Creation Matters

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Interdisciplinary Contradictions in Evolutionary Theory

by Dave Woetzel, MS

Creationists are sometimes accused of being "scientific generalists" who broadly discuss the origins issues. It is true that specialized experience often helps in understanding the context of an issue and having familiarity with the relevant literature prepares one to intelligently engage the issues, but it is also true that the era of specialization has brought an isolationism that can be unhealthy for large-scale theoretical model building. Because interdisciplinary expertise is missing, it is easier for contradictions to be maintained in models.

Paleontologists, for example, may not appreciate how their proposed accommodation to a particular problem stands in stark contradiction to historical scenarios envisioned by the biologists, who are working to resolve their own problems. Evolutionary theory has increasingly become a smorgasbord of competing theories, some of which are mutually exclusive. While multi-authored papers using experts from multiple disciplines are helpful, significant contradictions remain. Here are half a dozen areas where opposing hypotheses are entertained by different evolutionary specialties.

1. ***The Rate of Evolution:*** *fast and continuous vs. standstill with occasional bursts*

The population geneticist is faced with some severe constraints on evolutionary narratives. Beneficial mutations are, theoretically, very rare. It is difficult to see how a sufficient number of incremental benefits can be obtained to explain important transitions (like apes to humans). *Theorists appeal to every possible naturalistic mechanism to maximize both rates and fixation mechanisms for beneficial mutations.*

The corresponding problem is that the reproduction rate of higher mammals (like apes) is quite limited. To build up a large enough population so that there is a decent chance of obtaining a positive mutation requires some time. When the rare beneficial mutation does come along, it must become fixed in the population. This requires that all progeny from the non-mutated individuals need to be eliminated.

Next, the entire population needs to be regenerated from the mutated offspring so as to get a reasonable chance at another beneficial mutation. Population genetics places a severe constraint (called Haldane's Dilemma) on how quickly beneficial mutations can be fixed.

At optimized, highly accelerated rates of evolution, only 1,667 substitutions can be made in 10 million years[1] (allowing a generous amount of time to go from a simian to a sapiens within the standard darwinian model). That only amounts to about 0.0000006% of the total human genome!

On the other hand, the paleontologists are dealing with different constraints on evolutionary scenarios. The fossil record rarely shows transitional forms at the higher taxonomic levels. Species seem to appear suddenly, continue through their duration with minimal changes, and then often go extinct. Organisms usually only exhibit slight variation around a type (a bush pattern) and not a clear lineage (a tree pattern linking one kind to another). Paleontologists accommodated this "bushiness" in the fossil record by the theory of punctuated equilibria. The idea is that evolutionary change

... continued on p.7

Current CRS-sponsored Research Projects

by Eugene Chaffin, PhD

Following are a listing and descriptions of current research projects that have been awarded grants from the Creation Research Society (CRS). Each grant is awarded based on review and vote by the members of the research committee. We are grateful to the donors who have made these grants possible.

Examining the Function of DNA Topoisomerases

DNA topoisomerases are a family of enzymes involved in the maintenance of our DNA. These enzymes are required by cells to prevent DNA from becoming tangled during transcription, replication, and cell division. These enzymes are essential to cell survival and cell division. Pharmaceutical scientists have exploited topoisomerases in order to fight bacterial infections and cancer. A number of widely-used drugs target these enzymes to disrupt DNA metabolism, cause DNA damage, and kill cells.

The goal of the research is a thorough analysis of human DNA topoisomerases with the goal of identifying key regulatory domains and regions. By identifying these regions, we may be able to identify new ways to manipulate enzyme function and, ultimately, to improve cancer therapy. In the process, new facts about design in God's creation will undoubtedly emerge.

The Johnnie Oolite Bed an Early Flood Deposit

Oolite is a rock consisting of small round grains, usually of calcium carbonate, cemented together. A yellow-orange oolitic carbon-

... continued on p. 3

Math Matters

by
Don DeYoung, PhD

Music of the Spheres

This essay title has a long history, popularized 2500 years ago by Pythagoras of Samos (c 569–475 BC). His mathematical and musical interests led him to seek chords and harmonies in the sky above. In Greek times, astronomy was dominated by geocentricism with the sun, moon, and stars embedded in distant crystalline spheres centered on the earth. Meanwhile, sound was known to be a regular vibration, whether a stretched string or vocal chords. Pythagoras imagined the celestial spheres to be rotating at regular rates and thereby producing a form of music.

Johan Kepler wrote *Harmony of the World* in 1619, including musical notation representing the paths of the planets. Of course, sound does not travel through the vacuum of space. In addition, the orbital frequencies of planets are ultra-low, just one cycle per year for the earth, or 3.1×10^{-8} hertz (Hz). Kepler's research led to his third planetary law of motion, where α means "varies directly as":

$$(\text{Orbit time})^2 \alpha (\text{Sun-planet distance})^3, \text{ or } T^2 \alpha R^3$$

This useful law is a consequence of the law of gravity.

public domain

Rev. Dr. Maltbie Davenport Babcock (1858–1901)

In 1901, writer and clergyman Maltbie Babcock used the idea of planetary music in the hymn *This Is My Father's World*:

> This is my Father's world,
> and to my listening ears
> all nature sings,
> and round me rings
> the music of the spheres.

