures of stylophora calcichordates has shown that the basic assumptions of the calcichordate theory of fish evolution are invalid. Nielsen (2001, pp. 420) wrote that the calcichordate hypothesis has been rejected by a number of evolutionists based on various morphology traits.

The Agnathans

The first bona fide vertebrates documented in the fossil record are agnathans (Class Agnatha, from the Greek “without Jaw”), usually small (15 cm or less) jawless fishes that have been discovered all the way back to the lower Cambrian (e.g., see Shu et al., 1999, p. 42; Colbert, et al., 2001, p. 23; Repetski, 1978, p. 529). The earliest examples of fish fossils are found almost at the beginning of the fossil record, specifically as far back as an alleged 545 million years ago, and these early fossils are very “lamprey-like” (Shu et al., 1999, p. 42). The agnathans, sometimes called pre-fish, are the earliest widely recognized direct putative fish ancestor (Bond, 1996). One proposed agnathan example that dates back to the Cambrian is a small (6-mm long) creature that resembles modern hagfishes (Bond, 1996, p. 78).

All known agnathans, both living and fossil, closely resemble the fish families

that began in the Cambrian, and all obtained food by “sucking or scooping up organic matter through their jawless mouths” (Bond, 1996, p. 78). Most of them are extinct, except for the lamprey. Although many fossils of lampreys exist—some dated by evolutionists back to the Devonian period—and although many were exquisitely preserved, “their evolutionary history is obscure” (Gess, et al., 2006, p. 981). The earliest known lampreys are anatomically modern. These fossils, claimed to be the first vertebrates, are in an extant class called *cyclostomes*, which fall into two groups—the hagfish and lampreys.

The cyclostome group has “been carefully researched and many different opinions have been brought forward about the origin and relationship of those animals” (Grzimek, 1973, p. 30). Because some of these Cambrian fish have “close similarities to modern lampreys” or hagfishes and many “bonelike fragments resembling agnathan dermal armor or scales have been reported from Upper Cambrian,” one could argue that they are extinct lampreys or hagfishes (Colbert, et al., 2001, p. 23).

Much more is known about a fish called *Sacabambaspis*, “one of the earliest known vertebrates,” of which we have “many complete and well-preserved specimens” (Colbert, et al., 2001, p. 23). As far as can be determined, this animal was a fully developed, jawless fish. Rather than being a transitional form, it was simply an extinct type of fish.

A major conundrum in fish evolution is that many examples of living fish can be found in the fossil record that date back to the Upper Cambrian, a problem explained by hypothesizing that their evolution was originally quite rapid (Repetski, 1978, p. 529). The earliest chordate we have comparatively good knowledge about are agnathous fish because they are well documented in the fossil record and many examples of their close relatives are still living (Colbert, et al., 2001). A major reason

for the commonality of agnathans in the fossil record is that agnathous heads and chests are covered with fused bony plates and for this reason are well preserved. Only about a foot or less in length, they were bottom-dwelling creatures that apparently used their muscular, jawless mouths to suck in small, slow-moving prey or organic matter.

The first evidence for the existence of agnathous fish includes a single plate found in the middle Ordovician strata, and many other later finds have enabled us to create an adequate understanding of them (Gregory, 1959). Gregory (1959, p. 76) speculated that “one or another of the ostracoderms gave rise to the modern class of cyclostomes, including the lampreys and hags,” but he admitted that “no known gnathostome fishes definitely connect them with the ostracoderms.” Romer (1966, p. 22) confessed, “The ostracoderms are primitive vertebrates; but if we seek among the known forms for the ancestors of higher vertebrate groups, we meet with disappointment.” For examples of ostracoderms see Figure

1. Romer (1966, p. 16) concluded that “major evolutionary events must have been occurring in vertebrate history during the Ordovician and Silurian, but we are still in almost complete ignorance regarding them,” agreeing with the findings in this paper.

Other Proposed Fish Ancestors

Although ostracoderms are claimed to be a transitional fossil leading to modern jawed fish, they coexisted with jawed fish and flourished during the Silurian and Devonian periods (dated by evolutionists at 300 to 400 million years ago). They became extinct sometime at the end of the Devonian period, indicating that they are only an extinct fish type, not an evolutionary link connecting them to Pikaia or any other putative very early fish ancestor. They were evidently a separate fish type more closely related to modern lampreys than to jawed fish. Colbert et al. (2001, p. 50) concluded that many factors have contributed to the “disappear-

ance of the ostracoderms, acanthodians, and placoderms, but probably the rise and development of the bony fishes and sharks” was a major factor.

The Jawed Fish

Jawed fish (Gnathostomes) consist of two monophyletic groups, the class chondrichthyes (cartilaginous fish) and class osteichthyes (bony fish) (Botella, et al, 2007). Both have fully developed functional jaws. The evolution of the vertebrate jaw is considered “one of the great evolutionary breakthroughs” in fish evolution (Prothero, 2007, p. 210). One reason it is thought to be an evolutionary breakthrough is that jawless fish are extremely limited in what they can eat—most are filter or deposit feeders or parasites, such as lampreys or hagfish. Jawed fish that are predators are able to consume a diet consisting of much larger prey than jawless fish.

The gnathostomes, which comprise chondrichthyes (cartilaginous fishes), lobe-finned fishes (coelacanths and lungfishes), tetrapods, and actinopterygians (ray-finned fishes), include a wide variety of fish, from the coelacanths to lungfish and include sharks, rays, and chimaeras. Classical theorists have maintained that cartilage evolved first and that cartilage is a more ancient construction material than bone. Conversely, the “paleontological data strongly suggest that bone was a primitive adult skeletal material, cartilage an essentially embryonic adaptation which is retained in the adult only as the result of degenerative processes” (Romer, 1966, p. 22). Several major jawed fish are discussed below. The evolutionary relationships of the gnathostomes “have been debated for almost a century” and are still being debated (Venkatesh et al, 2001, p. 11382).

Acanthodii

Class *Gnathostomata*, Subclass acanthodii (spiny fishes), are small, extinct,

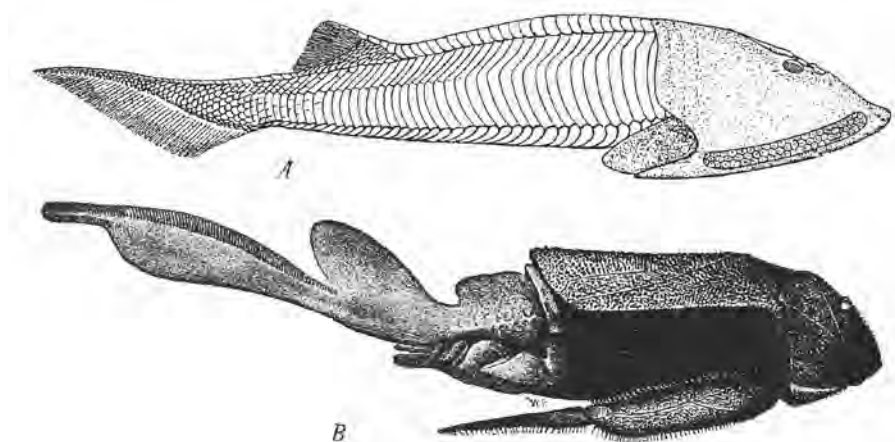


Figure 1. Devonian ostracoderms. Evolutionists call the Devonian the age of fishes because so many types appear in Devonian strata. Example A is *Cephalaspis Lyellii* and example B is *Bothriolepis*. Note how very different these fish are from familiar fish, such as perch, and yet how they do not show evidence for evolution. Instead they demonstrate the enormous variation found in the natural world (from Cleland, 1925, p. 462).

jawed fish covered with diamond-shaped scales. They possess both dorsal and pectoral fins and numerous irregular dermal bones. The bonelike material was located in various places on their epidermis, such as on the top of their head and over the lower shoulder girdle, and some even had a bony flap over their gill openings. Barton (2007, pp. 130–131) noted, “Widely divergent interpretations have been made of their affinities by paleoichthyologists.” Acanthodii were once believed to be transitional between the jawless and jawed fish because in many cases the interior skeletons were constructed out of cartilage. Extensive research, though, has now disproved this theory. Evidences of Acanthodii fossils are found from Lower Silurian to Lower Permian, indicating little change in the fossil record and no evidence of the transitional claim (Barton, 2007).

Placoderms

The placoderms or armored fish, were gnathostomes that were so ugly they have often been called armored monsters. For representatives of armored fish, see Figure 2. They were similar to the acanthodii, except they were more heavily armored. Placoderms are now divided into six clades, including the arthodires, which are the oldest known jawed fish, containing almost 200 genera. They are relatively common in the fossil record because their armor plates preserved fairly well. The excellent placoderm fossil record has long caused such great difficulty for evolutionists that Romer’s conclusion is still valid today:

Where to place these curious creatures has been a vexing problem. One or the other of these types has at times been thought allied to the ostracoderms, to the sharks, to the lungfish, to the “ganoids;” but in each case the supposed likenesses have been more than outweighed by the obvious differences. There are few common features uniting

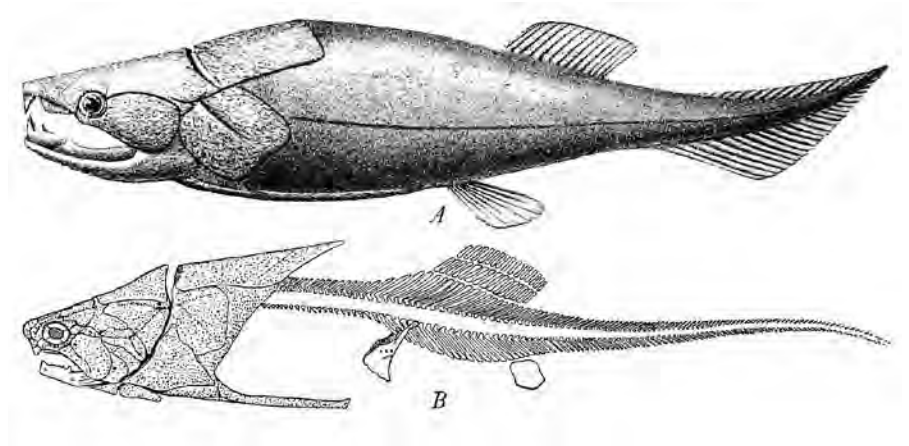


Figure 2. Two examples of armored lungfish from Devonian. A is *Dinichthys* and B is *Coccosteus*. In some ways these fish were more advanced than many modern fish. One trait that makes them appear primitive is the fanglike shape of the incisor teeth. *Dinichthys* species could attain a length of over ten feet (from Cleland, 1925, p. 464).

these groups other than the fact that they are, without exception, peculiar. All, however, are characterized by the presence of bony skeletal tissues (Romer, 1966, p. 24).

Chondrichthyes

The chondrichthyans (cartilaginous fishes) have a jaw and a skeleton composed of cartilage, along with paired appendages. (Consult Figure 3 for Devonian sharks.) The class includes about 60 families, 185 genera, and about 1,160 species, including sharks, skates, and rays (Barton, 2007, pp. 27–28). Not only is their phylogeny vexing, but they also pose serious problems for evolutionists in that they do not provide a linking transition at the Silurian-Devonian boundary. At that boundary evolutionists

would expect the appearance of proper ancestors for the sharks and higher bony fish groups. We would expect “generalized” forms that would fit neatly into our preconceived evolutionary picture. Do we get them in the placoderms? Not at

all. Instead, we find a series of wildly impossible types which do not fit into any proper [evolutionary] pattern (Romer, 1966, p. 33).

Romer concluded that chondrichthyans do not even appear to have evolved

from any possible source, or to be appropriate ancestors to any later or more advanced types. In fact, one tends to feel that the presence of these placoderms, making up such an important part of the Devonian fish story, is an incongruous episode; it would have simplified the situation [for evolution] if they had never existed (1966, p. 33).

He then reasoned that these linking forms must exist in the fossil record and we only need to keep looking for them and

attempt to fit them into the vertebrate evolutionary story. In our lack of knowledge of antecedent gnathostome types, we cannot even reasonably speculate as to their ancestry among hypothetical agnathous forms (Romer, 1966, p. 33).

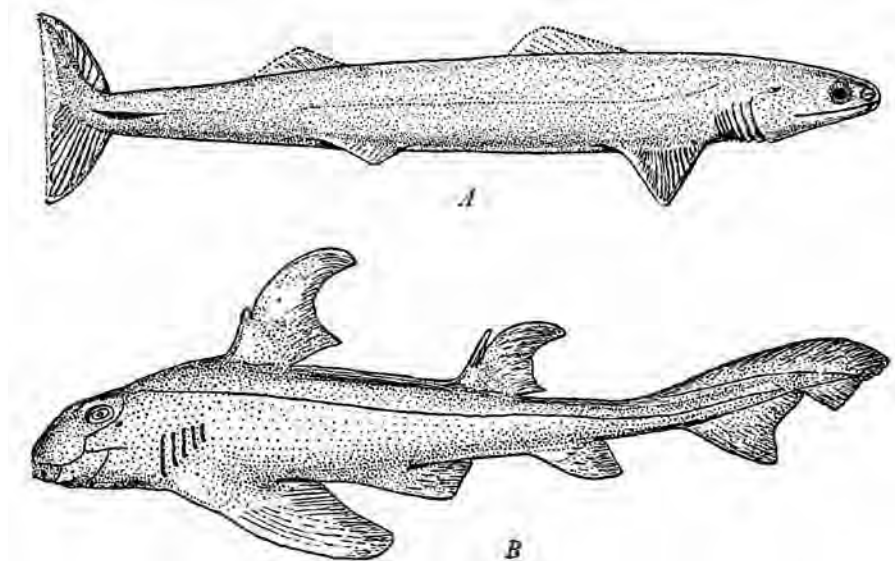


Figure 3. Two Devonian sharks. Shark A is *Cladoselache* and B is a Port Jackson or *Cestracion*, which has been called a “modern shark of ancient type.” This is because modern representatives are virtually identical to these so-called ancient examples. The shark family members are often called “living fossils” because of their similarity to putative ancient sharks (from Cleland, 1925, p. 463).

Osteichthyans

The osteichthyes are the bony-jawed fishes that constitute the vast majority of modern fishes, including both fresh and marine water fishes (Barton, 2007). They are divided into the Actinopterygians (sturgeons, gars, teleosts, bichirs, “bowfins”) and the Sarcopterygians, or lobe-finned fish (lungfish, some tetrapods, and coelacanths). How these “two osteichthyan lineages evolved their different traits is unknown, as is how their common osteichthyan ancestor arose from non-osteichthyan gnathostome groups” (Zhu et al, 1999, p. 607). As a result, the elasmobranch (sharks, rays and skates, subclass Elasmobranchii class Chondrichthyes) ancestry for osteichthyans has now largely been abandoned.

The *Psarolepis*

A putative morphological link, the *Psarolepis*, is dated by evolutionists as being about 400 million years old. It is

considered to be an evolutionary link because it has an unusual combination of osteichthyan and non-osteichthyan features (Zhu et al., 1999, p. 607). Thought to be one of the earliest osteichthyans known, it is a mosaic possessing fully developed traits of several fish types. It has a huge pectoral spine resembling some placoderms and also a median spine found in sharks.

The *Psarolepis*, which is claimed by evolutionists as a “probable missing link,” shows a mix of actinopterygian and sarcopterygian features. The problem with claiming the *Psarolepis* is a transitional form is that both bony fish clades Actinopterygii and Sarcopterygii first appeared about the same time as *Psarolepis* in late Silurian. This precludes *Psarolepis* from being the ancestor of bony fish (Benton, 2005).

Psarolepis is based on only one fossil and appears to be a chimeric fish with traits found in two other clades, and not

a transitional form (Barton, 2007). In fact, the case for it being any kind of a transitional form is very weak. Two possible positions of *Psarolepis* exist, and the conflicts between the two schemes remain unresolved and the exact position of *Psarolepis* remains uncertain. The uncertainty results partly from a lack of information available for *Psarolepis* and other important stem taxa ... and partly from the difficulty of selecting and polarizing characters when both osteichthyan and non-osteichthyan groups are used in the same analysis. However, whether *Psarolepis* turns out to be a stem-group sarcopterygian, its unique character combination will have a marked impact on present studies of osteichthyan evolution (Zhu et al, 1999, pp. 109–110).

This discovery has shaken previous conclusions made by evolutionists about *Psarolepis*:

Porolepiform-like features found in *Psarolepis* (a lower jaw with three infradentary foramina, well-developed internasal cavities and parasymphysial areas carrying tooth whorls) can no longer be used to define porolepiforms and/or dipnomorphs (porolepiforms and lungfishes). The polyplocodont folded teeth and quadrostian skull roof pattern of osteolepiforms should also be regarded as primitive because of their presence in *Psarolepis*. If *Psarolepis* turns out to be a basal osteichthyan, the presence of an intracranial joint and cosmine can no longer serve as defining characters (synapomorphs) for sarcopterygians (Zhu et al., 1999, p. 609–610).

The osteichthyans are considered to be the most advanced fish, but they have many features that are thought to be very primitive. Some members of the osteichthyans are considered to be very primitive, such as the soft-rayed fishes, confounding modern and primitive classification attempts (Barton, 2007,

p. 29). Some “highly evolved fish” are found very “early” in the fossil record, all the way back to the Silurian, dated by evolutionists at 423 to 416 mya (Botella, et al., 2007, p. 583).

True Fish

The so-called true fishes are in a super-class that contains an enormous number of species (Zim and Shoemaker, 1956). They are cold-blooded, jawed, aquatic vertebrates that breathe through gills. They have two-chambered hearts, fins, and streamlined bodies, and most have skin covered with scales. The theorized earliest known representation of “true” fish are the Sarcopterygii, the only living members of which are coelacanths and lungfishes (Maisey, 1996, p. 9). As far as can be determined from fossils, comparisons of their fossils with modern fish show that they are identical. Examples are herring, pipefish, sunfish, perch, mooneye fish, lungfish, salmon, garfish, trout, and sand fish, all of which have been dated by evolutionists from about 50 to over 100 million years old (Oktar, 2007). For an example typical of many so-called true fish, see Figure 4.

Fish Phylogeny

Disagreement over phylogeny exists from the base of the proposed fish lineage. For example, “Depending on one’s perspective, the jawless fishes—the hagfishes and lampreys—constitute a single, monophyletic taxon or two taxa of disparate origins” (Barton, 2007, p. 19). One proposed fish ancestor is the craniate, a marine animal with a skull that largely encloses the brain. The craniates are theorized to have branched into multiple lineages of saurischians, including the lungfishes, coelacanths, ray-finned fishes, acanthodians, and placoderms—a theory that requires a large number of fossil transitions (Maisey, 1996, p. 10).

Fish phylogeny is very difficult to construct for several reasons. A major

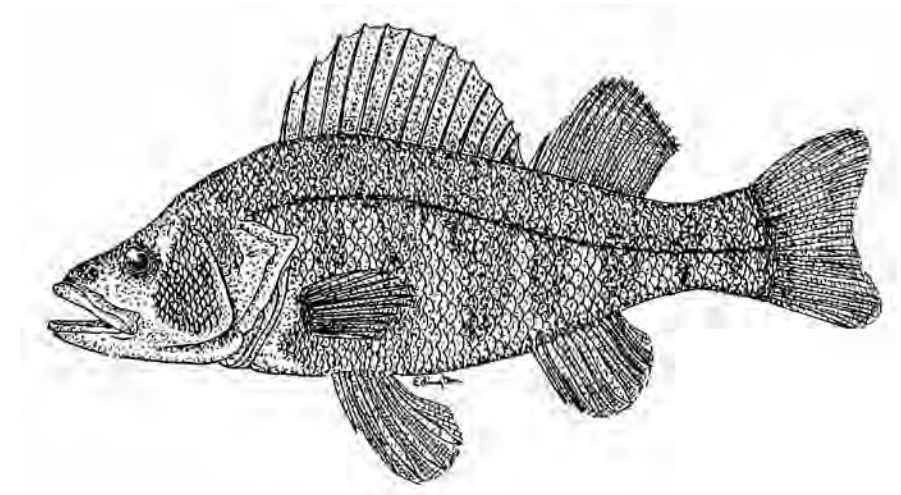


Figure 4. A modern perch. Note the smoother more aerodynamic, less fierce, design yet the strong resemblance to many putative ancient so-called primitive fish. Drawing by A. Edington (from Brown, 1880, p. 306).

puzzle in determining their phylogeny is that fish are quite different both in anatomy and physiology from all potential fish ancestors. There exists so much variety compared to all other life-forms that it is concluded that fish must not represent a single “lineage of creatures that evolved from a common ancestor” (Maisey, 1996, p. 10) but several separate lineages, requiring more fossils to support separate lineages, evidence of which does not exist.

In contrast to evolutionary assumptions, the fossil record of all basic classes of fish, including Agnatha, Placodermi, Acanthodii, Osteichthyes, and Chondrichthyes, began at close to the same evolutionary time, mostly during the Devonian or before (Botella, et al., 2007, p. 585). Thus, they existed contemporaneously, or close, with no evidence of transition forms. For this reason only a very tentative phylogeny is possible. Nelson’s conclusion, now almost 40 years old, that the phylogenetic interrelationships of many animals, including

turtles, frogs, salamanders, lungfishes, and coelacanths, are “hardly established at all” is still valid today (Nelson, 1969, p. 18). He added that the perplexities in devising phylogenies for fish are serious:

There is little justification for selecting a particular recent fish, e.g., a minnow, herring or trout, and assuming that it is some primitive teleost from which another has evolved ... no recent species or higher taxonomic group ultimately can be said to have given rise to any other. It is probably true that in some ways a minnow is more primitive than a perch, but in others, it is more advanced. Such matters are worthy of investigation, but we don’t progress much by making a teleostean morphotype out of a minnow, or for that matter a vertebrate morphotype out of a lamprey or any other single, recent vertebrate or vertebrate group (Nelson, 1969, p. 27).

Another evolutionary difficulty is that the supposed ancestors of modern fish,

the teleostians, are not “more evolved” than most putative ancient primitive fish, just different: “Fishes did not become more complicated as they evolved; if anything, the tendency was for them to simplify themselves” (Ommanney, 1971, p. 61).

The Fish Fossil Record and Evolution

As discussed earlier, fish are divided into two major divisions: jawless and jawed fish. Jawless fish comprise only sixty species compared to 51,000 species of jawed vertebrates (Janvier, 2006, p. 921). Some evolutionists hypothesize that jawless fish evolved into jawed fish, an idea that is greatly disputed among experts. There even exists a “lot of debate over the origins and diversity of the first fishes” (Long quoted in Werner, 2007, p. 98). Nor do we know how cartilaginous fish evolved, as even the “origin of sharks is still a mystery” (Long, 1995, p. 69).

This is true despite the excellent fossil record that exists for jawed fish, cartilaginous fish, bony fish, and sharks. It is not even clear “how much of early fish evolution took place in the sea, and how much in fresh waters,” and for this reason “one of the great mysteries and problems to be solved in vertebrate evolution” is the “origins and the interrelationships of these jawed fishes” (Long quoted in Werner, 2007, p. 98). Romer’s conclusion that the “common ancestor of the bony fish groups is unknown” is still true (1966, p. 53).

The fossil record also reveals that “evolution is usually slow, sometimes reversible, and highly dependent on ecological conditions” (Bond, 1996, p. 74). This is an indication that what the fossil record shows is not macroevolution but normal genetic fluctuation, such as recently documented to occur with the famous Darwin’s finches of the Galapagos Islands, and is likely the result of some epigenetic influence. Stahl (1974, p. 126) concluded that the

“higher fishes, when they appear in the Devonian period, have already acquired the characteristics that identify them as belonging to one of the major assemblages of bony or cartilaginous forms,” which illustrates the fact that fish, like other life-forms, abruptly appear in the fossil record.

Lancelet-like fish are commonly believed to be modern fish precursors, but no evidence of this lancelet-like precursor animal has been found in the fossil record, nor has any evidence been found of these species that is considered intermediate between the lancelets and the earliest known vertebrates (Bond, 1996, p. 78). The paucity of fossil evidence for fish evolution allows speculation about fish origins to abound. For example, Colbert et al. (2001, p. 53) wrote that the bony and cartilaginous fish

appeared in the late Silurian period, and it is possible that they may have originated at some earlier time, although there is no fossil evidence to prove this. Some paleontologists have proposed that different groups of sharklike fishes evolved from different placoderms, and that the Chondrichthyes are therefore polyphyletic. At present, there is insufficient evidence to resolve this issue.

The most common explanation for the total lack of fossil evidence for fish evolution is that few transitional fossils have been preserved. This is an incorrect conclusion because every major fish kind known today has been found in the fossil record, indicating the completeness of the existing known fossil record (Benton, 2005). New fossil finds are almost always more of the same, and occasionally new species are discovered that only create more gaps in the fossil record and do not fill in existing gaps. Most of the 34 orders and 418 fish families are known in the fish fossil record, as well as 29 orders of cartilaginous and bony fish (Grzimek, 1973, p. 45).

A detailed comparison of all known fossil examples shows they consist of ex-

tinct fish, fish once thought to be extinct such as the coelacanth, or fully modern fish that can easily be identified as such. All major groups of fish have appeared in strata labeled by evolutionists as far back as the Ordovician and Silurian eras (443–417 Myr) and are abundant during the Devonian (Benton, 2005, p. 39). (For examples of Devonian fish in which some appear very primitive yet others very advanced, see Figure 5, 6, and 7.)

This abundant fossil record provides little evidence for the evolution of fish, and for this reason, the “actual ancestral group of fishes has not yet been identified” (Grzimek, 1973, pp. 45–46). It is clear from the fossil record that “from the beginning of their evolutionary history,” sharks and bony fishes possessed the morphology required to effectively travel in water (Colbert et al., 2001, p. 50). Their “superior design for swimming” is mostly due to their fin design. Examples include the ostracoderms, acanthodians, and placoderms (Colbert et al., 2001, p. 50). Although microevolution has been observed in both living and fossil fish, “exactly how natural selection makes species is not well understood” (Bond, 1996, p. 66).

He concluded that in only a “few fortunate cases, we can actually study the *likely* ancestors and observe primitive characters and observe their descent and modification in their own ecological context” (Bond, 1996, p. 74, emphasis added). This review supports Ommanney’s conclusion penned over 36 years ago. He also wrote,

We do not know ... what stages of development it went through to eventually give rise to truly fishlike creatures....Between the Cambrian when it probably originated, and the Ordovician when the first fossils of animals with really fishlike characteristics appeared, there is a gap of perhaps 100 million years which we will probably never be able to fill (Bond, 1971, p. 60).

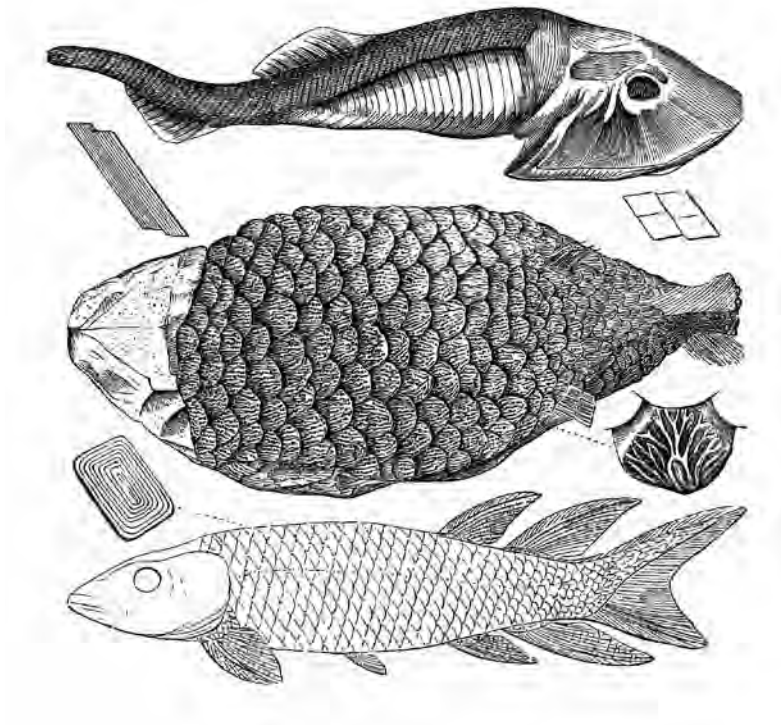


Figure 5. Devonian Ganoids. Note how primitive some appear, such as one at the top, and yet how modern others look, such as the one at the bottom in the illustration (from Dana, 1863, p. 112).

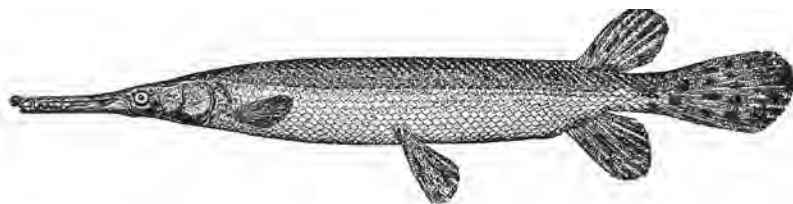


Figure 6. Another Devonian ganoid, the “modern gar pike,” illustrating that in the Devonian “age of fishes” both so-called primitive and modern fish existed (from Cleland, 1925, p. 465).

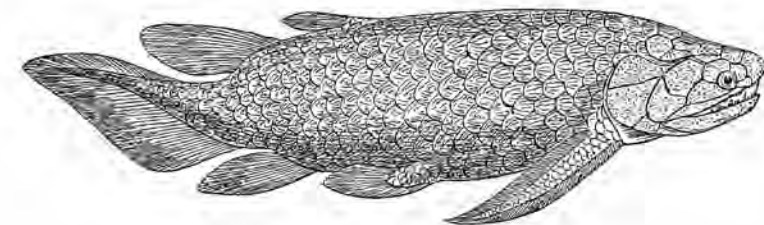


Figure 7. A Devonian ganoid *Holoptychius* resembling the coelacanth. Both fish could grow up to four feet long. They were considered by many to be the “missing link” between fish and the tetrapods until the first *Latimeria* specimen was found off the east coast of South Africa in 1938. It first appeared in the fossil record in the Middle Devonian and although known from fossils worldwide has since become extinct (from Cleland, 1925, p. 465).

Implications of the Fish Fossil Record

The absence of fossil evidence for evolution is significant because fish are one of the most common fossil types, with close to one half-million specimens in museums alone. So many fossil fish have been found that the Devonian period, dated by evolutionists as 350 million years ago, is called “the Age of Fishes.” Many fossil fish have been exquisitely preserved, including their bones, fins, and even their scales. It is estimated that there could be more extinct than extant fish species, indicating that there should be no shortage of potential links if fish arose by evolution, yet “significant gaps in the fossil record” is the norm (Maisey, 1996, p. 10). Dean (1987, p. 10) wrote that fish are critically important evidence for evolution because

fish hold an important place in the history of back-boned animals: their group is the largest and most widely distributed; its fossil members are by far the earliest of known chordates; and among its living representatives are forms which are believed to closely resemble the ancestral vertebrate.

As a result of a lack of transitional forms, Long (1995, p. 30) concluded that the “transition from spineless invertebrates to the first backboned fishes is still shrouded in mystery, and many theories abound as to how the changes took place.” The weakness of fish evolution in the fossil record includes not only the absence of evidence for fish origins but also the absence of evidence for the evolution of the many fish types *within* all classes. This is why Long (1995, p. 64) wrote that the “remarkable permanence of the different types of fishes seems a striking proof of how unchanging” aquatic living conditions must have been. Dean (1987, p. 10) attempted to explain this fact as follows:

From as early as the Devonian times there have been living members of the four sub-classes of existing fish-

es—Sharks, Chimaeroids, Dipnoans, and Teleostomes. Even their ancient sub-groups (orders and sub-orders) usually present surviving members; while, on the other hand, there is but a single group of any structural importance that has been evolved during the lapse of ages—the sub-order of Bony Fishes. There are many instances in which even the very types of living fishes are known to be of remarkable antiquity: thus the genus of the Port Jackson Shark, *Cestracion*, is known to have been represented early in the Mesozoic; the Australian Lung-fish, *Ceratodus*, dates back to Jurassic times; the Frilled Shark, *Chlamydoselache*, though not of a Paleozoic genus, as formerly supposed (Cope), must at least be regarded as closely akin to the Sharks of the Silurian.

One characteristic that typifies the fossil record is stasis. For example, the lamprey, although a very “primitive” life-form, has not changed in the past 360 million years, except that it is now slightly longer (Gess et al., 2006). A problem with all fossils, as explained by Nelson (1969, p. 22) is the common mistake of believing that

even one fossil species or fossil “group” can be demonstrated to have been ancestral to another. The ancestor-descendant relationship may only be assumed to have existed in the absence of evidence indicating otherwise.

It is also of much interest to compare the speculation of paleontologists in the past with the far more complete knowledge today (see Figure 1 of William Gregory’s diagram, originally published in 1933 and reprinted in Gregory, 1959). Another difficulty is that new discoveries often overthrow old ideas, especially new fossils that date contemporaneously with a putative fossil ancestor. For example, it was once concluded

that lampreys evolved from armored jawless vertebrates. But a recently

discovered lamprey fossil dates from the twilight age of their supposed ancestors, and looks surprisingly modern (Janvier, 2006, p. 921).

Sometimes a single discovery can move the earliest known example of a vertebrate back by as much as 40 million years, forcing a major reevaluation of the fossil record (e.g., see Repetski, 1978, p. 529; Jablonski, et al., 2003). The problem for evolution is that new findings tend to push the origin of fish farther back in time. This makes it even harder to explain fish origins, because less time exists for them to evolve. It also creates a longer period of stasis with out evolutionary changes (Wieland, 2000; Brown, 1996).

Conclusions

Much research has been completed on the microevolution of fish (e.g., see Echelle and Kornfield, 1984), but only speculation exists about their macroevolution from a common ancestor. Since paleontologists have no evidence of the evolution of fish from non-fish, nor any evidence of the evolution of the many basic kinds of fish, Long noted that there still exist “many different opinions as to which invertebrate group may have given rise to the vertebrates or first fishes” (quoted in Werner, 2007, p. 98).

Not only is the origin of cartilaginous fish unknown, but “the origin of bony fish is also shrouded in mystery” (Long, quoted in Werner, 2007, p. 98). We do know that many contemporary paleontologists admit that the earliest known fossil fish has all of the basic characteristics of modern fish. Many fish species have become extinct, but in spite of almost two centuries of searching, no evidence of gradual macroevolution has been found in the abundant fossil record so far uncovered. The fact is:

There is no ... justification for selecting even a particular fossil species or group, and assuming that it was some primitive animal from which

another has evolved. How, after all, can we hope to demonstrate that ostracoderms ever gave rise to anything else but other ostracoderms? This particular point cannot be overemphasized in view of past practices of vertebrate zoologists, who all too often have been willing to make facile assumptions about what is or is not primitive, and to derive one species or group from another....we have no ancestors alive today, that in all probability such ancestors have been dead for many tens or hundreds of millions of years, and that even in the fossil record they are not accessible to us (Nelson, 1969, p. 27).

One major current theory is that all bony fish evolved from spiny-finned acanthodian fishes, sharks, or placoderms. However, this controversial view is not supported by the fossil record. Thus, “the evolution of fish is still very much debated amongst paleontologists” (Long, quoted in Werner, 2007, p. 98). This scarcity of evidence not only includes the evolutionary origins of fish, but also the evolution of the many very different kinds of fish. The conclusion of fish biologist Kyle (1926, p. vii) that fishes “occupy a peculiar position in the hierarchy of animal life” and that we “cannot be sure whence they came” is still very true today from an evolutionary perspective. The claim made by Gregory (1959, p. 123) that “there are still many gaps” in the fossil record among fish, is also true today. Some of the references reviewed are 40 or more years old, but evidence that they are still largely current is Strahler’s evaluation of Duane Gish’s book on the fossil record. Strahler (1987, p. 408) summarized Gish’s conclusions as follows:

Mainstream paleontologists have found no fossil record of transitional chordates leading up to the appearance of the first class of fishes, the Agnatha, or of transitional forms between the primitive, jawless agnathans and the jaw-bearing class

Placodermi, or of transition from the placoderms (which were poorly structured for swimming) to the class Chondrichthyes, or from those cartilaginous-skeleton sharklike fishes to the class Osteichthyes, or bony fishes....Neither ... is there any record of transitional forms leading to the rise of the lungfishes and the crossopterygians from the lobe-finned bony fishes, an evolutionary step that is supposed to have led to the rise of amphibians and ultimately to the conquest of the lands by air-breathing vertebrates.

Strahler (1987, p. 408) concluded that "Gish finds all the confessions he needs" in the writings of paleontologists to support the conclusion that each of the fish classes "appears suddenly and with no trace of ancestors" in the fossil record. He then adds,

Absence of the transitional fossils in the gaps between each group of fishes and its ancestor is repeated in standard treatises on vertebrate evolution. Even Chris McGowan's 1984 anticreationist work ... makes no mention of Gish's four pages of text on the origin of the fish classes. Knowing that McGowan is an authority on vertebrate paleontology, keen on faulting the creationists at every opportunity, I must assume that I haven't missed anything important in this area. This is one count in the creationists' charge that can only evoke in unison from the paleontologists a plea of *nolo contendere* (Strahler, 1987, p. 408).

I have found the same, namely that an abundance of fossil evidence exists; and the results of this review, the conclusion that a complete lack of fossil evidence exists for fish evolution, is based on this abundant evidence that is widely available and has been so for years. Darwin's claim has been falsified, thus supporting the creation account recorded in Genesis 1:21, which reads, "God created the great creatures of the

sea and every living and moving thing which the water teems according to their kinds" (NIV).

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Notes from the Panorama of Science

The Mighty Triangle: A Microscopic Hammer of Design

Most people are familiar with the two basic kinds of symmetry, radial and bilateral, exhibited in the bodies of animals and plants (Figures 1 and 3). Other body variations (such as asymmetry and cylindrical and spherical symmetry) exist, but only radial and bilateral forms are discussed here.

A concise definition of general symmetry is that it represents a “balanced distribution of equivalent or corresponding entities” (Manuel, 2009, p.186). A radial (from *radii* of a circle) body symmetry revolves around a center point like the spokes and outer rim of a wheel revolve around the center point, such as in the flower shown in Figure 1.

In contrast, the symmetry of many animals is along a midline axis, called bilateral symmetry. If such a body were divided along the midline, two mirror images (or close to mirror images) would result (Figure 3). However, varied forms of symmetry are somewhat more complicated than this general explanation.

Evolutionists are at a loss to adequately explain the origin and purpose of bilateral and radial symmetry. It is thought that the earliest animal ancestors had asymmetrical body styles (like the amoeba, Figure 2) and that spherical symmetry resulted over time as a more complex body design evolved. Radial symmetry hypothetically developed later due to some unknown selection pressure on the spherical body form (Manuel, 2009). Radial symmetry is still considered the most “primitive” body type by many scientists, even more so than the amorphous body shape of the amoeba.

Evolutionists surmise that animal radial symmetry had its origin in ses-



Figure 1. Common flower of the dandelion showing radial symmetry.



Figure 2. Light micrograph, *Amoeba proteus*, showing asymmetrical body style.

sile benthic (bottom-dwelling) aquatic organisms that were somewhat at the mercy of gravity, water currents, pressure, and other forces. One theory states that this new body plan developed from increased competition for food, sunlight, and other resources (Manuel, 2009). This model lacks a credible step-by-step description of the process. It is generally assumed, however, that symmetry followed as a natural result of the increase in organism complexity over time and the need to “manage” the development of internal circulatory systems in animals (Finnerty, 2005).

During the earliest times of life on earth, little competition for resources existed; therefore radial bodies would have been adequate for survival. The fossil record displays a preponderance of radially symmetrical organisms in its deepest layers, but, the theory argues, when selection pressures for food gathering and optimization of other resources became severe, the “need” for bilaterality was generated (Martindale and Henry, 1998; Finnerty, 2005; Manuel, 2009).

Bilaterality allows movement in a directed fashion (creeping, crawling, and directional swimming). This allows the organism to capture moving prey, to exploit some moving or limited resource, or to escape predation. This force supposedly drove the “engineering” that resulted in bilateral symmetry (some even call it an invention).

Evolutionists speculate that radial symmetry in flowers preceded bilateral symmetry (Knapp, 2010), yet there are more plant families that exhibit bilateral flowers than there are those that employ radial flowers (Jabbour et al., 2008). Once again, no compelling mechanism or purpose (except natural selection, of course) is presented in the literature to explain this symmetry.

Another significant body design that supposedly arose along with bilaterality is the dorsal-ventral differentiation axis, wherein the top (or dorsal) side of an organism can be distinguished from the

bottom (or ventral) side of an organism due to differences in morphology, color, or texture. As mentioned, the transformation of a “simple” spherical or radial body style (with little to no directed locomotion ability) into a sophisticated bilateral animal like a fish with two similarly shaped sides but distinct dorsal/ventral surfaces and supremely designed locomotion features is poorly explained by these theorists. The presence of animal symmetry in the living world is a very powerful argument for design.

It is proposed that symmetry in plants arose independently in various plant types and for varied reasons (Knapp, 2010; Crane et al., 2010; Jabbour et al., 2008). Most plant parts are asymmetrical, but leaves and other structures exhibit radial or bilateral symmetry (Figure 3). Angiosperm flowers exhibit stunning diversity of bilateral and radial symmetry—so much so that Darwin called the rapid development and bewildering shapes of angiosperms in the fossil record an “abominable mystery” (Crane et al., 2010). He called the many seemingly hyper-designed flower shape-to-pollinator-shape matches in orchids “contrivances” [of devices to as-



Figure 3. Rubber tree leaf showing bilateral symmetry.

sist in pollination] (Knapp, 2010). From Darwin until today, living organisms are credited with inventive skills (what he called contrivances) that rival human ingenuity. The explanation given by evolutionists regarding the development

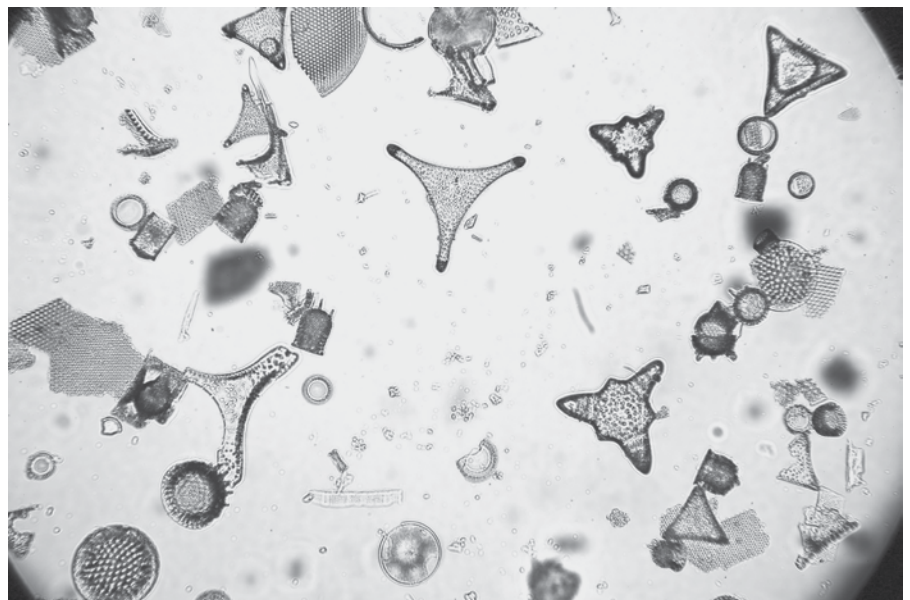


Figure 4. Light micrograph, field of *Triceratium* triangular diatoms.

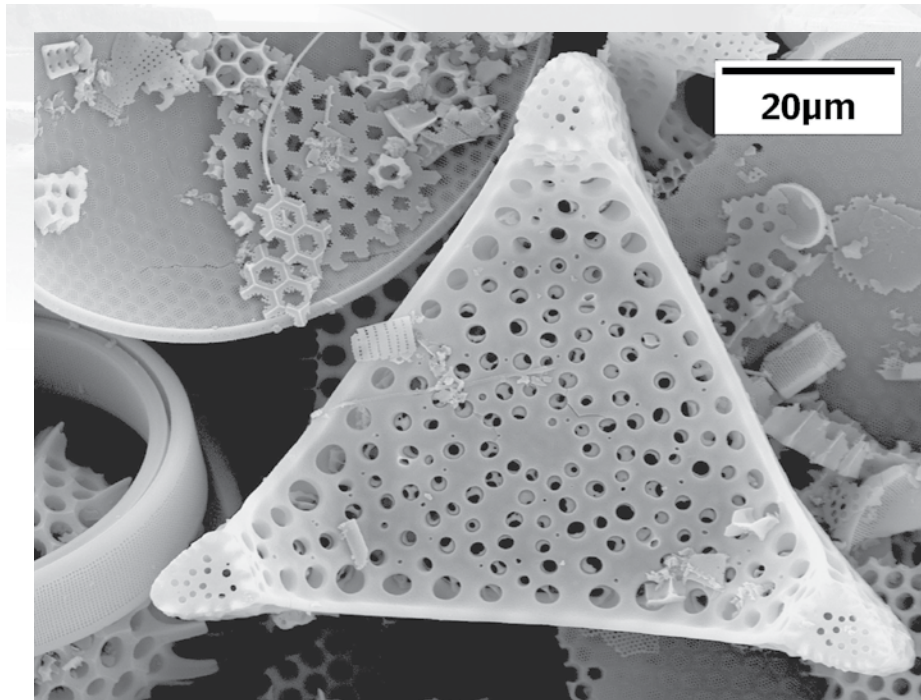


Figure 5. Scanning electron micrograph, *Triceratium* species. Scale bar = 20 microns. Perfect radial symmetry is displayed.

of body symmetry and the compelling shape-match between pollinator and flower is that flowers “co-evolved” along

with pollinators in order to attract the “perfect partner” to ensure the spread of pollen (Barrett, 2010; Knapp, 2010).

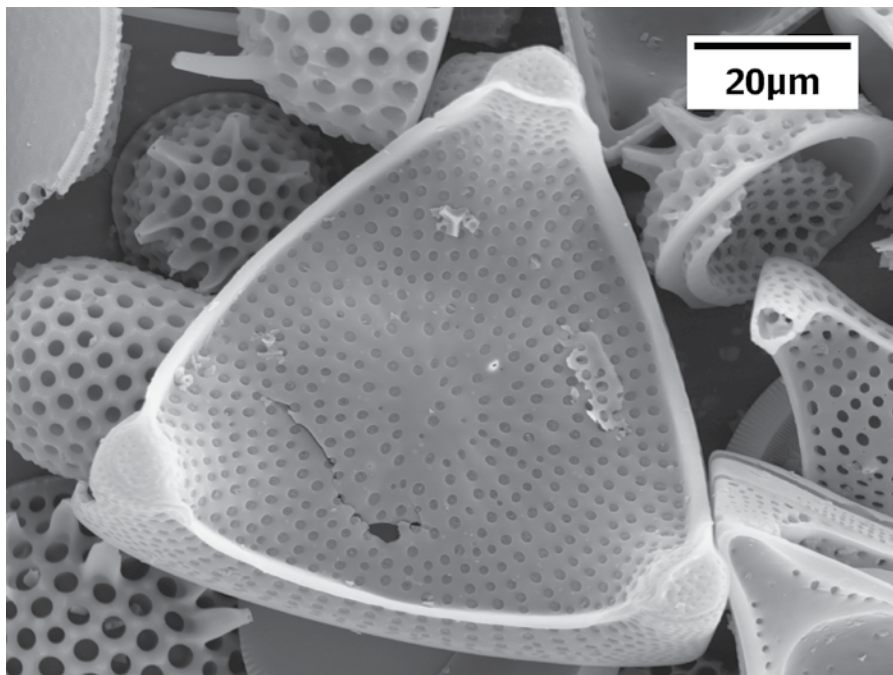


Figure 6. Scanning electron micrograph, *Triceratium* species. Scale bar = 20 microns.

In an attempt to further spin this tale, the “co-evolution” theory is employed to account for the fantastically complex system of “buzz” pollination occurring between insects and flowers that tightly hold on to their pollen (Smith, 2007). Only one highly specific resonance frequency of a bumblebee’s flight muscles in the absence of any discernable wing movement frees the tightly held pollen for gathering.

No matter what absurd yarn evolutionists spin to explain symmetry and specific shape in living organisms, one cannot escape the gnawing intuition that these compelling structures are there because of some purposeful planning.

In addition to the persuasive evidence of design in radial and bilateral symmetry, the dorsal/ventral differentiation, and perfectly matched pollinators and flowers, there exists the supremely vexing fact that complex and highly ordered *geometric* body shapes are employed as well.

Diatoms, a group of specialized single-celled plants that live in aquatic systems, exhibit remarkable geometric body styles—particularly when it comes to triangles (Figures 5–12). Diatoms are known for the intricate beauty of their self-manufactured shells, but they also represent a massive component of all aquatic biomass, upwards of 80% in some cases. They capture more global carbon than all terrestrial rainforests combined (Karthick, 2009). A more complete description of these microscopic plants is discussed in Armitage (2007).

Evolutionists contend that their complex geometric shapes and symmetry might form by a successive series of very small changes that produce intermediate steps (DeCarlo and Metaxas, 1998; Martindale and Henry, 1998; Finerty, 2005; Busch and Zachgo, 2009); each improving over the last to eventually arrive at perfect shapes, such as the triangular shape seen in Figures 5–12. It strains one’s credulity to imagine a long series

of steps to arrive at a perfect triangular shape, yet these workers are convinced that it can happen in spite of the lack of evidence, including fossil evidence.

Mathematical models are derived to account for complex body shapes, but evolutionists at some point often refer to terms that denote intelligence such as “the invention of stereotypical cleavage programs,” (Martindale and Henry, 1998, p. 672) and “shapes are cut apart and selected pieces are glued together ... using a method of interpolation” (DeCarlo and Metaxas, 1998, p. 1186). What remains to be explained are the *systems* that do the cutting, gluing, selecting, and interpolating by non-intelligent, non-self-aware and non-thinking processes!

A very sophisticated mathematical formula (called the Superformula) that allows one to generate flat geometric shapes by the manipulation of relevant variables was recently published (Gieles, 2003). A more concise explanation is available by typing the term “superformula” into Google. Geometric shapes, such as triangles employed by diatoms, can be derived in this fashion, but only in two dimensions: top to bottom and left to right.

What cannot be explained by this single (and very complex) formula is the three dimensional symmetry that diatoms make by the untold giga-billions each and every day. It requires two or more superformulae multiplied together to account for these three-dimensional symmetrical body shapes (Wikipedia, 2010). The triangle is a shape that rarely appears in body plans, therefore it is an appropriate and powerful weapon to defend intelligent design in living systems.

Other evolutionists believe that chaotic systems eventually “self-assemble” into a complex order. One researcher stated, “Organisms rehearse this flagrant disobedience of the Second Law” and that highly ordered geometric body plans are a design and order illusion (Porush, 1991; Passy, 2002). Such a drive

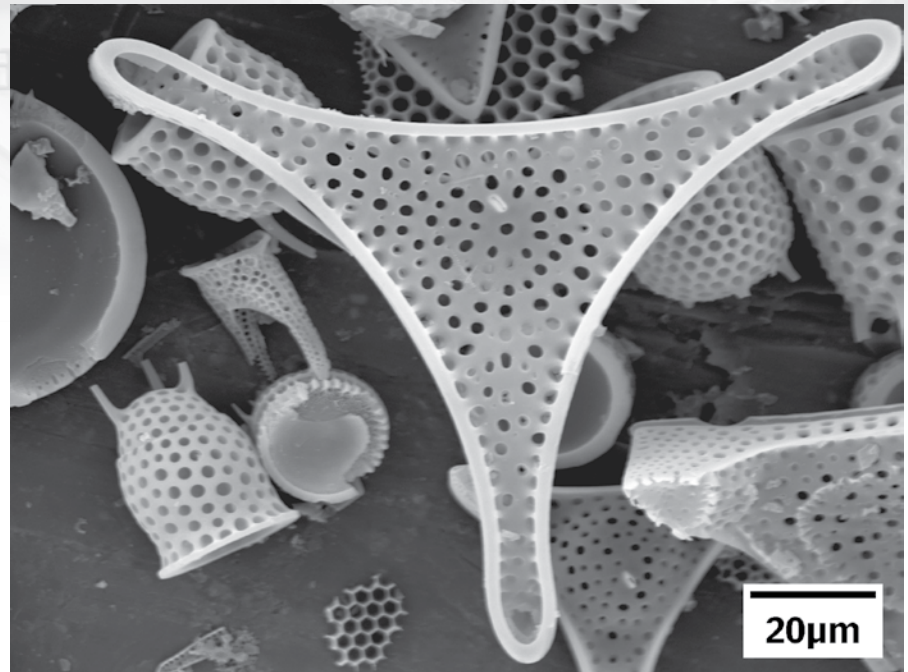


Figure 7. Scanning electron micrograph, *Triceratium* species. Scale bar = 20 microns.

to high complexity from sheer disorder utterly ignores the well-established second law of thermodynamics (the law of

entropy). Porush (1991, p. 369) admits, “Entropy is irreversible: it moves things along in one direction only. Once you

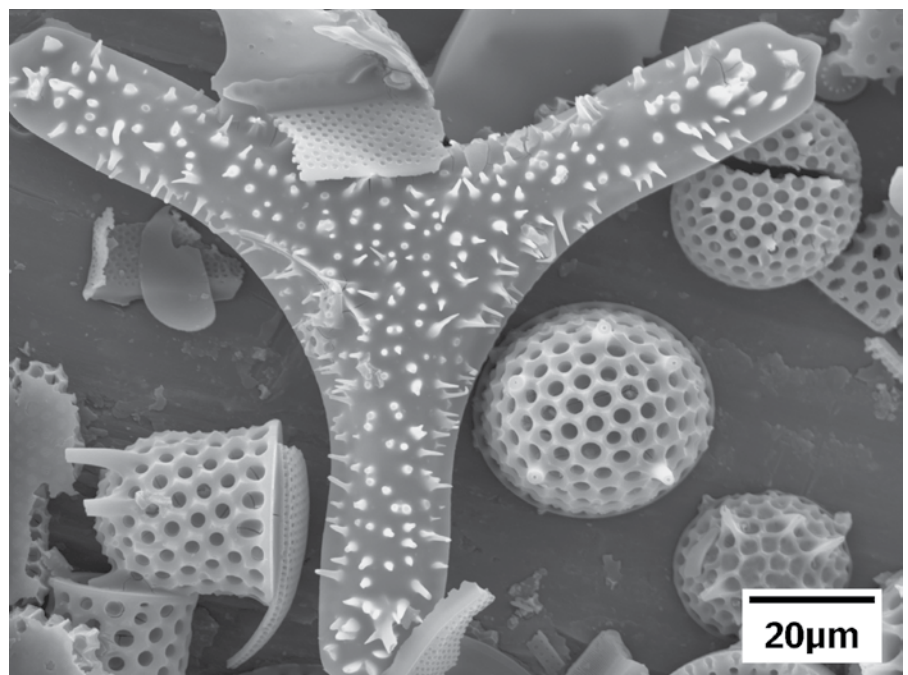


Figure 8. Scanning electron micrograph, *Triceratium* species. Scale bar = 20 microns.