We have learned that space, indeed, is filled with vibrational motions. The current high frequency record is held by a particular pulsar with a spin frequency of 716 Hz. Since our hearing spectrum ranges from 20 – 20,000 Hz, such pulsars, if audible, would produce a sound somewhat like the hum of a mosquito. The compact pulsar star rotates 62 million times faster than does the earth.

We cannot directly hear the sounds of space, and instead we can enjoy the silence of the night sky. Perhaps the ongoing music of heaven is reserved for the enjoyment of the Creator and his angelic realm.

Contents

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ate bed outcrops extensively in the Mojave Desert region and beyond. Geologists refer to it as a unique stratigraphic marker. The Johnnie oolite bed occurs throughout the region, with aerial extent of 10,000 square miles or more. Most oolites in modern environs form under shallow and wave-induced conditions. This carbonate bed formed soon after the start of the Noachian flood; hence, rapid deposition and burial occurred.

The research will investigate the role that depositional processes played in forming the Johnnie oolite bed. The investigation will include visiting outcrops, macroscopically examining the outcrops for grain size, grading, sorting, and looking for indications of cross-strata and other sedimentary structures. Microscopic investigation will evaluate the degree of relevant properties of the rocks. The research seeks to document and compare modern versus ancient oolite deposits, and to evaluate them in terms of how they were deposited.

Statistical Study of Surficial Gravel Deposits

Gravel is one of the most important building materials in modern society, being the chief ingredient in concrete and the standard for structural fill to support buildings, roads, and structures. While the relative ability of a stream or creek to transport fine sediments such as clay and silt is well known, coarse sediments require significant stream power. Laboratory research has centered on sand, and empirical equations have been developed to relate grain size distribution to current speed and stream power.

Gravel is too large to be easily investigated in the laboratory, so most of the research for gravel has been based on observed flood events. Since moving gravel requires greater stream power or current strength, than sand and fines, it has been of special relevance to debates of catastrophic versus uniformitarian depositional interpretations.

The research involves entry of large numbers of existing data from a sizeable area to research patterns that may indicate the directions and relative strengths of the currents that formed the deposits, effectively testing the predictions of uniformitarian versus catastrophic models of earth history.

Characterization of Mummified and Petrified Wood from an Eocene Deposit

This study experimentally investigates mummified wood, which is nondecomposed wood, and petrified wood from the same piece of material collected at a lignite mine. Chemical analysis reveals that the chemical compositions of mummified wood are similar to those of youthful wood (carbon based), and petrified wood is mainly composed of silicate (silicon based). From microscopic observations, it appears that the species of the original wood is a conifer. The research looks for DNA contained in nondecomposed wood on one side.

The research attempts to interpret the findings in terms of Flood geology. Ancient mummified wood provides the opportunity to study the structural and biological preservation of fiber (cellulose), proteins, and possibly deoxyribonucleic acid (DNA).

Ice Age Megafauna Bone Beds

Dense concentrations of fossilized bones, called "fossil bone beds," point to catastrophic flood destruction and deposition. Dinosaur bone beds are straightforward evidence of the Genesis Flood. "Ice age megafauna" are also found in dense bone beds. These megafauna can include mammoth, mastodon, saber tooth lion, "cave" bear, hippopotamus, wolf, sloth, and others. The term "ice age" is used because these particular animals are associated with the Ice Age in secular literature. Creation literature often agrees with the concept of a time of thick sheets of ice covering portions of the globe, but specifies an ice "age" of much shorter duration, and occurring several hundred years after the Deluge, according to an idea proposed by Michael Oard.

Note that the actual degree of ice sheet coverage during that time is not known and many geomorphic features used to indicate areas that were formerly ice covered were quite possibly formed by water and not by ice. The time period or periods during which the megafauna bone beds were deposited is not clear in the creation literature. Were they deposited during the Genesis Flood, at the end of the flood, or years later during post-Deluge megaflood catastrophes?

This project seeks to clarify the occurrence pattern of the deposits and to interpret the timings and events involved.

Catastrophism in the Type Area of the Lance Formation (Maastrichtian, Cretaceous)

In Wyoming there is an Edmontosaurus dinosaur bone bed in the Upper Maastrichtian Lance Formation. The exact stratigraphic position of the bone bed in the Lance is of interest, seeing as it is very close to the famed Cretaceous-Tertiary boundary (the uppermost stratigraphic record of the dinosaurs, and a possible Flood/post-Flood boundary). However, since the stratigraphy of the roughly 2500-foot-thick Lance has never been worked out, the stratigraphic position of the bone bed in the Lance is unknown. Both the bone bed and associated strata appear to be underwater debris flows covering at least hundreds, and perhaps thousands, of square miles, and having traveled at least scores, and probably hundreds of miles. This, combined with evidence of massive earthquake activity, suggests the Lance Formation was formed in the Flood or soon thereafter.

The research will look for evidence of these types of catastrophism in the region.

Numerical Model Development of Earth's Mantle Dynamics during the Genesis Flood: Multiphase Mantle Compositions and the Effects on Solid Mantle's Dynamics

Computer simulations of Catastrophic Plate Tectonics (CPT) will be performed using improved numerical modeling approaches to study the realistic rock deformational behavior under conditions of the Genesis Flood. The model will include the multiple mineral phases of the Earth's mantle, and thereby will take into account the effects of those phases on overall rock's mechanical properties. The microscopic features (e.g., grain size, recrystallization, and phase transformation) and the associated macroscopic thermal and mechanical properties of the rocks will be treated in more detail than ever before, in an attempt to model runaway plate movements.