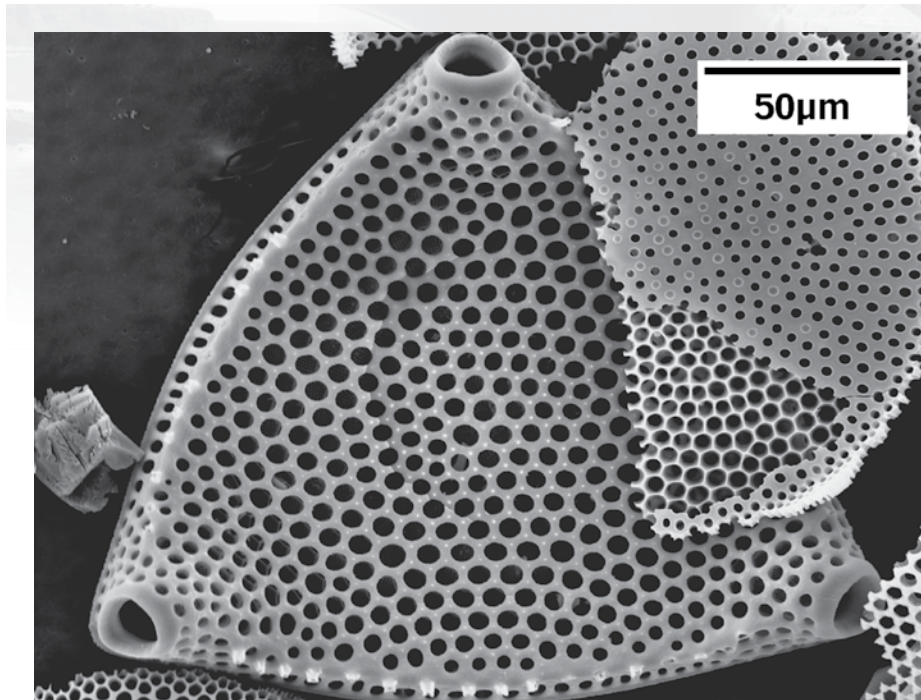


Figure 9. Scanning electron micrograph, *Triceratium* species. Scale bar = 50 microns.

are on the entropic road, you can't go home again." Yet in almost the same breath, he says, as "conditions evolve,

and [they] do so through feedback processes: a system can alter itself as it grows and grows" (Porush, 1991, p. 369). These

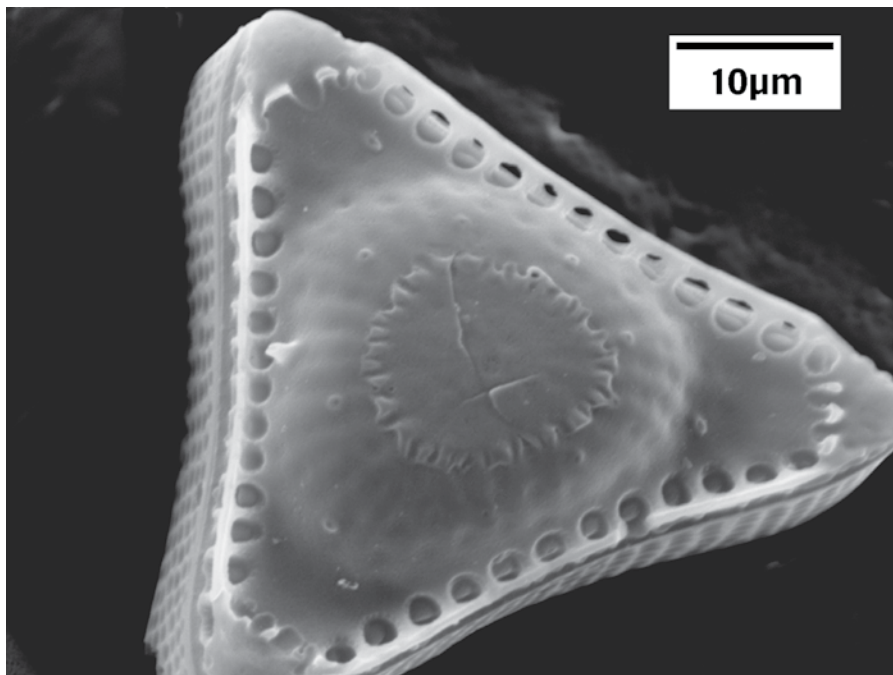


Figure 10. Scanning electron micrograph, *Triceratium* species. Scale bar = 10 microns.

explanations lack the necessary descriptions of the sensory capabilities and self-awareness faculties that must accompany any system that can "alter itself."

Many, such as Bunn (2009), contend that the earth is constantly absorbing high-energy sunlight and that this alone, plus natural law, is sufficient for the evolution of complex body shapes in direct opposition to the second law. It is true that monstrous amounts of solar energy are captured daily by earth's plants and absorbed by the ocean, the soil surfaces, and the atmosphere, but it is counterintuitive (and unobserved) to assume that sunlight striking a round or amorphous diatom can drive it to become a triangle by successive steps. Triangle body shapes are a hallmark of design.

Predation of diatoms by more advanced organisms is an explanation of triangular body shape that, as of late, has taken root. It is postulated that complex geometric body shapes may have evolved (and continue to evolve) to counter the ever escalating "arms-race" of predation (Hamm, 2005). Triangles represent an effort by the diatoms to escape predation by staying "one step ahead" of the predator and display a body shape that would "confuse" or otherwise "confound" them.

These shapes are so highly ordered that they exceed the existing human nanotechnology manufacturing capability (Gordon, et al., 2008; Hildebrand et al., 2009). Optics manufacturers have discovered centric diatoms can be used as ready-made lenses to focus very small spots (10nm) of laser light. They are not only better than anything humans can currently manufacture but can also be cheaply and rapidly cultured in enormous numbers (DeStefano et al., 2007; Vrieling et al., 2000). Other new applications of diatom nanostructure include the development of robotic nanoscale medical machines for highly localized drug delivery or tissue repair, for use in biophotonics as mentioned above, and for 3D computing development (Gordon

et al., 2008). Actual living computers made from diatom chips could be in our future!

The rigidity of diatom frustules has been measured to be able to withstand 100–700 tons of pressure per square meter, thus the actual genetic controls, the silica deposition, and assembly mechanisms of diatoms are being feverishly studied for use in various human manufacturing processes (Pappas, 2005; Hamm, 2005; Sumper and Brunner, 2006; Gordon et al., 2008; Vartanian et al., 2009; Tesson and Hildebrand, 2010). Some workers feel that we are now very close to understanding the molecular genetic machinery that dictates morphology; thus diatoms may hold the key to using this sophisticated technology for human manufacturing purposes (Gordon et al., 2008)

The diatoms featured in Figures 4–12 are all forms of the Genus *Triceratium*. This genus is predominantly populated by triangular body-shaped members, but squares and multi-pointed stars are also present (Google Images, 2010).

An interesting study could be undertaken by a worker with mathematical proficiency to measure and describe the complex angles and geometry displayed by this compelling group.

It remains to be seen, however, how complex body shapes such as those discussed in this work can arise by mechanistic environmental processes or by obscure selection pressures in populations. An explanation for their existence based on common intuition and supported by the empirical evidence is that triangles are designed by a Designer who has revealed Himself to us through the Bible and His Son, Jesus Christ.

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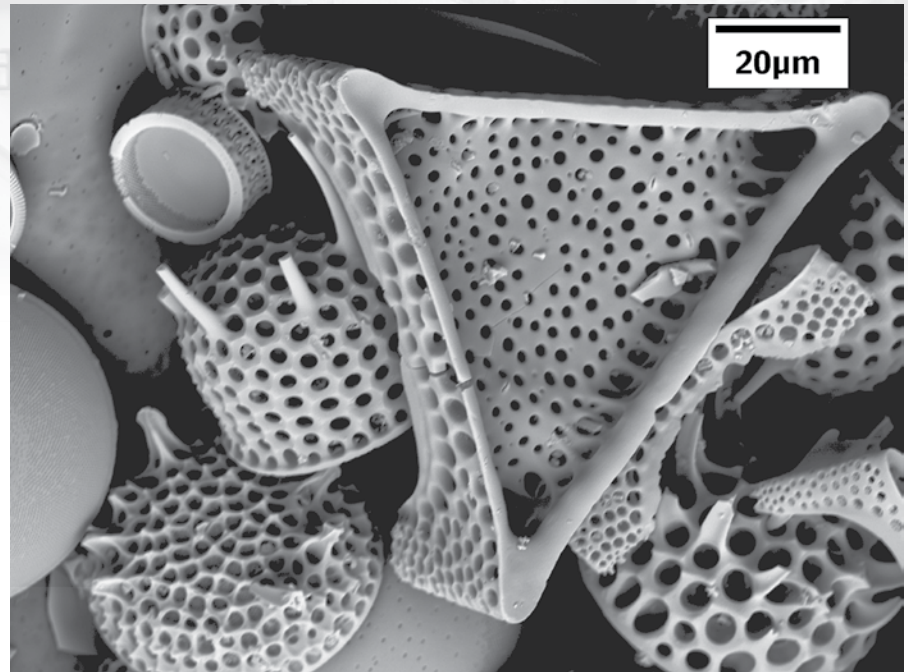


Figure 11. Scanning electron micrograph, *Triceratium* species. Scale bar = 20 microns.

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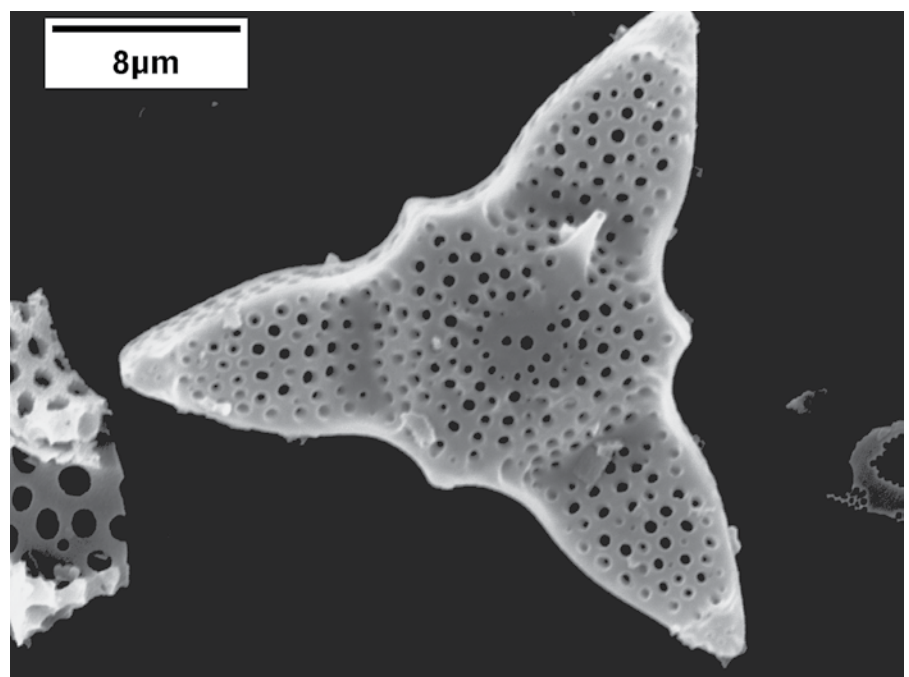


Figure 12. Scanning electron micrograph, *Triceratium* species. Scale bar = 8 microns.

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Mark H. Armitage, M.S., Ed.S.
 Thousand Oaks, CA
 micromark@juno.com

How Blind Are We? Reading a Picture

Figure 1 shows an outcrop at Grand Canyon, about a half mile along the trail to Clear Creek from Phantom Ranch and Bright Angel Creek. The Vishnu Schist occupies the bottom two-thirds of the photo, and the Tapeats Sandstone the upper third, separated by the Great Unconformity (Figure 2). There is a bleached zone and an obvious cavity near the center of the picture. While outliers of Precambrian sediment occur less than a mile away, at this location they are completely eroded.

This part of the Vishnu Schist is the “Brahma amphibolite.” Believed to be of volcanic origin, it yields “a zircon date of 1.75 Ga” (Karlstrom et al., 2003, p. 19). An intrusive dike into the amphibolite “gives a date of 1.73 Ga” (Karlstrom et al., 2003, p. 20). These relationships show that the amphibolite was emplaced, metamorphosed, and intruded before 1.73 Ga but has remained relatively unchanged since.

McKee (1945, p. 36) dated the basal Tapeats Sandstone in the eastern Grand Canyon as older than 513 Ma. While both Hereford (1977) and Rose (2006) differ with McKee (1945) in the exact method by which he obtained his date, they do not offer any significantly different one.

If the metamorphic process took place between 1.75 and 1.73 Ga and the Tapeats was deposited approximately 520 Ma, then 1.2 billion years is represented by the erosional surface between the amphibolite and the sandstone (Figure 3). But the appearance of this section suggests otherwise. The cavity probably formed when the schist melted and deformed around a small zone of the rock that had a higher melting point. Such changes seem to be intrinsically related to the visible ripples around and above the cavity. Whether the missing rock from the cavity was the cause of the ripples or not, we cannot now determine.

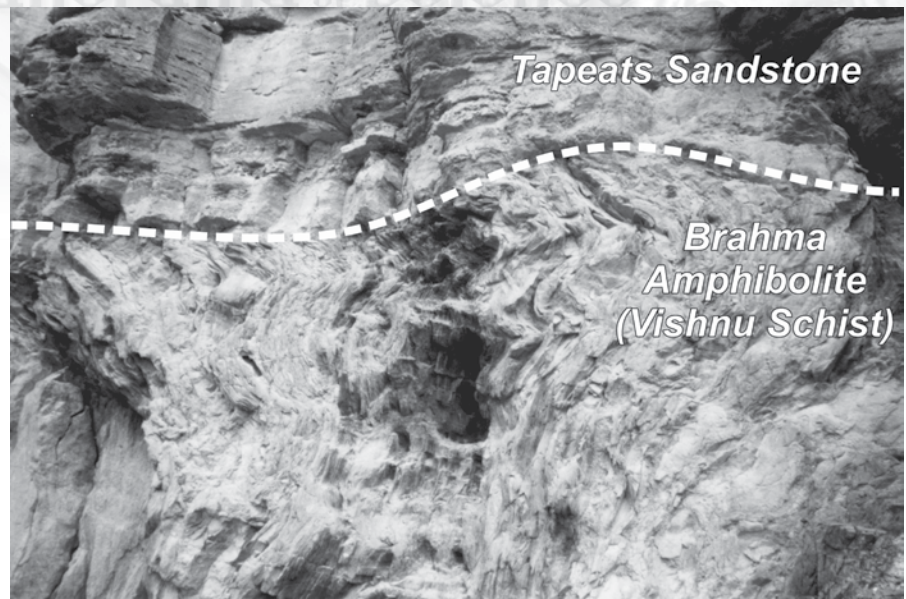


Figure 1. Bleached zone in Vishnu Schist and Tapeats Sandstone at the Great Unconformity, Grand Canyon, Arizona.

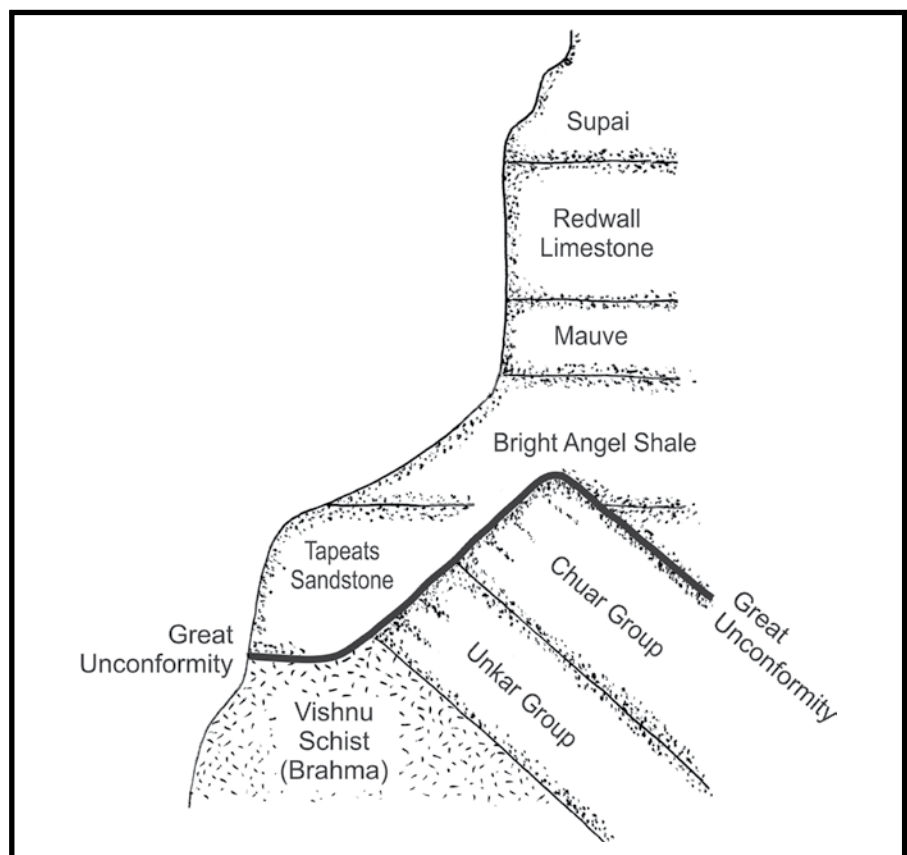


Figure 2. Stratigraphy of the upper Precambrian and lower Paleozoic sections of Grand Canyon.

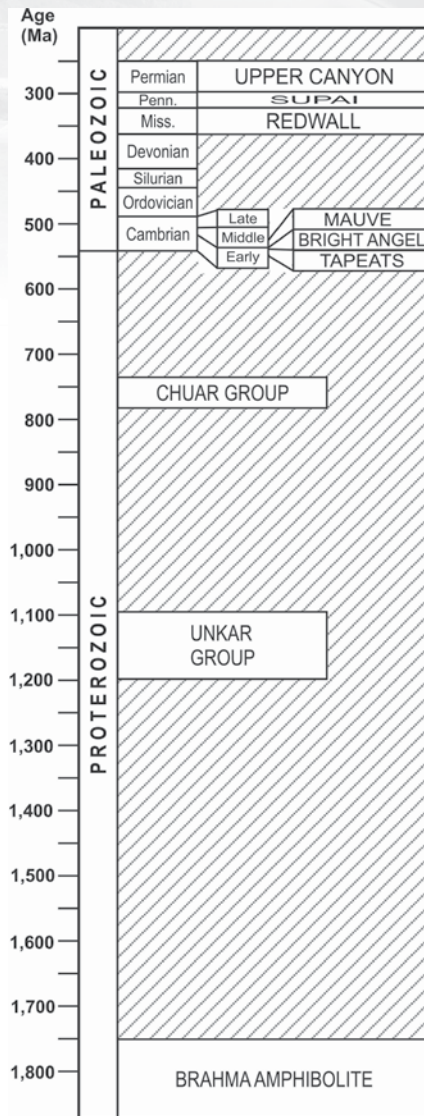


Figure 3. Stratigraphic chart of Precambrian and Paleozoic rocks at the Clear Creek Trail outcrop (Figure 1). Ages from ICS (2009).

Karlstrom et al. (2003, p. 26) proposed these rocks “were deposited at the earth’s surface (1.75–1.74 Ga) and then buried to depths of 20–25 km and complexly squeezed by thrusting and folding.” In spite of these repeated changes, the direction of the ripples is perpendicular to the unconformity, and the missing rock from the cavity was strategically located at their base.

One clue of discrepant timing is found in the symmetrical nature of the bleached zone around the cavity. It extends down into the amphibolite and up into the Tapeats, across the 1.2 billion years of missing time. This suggests that the rock previously occupying this cavity caused the chemical reaction that led to the bleaching. The bleaching decreases outward, yet it is present in both the schist and the sandstone.

This is surprising because of the 1.2 billion years separating the two formations. If the missing rock from the cavity caused the chemical reaction due to the effects of metamorphism, the bleaching should have affected the schist but not the sandstone. Thus we must believe that the reaction continued for more than 1.2 billion years, bleaching up into the Tapeats Sandstone as well as out into the amphibolite. Or, the reaction began after the Tapeats was deposited. But if so, what was the cause of the chemical reaction? On the one hand, we face the necessity of a chemical reaction continuing for more than 1.2 billion years; on the other hand, we face the lack of a trigger for the chemical reaction to be initiated at all.

There are several possible diluvial scenarios. If the bleaching migrated outward from the cavity a total of 0.5 m and the schist was primordial, the rate would have been 0.085 m per millennia. At the time of the Flood, about 1,500 years after Creation, the bleached front would have moved only 0.13 m and would not have reached the erosional surface. In the first scenario, the front would have continued to expand after erosion and deposition of the Tapeats, eventually crossing over into the sandstone.

However, a late Flood, or even post-Flood, origin of the canyon means that this rock would have been exposed during or soon after the Flood. But the bleaching appears to have occurred before the canyon was cut, the rocks exposed, and the missing rock body removed from the cavity. In that case,

the chemical front could not have crossed the unconformity and into the sandstone moving at the rate it did prior to the Flood. This would have produced a non-symmetrical halo.

That means that the schist was metamorphosed and the xenolith trapped early in the Flood. In a very short time, the schist was tilted, uplifted, and eroded, forming the Great Unconformity. Soon after, the Tapeats was deposited as the first unit of a thick sedimentary sequence. During these events, the chemical alteration began but was stopped suddenly after canyon cutting exposed the xenolith to surface conditions and the rock from the cavity was lost. Rather than the standard Precambrian history, which cannot explain this bleached area, the Flood accomplished all of the geological work, at rates far in excess of those seen today. In fact, it calls into question the entire supposition of Precambrian history and instead substitutes some rapid metamorphism, squeezing, and movement into present positions as the earliest events in a truly world-changing Flood.

Other explanations may be possible. But this illustrates the uncertainty of any historical reconstruction. It also illustrates the way in which different paradigms explain similar data. Finally, that uncertainty should remind us that the purpose of science, history, or any human endeavor is to discover truth. Losing sight of the goal is not an issue of science; it is an issue of human nature.

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W.R. Barnhart

The Little Oxygenators that Could: Cyanobacteria

In Genesis 1:11 the Bible teaches that God created “vegetation: seed bearing plants and trees on the land” (NIV) on Day 3 of the six-day Creation week. Beside the specific words “seed-bearing plants and trees” in the passage, the very general word “vegetation” is used, which may include “non-seed-bearing” plants, such as lichens, mosses, and possibly all of the microscopic organisms that also perform photosynthesis. This would include the very interesting cyanobacteria, once called blue-green algae. Therefore, based on the Creation account in Genesis, it is likely that cyanobacteria were also present on earth on Day 3.

I became interested in cyanobacteria during my light and electron microscopic examinations of various lichens that grow at the Van Andel Creation Research Center lab (Chino Valley, AZ) (Armitage and Howe, 2007a; 2007b). I was intrigued by cell groups that adhered to the exterior surfaces of the lichens, usually within narrow clefts of lichen tissues. These cells did not resemble any of the lichen cells. Later, while performing a similar light and electron microscopic study of mosses (Armitage, 2009), groups of cells like those previously seen on lichens that were distinct from moss cells were noted. These cells were associated with moss exterior surfaces and were seen in clefts and bends on the moss surface. I identified these cell groups as colonies of individual cyanobacteria (Figures 1–3).

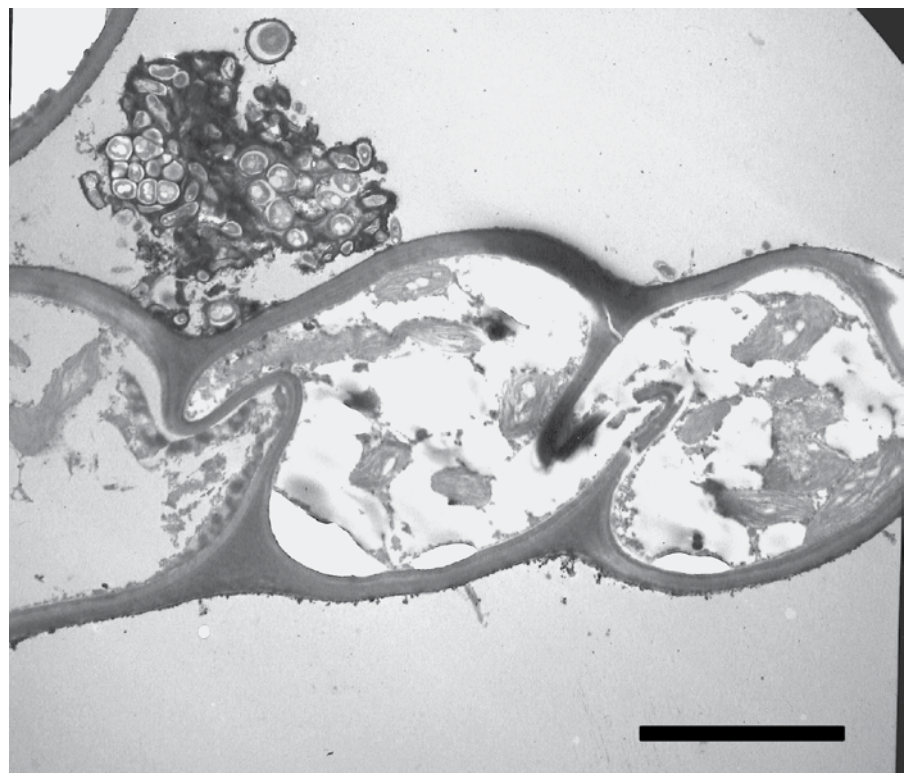


Figure 1. Transmission electron micrograph (TEM) of a thin section of the moss (*Funaria*) phyllid (or leaf-like structure), 1,600X magnification. Individual moss cells can be seen in a row from left to right with chloroplasts inside of them. The chloroplasts are the site in the plant where photosynthesis takes place. Above the phyllid on the left side is a colony of blue-green algae (probably *Gleocapsa*). The blue-green algae (cyanobacteria) have been found to be a symbiotic partner with mosses and other bryophytes. Scale Bar = 50 microns.

Cyanobacteria are widely distributed photosynthetic bacteria that are found in many different aquatic and terrestrial habitats. They exist as single

cells or as colonies made up of many cells. Cyanobacteria play a critical role in nitrogen fixation and oxygen production and are also an important

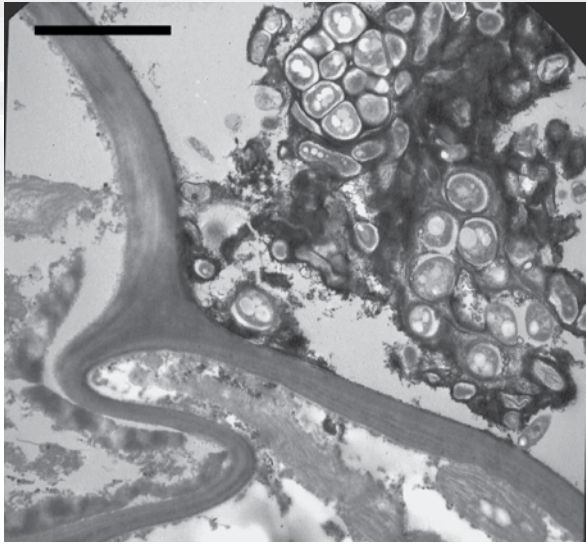


Figure 2. TEM of a thin section of *Funaria* phyllid, 4,000X magnification. Note the close association between the cyanobacteria colony and the moss. Scale bar = 10 microns.

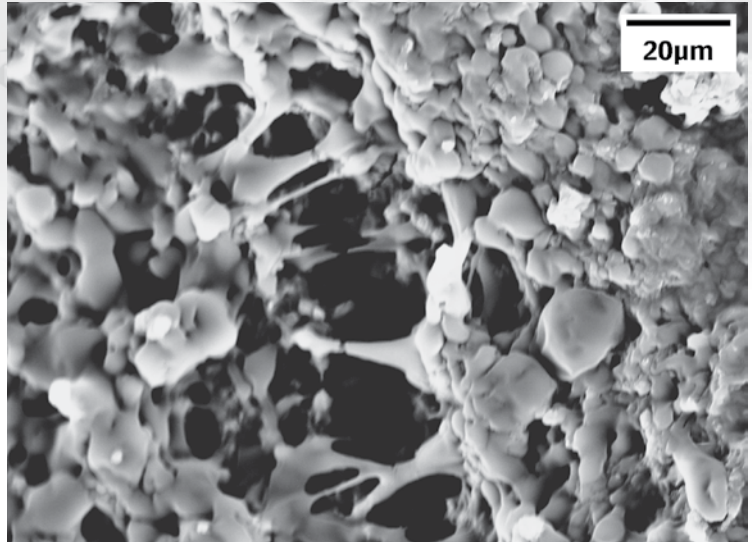


Figure 4. Scanning electron micrograph (SEM) of the outer surface of a *Gleocapsa* colony, 800X magnification. This was a colony that was growing on the moist surface of a statue in a moist southern California climate. Note the intercellular connections between cells across an open void. One characteristic of cyanobacteria is that they cover themselves in a thick mucilage. Scale bar is mislabeled and should read 100 microns.

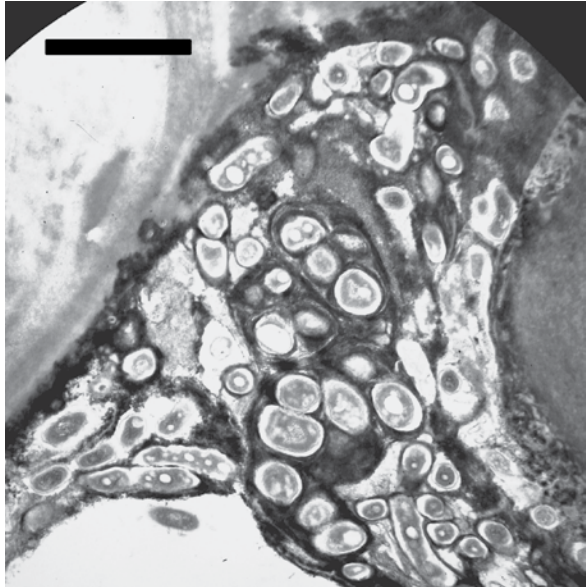


Figure 3. TEM of a thin section of *Funaria* phyllid, 6,300X magnification. This is a different type of cyanobacteria colony that is closely sandwiched between two moss surfaces. Scale bar = 5 microns.

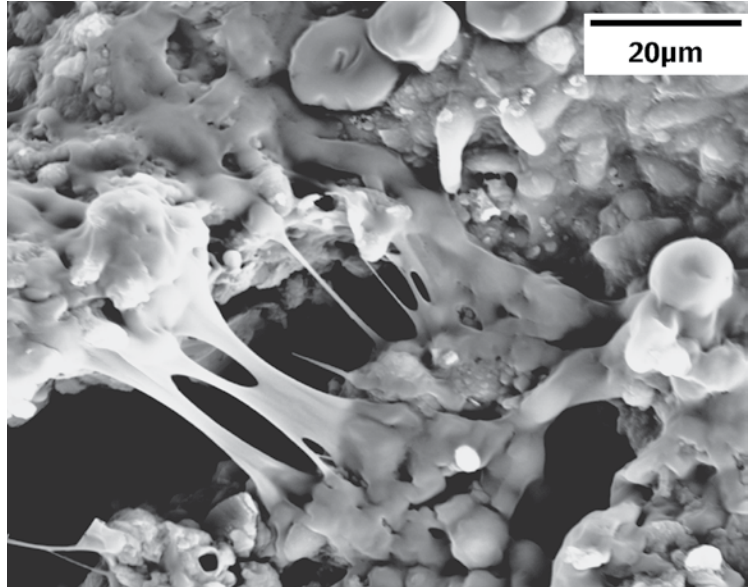


Figure 5. SEM of the outer surface of a *Gleocapsa* colony, 1,800X magnification. The intercellular mucilage connections are quite visible. Scale bar = 20 microns.

component of the carbon cycle as part of the CO₂ sink (Howe, 1967; Badger and Price, 2003; Tomitani et al., 2006; Adams and Duggan 2008). In Fig-

ures 4, 5, and 6, note a colony of many blue-green algae on the surface of a statue growing in the moist southern California climate.

Cyanobacteria are frequently characterized by evolutionary origin-of-life theorists as primitive prokaryotic ancestors of the more advanced eu-

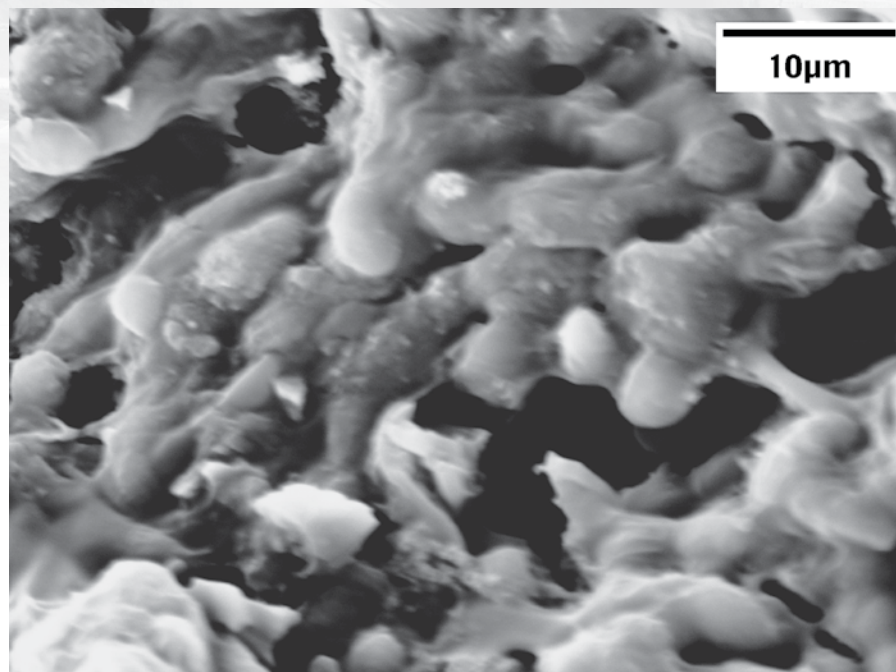


Figure 6. SEM of the outer surface of a *Gleocapsa* colony, 2,200X magnification. Close up of the thick covering over the cells. Scale bar = 10 microns.

karyotic photosynthetic plants. The fact that both cyanobacteria and more advanced photosynthetic plants still exist and are found in many of the same environments raises the question of why the more “primitive ancestor” types continued to prosper with little change for eons, while (according to Darwinist claims) their more advanced progeny evolved and diversified. It is further postulated by Darwinists that the more “advanced” eukaryotic plant cells (those with chloroplasts) arose by a non-photosynthetic protist “swallowing” (engulfing) a cyanobacterium and “deciding” to employ it for photosynthesis (as the endosymbiotic theory teaches) rather than to simply digest it as food (Yoon et al., 2009; Cavalier-Smith, 2010). In fact, Cavalier-Smith characterizes the engulfment of the cyanobacterium as enslavement! Nevertheless, prokaryotic cyanobacteria are still as prevalent on earth as are the eukaryotic plants that purportedly descended from them.

For many years a group of scientists at UCLA and elsewhere have collected and analyzed rocks thought to be among the oldest on the planet—upwards of 3.5–3.9 billion years (Schopf and Packer, 1987; Awramik, 1992; Schopf, 1993; Yamaguchi, 1996; Altermann and Kazmierczak, 2003; Schopf, 2006; Cavalier-Smith, 2010; Hoashi et al., 2009). A substantial amount of data show microscopic cyanobacteria fossilized in these “ancient” rocks (Kazmierczak and Altermann, 2002), yet a considerable number of counterclaims exist against the view that cyanobacteria have been active on earth for 3.5 billion years (Kasting, 2001; Badger and Price, 2003; Brasier et al., 2004; 2006; Olson, 2006; Tomitani et al., 2006; Yoon et al., 2009).

One study argues that these supposed microfossils are simply “self-organizing structures” or other artifacts and may represent the re-crystallization of carbonaceous glass into silica spheres in hot springs (Brasier et al., 2006; Eriksson et al., 2004).

It is only within recent decades that evolutionists have postulated bacteria were the first organisms on earth to produce biomass using photosynthetic processes. They maintain that the development of photosynthesis on earth was not an innovation first achieved by green plants, but rather a “less-complex” prokaryotic bacteria that did not liberate oxygen as a by-product of photosynthesis “invented” photosynthesis (Yamaguchi, 1996; Olson, 2006; Brasier et al., 2006). However, bacteria that employ hydrogen, hydrogen sulfide, or peroxide instead of water to produce “biomass” (sugar) that liberate non-oxygen-containing by-products are hardly “less complex” than other bacteria. Rather, they produce biomass via a light-mediated, non-oxygen-liberating photosynthetic process. No evidence of this supposed former group of bacteria has ever been found in the fossil record.

Evolution requires specialized bacteria that could perform anoxygenic (non-oxygen) photosynthesis on the early earth because any organism that could release oxygen would have changed the reducing atmosphere postulated by Darwinists to preserve the early molecules that supposedly led to life. Therefore, they argue, cyanobacteria could not have been early colonists. Oxygen is highly toxic to organic molecules, causing their rapid oxidation; thus the theory of an early evolution of life requires a reducing atmosphere.

Bacteria were well known in Darwin’s time, and the theory of germ-based disease was gaining popularity in 1828 when Darwin was in medical school. Robert Hooke, a member of the Royal Society, published *Micrographia* in 1665, a book that included several remarkable hand illustrations of highly magnified objects such as the facets of fly eyes. (His book can be seen at: <http://archive.nlm.nih.gov/proj/ttp/books.htm>.) Although Hooke included no microorganism illustrations, he did view natural objects at magnification levels

high enough that microorganisms could be observed.

The initial reaction to his single-celled organism observations was one of skepticism, but in 1680 Antony van Leeuwenhoek's claims about microorganisms were finally vindicated, and as a result he was inducted into the Royal Society. Darwin, as a member of the Royal Society, should have had access to these documents by 1859, almost 200 years later when he published his *Origin*. In fact, Brian Ford recently found all of Leeuwenhoek's specimens intact at the Royal Society in 1990 (see <http://www.brianjford.com/wavintr.htm>); thus Darwin might have even been aware of the specimens held by the Royal Society.

Darwin must have known from his medical school classes about bacteria and their potential for disease. Additionally, city planners in London were attempting to rid the Thames River of fouling sewage spills caused by bacteria (Kutschera, 2009). Yet, none of Darwin's books, including his 1859 *Origin of the Species*, even mentioned bacteria, and they seemed to have played no role in Darwin's evolutionary stories. Other than his "warm little pond" comment in an 1871 letter, Darwin never even attempted to tackle the origin of life issues, and the battle for a plausible abiogenesis theory rages on today.

Cyanobacteria are more complex than anoxygenic photosynthetic bacteria because they have two photochemical reaction centers versus one for the putative more "primitive" bacteria. A reaction center is a highly ordered molecular machine constructed from several proteins and used by photosynthetic organisms to collect light and to convert it into chemical energy. Cyanobacteria use a "more complex" chlorophyll molecule than anoxygenic bacteria; the former, in common with green algae and land plants, use chlorophyll *a*. Chlorophyll is the pigment used by plants and some microorganisms that efficiently

absorbs light photons. Chlorophylls are often highly specific for particular light wavelengths in the electromagnetic spectrum.

Anoxygenic bacteria use Bacteriochlorophyll *a*, which is less "complex" than Chlorophyll *a* and absorbs light in regions of the spectrum that green plants cannot. Not only do cyanobacteria utilize Chlorophyll *a* in their reaction centers (among other so-called accessory pigments), but they also use water and atmospheric carbon dioxide to manufacture biomass. Furthermore, they release molecular oxygen into the atmosphere.

These, the "simplest" of typical photosynthesizing organisms use two reaction centers and several accessory pigments such as carotenoids to gather light from various regions of the electromagnetic spectrum. The fact that they release oxygen into the atmosphere makes cyanobacteria unlikely early-earth photosynthetic candidates, because as previously mentioned abiogenesis requires an early earth (Precambrian and before) with a reducing atmosphere (Yamaguchi, 1996; Brasier et al., 2004; Kasting and Howard, 2006; Olson, 2006).

Furthermore, no agreement exists on the order in which the different chlorophylls evolved, nor even on a logical order they could have evolved, and genome sequencing of chlorophyll has not helped solve this problem (Bryant and Frigaard, 2006). Nonetheless, it is widely agreed by evolutionists that oxygen placed "selective pressure" on microbes to "invent" Chlorophyll *a* (Gomez et al, 2007).

Additionally, it is argued that any photosynthesis that was taking place on the very early earth was restricted to certain "oxygen oases" and would not be a global phenomenon until a billion years or more later (Kasting and Howard, 2006). How cyanobacteria gained this photosynthetic ability and how eukaryotic plant cells with fully functional chloroplasts arose are largely

unexplained. The evolution of photosynthesis on earth is, however, completely dependent on cyanobacteria's presence at a particular point in history. The implausible scenario called endosymbiosis, which requires the gobbling up of cyanobacterium after they gained this photosynthetic trait and the subsequent utilization of that cyanobacterium as a new organelle, is widely postulated.

Others have argued that it was not photosynthesis that accounted for the rapid rise of paleoclimate oxygen, but rather it was a by-product of a photochemical reaction by which certain sulphate-reducing bacteria pulled H_2 from the atmosphere and replaced it with oxygen (Yamaguchi, 1996; Kasting, 2001; Kasting and Howard, 2006). In fact, the whole "science" of paleoclimatology is characterized by bizarre claims and counterclaims.

One such instance is a study that concluded that oxygen mysteriously and suddenly disappeared some 500 million years after it was initially produced on earth (Lyons and Reinhard, 2009). Kasting and Howard (2006) also note that in order for oxygen levels to be able to increase and for early photosynthesizers to be able to survive, the earth could not have been hot at the beginning of the Precambrian as was once believed.

The creationist idea that an Intelligent Designer is behind the existence of cyanobacteria makes more sense than the convoluted scenarios proposed by Darwinists. Recent studies from England and elsewhere have shown that cyanobacteria have a very sophisticated symbiotic relationship with many bryophytes (hornworts, liverworts, and mosses), as well as with aquatic ferns, cycads, and some angiosperms and lichens (Adams, 2002; Meeks and Elhai, 2002; Meeks, 2003; Adams and Duggan, 2008). These more complex symbiotic partners release chemical signals that stimulate the formation of a motile filament called a *hormogonium* on the cyanobacteria. The cyanobacteria then use these hormo-

nia to gain entrance into plant roots, stems, leaves, and thalluses.

Once inside, the cyanobacteria fix and transfer carbon dioxide and nitrogen to the higher plant. It has even been shown that the amount of nitrogen fixation activity is many times higher for cyanobacteria serving as symbiotic partners in other plants (such as hornworts) than for free-living cyanobacteria (Adams and Duggan, 2008). Additionally, cyanobacteria in symbiotic relationships transfer upwards of 80% of the nitrogen they fix to the host plant (Adams and Duggan, 2008). Figure 7 shows a large number of blue-green filaments (probably *Nostoc* sp.) in close association with a moss thallus. It is unrealistic to conclude that such a symbiosis could have evolved by evolutionary mechanisms; therefore, there is good reason to believe that cyanobacteria have existed alone, as well as in association with other plants, since the earliest days of creation.

Acknowledgments: I thank Jerry Bergman for considerable help in making this a better manuscript. I also thank the anonymous reviewers who donate many hours of reading and editing to the society. Finally, I thank the donors to the CRS endowment funds, in particular Ray and Lois Strom and Arlin and Lois Penner. A portion of these funds helped to pay for this study. Soli Deo Gloria!

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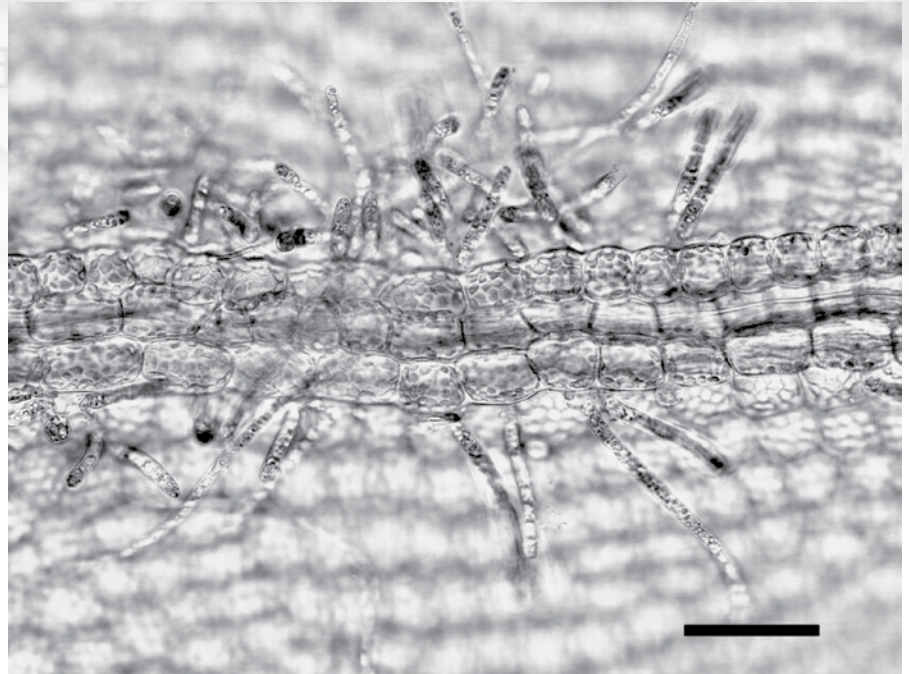


Figure 7. Light micrograph, 250X magnification brightfield image. The central rib of a moss phyllid (*Funaria*) is shown from left to right. Many single filaments of cyanobacteria symbionts are seen extending from the *Funaria* rib. Scale bar = 200 microns.



Figure 8. Light micrograph, 400X magnification brightfield image. Filaments of cyanobacteria are seen. Note the oval-shaped akinete cell. An akinete cell is unique to the cyanobacteria. It is a dormant cell that can survive unfavorable conditions and germinate when conditions are favorable for growth. Scale bar = 100 microns.

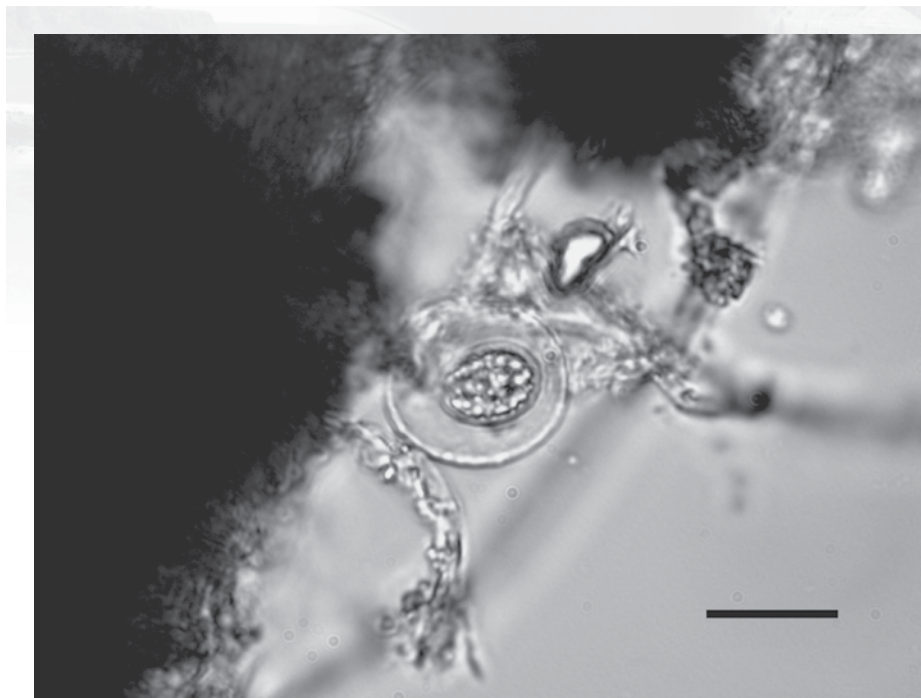


Figure 9. Light micrograph, 500X magnification brightfield image. Single *Gleocapsa* cell seen. Note the two distinct layers of covering. Scale bar = 60 microns.

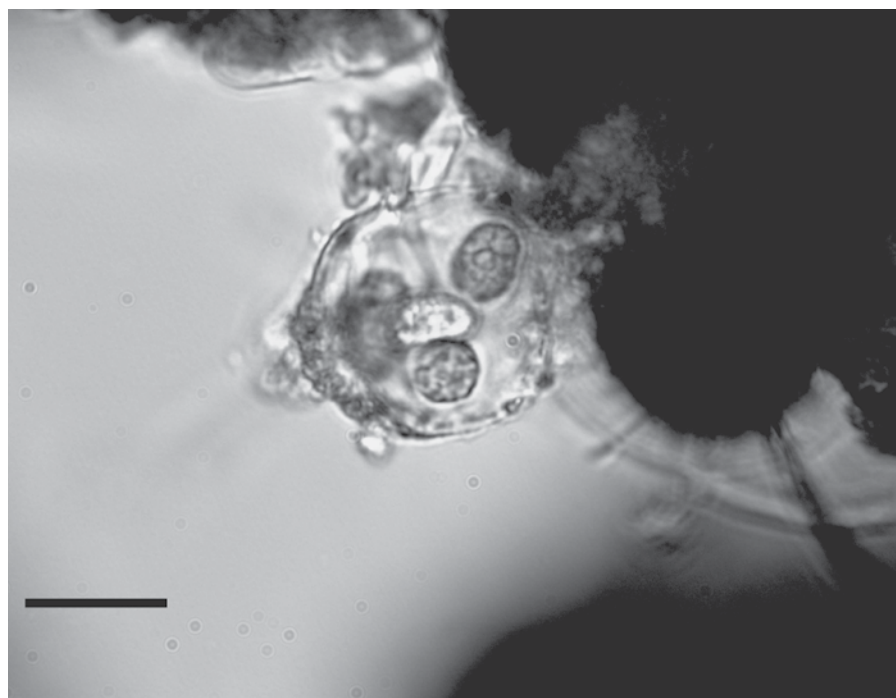


Figure 10. Light micrograph, 500X magnification brightfield image. Single *Gleocapsa* colony seen. Note several cyanobacteria in the covering. Scale bar = 60 microns.

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Mark H. Armitage, M.S., Ed.S.
 Thousand Oaks, CA
 micromark@juno.com

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.

Quest for the Original Type of Man

The question of who was the original type of man is raised again with the discovery of a *new* type of man unearthed in Siberia and given the date of 40,000 years. Its mitochondrial DNA is not like that of modern man. Yet, like the genes of Neanderthal man, they are found in some modern people, which means that mitochondrial DNA does not tell us the whole story. This new discovery is not the only fossil thought to be different. Skulls from Dail, Jinniushan, China, look different from *Homo erectus* and do not resemble the Neanderthals or modern man. It is not impossible to see this new type of man having its line going back to 500,000 years, bringing us to *Homo heidelbergensis* (from a private source).

This shows the ability of this line to reproduce with modern man, and likewise with the Neanderthal line, meaning man belongs to one big family, with *Homo sapiens* existing around 400,000 years ago, as shown in the fossils

from Spain (Bischoff, et al., 2007, pp. 275–280) and Israel (Fernandez, 2010, p. 33); plus those wonderful spears from Germany (Dennell, 1997, pp. 767–768), corroborate this.

At the same time, along with this, there is the skull from Steinheim, which is close by, geologically speaking, and must have a history going farther back in time. All this raises the question as to who was the original type of man. Also, we must question the origin of *Homo erectus*, particularly as Fred Spoor questions any link of *Homo habilis* with *Homo erectus* and the origin of *Homo erectus* itself (Brown, 2008, p. 322).

Could other forms of man have given rise to *Homo erectus*? Is the fossil record of man set out in the right way? Perhaps the fossil discoveries dating from 40,000 to 50,000 years are telling us that something is not quite right about the way they are currently being portrayed.

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Colin Brown
Golborne
Warrington
WA3 3EW
United Kingdom

Grateful for Comments

I thank Brian Jones for his interesting comments (CRSQ 47:243). I did neglect to mention in my paper that the experimental trial I engaged in employed a 20-pound solid weight, which compressed the mud and entombed fish

for the duration of the experiment. However, I think it is also important to note that many fossil formations that yield spectacular fossils, are found at or near the earth's surface (such as the remarkable fossils found in the

Lompoc, CA, diatomaceous earth deposits). These may never have been at the kinds of depths that Mr. Jones suggests, and yet wonderfully preserved fish are found there by the billions.