This study will provide crucial new understanding on how the microstructures and mechanical properties of multiple mineral phases cooperatively acted together to produce the extreme weakening that allowed the global Flood cataclysm to unfold as it did.

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Speaking of Science

from the Creation-Evolution Headlines

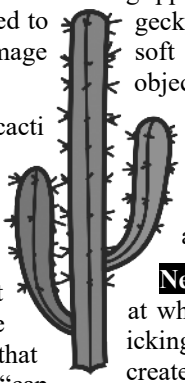
by David F. Coppedge

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

Biomimetics Parade Marches Upward

Scientists continue to find amazing things about animals and plants that they wish to imitate in technology.

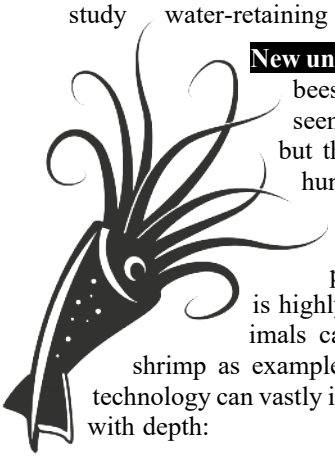
Scientists mimic a worm's lethal jaw.[1] With support from the U.S. Department of Energy, "Scientists created a bioinspired gradient in mechanical properties." The inspiration comes from the polychaete worm, which for a soft animal has a surprisingly tough jaw with which it injects venom into its prey. It withstands large forces through the layering of materials. "The design of the jaw, with a gradient of hard materials at the tip connected to softer tissues, dissipates force and prevents serious damage to the jaw."



Cactus roots inspire.[2] "During rare desert rainfalls, cacti waste no time sopping up and storing a storm's precious precipitation." Imitation of this process "could eventually have a host of applications in agriculture, cosmetics and medicine."

The raw power of human motion.[3] The researchers at King Abdullah Univ. of Science and Technology are getting into biological engineering. by designing robots that can hitchhike on human energy. Triboelectric generators "capture mechanical energy from their surroundings, such as vibrations and random motion produced by humans, and convert it into electricity."

Biodegradable shoes.[4] Researchers at the University of Delaware are skipping over the imitation part and going direct to the natural material. "Two University of Delaware students put their best foot forward at this year's National Sustainable Design Expo, showing off a biodegradable shoe they fashioned using mushrooms, chicken feathers and textile waste." The feathers provide growth medium for the mushrooms, which cushion and provide support. Hopefully the shoes don't biodegrade while you're walking around cactus to study water-retaining material.



New underwater geolocation technique.[5,6] Ants, bees, crickets, dung beetles, and spiders may seem like under-log vermin to some people, but they are nuggets of gold for biomimetics hunters. Each of these, as well as honeybees and other animals, has the ability to detect and use polarized light. Even less explored are underwater animals, where light is highly polarized—a source of information animals can exploit. Citing squid and the mantis shrimp as examples, the paper tells how their bioinspired technology can vastly improve on GPS information that degrades with depth:

> With its never-ending blue color, the **underwater environment often seems monotonic and featureless. However, to an animal with polarization-sensitive vision, it is anything but bland.** The rich repertoire of underwater polarization patterns—a consequence of light's air-to-water transmission and in-water scattering—**can be exploited both as a compass and for geolocalization purposes.** We demonstrate that, by using a **bioinspired** polarization-sensitive imager, we can determine the geolocation of an observer based on radial underwater polarization patterns. Our experimental data, recorded at various locations around the world, at different depths and times of day, indicate that the average **accuracy** of our geolocalization is 61 km, or **6 m of error for every 1 km traveled**. This proof-of-concept study of our **bioinspired technique** opens new possibilities in long-distance underwater navigation and suggests additional **mechanisms by which marine animals with polarization-sensitive vision** might perform both local and long-distance navigation.

Gecko-inspired adhesives.[7] The gecko is back, starring in another biomimetics role. At UC San Diego, "Researchers have developed a robotic gripper that combines the adhesive properties of gecko toes and the adaptability of air-powered soft robots to grasp a much wider variety of objects than the state of the art." The new project draws on previous work. The scientists "at Stanford University and the Jet Propulsion Laboratory recreated that mechanism with a synthetic material called a gecko-inspired adhesive."

New camera inspired by butterfly eyes.[8] Cancer patients, look at what The Optical Society is doing with butterflies. "By mimicking the intricate visual system of a butterfly, researchers have created a camera that provides surgeons with both a traditional color image as well as a near-infrared image that makes fluorescently labeled cancerous cells visible even under bright surgical lighting."

Cheer the biomimetics parade, and join it! Think of your kid's next science project. What in the backyard can inspire him or her to learn and design an application?

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The Information Packed into a Bird Egg

There's more in a bird's egg than can be accounted for by the Reverse Humpty-Dumpty Hypothesis (i.e., Darwinism).

A Closer Look at a Bird Egg. In an earlier commentary, we quoted Thomas Higginson who, in 1862, wagered that a bird's egg should be voted "the most perfect thing in the universe." His opinion received support recently from researchers from Montreal, Canada, who took a closer look at eggshells.[1] They found that eggshells are dynamic structures, that begin hard to prevent breakage while the mother bird incubates them, but gradually soften near hatching time so that the chick can peck its way out. According to *Phys.org*,

> The results also provide insight into the biology and development of chicken embryos in fertilized and incubated eggs. Eggs are **sufficiently hard when laid and during brooding to protect them from breaking.** As the chick grows inside the eggshell, it needs calcium to form its bones. During egg incubation, the **inner portion of the shell dissolves to provide this mineral ion supply**, while **at the same time weakening the shell enough to be broken by the hatching chick.** Using atomic force microscopy, and electron and X-ray imaging methods, Professor McKee's team of collaborators found that this dual-function relationship is **possible thanks to minute changes in the shell's nanostructure that occurs during egg incubation.**

World Magazine, which carried the story with its intelligent design implications, says,[3]

> The scientists hope their **discovery will allow human engineers to design** new, synthetic nanocomposite materials with novel properties.

Unfortunately, co-author Marc McKee gives the credit to blind chance, saying in *The Guardian*,

> **When you think about it**, we should be making materials that are inspired by nature and by biology **because, boy, it is really hard to beat hundreds of millions of years of evolution in perfecting something.**

Apparently he wasn't thinking about it with sufficient depth of logic.

What Comes Out of the Egg. Inside that egg was a growing embryo, which was once a single cell. Inside that cell were genetic and epigenetic instructions to grow an adult bird, as Illustra Media beautifully animated in its film *Flight: The Genius of Birds*.[5] All the instructions for the complete bird were there in the zygote, including the ability to learn as an adult from its environment. This means that the zygote is more complex than the egg, which is more complex than the adult bird. To fathom the amount of information in an egg, let's look at some adult birds that hatched out of those incredible incubating chambers.

How birds can detect Earth's magnetic field. Inside that egg was the potential to build navigation equipment that can use input from the magnetosphere. Scientists have been searching for years for the location of that sense. Researchers at Lund University believe they have found it in Cry4, a member of a group of proteins called cryptochromes ('hidden colors').[6]

> The receptors that sense the Earth's magnetic field are **probably located in the birds' eyes. N**ow, researchers at Lund University have studied different proteins in the eyes of zebra finches and discovered that one of them differs from the others: only the Cry4 protein **maintains a constant level throughout the day and in different lighting conditions.**

Other cryptochromes vary according to the biological clock, but Cry4 does not. Although work remains to be done to see how Cry4 reads magnetic information and responds to it, this is another clue to a long-standing puzzle. The team believes that all animals may have this ability. Do humans? Whatever is determined, there is another potential use for it: "this knowledge may be of use when developing new navigation systems."

New Bird of Paradise Species Has Smooth Dance Moves. Take a look at the photo in this *National Geographic* article.[7] Would you think it's a space alien? This jet-black bird of paradise from West Papua New Guinea, with two bright blue eyes and open beak, sporting a glistening aqua neck pouch, is doing its mating dance. Whether it is really a new species or just a variety is a debate for taxonomists, but the embedded video will likely impress anyone.

How birds focus with eyes on opposite sides of their heads.[8] Bird eyes look sideways, so how can they get stereo vision? This article, unfortunately behind a paywall, says that scientists have proposed three ways they might stay focused. Earlier studies showed that head-bobbing in some birds is accompanied by brain 'software' that maximizes the time an image remains still, so that the bird can maintain focus and not lose sight of a subject of interest in its field of vision.[9]

Extremely fast dives help peregrine falcons maneuver.[10] The world's fastest bird, the peregrine falcon, can catch its prey during high-speed dives even when the prey is rapidly changing directions. It's a "risky behavior" that "surely places **extraordinary physical and cognitive demands** on the falcon." The research team used computer simulations to imitate the hunting strategy, using data from videocams attached to falcons.

> The research team found that **optimal tuning of the mathematical laws** that control steering in the simulation corresponded closely to measurements of steering for real falcons.

Details can be found in the open-access journal *PLoS Computational Biology.*[11] The *ScienceDaily* article mentions a kind of reverse biomimetics, where humans invented something only to learn that nature had it first. "Detailed computer simulations reveal why falcons dive at their prey **using the same steering laws as human-made missiles.**" For the falcon, that precision guidance system had to be present inside the egg, and programmed inside the zygote.

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... continued on p. 10

Matters of Fact

by

Jean K. Lightner, DVM, MS

The Role of Epigenetics in Adaptation

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

Q Does epigenetics play a role in adaptation?

A Physiologist: YES!
Evolutionary biologist: Maybe….

Adaptation, in the sense that we will discuss, can be defined as changes which help an organism become better suited to its environment. It is related to one of the foundational characteristics of life: the ability to respond to the environment. Physiological adaptation relies on epigenetics, or modifications that can affect gene expression. This does not change the sequence of DNA, but allows genes to be up or down regulated to suit the needs of the organism (see Lightner, 2013).