Mark Armitage

Klenck's Errant Interpretation

I wish to object to the article, "A Genesis Model for the Origin, Variation, and Continuation of Human Populations" by Joel David Klenck (CRSQ 47:111–137). That article is not science but instead Mr. Klenck's own private explanation/interpretation of Genesis 6:4–5. And from a hermeneutical point of view, we know that his interpretation is false because the Bible plainly tells us that "no prophecy of the scripture is of any private interpretation" (2 Peter 1:20).

Furthermore, when it comes to Bible interpretation, the author of the article does the very things that we condemn the evolutionists for doing; namely, arbitrarily picking the evidence while

ignoring what does not fit, explaining away facts that do not fit his worldview, and contradicting known facts.

He arbitrarily defines the word "Nephilim," a word that only appears three times in Scripture, while rejecting evidence that it should be translated "giants." He claims the phrase "sons of God" only means angels in Scripture. However, in the passages he gives in support of that view, it is only assumed that the "sons of God" mentioned are angels. The Bible never says it. He then claims that his interpretation of that phrase is "literal," when it is obvious to any thinking person that the phrase "sons of God" literally means "sons of God,"

not angels. The literal meaning of the word "son" is male child.

He also fails to mention any of the New Testament passages that clearly define the phrase "sons of God" as "believers" (e.g., John 1:12; Romans 8:14; etc). The Bible often explains Old Testament phrases by repeating them in the New Testament. And he ignores the fact that the angels are spirits, not flesh and blood, and that they are not sexual beings (Hebrews 1:14; Matthew 22:30).

Sincerely

Gary Ray Branscome
La Vergne, TN

Questions for Klenck

I have followed with interest the discussion that Dr. Joel Klenck's article on the "Demise of the Dinosaurs" (*Creation Research Society Quarterly* 46:159–166) has stirred. In the recent issue (*Creation Research Society Quarterly* 47:162–169), Dr. Klenck responds to several letters concerning his dinosaur article and defends his position on the timing of the dinosaur extinction. His article, "A Genesis Model for the Origin, Variation, and Continuation of Human Populations," in the same issue (47:111–137) promises to continue this stir of controversy. There are several comments I would like to make about both his response and his article on human populations.

First, I want to express my appreciation to Dr. Klenck for the courage to publish a viewpoint not currently popular among creation scientists. Such fresh ideas can produce valuable discussion

and needed critique of old ideas. However, we should also strive for the highest standards possible in such exchanges.

His hypothesis in this article is interesting and worthy of further study, but he makes several problematic statements within this article.

First, Dr. Klenck states that the two possibilities for the identity of the "sons of God" in Genesis 6:4 are either fallen angels or members of the line of Seth. He suggests that the fallen angels hypothesis is "the more literal understanding and therefore Biblically correct" (p. 112). However, Dr. Klenck fails to realize that there is at least one more hypothesis to be found in the literature: the idea that the "sons of God" are actually ancient kings who accumulated a harem. Ancient Near Eastern kings were often known as descendants of the gods, and thus a reference to "sons of God"

would, under this interpretation, be to the kings of cities or nations. For a good discussion of the various views on this passage, see Beale and Carson (2007, p. 1049). Regardless of the plausibility of this interpretation, it is a well-known option and should not be ignored. It is also inaccurate to state that the "fallen angels" hypothesis is the "more literal" and therefore Biblically correct view. The "more literal" view is that these were humans, not angels, as attested by the fact that God's judgment is directed against *men* and not angels, or even the Nephilim. Whatever position one takes on this passage should be determined by more than the evidence Dr. Klenck presents.

He also states, "The term 'sons of God' ... is used only to describe angels throughout the Bible" (p. 112). This is simply wrong, as a simple search engine

can show. Though the phrase occurs rarely in the Old Testament, in the New Testament it is used multiple times and refers to human believers (Matt. 5:9; Luke 20:36; Rom. 8:14; Gal. 3:26). I might note that in the Hebrew version of the New Testament (Delitzsch, 1877), the phrase appears exactly as it does in Genesis 6:4. In addition, Deuteronomy 32:8 is textually debated, but it is possible that it originally read “sons of God,” as is followed in the ESV, and refers to humans. Thus it is not at all clear that we should read “angels” in Genesis 6:4. Further evidence should be presented before assuming that the case is closed.

Dr. Klenck also argues that the Nephilim were not on the earth after the Flood, contra Numbers 13:33. He argues that the Numbers incident relates erroneous information because it was a part of the “evil” report brought by the ten spies to Moses. However, the report was not primarily “evil” because of the content of the report but because of the conclusion of the spies (notice that Joshua and Caleb never refute the

claims of the other spies but call the Israelites to have faith in the Lord). Also, the Septuagint translates Nephilim in Genesis 6:4 as “giants” (*gigantes*), indicating that Jewish rabbis saw the “giant” interpretation as correct. Dr. Klenck’s hypothesis lacks too much evidence for him to make statements such as “It is Biblically impossible that the sons of Anak, with their gigantism, were from the Nephilim” (112).

Dr. Klenck has an almost complete lack of citations of Biblical scholars regarding the Nephilim, their identification, and the meaning of Hebrew words. In fact, the sum total of works specifically dealing with the Biblical text on its own terms is four: one each by Henry Morris, Arthur Custance, F. A. Schaeffer, and P. Schaff. One citation (Boice, on page 112) is not included in his list of references. None of these works were published after 1983. There are also no standard Hebrew lexicons cited, though he makes a number of statements regarding what various Hebrew words and phrases mean, and at times these

definitions are questionable. While I applaud Dr. Klenck’s thorough research in paleontology and archeology, he needs to upgrade his work in Biblical exegesis.

There are further issues with Dr. Klenck’s article, but I do not wish to be overly critical. What I do wish to point out, however, is that the highest standards possible should be applied in our research, particularly when dealing with the Biblical text itself. I do thank Dr. Klenck for his extensive research in paleontological matters and would encourage him to apply the same rigor to his Biblical studies.

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Jeremy Maurer

Klenck’s Nephilim Model Stacks Assumptions upon Speculations

It is commendable that Dr. Joel Klenck is producing thought-provoking, “out of the box” theories (the Garden of Eden, the demise of the dinosaurs, and more recently an anthropology model). But I would strongly caution him about being overly dogmatic in his presentation. Good men with a solid knowledge of the Hebrew and many years studying the Bible have disagreed on some of the interpretations that he makes foundational in his models. Greater caution and humility would win a more favorable consideration for novel approaches. For example, the paper in the Fall 2010

CRSQ (Klenck, 2010) is entitled “A Genesis Model...” and uses that name for his theory a dozen times in the paper. This characterization of Klenck’s Nephilim theory implies that the models from Cuozzo, Wise, and Lubenow are not based upon Genesis or perhaps are unbiblical models.

My biggest criticism of the Nephilim model is that the case is overstated, built with assumption piled on top of speculation. This produces an unsteady structure that makes far-reaching claims but has little foundational stability. Let me address a few of these speculations.

On page 112 Dr. Klenck (Klenck, 2010) summarily discusses the sons of God, which he identifies as angels. “The first position is the more literal understanding and therefore Biblically correct.” This simplistic dismissal of opposing interpretations (like identifying the sons of God with the godly lineage of Seth or a priestly/kingly class that were being worshiped) is not fitting for a research paper, especially when this issue is fundamental to the whole model. Klenck claims, “The term ‘Sons of God’ is used only to describe angels throughout the Bible.” While he is cor-

rect in the narrow sense that those precise Hebrew words are only used again in Job (where they do describe angels), the Greek equivalent is used many times in the Bible to describe godly believers (Matt. 5:9; Luke 20:36; John 1:12; Rom. 8:14,19; Gal. 4:6; Phil. 2:15; Heb. 12:7; 1 John 3:1–2). Furthermore, Klenck never discusses Matthew 22:30, which seems to indicate that angels do not have the ability to procreate. Hebrews 1:14 tells us that the angels are ministering spirits. We do know that they can take on a human form as they appear to men and that they can inhabit people and animals. But there is no evidence that spirits can produce human genetic material to fertilize a human egg. Fundamental to the historical creation model is the belief that different kinds are not interfertile. Clearly angels are fundamentally different creatures from humans (Psalm 8:5).

We know that Jesus Christ died to bring salvation to men. He didn't die for the angels. So could half-breed angel/humans and their later mixed-breed offspring even be saved? Klenck seems to indicate that they could not: "Nephilim were the products of angelic and human couplings, evil acts that resulted in the damnation of their progenitors" (Klenck, 2010, p. 113). But where is the theological basis for damning children because of parental evil? If the progenitors could in fact be saved, then I see no reason to call them "evil," as Klenck does in his postscript. We are all born sinners and in need of a savior. A whole paper could have been written on these issues, but Klenck never addresses any of them substantively.

Then Dr. Klenck quickly moves onto another speculative interpretation as he discusses Genesis 6:4. The Bible merely says, "There were giants in the earth in those days; and also after that..." Klenck interprets this to mean that "there were at least two periods during ancient times, before the Flood, that the Nephilim flourished" (Klenck, 2010, p. 113). There is no reason why the text

can't simply mean that they persisted after they first appeared. Why would one expect this hardy lineage to have flourished and then decreased before again coming to prominence?

Then Klenck makes the assumption that these Nephilim were more wicked than others in that day. On page 113 (Klenck, 2010) he states, "The Nephilim are also associated with intense and continuous evil." But there is no Biblical warrant for the speculation that Genesis 6:5 applies specifically to the Nephilim. The fact that the entire primeval civilization was destroyed is good evidence that it was all equally wicked. God wiped out post-Flood societies that gave themselves to great wickedness, like Sodom and Gomorrah. So such societal wickedness surely isn't limited to "non-modern humans."

Further speculation is presented as fact regarding Noah's ancestry not being affected by the Nephilim lineage. While the Bible gives the patriarchal line from Adam to Noah, nothing whatsoever is stated about maternal ancestry. Nephilim or mixed ancestry women could well have married into this patriarchal line (just as Ruth and Rahab later married into the messianic lineage). Yet this becomes a major pillar in Klenck's model, strongly restated at the very conclusion of the article: "That Noah and his family, direct descendants of Adam not influenced by Nephilim ancestry, were the only humans that survived the Flood, explains the extirpation of all non-modern human populations throughout earth" (Klenck, 2010, p. 132).

Another example of Klenck's making unwarranted assumptions is his presenting two small artifacts as evidence for his statement that the whole Nephilim civilization exhibited "artistic fixation on sexually-themed figurines" (Klenck, 2010, p. 131). This is a grand generalization! But even if it were true, it would hardly be different from anatomically modern human cultural artifacts from the ancient Middle East or today's

Americans that are obsessed with pornography. So it is not evidence of greater wickedness in Nephilim than in modern man. Artwork has been found in Neanderthal caves. Apparently Klenck assigns this to modern humans since he doesn't specifically mention it, though he never indicates why.

On page 114 Dr. Klenck states, "To test the Genesis model, there should be skeletal remains in early paleoanthropological contexts, which are more comparable to anatomically modern humans" (Klenck, 2010). This is a test that Klenck's model fails to pass, despite citing a number of speculative finds from different contexts. Indeed, it has long been admitted by creationists that no clear pre-Flood human skeletons have been found. Making the case that nearly all hominid fossils are pre-Flood is a very tough assignment and would deserve a full paper itself. Some of these fossils are found in late Cenozoic layers. Many are on top of vast sediments traditionally ascribed to the Flood. How come Neanderthal remains are at a depth one would expect for human burial? Would not the Floodwaters have easily filled Neanderthal caves with sediment or entirely wiped them out? Are not the caves themselves Flood formations?

Unfortunately, Joel Klenck's paper provides little in the way of empirical analysis. In contrast, Dr. Jack Cuozzo took fifteen years of his life in original empirical research to produce his groundbreaking work *Buried Alive* (Cuozzo, 1998). In my opinion, Cuozzo's work is well reasoned, focused, and convincing. Klenck's model is overreaching and based on multiplied broad assumptions. It assumes evolutionist's dating of many specimens, at least in a relative sense. We must be careful about accepting the Darwinists' dating and characterization of hominid fossils. As Henry Gee, the chief editor for *Nature* admitted, all the fossil evidence for human evolution "between ten and five million years ago—several thousand

generations of living creatures—can be fitted into a small box” (Gee, 1999, p. 32). The conventional picture of human evolution is “a completely human invention created after the fact, shaped to accord with human prejudices” (Gee, 1999, p. 114).

A key point of conflict between the work of Cuozzo and Klenck’s Nephilim theory is whether Neanderthals aged more slowly or more quickly than modern humans. Again, this alone would be a worthy topic of a full paper. On page 127 Klenck reprimands Cuozzo for hypothesizing that “Neanderthals, are *homo sapiens sapiens* who, according to Genesis, are more than several hundred years old and existed before and soon after the Flood” (Klenck, 2010). But Cuozzo does not argue that Neanderthal specimens are several hundred years old. His extensive firsthand research indicates an age of approximately 300 years old, and he theorizes that these Neanderthals are typical *post-Flood* descendants of Noah.

Klenck proceeds to mix *H. ergaster*, *H. erectus*, and *H. neanderthalensis* all together in trying to refute Cuozzo’s theory with evidence that non-modern human children display distinctive robust features (concluding that those features can’t be the result of great age). But this is misleading since Jack Cuozzo’s work is focused only on Neanderthals. Jack claims that his cephalometric x-rays showed that Neanderthal children had retruded faces compared to modern children. Concerning Neanderthal adolescents Cuozzo wrote, “I thought it was established fact that the French had fixed Pech de l’Az (2.5 yr) infant by putting the lower jaw forward. Also, Gibraltar II child (5 yr approx) lower jaw had been broken and reset to make it look older” (Cuozzo, 2011). There is no clear evidence of adolescents displaying robust Neanderthal features.

After reading Dr. Cuozzo’s work, I came away convinced that Neanderthals were descendants of Noah and that

the distinctive robust features were the results of longevity. But Klenck cites the work of Rozzi and Bermudez de Castro (2004) to support his contention that Neanderthals actually matured *faster* than modern humans (Klenck, 2010, p. 129). However, these authors seem to have an axe to grind, aggressively seeking to classify Neanderthals as a separate species. Their dentition analysis has been strongly challenged by Cuozzo (Cuozzo, 2004). Klenck does not mention later studies that report Neanderthal children had more prolonged childhoods (Owen, 2005) and slower sexual development (Ravilious, 2008). A 2009 paper on this topic begins: “The assessment of the degree of similarity or difference between Neanderthals and modern humans in their patterns of dental development remains a controversial matter” (Bayle et al., 2009).

In fact, a number of evolutionists have come to agree with Cuozzo. “This pattern of growth resulted in larger adult brain sizes but not in earlier completion of brain growth. Because large brains growing at high rates require large, late-maturing, mothers ... it is likely that Neanderthal life history was similarly slow, or even slower-paced, than in recent *H. sapiens*” (Ponce de Leon et al., 2008).

Klenck acknowledges that Neanderthals built and played musical instruments, hardly a trait one might expect of wild, evil Nephilim. But Klenck doesn’t give the full story. They also cooked vegetables and built bread-making facilities (Vegas, 2010), used pigments (perhaps for body paint) (Zilhao et al., 2010), invented glue (Koller, Baumer, and Mania, 2001), used ornate jewelry, and ceremonially buried their dead. Klenck would have done well to include some of these additional findings that are problematic for his “wild men” interpretation and respond to them. Perhaps he can still address these.

In conclusion, Klenck’s paper, while overly sweeping, raises some thought-provoking questions. We do need quite

a bit more work on creationist anthropology. We clearly are richer in our geology models than our anthropology models. However, I am not persuaded by this Nephilim model. It seems to me that we have an amazing variety of morphology in living human populations, some with more robust features and some with a more gracile build. There is every reason to expect that more diversity existed before the Flood. It is typical for genetic refinement to take place during a population bottleneck (like the Flood event). So even if one granted that all the hominid fossils listed by Klenck were pre-Flood, the diversity displayed could easily be accounted for through dispersion and genetic drift. It does not require the insertion of angelic genetics.

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David Woetzel

Klenck Responds—Genesis Model: Theological and Archaeological Considerations

It is necessary for creationists to establish multiple explanatory models that accommodate a full range of relevant Biblical references and examined phenomena. These explanatory models must then compete against each other and be modified, refined, or rejected to favor those that best correlate with Biblical passages and analyzed data.

The Genesis model article represents one of several models incorporating a wider range of biblical references and observed facts (Klenck, 2010a, 2010b, 2010c, 2010d, 2010e). With this article I provide a Biblically based paradigm for the origin, variation, and continuation of human populations.

Explanatory Models

Several critics note that I have not provided “proof” for the Genesis model. In historical sciences, it is impossible to provide “certainty.” Instead, models serve to explain correlations between data sets—in this case between Biblical references and observed phenomenon in archaeological and paleoanthropological contexts. That some label the model “sweeping” or “speculative” shows their confusion of the function of models: to explain patterns and correlations in observations. The Genesis model article proffers a paradigm founded on a range of Biblical references and a

wealth of observed data from osteological, archaeological, and paleoanthropological studies (Klenck, 2010a, 2010b). Although the model does not “prove” or provide “certainty,” the paradigm does accommodate a greater range of Biblical references and observed data with more precision and offers a better explanation compared to other competing views.

Theological Considerations

Branscome, Maurer, and Woetzel critique my adherence to the older, theologically traditional interpretation of Genesis 6:1–4 that the “sons of God” represented angels while the Nephilim comprised their part-angelic offspring.

Several of Branscome’s assertions are incorrect. First, a range of interpretations for the “sons of God” were noted with diverse sources (Boice, 1982; Morris, 1976; Schaff, 1977; Schaeffer, 1972). Second, searching the Scriptures and Biblical exegesis—the exploration of the meaning of Biblical texts to discover their significance to subjects of inquiry—is encouraged in the Bible (2 Timothy 2:15; 3:16–17; Matthew 4:4; 1 Peter 2:2; Job 23:12; Acts 17:11; 1 Corinthians 2:13). Third, the association of the “sons of God” with angels in Genesis 6 in the Old Testament is not a “private” explanation, as nearly all Jewish and Christian commentators confirmed the

association between the sons of God and angels until Augustine proposed an alternate view (Boice, 1982). Fourth, doubts about the post-Flood sons of Anak (in Numbers 13) being from pre-Flood Nephilim populations (in Genesis 6) is also not a “private” interpretation, as others have voiced similar doubts about the evil report of the ten spies and their correlation between the sons of Anak, their tall stature, and the pre-Flood Nephilim (Hodge, 2008).

Maurer and Woetzel note that I did not address the equation of the Nephilim with kings or chieftains. This position has no Biblical support and no scriptural sources accommodate this view. In addition, although the views of Jewish rabbis and mystics are important to the study of Hebrew and Jewish culture over time, their views hold a lesser position of authority compared to passages from the Torah or Tanakh.

Branscome insists that the “sons of God” in Genesis 6 were ordinary humans, the descendants of Seth, and not angels. His proposal has many problems. The first problem is that Branscome tries to force New Testament Greek terms and contexts on a Hebrew passage that is more than a thousand years older—when comparable Hebrew passages and contexts confirm the association between the sons of God and angels.

Table 1: Genesis model for the origin, variation, and continuation of human populations (from Klenck, 2010a, b).

Biblical Periods & Events	Populations in Genesis	Linnaean Classifications	Other Nomenclature
Modern times.	Non-Nephilim Descendants of Adam.	<i>Homo sapiens sapiens</i>	Anatomically modern humans.
After the Flood (Genesis 8:15 and afterwards).			
Flood of Noah (Genesis 7:10–8:14).	Non-Nephilim Descendants of Adam; Nephilim; and offspring of both.	<i>Homo sapiens sapiens</i> , <i>H. habilis</i> , <i>H. rudolfensis</i> , <i>H. ergaster</i> , <i>H. erectus</i> , <i>H. antecessor</i> , <i>H. heidelbergensis</i> , <i>H. neanderthalensis</i> , <i>H. floresiensis</i> , and potentially other populations.	Anatomically modern humans and non-modern humans.
“...and also afterward” (Genesis 6:4).			
“...in those days” (Genesis 6:4).			
“...when men began to multiply on the face of the earth” (Genesis 6:1).			
Soon after expulsion from Eden (Genesis 3–4).	Descendants of Adam.	<i>Homo sapiens sapiens</i>	Anatomically modern humans.
Sixth day of Creation week (Genesis 1–2).	Adam and Eve.		

Passages in Job 1:6, 2:1, and 38:7 show such a clear association between “sons of God” or *bene ha’elohim* [בני האלהים] and angels that the New International Version has simply replaced the longer phrase with “angels.” A similar phrase, “son of God” or *bar elohin* [בר אלהין] in Daniel 3:25 is used to describe the angelic figure that Nebuchadnezzar sees in the burning furnace—the Son of God. Furthermore, there are no Scriptures that can link the Hebrew *bene ha’elohim* [בני האלהים] with the Greek “children of God” or *tekna theou* [τέκνα θεού]. The Hebrew *bene ha’elohim* [בני האלהים] clearly refers to angels in the Old Testament (Job 1:6, 2:1, and 38:7), and the Greek term *tekna theou* [τέκνα θεού] clearly refers to believers in Jesus in the New Testament (John 1:12; Romans 8:14). Moreover, there are no verses

that link believers in Jesus in the New Testament with the sin of the “sons of God” in Genesis 6.

Branscome, Woetzel, and Maurer castigate a clear, close, Hebraic connection between the “sons of God” or *bene ha’elohim* [בני האלהים] and angels. Instead, they favor a phrase that is written more than a thousand years later, in a different language (Greek), regarding a different context, referring to a different group, concerning a different covenant, without any scriptural support tying the Hebrew and Greek terms together—and then declare their views as scriptural and true. Their proposals are theologically, philologically, and exegetically untenable.

Their views are also discounted by very clear New Testament passages using Greek terms, which specifically denote

angels with the pre-Flood abomination of the Nephilim in Genesis 6.

1 Peter 3:18–20: “Christ...preached to the spirits in prison, who disobeyed long ago, when God waited patiently in the days of Noah while the ark was being built” (NIV)

There is only one reference in Genesis of spirits disobeying in the days of Noah. This reference is in Genesis 6, when *bene ha’elohim* [בני האלהים], the Hebrew phrase for angels, took human women and birthed the Nephilim. There are simply no other verses about spirits that disobeyed in the days of Noah, other than the Nephilim account in Genesis 6:1–4. Also, this verse provides clear support for the equation of the sons of God with angels. The word “spirits” or *pneumasin* [πνεύμασιν] is used interchangeably with angels or

angelous [ἁγγέλους] throughout the New Testament. Please refer to Hebrews 1:7. Here, angels and spirits are used interchangeably in this translation of Psalm 104:4. The latter passage employs the Hebrew terms *malachav* [מלאכיו] and *ruchot* [רוחות], both used in the Old Testament to denote angels. To reiterate, we have a New Testament verse from the apostle Peter denoting the sinning of “spirits” or *pneumasin* [πνεύμασιν] during the days of Noah that is translated by the apostle Paul [in Hebrews 1:7 / Psalm 104:4] from the Old Testament *ruchot* [רוחות], which denotes angels in other Old Testament passages (e.g., Ezekiel 1:20; 2 Chronicles 18:20).

2 Peter 2:4–5: “For if **God did not spare angels when they sinned**, but sent them to hell, putting them into gloomy dungeons to be held for judgment; if **he did not spare the ancient world when he brought the flood** on its ungodly people, **but protected Noah**, a preacher of righteousness, and seven others ...” (NIV).

The apostle Peter very specifically denotes that angels sinned and associates their sinfulness with the destruction of the ancient world during the days of Noah. Here, the Greek term for angel or *angelōn* [ἁγγέλων] is crystal clear. The Greek *angelōn* [ἁγγέλων] only refers to angels in the entirety of the New Testament.

Jude 6: “**The angels who did not keep their positions of authority but abandoned their own home**—these he has kept in darkness, bound with everlasting chains for judgment on the great Day” (NIV).

Here, the apostle Jude again refers to angels or *angelous* [ἁγγέλους] bound in chains, similar to 1 Peter 3:18–20 and 2 Peter 2:4–5. Jude notes that these angels did not keep their positions of authority. Eight verses away, Jude mentions the pre-Flood days of Enoch. In fact, two of the verses in Jude (14 and 15) bare a close resemblance to the Book of Enoch. This work is apocryphal and not inspired

but provides an elaboration of Genesis 6, where angels took human females and birthed the Nephilim. Again, the association with angels, the days of Noah, and the Book of Enoch—which describes angelic sin causing the emergence of the Nephilim—provides clear New Testament support for the equation of the “sons of God” with angels in Genesis 6.

Also problematic for the alternate theory is that both 2 Peter and Jude associate the sinning of angels before the Flood with the judgment of Sodom and Gomorrah. After discussing the sin of the angels in 2 Peter 2:4–5, the apostle Peter mentions the destruction of the two post-Flood cities in the very next verse (6). Jude provides even more clarity. After discussing the judgment of angels that left their proper domain (Jude 6), in the very next verse the apostle Jude states,

Jude 7: “...as **Sodom and Gomorrah**, and the cities around them in a **similar manner** to these, having given themselves over to sexual immorality **and gone after strange flesh**, are set forth as an example, suffering the vengeance of eternal fire” (NKJV).

This comparison is noteworthy as the apostle Jude compares the sin of the angels with the sin of Sodom and Gomorrah, whose inhabitants tried to fornicate with angels and were destroyed (Genesis 19:4–11). The Greek term “strange flesh” or *sarkos heteras* [σαρκὸς ἑτέρας] denotes flesh that is entirely different. The apostle Paul provides insight in 1 Corinthians 15:40. Comparing our earthly and heavenly bodies, he declares the two as *hetera* [ἑτέρα], or entirely different. This comparison is even greater than in the preceding passage (1 Corinthians 15:39), where Paul states that the flesh of men, animals, and birds is *allē* [ἄλλη], different but of the same kind (Boice, 1982, p. 247).

Branscome attempts to support the alternate view with the notion that “angels are spirits ... not sexual beings.” This

argument has severe theological problems. First, the Holy Spirit caused the Virgin Mary to be with child (Matthew 1:18–25). Second, there are references in the Old Testament to angels eating, pulling people, and shutting a door (Genesis 18:8; 19:10). These passages illustrate that during Old Testament times some angels on the earth possessed functioning earthly bodies. Third, even Morris noted that just because Jesus stated that marriage will not occur in heaven (Matthew 22:30) does not mean that angels were incapable of sexual relations on earth during the pre-Flood period (Morris, 1976, p. 166). Finally, Branscome and others must confront all the aforementioned Old and New Testament passages that mention angels leaving their positions of authority, sinning during the days of Noah, taking human women, and siring children.

My appreciation extends to Cuthbertson’s cogent mention that God, Himself, counters the association between the post-Flood sons of Anak and the pre-Flood Nephilim in Numbers 13:32, when God says to Moses in Numbers 14:25: “*Now, the Amalekites and the Canaanites dwell in the valley*” (NKJV). Cuthbertson’s noteworthy exegesis that the sons of Anak lived in Hebron (Numbers 13:22); the twelve spies collected fruit from the Valley of Eschol that encompassed Hebron (Numbers 13:23–24); and that God stated the post-Flood Amalekite (Genesis 10:6) and post-Flood Canaanite (Genesis 36:10–12) populations lived in the valley provides the ultimate Biblical refutation of the evil report’s correlation between the pre-Flood Nephilim and post-Flood sons of Anak in Numbers 13:32.