There are several known mechanisms of epigenetic regulation (Figure 1):

1) histone modification (including acetylation, phosphorylation, and methylation)
2) cytosine methylation in DNA
3) various non-coding RNA molecules (miRNA, siRNA, piRNA, and lncRNA)

These mechanisms vary in the timeframe over which they typically act, allowing for both rapid changes and more stable, long-term changes.

Scientists had assumed that these types of changes could not be inherited by offspring. The basis for this was largely philosophical: the Modern Synthesis (aka Neo-Darwinism) was predicated on the idea that the environment could not direct phenotypic change. Instead, the source of phenotypic variation is claimed to be from random genetic mutations; natural selection then reduces or eliminates less fit variants. To support the conjecture that epigenetic changes are not heritable, some scientists pointed to the observation that DNA methylation patterns are reset in pathways leading to offspring (i.e., germ cell formation and fertilization). However, it is now recognized that the reset of DNA methylation isn't always complete, and it is not the only mechanism involved in trans-generational epigenetic inheritance (Morgan et al., 1999; Rassoulzadegan et al., 2006).

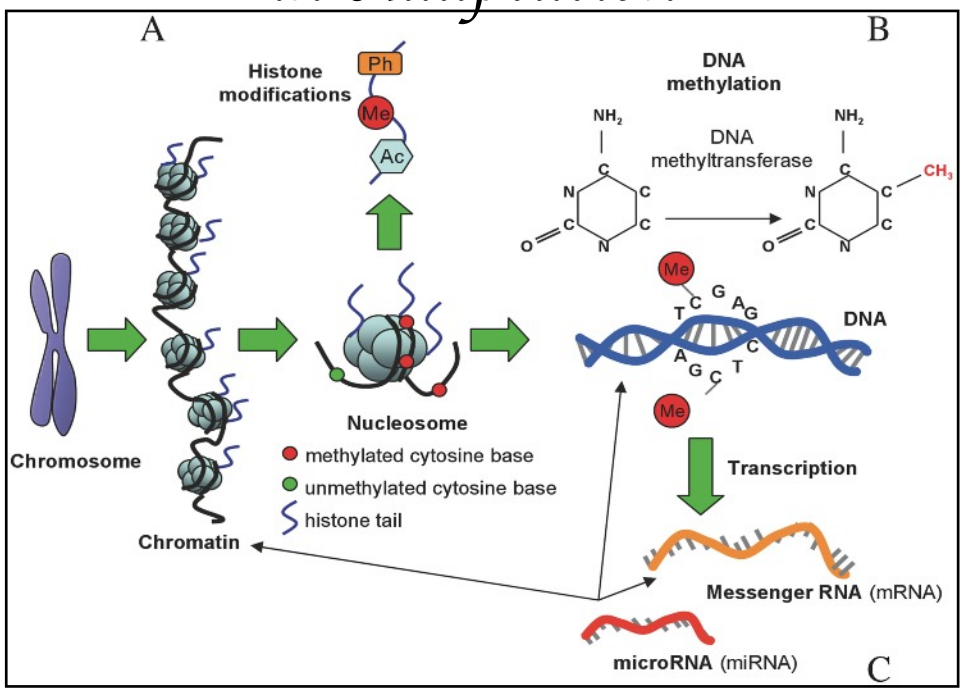

FIGURE 1. *A chromosome is made up of DNA coiled around proteins, called histones. There are three basic mechanisms by which epigenetic changes can be made. First, the tail of the histone proteins can undergo several types of modification (A), including phosphorylation (Ph), methylation (Me), and acetylation (Ac), that can affect accessibility of specific genes. Secondly, cytosine residues in DNA can be methylated (red dot) or un–methylated (green dot), the details of which are represented in section B of the figure. This affects gene transcription (the copying of DNA to make mRNA). Finally, various microRNAs (C) can bind mRNA to prevent synthesis into proteins. All of these mechanisms play a role in changing gene expression without affecting the DNA sequence.*
(Illustration is from Gómez-Díaz et al., 2012, and is used herein according to the CC BY license.)

For several decades now, it has been known that epigenetic inheritance can provide a source of heritable variation. However, it is not yet clear how often it does so, and what role it plays in adaptation of populations. Research has increased on this important topic, but much remains to be learned. One recent review article identified a web of potential interactions. It also pointed out that understanding patterns of natural epigenetic variation, the causes of that variation, and the consequences of it are necessary to adequately address the role it may have in adaptation (Richards et al., 2017).

Factors influencing epigenetic variation

In some studies it appears that DNA methylation differences are associated with underlying genetic differences. This raises the possibility of genetic control of epigenetic variability. It is also possible that a stable epimutation (heritable epigenetic change) could be inherited along with the underlying genetic sequence, thus causing the correlation. It has also been noted that epigenetic changes can influence genetic variation, specifically as it relates to silencing transposable elements, whose movement can change the sequence of a gene or its promoter (Richards et al., 2017).

Some epimutations appear to arise stochastically. If these are stable over multiple generations, then natural selection may affect the pattern of variation. It is also known that environmental factors can effect heritable epigenetic changes, but the pattern and extent of this is not well known. Significant work needs to be done across different species, especially wild plants and animals, before reasonable generalizations can be made (Balao et al. 2018; Richards et al., 2017).

Potential role in adaptation

Some researchers are exploring the role of

epigenetics in adapting to environmental stresses (e.g., heat stress). (Balao et al., 2018; Hu and Barrett, 2017) One recent review suggested that it is not isolated epigenetic mechanisms that can account for changes, but "often suites of epigenetic mechanisms that act in concert to influence animal responses to temperature change." (Hu and Barrett, 2017) Further, in cases where observations have been made, epigenetic variation seems to exceed genetic variation, allowing for the possibility of its playing a major role in adaptation.

It should be pointed out that there are some conceptual problems for Neo-Darwinism if epigenetic changes play a major role in adaptation. If epigenetic adaptation precedes genetic adaptation, it may allow organisms to persist longer in a given environment; this would allow more time for adaptive genetic variants to arise. However, once they do arise, there is a problem fixing the adaptive genetic variant by natural selection. This is because the phenotypic difference between those carrying the variant and those that lack it would not be as great if there has been significant epigenetic adaptation. Natural selection is not effective unless there is a large fitness difference (Lightner, 2015). All this hints that there are other undiscovered mechanisms by which genetic adaptation takes place.

One function carried out by epigenetic mechanisms is the control of access to different regions of DNA. They can expose a region of DNA, making it more accessible for transcription or repair. Conversely, they can conceal a region that is not needed at that time. Based on this known function, and the fact that adaptive genetic changes are often found in the same genes that are upregulated in physiological adaptation, Lightner (2016) has suggested that epigenetic changes may provide access to regions of DNA that allow various designed mechanisms involved in DNA editing to induce potentially adaptive mutations. Then, mechanisms such as biased gene conversion (a form of meiotic drive, or non-Mendelian inheritance) could contribute to increasing the frequency of adaptive alleles. It will be interesting to see if either of these hypotheses turns out to be correct.

Conclusion

Epigenetic changes have long been known to play an essential role in physiological adaption, allowing organisms to adjust to their surroundings. However, it is not currently known to what extent epigenetic changes are passed on to the next generation, how stable they are over multiple generations, or to what degree they contribute to long term adaptation in a population. As discoveries from further research on this topic continue to be revealed, it seems quite reasonable to expect that we will be awed by the astoundingly complex and ingenious ways that God has provided for his creatures to adapt in this world.

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Contradictions

...continued from page 1

happened in a brief burst, too quickly to be preserved in the fossil record.

Gould estimated that a species will spend 90% of its time in stasis (not making any evolutionary progress).[2] *Obviously, this means that no beneficial mutations that impact morphology are getting fixed the vast majority of the time.* These two scenarios stand in stark contrast, and can't both be true.

2. ***The Evidence of Homology:*** *established ancestral body plan vs. flexible, changing body plan*

One of the classical arguments in favor of descent from a common ancestor is homology. An icon of homology is the pentadactyl limb seen in tetrapods (amphibians, reptiles, birds, and mammals). The idea is that a common ancestor had 5 digits on its limb. Because this design was so fundamental to the body plan, it was thereafter incorporated into diverse descendants.

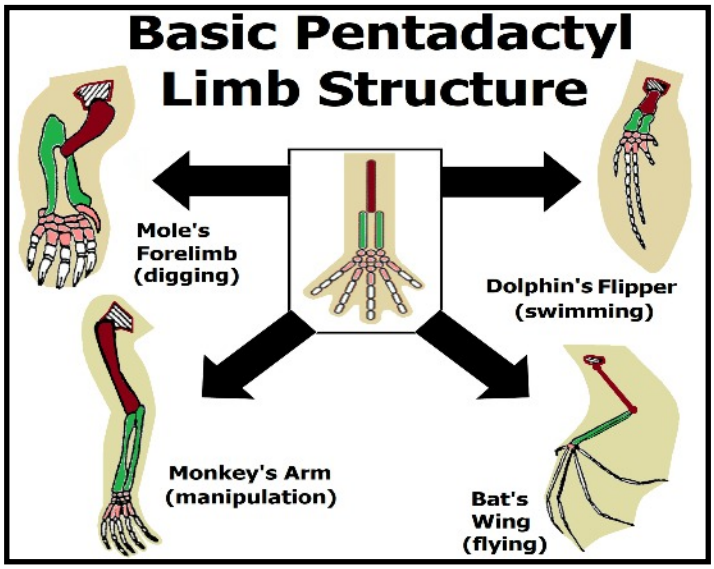

FIGURE 1.
The Pentadactyl Limb, Icon of Homology.

Consider mammals. Bats use the five-fingered structure to support their wing membranes for flying. Moles use the same basic design for the purpose of digging. Humans and apes use their digits for grasping. Whales and dolphins display the same pentadactyl design in their flippers for swimming. Perhaps it would be advantageous to bats to have six radials to

better support their membranes. Or it might have been more efficient for dolphins to have only three or four digits in their fins, but evolutionists postulate that they were saddled with the pentadactyl limb of their ancestors.