To sum, the proposal between the “sons of God” and angels is supported by Biblical contexts, Hebrew verbiage, Old and New Testament references, and the forefathers of the faith. This traditional view incorporates the range of Biblical references concerning the Nephilim abomination in Genesis 6 with greater

Biblical precision and contextual affinity compared to newer alternative proposals advocated by Branscome, Maurer, and Woetzel.

Archaeological Considerations

Other critiques of the Genesis model comprise defenses of competing paradigms or alternate proposals. Woetzel decries that I critiqued Cuozzo's theories. The latter argues that Neanderthals represent a phase of modern humans with great Genesis ages; that early human populations had childhoods in excess of thirty years; and that Neanderthals comprise the earliest type of humans that disappeared as longevity declined after the Flood (Cuozzo, 1994, 1998, 2010). Genesis Model critiqued one aspect of Cuozzo's works, namely that because Neanderthal children look like adults, Neanderthal features cannot be a product of great age. Other critiques include that Neanderthal measurements disagree with Cuozzo's claim that the faces of Neanderthal children are smaller than modern human children. Neanderthal juvenile faces are larger and thicker than modern human children (Ponce de Leon et al, 2008; Klein, 1999; Schwartz and Tattersall, 1996). The data supports that Neanderthal children aged faster than modern human children and the presence of two different contemporaneous human populations.

Furthermore, the Bible does not support Cuozzo's assertion that Genesis children had thirty-year childhoods (Cuozzo, 1998, 2010). Because men lived many years does not mean that babies remained babies for decades. In modern times, data conflicts with Cuozzo's claims that older ages of death correlate with older ages of puberty. Human populations that pass away at more advanced ages have puberty arriving earlier and not later (Finley, 2007; Whincup et al., 2001). Conversely, the Bible firmly and directly notes the presence of two human populations,

Nephilim and non-Nephilim, before the Noachian Deluge (Genesis 6:1–4).

Also, modern human skeletons are found in contexts before, during, and after those of Neanderthals (see Trinkaus, 1986; Klein, 1999, pp. 394–406; Stringer, 2000; Pearson et al, 2008). This observed data destroys Cuozzo's argument. Since modern humans (*H. sapiens sapiens*) are found in contexts earlier and in lower strata compared to Neanderthals, Neanderthals cannot be an early "great-age-Genesis-phase" of modern humans. Modern humans are found in contexts earlier than Neanderthals, and their remains overlap with Neanderthals. These facts support what I and all other paleoanthropologists propose—that Neanderthals and modern humans represent two different human populations that once existed at the same time (Klenck, 2010a, 2010b; Schwartz and Tattersall, 1996; Klein, 1999, p. 388; Ogilvie et al, 1989; Trinkaus, 1983, 1989a, 1989b, 1993; Geist, 1981; Wesley et al, 2003).

Cuozzo does not consider that his alleged data to "support" slow maturation actually evidences faster maturity rates in Neanderthals and differences between two distinct human populations (e.g., Neanderthal and modern human groups). For example, Cuozzo states that the thick jaws of Neanderthal children and their blunt baby teeth or "taurodont deciduous dentition" show that these populations remained children for 30 years or more (Cuozzo, 2010). However, all physical anthropologists disagree with Cuozzo, discount his arguments, and show the evidence supports faster maturity for Neanderthals and the stronger jaw strength of Neanderthal populations, which are distinct from modern human groups (Ponce de León et al, 2008; Stringer et al, 1990; Tompkins, 1996; Trinkaus, 1995).

Furthermore, Cuozzo is adamant that maturation is speeding up in today's modern human populations, reflecting a trend away from great Genesis

ages (Cuozzo, 1998; 2010). However, Cuozzo's speeded maturation rates conflicts with observed data. Around 300 B.C., the menstruation for Greek females began at 14 years of age; however, the onset of menarche in European females in A.D. 1850 was 17 years of age (Cuozzo, 1998; Plowden Report, 1967). If modern human females encountered menstruation at 14 years of age in 300 B.C. and had older ages (17) of menarche in 1850, this data conflicts with Cuozzo's assertions that menarche has decreased throughout time or that Genesis children had childhoods in excess of thirty years.

Cuozzo argues that since he has held the bones of ancient humans, only he can make cogent remarks about their measurements or qualities. I disagree as I have analyzed some early human bones and anyone can read osteological (bone) and archaeological field reports from other researchers who have held, studied, and measured these specimens. The data supports that Neanderthal juveniles exhibited faster maturity and represented a different population compared to modern human children before the Holocene (Klenck, 2010a, 2010b; Schwartz and Tattersall, 1996; Ogilvie et al, 1989; Trinkaus, 1978, 1983, 1989a, 1989b; Wesley et al, 2003; Gore, 1996, 1997).

Also problematic for Cuozzo's theories: Other non-modern human populations have juvenile and adult specimens with similar features. This trend is exemplified in *H. erectus* (e.g., KNM-WT 15000, juvenile *H. erectus*; see Brown et al., 1985). Cuozzo's solution is to deny that *H. erectus* is human and insist these specimens represent great apes (Cuozzo, 1998). This conclusion is incorrect, as cranial and post-cranial features of *H. erectus* are resoundingly human and not ape (Hartwig-Scherer, 1998; Lubenow, 2004; Wise, 2005; and Wood, 2010).

That Cuozzo insists that Noah looked like a Neanderthal shows his lack

of archaeological knowledge (Cuozzo, 1998; 2010). The earliest sites surrounding Mount Ararat are Pre-Pottery Neolithic A [PPNA] cultures, allegedly dated to 11,500 years ago (Esin, 1999; Ozdogan, 1999; Kuniholm and Newton, 2003). Since these sites around Ararat are absent of any Neanderthal remains, and comprise only modern human skeletons, the archaeological data directly opposes Cuozzo's claims.

In addition, Cuozzo (1998; 2010) claims that there is a conspiracy by evolutionists to remove Neanderthal features (e.g., the chin of La Quina V) to make them more apelike. This accusation is refuted by evidence. If anyone filed away a human chin, the porous, cancellous bone mass inside the chin would be visible compared to the non-chiseled hard exterior of the chin. Cuozzo's alleged "chin" represents the plaster casting used to preserve the mandible (Groves, 1999). That the specimen exhibits no hint of cancellous bone near the locale of the alleged chin contradicts Cuozzo's allegation. Also, that many Neanderthal traits exhibit additions to bone comprising robust brow ridges or masses of upraised bone further conflicts with Cuozzo's claims of a secretive evolutionary cabal removing bone material (Schwartz and Tattersall, 1996).

Cuozzo (1998; 2010) states he was pursued by assassins employed by evolutionists. However, Cuozzo's earlier articles do not mention any Darwinian hitmen or assassins. I believe these fanciful accounts comprise a marketing ploy to sell more books, as neither Cuozzo's data nor his arguments necessitate an assassination attempt.

Also, Cuozzo argues that because there is a continuity of the use of red ochre by Upper Paleolithic Neanderthals in Europe, in contexts allegedly dated around 30,000 B.C., and modern humans in Sumeria around 3,000 B.C., these populations and cultures are related (Cuozzo, 1998; 2010). However, the determinations of relatedness between

archaeological assemblages are based on a range of cultural and morphological features. Cuozzo's position is untenable, as Neanderthal morphology and culture differs widely from those of urbanized Sumerians, the latter comprising only modern humans from later contexts.

In addition, genomes of Neanderthals and modern humans show differences in RUNX2 and CBFA1, genes associated with cleidocranial dysplasia (causing delayed closure in cranial sutures), dental abnormalities, the morphology of the frontal bone, clavicle, rib cage, and other features of the upper body and cranium (Green et al, 2010). These genetic differences correlate with morphological disparities between modern humans and Neanderthals such as rates of closure for cranial sutures, degree of frontal bossing or protrusion, clavicle morphology, and the shape of the rib cages—all traits that differentiate Neanderthals (and other non-modern humans such as *H. erectus*) from modern humans.

This data conflicts with Cuozzo's longevity theory. Differences in rates of suture closure and dentition between Neanderthals and modern humans, which Cuozzo ascribes to great Genesis ages, are most likely caused by genetic differences in RUNX2, CBFA1, and other genes. Also, these genes are not associated with longevity, unlike aging genes such as WRNp or Dnmt3b (Smith et al, 2010).

Furthermore, Cuozzo's assertions that Neanderthal reconstructions comprise "circular reasoning" conflict with observed data. Reconstructions of Neanderthal skeletons have little to do with "ape heritage"—a concept that even Cuozzo admits is from the 1940s (Cuozzo, 1994). Instead, these constructions are based on bone-on-bone connections or matching fracture points and are based on numerous studies and measurements. This is only a brief synopsis of a critique of Cuozzo's works.

Recently, a report was brought to my

attention concerning a cranium from a Kurgan burial, purportedly dating to the third millennium B.C. The somewhat blurry report exhibited a cranium resembling a modern human with a brow ridge (Hoyer, 1909). In modern humans, the brow ridge, or supraorbital torus, is usually absent. If present, the torus exists in two parts over each eye with a v-shaped supraorbital trigone dividing the ridge and a supraorbital notch dividing each individual torus. The Kurgan cranium is no exception to this standard, as its brow ridge displays the v-shaped supraorbital trigone, and a supraorbital notch interrupts each individual torus (see arrows in Figure 1). Furthermore, the cranium has a rounded occipital (A), vertical face (B), steeply angled frontal (C), and flaring parietals (D; see Figure 2). The author, M. H. Hoyer (1909), mentioned the principal archaeologist, Professor Schwalbe, disagreed with the former's attribution of the cranium to a non-modern human. Schwalbe was correct, as the Nowosiolki skull resembles a modern human rather than a cranium of *H. neanderthalensis* or Hoyer's classification of a non-modern specimen, *H. primigenius*.

To sum, archaeological data and the remains of Neanderthals and modern

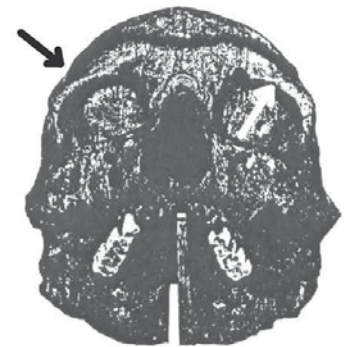


Figure 1: Nowosiolki cranium, from Hoyer (1909), with arrows exhibiting supraorbital notches dividing each individual torus - a characteristic of modern human craniums.

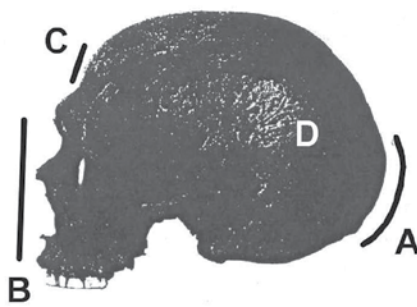


Figure 2: Nowosiolki cranium, from Hoyer (1909), with modern human traits: (A) rounded occipital; (B) vertical face; (C) steeply angled frontal; and (D) flaring parietals.

humans overwhelmingly support the notion that these groups represent two different human populations that once existed at the same time (e.g., Hublin et al, 1996; Ogilvie et al, 1989; Schwartz and Tattersall, 1996; Stringer et al, 1990; Stringer, 2000; Trinkaus, 1995; Trinkaus and Thompson, 1987; and other studies and excavation reports). This summation more closely resembles the Biblical account of variation in pre-Flood human groups, as described in Genesis 6:1–4, between Nephilim and non-Nephilim populations (Klenck, 2010a, 2010b). Far from being “out of the box,” as Woetzel claims, Genesis model is directly supported by Biblical passages (Genesis 6:1–4), which overtly and specifically describe different pre-Flood human populations and correlate with a wealth of observed data from archaeological and paleoanthropological studies.

Conclusions

That genetic differences correlate with morphological distinctions between Neanderthals and modern humans and that Neanderthals were much stronger, potentially faster, matured earlier, had thicker bones, and preferred to hunt dangerous game at a closer range—compared to modern humans—provides varied and compelling evidence (in

addition to other factors) to support the association of non-modern humans with the Biblical Nephilim (Klenck, 2010a, 2010b). Competing proposals that insist these morphological differences were primarily caused by longevity, disease, or intense chewing conflict with Biblical references and a range of observations from archaeological, paleoanthropological, and osteological analyses. Genesis model provides a better paradigm—which incorporates a broader range of references from the Bible and a greater breadth of observed phenomena—for the origin, variation, and continuation of human populations.

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Joel D. Klenck
Arlington, VA
jklenck@paleor.com

Response to Michael Oard's Article Questioning our Post-Flood Interpretation of the Fossil Animals Identified at Ashfall Fossil Beds State Historical Park, Nebraska

We appreciate Michael Oard's response (Oard, 2009) to our articles on Ashfall Fossil Beds State Historical Park in northeastern Nebraska (Akridge and Froede, 2005; Akridge and Akridge, 2008) regarding whether the site's fossils should be considered Flood or post-Flood and also relating to the cause of death of the hundreds of fossil animals located there. Oard writes that the fossils are Flood-aged and postulates another scenario by which the animals may have died. We encourage and appreciate other creationist research done on this interesting site, even if conflicting with our observations and conclusions.

What Determines How Fossils Are Labeled "Ice Age"?

Oard (2009, p. 87) states: "The types of animals at the Ashfall site should be typical of the Ice Age if they are post-Flood." His concern is that Ice Age animals are quite different from those found at the Ashfall site, and he lists "non-Ice Age animals" found there as the "four-tusked elephants, oreodonts, three-toed horses, and extinct rhinos." Does this mean that the presence of certain fossils indicates they are from "typical" deposits of the Ice Age and, otherwise, if working in supposed Ice Age deposits, should discovery of only "typical" Ice Age fossils of animals be expected within the Creation/Flood framework (i.e., circular reasoning)?

Oard (2010b) writes:

Hippopotami are found together with reindeer and woolly mammoth fossils in northwest Europe. This is probably the most dramatic example of a disharmonious association, but such associations were common during the Ice Age.

Perhaps some or most of the many different kinds of fossilized animals at Ashfall Fossil Beds could be called

disharmonious regarding the locations they would ultimately inhabit. Actually, animals from mice to elephants are found in Ice Age deposits. Some of the Ice Age animals are now extinct and many are extant. All kinds of living animals today had to come through the period of the Ice Age, but, obviously, not all their particular environments were too cold or too harsh for them to survive. In Genesis 8:17, God repeated the Edenic command for animals leaving the ark to be fruitful and multiply on planet Earth. From exiting the ark, the animals dispersed and ultimately found the unique ecological niche that was ideal for each kind of animal. Today, certain kinds of animals tend to be found in certain locales, but with occasional disharmonious examples providing a break in the norm.

Was Ashfall Fossil Beds Site Warm or Cold During the Ice Age?

Oard (2009, p. 86) writes, "Another item of interest is the presence of warm-climate animals in the Ash Hollow Formation. ... These animals indicate *winter temperatures above freezing*. ... A climate this warm in the interior of North America during the Ice Age is unlikely" (emphasis his).

Perhaps many animals initially settled in the warm, northerly latitudes after the Flood and were later driven south because of encroaching cold weather and lessening food supplies that later followed. The proliferation of so-called Ice Age animals found now as fossils in northern sites may attest to this, as many of them must have ultimately migrated south as indicated by fossils found today. For example, fossils of Ice Age mammoths and mastodons are extremely abundant in the Arctic regions, even at sites now frozen most

or all of the year. Their remains are also found as far south as Florida. Oard (2010a) writes that the huge herbivorous elephants would not have had sufficient food to live in areas covered by snow and ice most of the year. Based on modern elephants' dietary needs, a woolly mammoth's daily requirement would be 400 to 650 pounds of food and 35 to 50 gallons of liquid water. Among other harsh conditions found in Siberia today, woolly mammoths could not survive because of a lack of adequate food and liquid water necessary for their daily intake. In describing Siberia's living conditions when the woolly mammoths were there during the Ice Age, Oard (2010a) continues:

It is rather obvious at this point that the climate and environment of Siberia had to have been much warmer when the woolly mammoth lived. Yet, paradoxically, they lived during the Ice Age.

If warm enough conditions existed during the Ice Age in Siberia for a proliferation of perhaps millions of woolly mammoths, mastodons, and great numbers of other animals, then a moderate-to-warm climate in Nebraska for a time during the Ice Age seems reasonable.

Is the Ashfall Fossil Beds Site Flood or Post-Flood?

Oard (2009, pp. 88–89) provides information he believes demonstrates that the Ashfall Fossil Beds (AFB) site is Flood-deposited during the inundatory stage of the Flood. He writes:

Thus, the animals probably died late in the early part of the Flood. This is supported by the lithification of the Ash Hollow Formation. This suggests *a fair amount of overburden compressing the formation*. If so, that sediment was later eroded. However, that would be expected during the retreating stage of the Flood and

should not be surprising (emphasis added).

Although the AFB fossils are attributed to the Ash Hollow Formation, we doubt they could be a part of that formation for several reasons. Oard indicates that the Ash Hollow Formation is a well-lithified sandstone that apparently was hardened by pressure, but we found that the fossils are buried in a shallow deposit of unconsolidated ash and overlain by a paucity of other unconsolidated materials. The amount of deposition above the fossils is what would be expected in a few thousand years of subaerial activity. We saw no evidence of the AFB fossils having undergone compression, cementation, or high temperature (associated with carbonization of organic material) in thicker sediments.

Oard's interpretation might be feasible for sites located elsewhere, but the physical evidence at AFB contradicts this. If the animals at AFB had been deposited in strata above which "a fair amount of overburden" had been removed, a quite different scene would have developed at the site. The macrofossils are three-dimensional and fully articulated with the exception of those that were obviously trampled and damaged by other animals at the site. Had the animals been buried under a "fair amount of overburden compressing the formation" that contains them, compression of the animals and their bones would be apparent. Many of the bones would not only be bent, flattened, and distorted by compression, but broken as well.

For example, Akridge and Akridge helped excavate parts of a large theropod dinosaur – *Acrocanthosaurus* – found in Texas that had obviously been buried by Flood processes in unconsolidated "Cretaceous" clay. The massive dinosaur, which in life would have been about 30 feet long and stood perhaps 12 feet high, was compressed to about eight inches of vertical contour. Its bones were broken, fragile, and poorly mineral-

ized, with parts of bones being carbonized. Its huge, 38.25-inch-long ilium was bent and broken in three places. Remains of fluids from the creature's compressed body remained visible and were excreted and carried horizontally and vertically through the surrounding clay matrix by capillarity. The depth of unconsolidated sediment above the excavation was only about 15 feet. That, plus any additional sedimentary deposition that was eroded away by retreating Floodwater, was enough to compress that massive dinosaur almost flat. This similar setting would be expected for the many skeletons found at the Ashfall site if they were deposited during the Flood to certain depths in strata and compressed. However, this is not what is found at AFB.

A Last Meal Prior to Death?

Oard (2009, p. 90) maintains that the AFB animals might have survived "the initial violence of the Flood on some high refuge" and subsequently on briefly exposed Flood sediments due to "local variations in tectonics and eustasy that would probably cause the emergence of land" (Oard, 2009, p. 89). Oard (2009, p. 90) writes,

Grass found at the site and even in the mouths and stomachs of the dead animals could have sprouted from seeds carried in the atmosphere or in floating vegetation. Grass would sprout quickly under the right conditions.

If this scenario were true, the animals would have been standing and eating where the grass grew and proliferated on top "of thousands of feet of fossiliferous sediments under the Ash Hollow Formation" (Oard, 2009, p. 85) and volcanic ash that underlie the site today. Those sediments would not supply the right conditions for growing plants because they would not incorporate the needed ingredients of proper pH, chemical structure, minerals, nutrients, and microorganisms necessary for plant

growth and maturation. Plus, a time of oscillating sea level, whereby land surfaces alternated with periods of inundation that Oard proposes, would further complicate any likely growth of vegetation. And the addition of enough seeds in such a scenario would seem unlikely as well, even if they would have had time and good soil to produce enough grass necessary to sustain the lives of a large population of herbivores. Modern studies indicate that as little as one-to-six inches of tephra coverage over an area eliminates most plant cover for at least a year (Neild et al., 1998). The hundreds of large herbivores at AFB would probably have died of starvation and the rigors of their environment that was greatly modified in the days leading up to the "briefly exposed" sediments proposed by Oard. Based on our own observations of unconsolidated, Flood-deposited sediments, plants do not readily grow in them unless they are exposed over large areas for extended periods of time allowing fertile soil to develop over their surfaces.

What Caused the Deaths of the Animals at Ashfall Fossil Beds?

The cause of the animals' deaths proposed in our article (Akridge and Akridge, 2008) is questioned by Oard (2009, p. 90):

In a Flood scenario, the animals on high refugia were likely subjected to multiple ashfalls and particles from meteoric impacts before they were forced to flee. Thus, the development of Marie's disease might have occurred over the early weeks or even months of the Flood before their final demise.

Marie's disease was interpreted by uniformitarian scientists to be the cause of the animals' deaths at the site (Akridge and Akridge, 2008, p.126). As noted in Akridge and Froede (2005, p. 188) and Akridge and Akridge (2008, p. 126), Marie's disease (or the currently accepted

term, “Marie-Bamberger syndrome”) is a disease of *humans* with symptomatic differences to that of hypertrophic osteopathy (HO), which affects some animals. HO takes months or years to develop to a fatal stage because it is a secondary bone disease prompted by the initial insult to an animal’s lungs. In fact, it can be chronic and long-standing for years in animals (Pool, 2003; 2007). Oard (2009, p. 90) surmises the animals breathed offending ash or meteoric particles causing the disease while Floodwater had the animals stranded on high ground until the Floodwater completely covered the Earth in 150 days. Depending on the elevation of the land surface where these animals were located, the time frame of the Floodwater’s arrival there could have been much less than 150 days. But even 150 days would not likely be enough time for the bone disease (HO) to progress to the stages found in the animals. Also, within a number of animals exposed to the same insults known to cause HO, only a *small percentage* of the animals will actually get the disease as has been discovered in modern veterinary studies (Pool, 2003; 2007), whereas *all* the AFB animals are recorded to have a bone disease (Ashfall Fossil Beds State Historical Park, n.d.; Voorhies, 1978; 1992). From all these data contradicting the likelihood of HO having caused the bone disease, we searched further to discover a disease that would exhibit symptoms similar to HO, activate rapidly after exposure, and cause death to *all* the affected animals within a short time frame.

Our research indicates that fluoride intoxication by ingestion of volcanic ash can produce a bone disease with similar symptoms to HO but acts much more rapidly and with more deadly results in *all* the affected animals (Pool, 2003; 2007). We postulated a post-Flood paleoenvironment with one or more volcanic ash layers, light coverings of fluoride-laden ash that precipitated the disease in the grazers, and a later, larger

ashfall that caused the deaths and burial of already weakened animals (Akridge and Akridge, 2008, p. 130).

Akridge and Akridge (2008, p. 130) write:

In fact, the greatest danger to grazing animals from fluorosis is usually from a distant eruption where less than a millimeter of ash is deposited. A thin covering of fluoride-rich tephra particles can adhere to grasses, poisoning any herbivore that ingests toxic amounts (Cronin et al., 2002; Gregory, 1996; Rubin et al., 1994).

Acute fluoride poisoning can be discovered in animals only days after ingestion of toxic ash. After an exhaustive search in the literature and several communications with a world-class expert in this field, we discovered *no information* that indicates HO can be caused by inhalation of *any kind* of contaminants—volcanic ash, meteoric particles, siliceous materials, or any pollutant breathed by working animals used in mines (Pool, 2003; 2007). From the studied data, only one disease—fluoride intoxication from ingestion of fluoride compounds in volcanic ash—appears to be the most likely cause of the fatal disease and would rapidly manifest itself in *all* the animals because it is a quick-acting, poisonous, chemical insult to living organisms. Grazers eating ash-coated vegetation are particularly susceptible to fluoride intoxication with the rapid onset of illness leading to high mortality rates. Bone lesions from fluoride intoxication are also similar to those caused by HO.

Based on the evidence documented in our previous articles, we continue to believe that the animals were killed by fluoride intoxication and buried in shallow, unlithified ash, which allowed them to remain in an uncompressed state. This occurred in a post-Flood setting with burial resulting from one or more volcanic ash events that probably originated in southern Idaho.

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University of Nebraska State Museum, Lincoln, NE.

A. Jerry Akridge, B.S.

Arab, AL

ajakridge@mindspring.com

Carl R. Froede Jr., B.S., P.G.

M. Elizabeth Akridge, RN

Michael Oard's Response

The question before us is whether the fossils discovered at Ashfall Fossil Beds State Historical Park (AFB) in northeast Nebraska are from early in the Flood or are post-Flood. They cannot be late in the Flood, from Day 150 to Day 371, because all air-breathing land animals had to have been dead by that time, based on Scripture, and there is evidence of live animals at the site. There is evidence for both positions at AFB, as I stated in my original article (Oard, 2009a). This is what makes the interpretation of AFB so difficult and also why I applied multiple criteria to determine where the fossils fit. I will respond to Jerry Akridge and Carl Froede's questions in order.

Are There Ice Age Animals?

The first question is whether there are typical animals of the Ice Age that can be used to determine Ice Age deposits. I realize the element of circular reasoning in this, but if the same animals are always associated with the Ice Age, then it seems like a valid indicator of what animals lived in the post-Flood Ice Age. The answer to the question is yes, and there is a huge literature on the subject. Such animals include the woolly mammoth, Columbian mammoth, American mastodon, one-toed horse, bison, cave lion, woolly rhinoceros, giant deer, camel, and many others. Such animals have been found over most of the Northern Hemisphere in unglaciated areas, such as in the lowlands of Siberia, Alaska, and

the Yukon Territory; western Europe south of the ice sheet; and in North America south of the ice sheet. There were local glaciated areas where Ice Age fossils are found, and these can be explained either by migration before glaciation or after the ice melted.

This is not to say all Pleistocene animals are from the Ice Age because some animals found in mid- to early Pleistocene sedimentary rocks are likely from the Flood, especially in areas far from the ice sheets and in areas of thick sediments, such as the many thousands of feet of Pleistocene and Pliocene sedimentary rock in the Santa Clara Basin of Southern California.

I certainly agree that animals spread out from the "mountains of Ararat" after the Flood and found their niche. Furthermore, Ice Age animals, as well as plants, were commonly disharmonious; this is the rule and not the exception in the mid- and high latitudes of the Northern Hemisphere. Disharmonious associations can be explained by mild winters and cool summers during the Ice Age, which is the climate that would have occurred in the post-Flood Ice Age (Oard, 2004). Disharmonious associations is a very difficult problem for evolutionists to swallow, because in their scheme glacial periods were much colder than winters today.

The most outrageous example, as mentioned by Akridge and Froede in their letter, is the finding of hippo fos-

sils with those of woolly mammoths, reindeer, and other cold climate animals in northwest Europe. There are 100 locations in England. Such an unusual aspect can be accounted for by warm onshore flow of moist air early in the Ice Age. Sea surface temperatures in the northern North Atlantic would have been around 80°F. Hippos could easily migrate up into northwest Europe from the mountains of Ararat in this warm, wet climate. Then as ocean temperature fell, the British Isles would have become colder until snow and ice developed on the high areas, subsequently spreading to lower altitudes and farther southward. As the ice was building, cold climate animals would have been attracted to the nonglaciated areas. Then as the Ice Age overwhelmed the British Isles, all these animals finally died and hence are sometimes buried together in Ice Age deposits.

Then at the end of the Ice Age, the climate would transition to colder winter temperatures than today with summers becoming warmer. The climate would be drier and windier than today. The large animals and birds were not used to cold, dry winters, and so a majority of them went extinct on all the continents except Africa.

The above is the big picture of the post-Flood rapid Ice Age (Oard, 2004). The upshot of this is that there are typical Ice Age animals. There are also typical Tertiary animals that are com-

monly different than Ice Age animals. In some cases there is an overlap, which complicates the situations and results in disagreements between creationists. So, in taking a look at many of the extinct animals from the AFB, we find many typical of the Tertiary and not the Ice Age, such as the four-tusked elephants, oreodonts, three-toed horses, extinct barrel-bodied rhino, hornless rhino, three horned deer, and a hornless saber-toothed deer. I have seen and read the geological and geomorphological context where such fossils are found in the western United States, and these animals are likely from the Flood. For example in the Cypress Hills Formation, there are lots of three-toed horses, and this formation is almost certainly from the Flood (Klevberg and Oard, 1998; Oard and Klevberg, 1998; Oard et al. 2005). There is the cast of an extinct rhino, the Blue Lake Rhino, between basalt of the Columbia River Basalts in the lower Grand Coulee, north central, Washington. Since the Columbia River Basalts are very likely from the Flood (Oard, 1996), so would the extinct rhino. There are no rhinos associated with the Ice Age in North America. It is a uniformitarian mystery of why the woolly rhino did not make it into Alaska from Siberia.

So, this criterion of whether there are typical Ice Age animals at the site suggests that the site is from the Flood and not the Ice Age. Remember that this is only one criterion and because geology and paleontology are so complicated, one criterion is not enough. That is why I have done a multi-criteria analysis of the site, which indicates that overall the site is from the Flood, although there are a few criteria that indicate a post-Flood environment. I will be amplifying all these criteria for determining the Flood/post-Flood boundary in future publications.

Ice Age Temperatures in Northeast Nebraska

The second question revolves around the temperature tolerance of the animals

at AFB compared to Ice Age animals. I can also see that there is some confusion on the Ice Age climate. I will try to amplify.

The time immediately after the Flood was the Ice Age (Oard, 2004). Some creationists attempt to postulate a period of a hundred or a few hundred years of immediate post-Flood warmth that held back the Ice Age (Wise, 2002), but this won't work, because temperatures over mid-latitude continents depend especially on the angle of the sun and the distance from the ocean, no matter the ocean sea surface temperatures (Oard and Klevberg, 2008). Besides, those who postulate this period of warmth have the bias that the Cenozoic, which has abundant warm-climate animals and plants clear to the polar areas, is post-Flood and do not understand basic meteorology.

All the ingredients necessary for an ice age—cool summers caused by volcanic ash and aerosols in the stratosphere and warm ocean water at mid- and high latitude—were available immediately after the Flood. Contact between the cool air and the warm ocean and the release of latent heat during condensation will result in much warmer winters than today at mid- and high latitudes. The results of such a climate would be mild winters and cool summers, which the animals and plants of the Ice Age demonstrate, as stated above.

However, a mild winter in northeast Nebraska, as well as Siberia, does not mean above freezing temperatures all the time. In fact, the boundary of the ice was close by, forming *in place* and not needing to move down from northern Canada, as envisioned by uniformitarian scientists. The Ice Age should begin soon after the Flood in the interior of North America, which would include the north central United States and much of central and eastern Canada.

Therefore, there could not be any tropical or subtropical animals in northeast Nebraska and vicinity right after the

Flood. Such animals as the alligator and giant tortoise are found at the AFB site as well as other Tertiary sites in the Midwest and even south central Canada. From the literature, the climatic tolerance of these animals is specific: they cannot tolerate below freezing temperatures for more than very short times.

Is the AFB Part of the Ash Hallow Formation?

Although two criteria explained above indicate that the AFB site is from the Flood, there is the question of whether that particular site is really part of the Ash Hallow Formation. This is an important question, and if true would negate all of the rest of the criteria I applied to the site (Oard, 2009a). It is possible that the unconsolidated ash was laid on top of the Ash Hallow Formation at this location from post-Flood volcanism, claimed to be from southern Idaho. I did not think of this while examining the observations of the site. Going back over my pictures, I could not find any pictures that showed the stratigraphic position of the AFB, except the sign at the park (Figure 3 in my article), which could be mistaken. It is claimed that the AFB is part of the Ash Hallow Formation, which dips slightly westward and passes into the subsurface going west, and that ash bed markers can be correlated in wells to the west of the fossil site. This should be checked, as I am suspicious of correlations by tephrochronology. It looks like I will have to go back out to AFB and check it out. But on the other hand, I would imagine that if the AFB could be determined to be in the Ash Hallow Formation, Akridge and Froede would likely concede that the site is from the Flood.

There is a further consideration that I did not mention in my article, and that is the ash at AFB site is correlated with an eruption is southern Idaho dated about 8 million years ago. Besides being suspicious of such ash correlations, as well as the dating of such events, the volcanoes claimed in southern Idaho that I have

seen are significantly eroded. Southern Idaho is a dry area today, and it is doubtful this much erosion of these volcanoes can occur in post-Flood time.

But it must be made clear that just because the ash at AFB is unconsolidated does not mean that it does not belong to the well-lithified Ash Hollow Formation. The state of lithification is not a criterion to reject the location as being in the Ash Hollow Formation. It is not unusual to find unconsolidated sediments, especially volcanic ash, on the High Plains. Even Akridge and Froede say,

For example, Akridge and Akridge helped excavate parts of a large theropod dinosaur—*Acrocanthosaurus*—found in Texas that had obviously been buried by Flood processes in unconsolidated “Cretaceous” clay.

Sometimes these unconsolidated sediments are bracketed by well-lithified sedimentary rocks. I have seen dozens of these sites, including Toadstool Geologic Park in northwest Nebraska, where there are mammal tracks in poorly consolidated volcanic ash (Oard, 2009a). Many dinosaur fossil sites are in unconsolidated ash or ash that has been weathered to clay. It can also be shown on the High Plains that there was considerable overburden on these unconsolidated locations that has been eroded off. It is an interesting question of why these areas remained unlithified.

The same argument can be developed for unpermineralized fossils. There has been much ado about the Montana dinosaur fossils that are not mineralized (Asara et al., 2007; Schweitzer et al., 1997a; 1997b; 2005; 2007; 2009).

The observation that the animals at the AFB site are not compressed from a substantial overburden that has since been eroded is a good argument. Such fossils are commonly compressed by a thick overburden but not always. There are some dinosaur fossil long bones in the Rocky Mountain Region and High Plains that are not compressed or com-

pressed only little. Many other dinosaur bones are compressed as well as broken. There are probably several variables that determine whether a fossil is significantly compressed, such as the rapidity of fossilization and the actual amount of overburden. It is quite possible that northeast Nebraska had a relatively low overburden.

Questions about the Animals' Last Meal

Since I lean toward the AFB being from the Flood, I went on to speculate on a Flood hypothesis to explain the observations. This hypothesis relates to similar problems in accounting for dinosaur tracks, eggs, and scavenged bonebeds early in the Flood by the BEDS (Briefly Exposed Diluvial Sediments) hypothesis (Oard, 2009b, in press). If the BEDS hypothesis can be applied to dinosaurs, and I believe much evidence shows that it can, then it can be adduced to explain such exotic observations as mammal tracks, scavenged bones, and other such observations indicating a live mammal in clear Flood rocks, based on the geology and geomorphology.

The BEDS hypothesis depends upon rapid sedimentation that results in shallow Floodwater in areas. Then local falls in sea level, due to five mechanisms that would operate during the Flood, would expose the freshly laid Flood sediments. Animals still alive can potentially embark on the BEDS. The length of time of BEDS exposure depends on several variables. Two mechanisms in particular can result in a long-term exposure of BEDS, allowing enough time for grass to grow. These two mechanisms are large-scale upward tectonics of an area and the dynamics of Flood currents on a mostly flooded earth, according to Barnette and Baumgardner (1994), although there are now problems interpreting their results (Prabhu et al., 2008).

I consider that the analysis of Akridge and Froede on why grass could not grow in the area a significant consideration

but similarly speculative as my scenario, since many of those factors that determine plant growth are unknown at AFB site. Although volcanic ash would retard grass growth in today's climate, the grass might not have grown on the volcanic ash but on the sediments below the ash. Alternatively, the observation of grass in the stomach of the animals could possibly be explained by grass from the “log or vegetation mat” let down on BEDS during a local drop in sea level. Obviously, there are many unknowns associated with this unique site and further study is needed. But first it needs to be determined whether the site is Flood or post-Flood.

The Cause of Death

The way I understand the evidence for the death of the animals is that death could have been by inhaling volcanic ash, except that there was not enough time for the effect to occur, assuming that the animals died right away. In a post-Flood scenario this would be true, the volcanic ash that buried them likely killed them. However, in a Flood scenario, the effects of previous volcanic ash inhalation could have manifested itself by the time they were buried in the ash at the AFB—a situation considered possible by Akridge and Akridge (2008, p. 129): “One possibility is the presence of minor eruptions prior to the major eruption that produced the ashfall that killed and buried the animals.”

I believe that Akridge and Froede's amplification of the situation is very good and that it was probably the flouride intoxication from ingesting volcanic ash that caused the osteological observations observed in all the animals. They say that symptoms can be manifested within days. I accept what they say as far as the previous ashfalls that caused the disease.

We postulated a post-Flood paleoenvironment with one or more volcanic ash layers, light coverings of fluoride-laden ash that precipitated the dis-

ease in the grazers, and a later, larger ashfall that caused the deaths and burial of already weakened animals (Akridge and Akridge, 2008, p. 130).

But, such a sequence could also occur for all the animals if they had endured previous ashfalls on their Flood refugia before the final event, especially if it takes only a matter of days for the disease to manifest itself.

So, it looks to me like the state of disease in the animals can be explained in both the Flood and post-Flood model.

Summary

Akridge and Froede make many good points. I believe the situation partly hinges on whether the AFB site is part of the Ash Hallow Formation or whether the ash was dumped on top of the formation at this location. In the latter case, all the criteria I used would not apply, except for the type animals and their warm-climatic deduction. Even the warm-climate fossils argument could be nullified for this site if it can be shown that the warm-climate fauna are not associated with the ash itself, which may be the case, assuming that it can be shown that the ash was dumped on top of the Ash Hallow Formation at this site.

However, I continue to lean for a Flood explanation especially because my study of the Ice Age does not show that most of these animals linked to the Ice Age, which occurred nearby right after the Flood. I admit that I am not as certain as I was before. It looks like the area needs further analysis.

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Michael Oard

Media Reviews



The Call of the Wild

by Jack London

Dover Publications, Inc., New York, 1990, 62 pages, \$2.00.

This book was first released in 1903, a product of author London's experiences in the remote Yukon. Why review this book by Jack London (1876–1916) 107 years later? During the year 2010, it was chosen for "The Big Read" by the National Endowment for the Arts. As a result, *The Call of the Wild* was read by many thousands of school children with gratis copies placed in public libraries across the country. I picked up a copy of the classic to reread and was dismayed by evolutionary implications I had missed before. Likewise, readers young and old will receive yet another dose of evolution subterfuge.

The story of the dog Buck is indeed a fascinating read as he experiences the best and worst of masters. Stolen and transported to Alaska as a sled dog, Buck distinguishes himself for strength, intelligence, and allegiance to his owner. Eventually left on his own, he hears and feels the call of the wild, the invitation to join a wolf pack in the northern

wilderness (p. 55). Parts of the story are poetic, including classic descriptions of the subzero north, "With the aurora borealis flaming coldly overhead, or the stars leaping in the frost dance, and the land numb and frozen under its pall of snow" (p. 21).

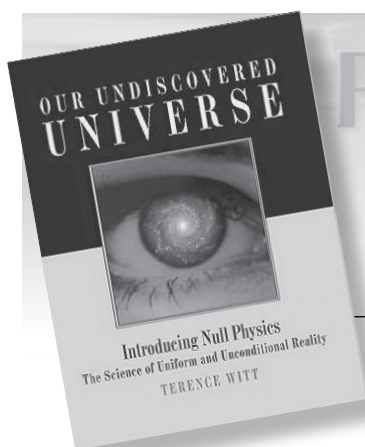
Where does evolution doctrine slip into this book? Several times, author London describes the instinctive dreams that Buck has about his distant ancestry. He sees a different master from ages gone by, a man "shorter of leg and longer of arm ... The hair of this man was long and matted, and his head slanted back under it from the eyes. ... He clutched a stick with a heavy stone made fast to the end ... He was all but naked ... He did not stand erect, but with a trunk inclined forward from the hips, on legs that bent at the knees" (p. 28). In other words, Buck's ancestors belonged to hominid ape men. This dream theme continues later in the story, "The hairy man could spring up into the trees and travel ahead as fast as on the ground, swinging by the arms from limb to limb ... he seemed as

much at home among the trees as on the ground" (p. 53).

Jack London's background helps us understand the evolutionary content to the book. His father was an astrologer, and his mother "channeled" dead spirits. Self-educated and without religion, London spent early years as a sailor, factory worker, and hobo. He was jailed for a time in Pennsylvania at age 18 for vagrancy. This experience began his lifelong connection with socialist political parties and a "survival of the fittest" mentality. London eventually dropped out of college and headed for the Klondike gold rush where most of his writing background formed.

The Call of the Wild gives a clear picture of early rugged life in the Yukon. Unfortunately, Jack London's bias in philosophy and origins also comes through. Of course, the National Endowment for the Arts makes no such disclaimers as it promotes the book nationwide as an American classic.

Don DeYoung
DBDeYoung@Grace.edu



Our Undiscovered Universe: Introducing Null Physics

by Terence Witt

Aridian Publishing Corporation,
Melbourne, 2007, 457 pages,
\$59.00.

This book is designed to resemble a physics textbook. The author tackles the most basic of existential issues: Why does the universe exist? When did it come into existence? And of what is it composed? The logic of the argumentation seems tight, the illustrations appear cogent, and the math is relatively easy to follow. However, the conclusions are not heartwarming: The universe exists because

it is inevitable. The universe has always been. And it came from nothing.

The problem with Witt's conclusions is his assumptions. While he accepts the concept of "nothingness," he rejects the idea of a spiritual universe or a God who can interact with the physical universe. For him this physical universe is all there is. While he accepts the concept of a universe that has existed forever, he does not acknowledge that there might have been a Creator who caused this universe's existence. As a result the work

is a striking example of Paul's comment in Romans 1:22.

This work ends with fifteen different appendices on various astronomical phenomena, from quasars to dark matter. The book is written in a very readable style (though I found myself re-reading many paragraphs), and were I a secularist my evaluation of this tome might be quite different.

Stanley V. Udd
sudd@graceu.edu



Censored Science, The Suppressed Evidence

by Bruce A. Malone

Search for Truth Publications,
Midland, MI, 2009, 112 pages,
\$20.00.

Bruce Malone was a chemical engineer at Dow Chemical Corporation. He retired recently to direct the Search for Truth ministry. Bruce has an active speaking and writing schedule and freely distributes creation literature to schools and prisons.

This book is a work of art with many color photos of nature. Chapters touch on biology, geology, and cosmology. Several classic creation/evolution topics are covered including carbon-14 (p. 96), dinosaur petroglyphs (p. 60), horse evolution (p. 42), irreducible complexity (p. 18), and Mount St. Helens (p. 58). The helpful material is nontechnical and error-free. The book cover carries

endorsements from Steve Austin, John Baumgardner, and John Sanford.

Censored Science has no subject index. Several creation organizations are included; however, neither the text (p. 13) nor the searchforthetruth.net website includes the Creation Research Society as a resource.

Don DeYoung
DBDeYoung@Grace.edu



Reviews

Rational Conclusions

by James D. Agresti

Documentary Press, No address,
2009, 333 pages, \$35.00.

This book is a positive experience to read. The front cover shows an attention-getting, multicolored mélange of two dozen topics considered in the text, including reason, faith, physics, embryology, credibility, and microbiology. In addition to these topics, the book discusses ancient history, science, archaeology, ancient manuscripts, cosmology, biogenesis, genetics, the fossil record, and authentic Christianity. With

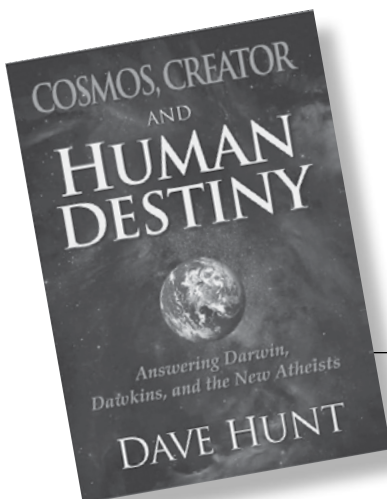
such a breadth of topics, we are tempted to suspect a superficial coverage. Yet to my amazement Agresti has done an astonishing job of supporting his conclusions, citing 2,556 references. Talk about documentation! The citations and searchable electronic index are not in the book but may be obtained at www.RationalConclusions.com. There are hundreds of pages of references and additional comments.

Author Agresti is a Brown University graduate and “a former atheist who became a Christian after reading the Bible over the course of a year and finding objective evidence for its accuracy”

(back cover). This was at a time in his life when he “was looking for flaws and contradictions” because he thought the Bible was just fiction (p. 306).

Agresti clearly opposes large-scale evolution and writes that the “fossil evidence is mangled by evolutionary presumptions” (p. 276). He proclaims that “detailed and well-substantiated evidence points to creation, while on the contrary, the case for evolution is built upon murky data and shaky inferences” (p. 277).

Wayne Frair, Ph.D.
frair@fonline.net



Cosmos, Creator and Human Destiny: Answering Darwin, Dawkins, and the New Atheists

by Dave Hunt

The Berean Call, Bend, OR,
2010, 606 pages, \$30.00.

Dave Hunt, like the late Henry Morris, has long exposed the flaws of evolutionary thinking and its ties to the New Age Movement. In this most recent work, Hunt takes on the new atheists and undermines the basis for their ar-

rogant rejection of the Bible in favor of materialism.

According to Hunt, part of the motivation for writing this book comes from the lack of attention by creationists to “what is really important. What makes a human being what he or she is, and what distinguishes mankind from every other living creature” (p. 17). In this relatively large volume, Hunt covers a lot

of ground without getting overly technical. The book is well documented, as the author draws from a variety of sources.

Hunt begins his rebuttal of materialism by revealing how foolish mankind is to boast of a space program when one considers the vastness of the universe: “Our ‘space program’ is like an ant climbing to the tip of a blade of grass. In a state of euphoria at its achievement ...

it calls down to the other ants standing in awed admiration below, 'I'm exploring the world!' The fact is, it hasn't even begun to explore the lawn" (p. 12).

Hunt explains how any real exploration of space will never be possible due to the incredible distances involved. He suggests that such an exercise in futility can be explained only by the fact that "the atheist is determined to prove that life on Earth is not a unique event but that it has originated time and again all over the cosmos by purely natural means" (p. 19). Attention is given to the SETI program (pp. 331–332) and the materialists' blatant inconsistency in presuming that they would easily recognize intelligent communication (information) transmitted from a distance, yet they stubbornly deny the necessity of a Sender to account for the information carried by the DNA molecule.

Throughout the work, Hunt refers often to the "*law of biogenesis*—that life comes from life—a universal principle that has stood the test of time" (Williams, 2008, p. 85). Hunt reminds the reader that any discussion of biological evolution is worthless since spontaneous generation violates this law of nature. This is sufficient to end the discussion as far as Hunt is concerned. However, it should be noted here that "A law of nature can, in principle, be refuted—a single contrary example would end its status as a natural law" (Gitt, 2009, p. 96). In no way justifying the atheists' blind faith in spontaneous generation, it is true that a scientific law can (in principle) turn out to be false since such laws are not provable but merely based upon observation (Gitt, 2001, pp. 22, 26–27). Laws of nature are merely descriptive of what has been repeatedly observed.

How then can we be certain that spontaneous generation was not possible at sometime in the distant past or in a distant galaxy as Francis Crick contends? Certainly, we "cannot experimentally test the laws of nature in other parts of the universe so they are only assumed

to be true there also" (Hartnett, 2008). However, making predictions in science *depends* on laws being universal.

Penetrating their facade of being reasonable and rational scientists who are above religion, Hunt accurately identifies the new atheists' sacred belief system as *scientism* (Anderson, 2007). Materialism or uniformitarianism "is not science but 'scientism,' the worship of science in the place of God" (p. 117).

One of the highlights of this book is that it contains numerous statements by prominent evolutionists, many of which are so ludicrous they do not even merit a lengthy refutation. For example, Hunt quotes from Dawkins's *Selfish Gene* (1976), evincing the atheist's reliance upon natural selection at the molecular level. To such nonsense Hunt simply responds, "no 'selection' can occur until there is a living replicator" (p. 107).

Hunt spends considerable time dealing with the evidence of a nonphysical dimension unexplainable by naturalism (Smith, 2002; Thomson and Harrub, 2004). If there is an immaterial reality, evolution would be incapable of imposing itself on it, while the big bang certainly could not explain its origin (Gitt, 1993, pp. 48–50). Hunt explains that "language and knowledge, like the mind that conceives and uses them, are nonphysical" (p. 273). "[If materialism is true] there is nothing to discuss about life, education, science, politics, hopes for a better world, or anything else because the best arguments on either side would merely be the result of chance motions of atoms in opposing brains" (pp. 162–163).

In discussing the mind in contrast to the brain, Hunt often quotes renowned neurophysiologist John Eccles for support. Jerry Bergman likewise noted Eccles's conclusion that "materialism does not, and cannot, explain either the existence or the operation of the mind" (2010a, p. 84).

Though this book is written primarily in response to the new atheists, Hunt

includes some much-deserved criticism for Francis Collins and others who hold to any of the various unbiblical compromise positions: "Collins cannot deny that evolution contradicts the Bible and Christianity at its most basic level. Clearly, Jesus considered Adam and Eve to have been historic persons and vouched for the validity of the Genesis account of their creation. *If evolution is a fact, then Jesus could not contradict it and yet be the son of God, able to pay the penalty for the sins of the world*" (p. 327, emphasis added).

In the conclusion, Hunt again exposes the fundamental flaw of compromise, pronouncing what may be considered to be the bottom line: "This is no light matter. If the Genesis account of creation isn't reliable, then how can we trust any other part of the Bible? If the Bible is wrong about the origin of man, how can we trust what it says about man's destiny? If the Bible is wrong about how sin entered into the world, then how can we trust its solution for sin? Moreover, Christ must therefore not be God and capable of saving us but a mere man who foolishly took the story of Adam and Eve literally because He lacked the insights of modern science" (pp. 517–518).

Some minor book criticisms follow. There is some confusion and inconsistency in the way the terms "species" and "kind" are used. One example: "The only way to create a new species is by an infusion of new information" (p. 174). This species/kind confusion is probably at least in part due to the fact that "the definition of a biological species can be controversial" (Lightner, 2009, p. 6). However, new genetic information is required for upward, microbe-to-man evolution but not for speciation. In fact, creationists have often pointed out that rapid speciation would have been likely in the immediate post-Flood world (Woodmorappe, 1996). Elsewhere in the book it appears that Hunt does in fact understand that it is the Biblical kind (baramin) that is immutable, not

the man-made designation species: “The abundant variety of dogs is not evidence of evolution from one *kind*, as defined in Genesis 1, to another *kind*. Clearly ‘*kind*’ is still a division that cannot be crossed” (p. 137). But later he defines speciation as “a change in some characteristics while remaining within the same species” (p. 306). Since Hunt quotes more than once from Jonathan Sarfati’s *Refuting Compromise* (2004), it is a little disappointing that he did not refer to Sarfati’s work for clarity here (pp. 225–240).

During the mind/brain discussion, Hunt uses the illustration that the brain is like a computer operated by the mind (p. 44). While this is helpful to a point, Christian researchers and outspoken critics of psychotherapy Martin and Deidre Bobgan discourage the use of the “brain is like a computer” metaphor since “the current research demonstrates that computer memory and biological memory are significantly different” (Bobgan and Bobgan, 1999, p. 54). They believe that “the brain does not operate as a computer any more than it operates like any other piece of technology.” According to Bergman, “even today it is still considered largely a black box” (2010b, p. 180).

At one point, Hunt appears to confuse the Curse with the second law of thermodynamics when he states, “The human race . . . is doomed by the second law” (p. 334). Although some earlier

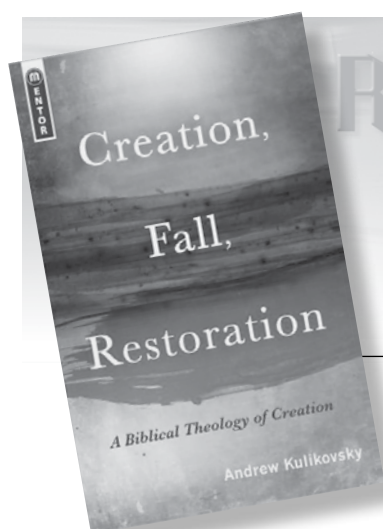
creationist literature taught that entropy began at the Fall, there is good reason to reject this view (Sarfati, 2004, pp. 213–214). At times Henry Morris tied the second law to the Fall and God’s Curse on creation (1976; 2002), but it is noteworthy that his son has more accurately distinguished entropy from the effects of the Fall (Morris III, 2009).

Overall, *Cosmos, Creator and Human Destiny* covers enough ground to challenge the average skeptic while addressing related philosophical and social issues (the existence of evil and the bad fruit of evolutionary philosophy in history). The author provides some fine insights to the debate and offers a few clever illustrations. He includes a clear presentation of the gospel built on a Biblical/historical foundation. With the exception of some minor criticisms, Hunt’s book is proof that it does not take a Ph.D. to reveal that it is the atheists who suffer from “blindness,” not the Watchmaker.

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Nick Sabato
n.sabato@yahoo.com



Reviews

Creation, Fall, Restoration: A Biblical Theology of Creation

by Andrew S. Kulikovsky

Christian Focus Publications,
Scotland, UK, 2009, 312 pages,
\$20.00.

Many commentaries have been written on Genesis, including several by those who hold to a young earth and global Flood, as well as proponents of an old earth. Kulikovsky has produced not a commentary but an actual theology of creation. He covers an entire range of topics that pertain to creation studies, and all of them are focused on Scripture and an appropriate view of the Genesis account of Creation. This stands in contrast to other approaches that discuss scientific evidence or philosophy. The author's approach should not be seen as critical of these other perspectives but rather complementing them. Indeed, this kind of approach is exactly what has been lacking in the creation writing to date: a Biblical theology of creation constructed irrespective of scientific debate.

The book begins by discussing the need for a Biblical theology of creation and the nature of revelation. It next discusses inerrancy and hermeneutics and the implications of following the grammatical-historical approach to interpreting Scripture, which has come under more and more criticism as a result of the influence of postmodern thought. The nature of truth and scientific research is also covered as background information to the subject.