> The evolutionary explanation of the pentadactyl limb is simply that all the tetrapods have descended from a common ancestor that had a pentadactyl limb and, during evolution, it has turned out to be easier to evolve variations on the five-digit theme, than to recompose the limb structure. If species have descended from common ancestors, homologies make sense; but if all species originated separately, it is difficult to understand why they should share homologous similarities. Without evolution, there is nothing forcing the tetrapods all to have pentadactyl limbs.[3]

On the other hand, paleontologists take a different tack when discussing the ancestral tetrapod. The first amphibian to transition onto land from the ocean supposedly descended from a lobe-finned fish like Tiktaalik, and was thought to be something like Ichtyostega, Acanthostega, or Tulerpeton. These "early tetrapods" are hypothesized to be the ancestors of both reptiles and mammals. Even though one of the key homologies of tetrapods is supposed to be the pentadactyl limb, these "tetrapod ancestors" were not pentadactyl.[4]

- **Tiktaalik**—octadactyl (8 digits) [thought to have lived about 375 mya]
- **Acanthostega**—octadactyl (8 digits) [thought to have lived about 360 mya]
- **Ichthyostega**—heptadactyl (7 digits) [thought to have lived about 360 mya]
- **Tulerpeton**—hexadactyly (6 digits) [thought to have lived about 365 mya]

Yet evolutionary paleontologists don't seem to be particularly bothered by that. Apparently, evolution was still tinkering with the optimal number of digits, and variation abounded. As Harvard paleontologist Gould stated:

> But the greatest boost to contingency lies in the discovery that prompted this essay in the first place—seven digits in Icthyostega and eight in Acanthostega. If tetrapods had five at the beginning, and always retained five thereafter, then some predictability or inevitability could legitimately be maintained. (At the very least, no fuel would exist for an alternative proposal.) But if the first members of the lineage had six, seven, or eight toes, then alternative possibilities are legion, and an eventual five may be happenstance, not a necessity.[5]

Nonetheless, the Darwinists can't have it both ways. It (the pentadactyl condition) can't be so deeply embedded that subsequent generations are stuck with it over the vast eons, if *evolution could easily modify the numbers of digits in early tetrapods.* And it can't be a homology that points back to our common ancestor if the proposed common ancestors weren't pentadactyl!

3. ***The Nature of the Fossil Record:*** *clear historical evidence vs. too scanty to be informative*

Evolutionary biologists routinely argue that the fossil record is the best evidence of evolution. Since macroevolution is an extremely gradual process, involving beneficial changes over millions of years, the fossil record is the only place where large-scale evolution can be observed. Macroevolution (the origin of new types of organisms from previously existing, but different, ancestral types) cannot be observed in the lab or in the field, placing it on very shaky ground within the realm of empirical science. *Therefore, the fossil record plays an important part in validating historical evolution.* Textbooks on evolution prominently display various lineage trees and phylogenies that are informed by cladistic analysis of fossils (biological taxonomy based on particular traits).

On the other hand, the paleontologists have two problems. There are consistent gaps in the fossil record (missing transitional forms) and there is no clear phylogeny (line of ancestors to descendants). Evolutionary paleontologists argue incessantly over which hypothetical tree is to be preferred. Starting with Darwin, they excuse this lack of evidence for their theory by appealing to the extreme imperfection of the fossil record. Eldredge makes this point clearly.

> Stasis is a common (I would say the dominant) pattern of anatomical (non)change in the evolutionary history of species……And, of course, given a concatenation of many separate 'punctuated equilibria' events all happening more or less at the same time, Darwin, armed with his particular conception of evolution through natural selection, must have felt totally helpless in the face of such a monstrous pattern. He could blame stasis on a poor geological record, but faced with paleontologists talking up Cuvierian patterns, Darwin simply cut and ran.[6]

Fossilization, they note, is a very rare event. The gradual transition from a fish to an amphibian, for example, would require millions of mutations, the vast majority being evolutionary dead ends and unfit monsters. Where are all those fossils? We don't find them. So evolutionists insist that only between 0.005% and 0.0005% of all species are represented in our catalogued fossil archives.[7] *Thus, evolutionists have been forced to explain away the major features of the fossil record to prop up their theory.*

4. ***The Biological Role of Mutations:*** *progressive tool vs. destructive force*

The geneticists of the 20th century darwinian synthesis postulated that genetic accidents were the fundamental "stuff" of evolution. They argued that random mutations being offered up to the all-powerful force of natural selection could turn algae into philosophers. It follows that without mutations, evolution is dead in the water. Within bounds, the more mutations, the faster the evolution. *Species that enjoy a regular supply of genetic mutations for natural selection to tinker with should be the ones that enjoy the most progress*. If a more advanced human race is desirable, it stands to reason that a large population and abundant mutations are required.

Yet the medical industry has clearly demonstrated the problem of accumulating mutations in our DNA. These are the basis for cancer, deformities, and congenital defects. Healthcare professionals warn against exposure to radiation because it causes mutations. Evolutionary geneticists fear that the human genome is in error catastrophe (mutations are accumulating faster than can be dealt with, and our genetic machinery will eventually cease to function).[8]

The world of microbiology has, in recent years, elucidated layers of careful error-checking and mutation-correcting systems at the cellular level. These are essential to the maintenance of a healthy genome and a biologically sound organism. *Truly random mutations are highly destructive in a sophisticated information system.*

5. ***Defining Evolution:*** *metaphysical theory of origins vs. undeniable fact of biology*

In the broader origins debate, evolutionary

theorists and philosophers of science present evolution as a powerful explanation of origins. Before Darwin, supernatural creationism held sway amongst classical scientists. But that model of origins, leading evolutionists claim, was defeated in the scientific arena.