Three chapters are devoted to historical and modern views on Genesis

1–3. The author surveys Jewish and early Christian commentators as well as discusses the debate over literary genre and purpose of the narrative. The next four chapters are an exegesis of Genesis 1–3, in particular focusing on Genesis 1. These chapters discuss such issues as the meaning of a “day” in Genesis 1–3, the nature of the Sabbath, and a Biblical theology of the Fall into sin. There is also a chapter on the Flood, focusing on its significance and its extent. The final two chapters may be the most interesting for most readers as they discuss how a Biblical theology of creation should inform an appropriate Christian response to environmental issues and how we understand the final restoration of creation at the second coming of Christ.

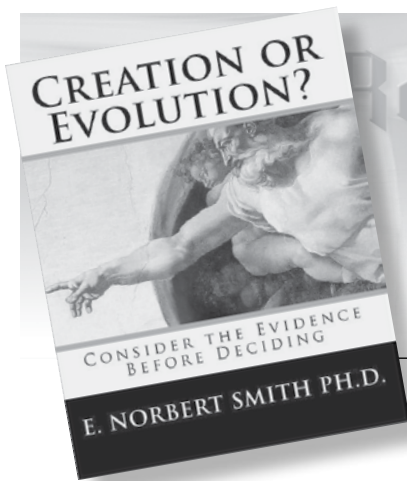
The book is very well researched and referenced. Throughout the book, particularly the exegesis chapters, the author discusses language, grammatical, and syntactical issues and how they relate to the meaning of the text. I appreciate the extensive citation and use of other commentaries that deal with Genesis 1–3 from all parts of the interpretive spectrum. The author has been very thorough in his work and discusses many issues that are relevant both to the creation science field and to a more general Christian response to science and the environment. In addition, he discusses important textual matters and theology as he does his exegesis. For example, he discusses the meaning of the “waters above” of Genesis 1, the location of the Garden of Eden, and the nature of the

Fall and how it relates to salvation. These and many other issues are all covered in a systematic fashion.

Not everyone will agree with all of Kulikovsky's thoughts. I personally found his explanation of the final restoration of creation to be unsatisfactory. Though he does not explicitly say so, he apparently takes a view known as *amillennialism* which denies a literal 1000-year reign of Christ on the earth previous to the creation of a new heaven and new earth. This causes him some difficulty since he admits that there are Scripture passages that seem to speak of the renewal of this earth as well as others that speak of a brand-new creation. A view that takes a more literal interpretation of the millennium solves this difficulty. While details about end times may be disputed, the fact of a final restoration not only of believers but also of the entire creation is clearly taught in the Bible as well as in this book.

The book contains an extensive bibliography and a Scripture index but no subject or author indices, both of which would be helpful additions. It is not too long for lay readers and yet is deep enough for serious Bible students. I recommend it to anyone seeking a better understanding of the Biblical doctrine of creation as it applies to origins and all the ramifications that such a doctrine implies.

Jeremy Maurer
maurerjl@grace.edu



Creation or Evolution? Consider the Evidence before Deciding

by E. Norbert Smith

Self-published, 2010, 310 pages, \$24.00.

Creation or Evolution (CORE) is a book written by my long-time friend, Dr. E. Norbert Smith. I admired this man's motivation for scientific research back in his graduate school days when he spent much of his spare time doing research at home in his own laboratory. Several years later Norbert helped a student of mine complete a project that led to a CRS paper on survival of fresh- and saltwater fish in the same aquarium. It has serious implications for the survival of both kinds of fish during the Genesis Flood.

Norbert has been a board member of the Creation Research Society (1979-1987) and has accomplished many other objectives in his long scientific career, as one will learn in the fascinating section entitled "About the Author." Since retiring he has written numerous books, among which he considers CORE to be his *opus magnum*.

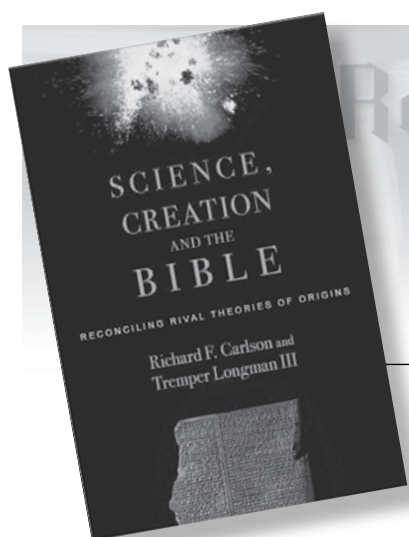
The extent of discussion in CORE is almost as broad as creation itself, which ensures usefulness and applicability to all categories of readers. Bible students

will discover that every verse about creation is published here, most of them from the best-selling, user-friendly New International Version. This amounts to 474 scriptural passages referring directly to creation and 1002 that cover God's ongoing role in His creation. The collection of Bible texts in CORE could serve as a devotional guide to many creation topics. The typical subjects involved in the conflict between creation and evolution are discussed in CORE, and a few new ones are included as well, such as the uniquely designed lung structure of the bison and the alligators' care for their eggs. CORE is something like a garden of origins ideas waiting to be harvested by people with different interests. The 14 chapters cover such themes as: the history of creation science, scientific evidence for creation, good science in the Bible, the war between the Bible and secular science, supposed scientific evidences for evolution, evolutionism today, theistic evolution, evolutionary idolatry, intelligent design, the influence of evolutionary ideas on society, and the persecution of non-evolutionary scientists in America. In the last chapter,

entitled "Does it really matter?" Norbert makes a strong appeal for all readers to experience personal salvation through Jesus Christ alone.

Individuals who have faced their own "school of hard knocks" in academia will enjoy learning about Norbert's continual progress despite repeated, unwarranted attacks at the university level. He has experienced a trying but fascinating time period in the history of academic freedom in America. Hopefully this book and others like it will lead to curtailment of such abuses of personal liberty. Near the end of the book, the author gives these searching remarks to all who would bear the message of Christ in scientific circles and elsewhere: "Are you prepared? The risks are great. Will you witness, no matter what the costs?" (p. 297). CORE will be a useful addition to private libraries and a creative gift for others. For a book this size, "the price is right."

George F. Howe
www.evolutionflunksbotany.org
georgefhowe@sbcglobal.net



Reviews

Science, Creation and the Bible

by Richard F. Carlson and Tremper Longman III

InterVarsity Press, Downers Grove, IL, 2010, 144 pages, \$16.00.

Author Carlson is a Ph.D. physics professor at the University of Redlands, CA; coauthor Longman is on the Bible faculty at Westmont College, Santa Barbara, CA. Both men have written considerably on the book topic, and their goal in this work is to reconcile rival theories of origins. The effort is appreciated; however, countless books with this theme have been reviewed in the *CRSQ* for decades.

I was impressed with the writers' effort to treat all viewpoints of earth history with respect, including young-earth creation. Less impressive was the lack of any new ideas offered. The bottom line suggestion is that the Bible is limited to explaining *why* physical and biological processes began and unfold, while contemporary science has authority to explain the *how* (pp. 13, 34). This echoes the popular sentiment from

Galileo four centuries ago, "The Bible shows us how to go to heaven, not how the heavens go."

The authors describe their theology as supporting a high view of Scripture including Biblical infallibility and a generally literalist reading of the text (Introduction). The CRS approves of this position. How, then, do the authors resolve Bible-science tensions regarding origins and earth history? It is concluded that Genesis 1–2 is not historical, scientific, or literal in content. Instead, these chapters describe the ancient, outdated, incorrect cosmology familiar to Old Testament Hebrews (pp. 17, 122).

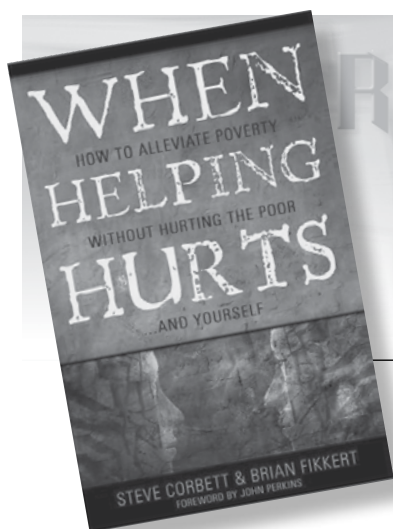
On what grounds do the authors conclude that Genesis 1–2 is not literal history? It is because the Creation account conflicts with modern science (p. 125), and the latter must take precedence. This amazing conclusion has unintended consequences: Must one then also accept a spontaneous origin of life, animal ancestry for mankind, geologic uniformity with no global Flood, and an

eventual expansion of the universe into oblivion billions of years in the future?

Considerable time is spent on apparent discrepancies between Genesis chapters 1 and 2, and this is offered as further evidence of the nonliteral nature of these texts. Sadly, this is the message presented to thousands of students in the InterVarsity Press readership.

What, then, is the authors' solution to current creation/evolution tensions? Every modern consensus of science is correct, so this must be the way God set it all up in the first place. I was hoping for something more palatable in this book by two academic scholars who are men of faith. On a positive note, the rules for Biblical interpretation are carefully spelled out in thorough fashion (pp. 51–74). However, the authors are overly enamored with the contemporary, temporary ideas of secular science. The book provides subject and Scripture indexes.

Don B. DeYoung
DBDeYoung@Grace.edu



When Helping Hurts: How to Alleviate Poverty without Hurting the Poor... and Yourself

by Steve Corbett and Brian Fikkert

Moody Publishers, Chicago, 2009, 230 pages, \$15.00.

Why would someone review a book on relieving poverty in a creationist journal? I have two reasons. First, in analyzing the issue of poverty, the authors rely on the Creation account in Genesis. This provides an understanding of reality on which a useful understanding of poverty and its alleviation can be built. The importance of Creation to all areas of life often is emphasized. In missiology, for example, New Tribes Mission begins with Genesis when they bring the gospel to tribal people who have no background in Christianity. While poverty alleviation overlaps with missions, I was still impressed by how important the first few chapters of Genesis are to developing an understanding of poverty.

The second thing I found was that the basic worldview developed based on Genesis had implications far beyond the scope of addressing material poverty. These implications involve how we view God, other people, ourselves, and the rest of creation. Many concepts are directly applicable to the daily life of Christians and creationists, whether or not they are directly involved in poverty alleviation.

The first chapter examines why Jesus came to earth. Many Christians might answer that He came to die on the cross to save us from our sins so that we can live with Him in eternity. This is obviously true, but the authors convincingly

show that Christ's purpose went beyond this. I enjoyed this insightful chapter, which emphasizes the impact of the gospel on all areas of our lives.

The second chapter identifies the basic problem with poverty. The authors examine the Creation account in Genesis. Before they begin, they bring up the point that God is triune, which implies that God is inherently a relational being. Thus man, who is created in the image of God, is inherently relational also. Four fundamental human relationships are identified: with God, with other people, with self, and with the rest of creation.

While all relationships were harmonious at Creation, things did not stay that way for long. The authors do a nice job of examining the effects of the Fall on each of the relationships. While most Christians are very well acquainted with the effects of sin on man's relationship with God, some of the observations made on the other relationships are quite interesting.

The authors describe two extremes that are common when the brokenness from sin is evident in our relationship with ourselves. They term this as *poverty of being*. The first is low self-esteem, which is common among the poor. In their marred identity, they feel worthless and powerless. They do not recognize that they were created in God's image and have an inherent value and dignity. They do not realize that God cares for them and has given them talents and abilities to use to bless others and provide for themselves.

A second manifestation of a poverty of being is found in the god-complexes of the rich, "a subtle and unconscious sense of superiority in which they believe" they have all the answers and can fix the problem for others. They often help in the way they feel is best and leave with a sense that they have successfully solved the problem. Unfortunately, there are times when they have actually made the problem worse. The book provides some excellent examples that illustrate this point clearly.

It seems to me that the poverty of being described by these authors is evident throughout our culture, including among those involved in creation-evolution issues. When we suffer from god-complexes, we seem to forget that it is God who has all the answers and everyone is dependant on Him. We also fail to realize that God has gifted others too, and, if we are willing to listen, we might learn something. Scripture certainly encourages us to have a teachable attitude (Proverbs 1:5, 7; 9:8-9; 12:15).

To help bring things into perspective, the authors discuss Colossians 1:16-17 and Hebrews 1:3. These verses describe how Christ sustains things, even in this fallen world. They bring out the point that wherever we go, God has been there first and is already at work (cf. John 5:17). I know this realization has been very important for missionaries who minister in some of the most challenging and seemingly Godforsaken places on earth. Perhaps we need to recognize that this is also true in the secular universities where

it sometimes appears that the atheists rule.

This book addresses a number of blind spots I think many of us suffer from in our Western culture. I know it is easy for me to get focused on things and forget that God is ultimately concerned about relationships. While it is important that we “test everything” in regard to truth claims, we also need to regard others with respect since God created them in His image and considered them

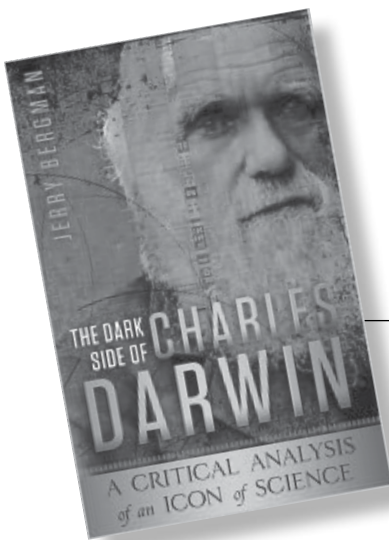
worth dying to save. When I take time to keep my relationships healthy, I find I am living more consistently with the teachings of the Bible. Then I am able to relate well to evolutionists and creationists, unbelievers and believers. This improves my ability to communicate my thoughts with them, as well as allows me to listen and receive potentially valuable information. Most importantly, when we value our relationships with other believers, it allows us to lay hold of the most distinguishing feature of followers

of Christ: our love for one another (John 13:35).

The remaining seven chapters of the book build on these foundational concepts. I found the book fascinating and helpful to me in many ways. I highly recommend it to any with an interest in missions, poverty alleviation, social justice, or how a Biblical worldview affects our approach to life.

Jean Lightner

jklightner@gmail.com



The Dark Side of Charles Darwin

by Jerry Bergman

New Leaf Publishing, Green Forest, AR, 2011, 250 pages, \$14.00.

This book should be on a shelf in every library for ready reference. Countless publications laud Darwin for his “monumental” accomplishments, primarily during the latter half of the nineteenth century. However, this book is different. Rather than propagating another adulation of Darwin, it opens a window on his negative influence. This effort is supported by close to 900 references.

The contents include four parts—“Christianity,” “Mental Health,” “Darwin’s Theory,” and finally, “Racism & Sexism.” In each of these categories there are 3 or 4 chapter titles, which include “Darwin’s Religious Views,” “Passion for Hunting and Killing,” “Plagiarism,” and his “View of Women.”

Bergman’s comprehensive coverage provides a depth and breadth not widely perceived by many who consider

Darwin to be a man of great stature, prominence, and productivity within the scientific community. There has been a great need for this book, as unpleasant as it may seem, to provide readers with information that more readily can aid in their panoramic scan of late nineteenth-century history.

It is important to recognize that the overriding goal of Darwin’s life was deceptively to obliterate supernaturalism and replace it with naturalism—a purely atheistic position. Darwin did not want his public to perceive him as anti-Christian or irreligious. He therefore put on a front because he knew it would take considerable time to convert society away from the more popular position of belief in a supernatural God. Natural selection, for instance, implied that there was no divine influence in the evolution of life.

For me, chapter 8, which happens to be near the center of Bergman’s book and deals with Darwinian plagiarism, stands out as a key paradigm-changing section of the book. Until I read through

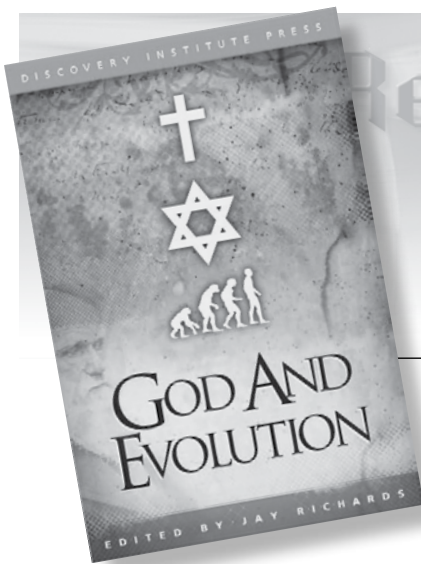
this chapter, I did not realize that virtually all of Darwin’s major conclusions, including natural selection, were the brainchildren of someone else, including especially his grandfather, Erasmus Darwin.

Charles Darwin’s assessment of women is not popularly understood but is most interesting: Women were inferior to men and occupied a lower position in an evolutionary tree of life. The intelligence gap was thought to be so great that some even classified women as a lower species.

This book will encourage Darwinians to reconsider what they have been taught, and it will reinforce the conclusions of Darwin-doubters. Buy the book; give it to evolution-minded individuals, and put it in libraries. The world must come to realize that the evolutionary “monarch-hero” from the nineteenth century has been dethroned.

Wayne Frair, Ph.D.

Basking Ridge NJ



God and Evolution

edited by Jay Richards

Discovery Institute Press,
Seattle, 2010, 387 pages, \$22
paperback.

Editor and main contributor Jay W. Richards is joined by John G. West, Casey Luskin, William Dembski, Logan Gage, David Klinghoffer, Stephen Meyer, Denyse O'Leary, Jonathan Wells, and Jonathan Witt in presenting a polemic that characterizes theistic evolution as incompatible with Christian orthodoxy. The book makes many points that agree with creation science and does not denigrate, scoff, or rebuke creationist positions. Early on (p. 22), Richards clarifies that neo-Darwinists view and utilize evolution primarily as a means to remove God from any creative role whatsoever in establishing the universe and life on earth. Richards writes, "A proposition cannot be true in theology, but false in natural science" (p. 27). A few pages later West says wisely that without God as Creator, the rest of the Christian story makes little sense, and in support of this position he quotes Philip Schaff saying, "Without a correct doctrine of creation there can be no true doctrine of redemption" (p. 34).

The rest of the book is largely about the glaring inconsistencies in positions that are completely incompatible with orthodox Protestant Christianity, Catholicism, and Judaism (Klinghoffer has two chapters on Judaism and evolution), and shows that theistic evolution is not congruent with orthodox doctrines on creation. Islam is not represented in

the book, although the last statement would surely apply to the religion of Islam. West suggests that if theistic evolutionists were serious natural philosophers, they would examine the scientific merits of neo-Darwinism and find them lacking.

Casey Luskin in chapter 3 makes a compelling case that theistic evolutionists do not and have not appeased the atheistic scientific community controlling the teaching of biology in public education facilities. Professor William Provine, for example, calls evolution the "greatest engine of atheism ever invented" (p. 68). I agree with Provine's characterization of evolution as an invention. Luskin notes that Eugenie Scott of the National Center for Science Education (NCSE) disingenuously states that science and religion are not in conflict regarding evolution. While the NCSE makes accommodations with theistic evolutionists, hard-line atheists such as Michael

Ruse, P. Z. Meyers, and Chris Mooney advocate a full-scale attack on all forms of religion, including theistic evolution. To this group, all religions and especially Christianity, are threats to right thinking and need to be eliminated, with an initial goal being to reduce such belief to 20 percent or less of the U.S. population (p. 75). Jerry Coyne, another prominent evolutionary biologist, said "Attempts to reconcile God and evolution keep rolling off the intellectual assembly line. It never stops because the reconciliation never works" (p. 78). William Dembski (chapter 4)

discusses why theistic evolution does not provide a solution to the presence of evil in the world.

Two chapters in section II on Protestants and evolution take Francis Collins to task. It is quite obvious that the Discovery Institute (DI) is particularly disturbed by Collins, who refuses to meet or communicate with them and continues with an incoherent attack on intelligent design. In chapter 6, Jonathan Wells critiques Collins on Collins's own science specialty, DNA. Collins still refers to junk DNA, even though there is far, far less junk (if any) than initially suggested.

Howard Van Till, now retired from Calvin College, is typical of theistic evolutionists. He specifically directed criticism first on young-earth creationism and then on intelligent design (ID). His own proposal is the "Robust Formational Economy Principle," which supposedly allows the theist Christian to accept methodological naturalism because from the beginning God endowed the universe with the full capacity to evolve by providing the primordial state with all the necessary capacity to organize and transform by random events and natural selection. This sounds like some form of emergent evolution. Richards (p. 129) notes that Van Till, like many intellectuals who were once nominally Christian, has repudiated his Christian beliefs, proving once again that compromising the doctrine of creation is a dangerous path for believers.

But how can God direct an undirected process? Steven Meyer lays bare the

problem that Denis O. Lamoureux and others in the theistic evolution group face. Lamoureux proposes a front-loaded view of intelligent design in which the initial conditions of the universe are arranged or designed in such a way that life will inevitably evolve without any additional input or activity of a designing intelligence. But when and how did the spirit and soul of man come onto the scene; when did man obtain the “image of God”? Meyer points out that the origin of specified information is not considered by theistic evolutionists.

Part III of the book is devoted to rebuking Catholic and Jewish intellectuals and theologians in their quest to accommodate the neo-Darwinian model of unguided, non-teleological, evolution. Within this narrative are occasional references to creationists, but nearly always without the condescension intelligent design authors sometimes expressed in the past. The key point of the book is that orthodox Christianity and any variety of theistic evolution are simply not logically compatible. The philosophical bent of Darwinists is that evolution and atheism fit like hand and glove and are mutually coherent and supporting. Let me add that both philosophies are completely false from this author’s orthodox Christian position. I am encouraged by the strong condemnation and critique of

theistic evolution offered in this book by the inner circle of ID philosophers and scientists. I hope this means young-earth creationists will be afforded more appreciation from the ID. ID scientists, like creationists, have been expelled from academic institutions (Dean Kenyon and Caroline Crocker were demoted from teaching duties for merely suggesting intelligent design). Prior attempts by the ID to gain acceptance of Big Biology, Inc. (my term) have not worked, and the attempts by theistic evolutionists to compromise with undirected, purposeless evolution are not appreciated by the atheists controlling Big Biology, by intelligent-design theorists, or by young-earth creationists.

Evolutionism is a faith-based natural philosophy that takes no prisoners. It stands alone as a monumental delusion and will not and cannot compromise its foundational principle that unguided, purposeless forces have or will explain everything that exists. Even setting up the whole process prior to the beginning by God or godlike force is forbidden by this comprehensive atheism.

Young-earth creationists like me would like to connect and interact with intelligent design proponents since we share with them the belief in intelligent design. The ID proponents are not inclined to make an issue of the age of the

earth, at least not in public writing, and specifically avoid theological implications of ID. Privately, some do accept a historical Adam and Eve, some do not, and some will not say. A few of the main group, including authors of this book, appear not to accept common descent, although some like Michael Behe do. John West makes the statement that the doctrine of redemption depends on the doctrine of creation and the Fall (p.34). At this critical point young-earth creationists insist that the fall depends on a historical Adam and Eve. This then leads to the obvious questions of the age of the earth and humanity. Young-earth creationists have considerable scientific and Biblical evidence for our position and should keep bringing up the salient points for a young earth. I would encourage our readers to interact with ID individuals and exchange more than pleasantries. I have found these persons, including Casey Luskin, John West, and Stephen Meyer, far less authoritarian on ID and more receptive to creation matters than neo-Darwinists and theistic evolutionists. The book is very well organized by topic and references and has name and subject indexes.

Theodore J. Siek
Theodore.Siek@verizon.net

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.

4. Body of the text. Two types of headings are typically used by the *CRSQ*. A major heading consists of a large font bold print that is centered in column, and is used for each major change of focus or topic. A minor heading consists of a regular font bold print that is flush to the left margin, and is used following a major heading and helps to organize points within each major topic. Do not split words with hyphens, or use all capital letters for any words. Also, do not use bold type, except for headings (italics can be occasionally used to draw distinction to specific words). Italics should not be used for foreign words in common usage, e.g., "et al.", "ibid.", "ca." and "ad infinitum." Previously published literature should be cited using the author's last name(s) and the year of publication (ex. Smith, 2003; Smith and Jones, 2003). If the citation has more than two authors, only the first author's name should appear (ex. Smith et al., 2003). Contributing authors should examine this issue of the *CRSQ* or consult the Society's web site for specific examples as well as a more detailed explanation of manuscript preparation. Frequently-used terms can be abbrevi-

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).

5. Summary. A summary paragraph(s) is often useful for readers. The summary should provide the reader an overview of the material just presented, and often helps the reader to summarize the salient points and conclusions the author has made throughout the text.

6. References. Authors should take extra measures to be certain that all references cited within the text are documented in the reference section. These references should be formatted in the current CRSQ style. (When the *Quarterly* appears in the references multiple times, then an abbreviation to CRSQ is acceptable.) The examples below cover the most common types of references:

Robinson, D.A., and D.P. Cavanaugh. 1998. A quantitative approach to baraminology with examples from the catarrhine primates. *CRSQ* 34:196–208.

Lipman, E.A., B. Schuler, O. Bakajin, and W.A. Eaton. 2003. Single-molecule measurement of protein folding kinetics. *Science* 301:1233–1235.

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.

7. Tables. All tables cited in the text should be individually placed in numerical order following the reference section, and not embedded in the text. Each table should have a header statement that serves as a title for that table (see a current issue of the *Quarterly* for specific examples). Use tabs, rather than multiple spaces, in aligning columns within a table. Tables should be composed with 14-point type to insure proper appearance in the columns of the CRSQ.

8. Figures. All figures cited in the text should be individually placed in numerical order, and placed after the tables. Do not embed figures in the text. Each figure should contain

a legend that provides sufficient description to enable the reader to understand the basic concepts of the figure without needing to refer to the text. Legends should be on a separate page from the figure. All figures and drawings should be of high quality (hand-drawn illustrations and lettering should be professionally done). Images are to be a minimum resolution of 300 dpi at 100% size. Patterns, not shading, should be used to distinguish areas within graphs or other figures. Unacceptable illustrations will result in rejection of the manuscript. Authors are also strongly encouraged to submit an electronic version (.cdr, .cpt, .gif, .jpg, and .tif formats) of all figures in individual files that are separate from the electronic file containing the text and tables.

Special Sections

Letters to the Editor:

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.

Editor's Forum:

Occasionally, the editor will invite individuals to submit differing opinions on specific topics relevant to the *Quarterly*. Each author will have opportunity to present a position paper (2000 words), and one response (1000 words) to the differing position paper. In all matters, the editor will have final and complete editorial control. Topics for these forums will be solely at the editor's discretion, but suggestions of topics are welcome.

Book Reviews:

All book reviews should be submitted to the book review editor, who will determine the acceptability of each submitted review. Book reviews should be limited to 1000 words. Following the style of reviews printed in this issue, all book reviews should contain the following information: book title, author, publisher, publication date, number of pages, and retail cost. Reviews should endeavor to present the salient points of the book that are relevant to the issues of creation/evolution. Typically, such points are accompanied by the reviewer's analysis of the book's content, clarity, and relevance to the creation issue.

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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.

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