Therefore, evolution is presented as a real alternative to creation, eliminating the need for anything supernatural.[9] *In this respect, 'evolution' is considered to be molecules-to-man transformation.* Theodosius Dobzhansky, one of the most eminent evolutionists of the twentieth century, defined evolution this way:

> Evolution is a process which has produced life from non-life, which has brought forth man from an animal, and which may conceivably continue doing remarkable things in the future. In giving rise to man, the evolutionary process has, apparently for the first and only time in the history of the Cosmos, become conscious of itself. …Evolution comprises all the stages of the development of the universe: the cosmic, biological, and human or cultural developments. Attempts to restrict the concept of evolution to biology are gratuitous.[10]

"Population geneticists use a different definition of evolution: a change in allele frequencies among generations….The 'allele-frequency' definition of evolution has survived to become the 'standard' definition in textbooks and discussions about the nature of evolution."[11] As a result, darwinian apologists affirm that evolution is an indisputable, empirical fact that can be observed in the lab and the field. Richard Dawkins states, "Evolution is a fact. Beyond reasonable doubt, beyond serious doubt, beyond sane, informed, intelligent doubt, beyond doubt evolution is a fact."[12]

Enshrining this "fact" of evolution so that it is unassailable requires defining it in such a way that nobody can doubt that it is true. *Thus 'evolution' is defined as merely a change within a population of living organisms.* This affirms nothing more than the most basic biological reality, known from time immemorial, a settled observation long before Charles Darwin came along.

In fairness, it must be said that some evolutionists over the years have chided their peers for this contradiction. Mayr stated: "I pointed out more than a decade ago (1977) that the reductionist explanation, so widely adopted in recent decades — evolution is a change in gene frequencies in populations — is not only not explanatory, but is in fact misleading."[13] However, the equivocation continues and darwinian apologists take advantage of the confusion to lay claim to both explanatory power and undeniability for their theory.

6. ***The Concept of Fitness:*** *evident improvements that explain complex designs vs. unpredictable changes that can only be quantified after the fact*

The final incongruity in evolutionary theory that I will highlight involves the mechanism of selection. Fitness is the currency of evolution. Increased fitness is a way of making a tree of life more plausible, with the basic, single-celled creature on the bottom and the various elegant, highly specialized organisms that we observe on the upper branches. Textbooks present evolutionary fitness gains in very basic terms, like a ramp up a hill, with lower fitness at the bottom and greater fitness at the top. Each step up the ramp represents a superior design that can outcompete those that are below in the struggle for existence. *Small fitness improvements are preserved by natural selection so that a population moves inexorably upwards.* Such tiny fitness gains over great eons allegedly allow for the development of those highly specialized biological systems.

However, modern population biologists and geneticists have great difficulty evaluating an organism's fitness. The simplistic ramp concept does not fit the real-world scenarios in the lab and in the field. As environments change, what was once "fit" is no longer "fit." A population might shift to better survive in a new environmental paradigm, but that change does not equate to any general "progress" towards greater complexity, or towards a higher organism. Indeed, survival is terribly complicated because of all the factors involved (happenstance deaths, freak good fortune, constant environmental change, countless competing fitness variables, vagaries of sexual reproduction, and large-scale natural events) so that "fitness" can't be defined in advance.

Therefore, darwinian biologists have defined fitness as survival success (essentially assuming that increased survival rates imply fitness). This circular reasoning destroys the concept of fitness that is required to actually explain competitive success and progress. *An increase in fitness might be the loss of function, greater simplicity, or even the return to earlier stages of evolution*. There is no reason to expect any general trend of "improvement" or "complexity" over time.

In fact, as one moves from a naïvely unrealistic concept of a fitness ramp into a complicated, multi-dimensional, morphological fitness terrain, significant theoretical problems arise. A population might arrive at a local hill of fitness that is surrounded by valleys of lower fitness. Thereafter, evolution will stop as the population is marooned there, resisting all efforts to change, even though there might be a mountain of potential fitness just across the valley. Darwinian theorists then needed to produce mechanisms that might move a population off the local fitness peak so that it can again evolve towards higher fitness.[14]

In other words, processes that work against fitness and greater survivability in the short run are necessary for the evolution of significant increases in population fitness over the long term. What was presented as a seemingly elegant, simple concept of progress in the textbooks becomes a convoluted, inexplicable process of moving up or down in an unpredictable fashion.

Conclusion

Darwinists have been very creative in constructing endless hypotheses and numerous specialized scenarios which are designed to address particular challenges to evolutionary theory. While these tailored solutions might seem to patch over some specific problems, the various scenarios are not plausible within the broader origins model. The fact that such contradictions are allowed to persist should raise serious doubts about the validity of the entire theoretical structure.

Acknowledgments: I want to express my appreciation to Jean Lightner, Matthew Speights and Walter ReMine for helpful comments.

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Figure 1. Some of the images were adapted from Evolution_pl.png (J.C. Mann, 2005) by the author and are used under the terms of the GNU Free Documentation License.

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...continued from page 5

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Quarterly Research Matters

Summaries of Cutting-edge Research from the Creation Research Society Quarterly*

Creation research that engages the current scientific literature and builds the creation model is crucial; CRS exists to support and publish such research. Only through high-quality research can we equip others with strong, sound apologetics arguments that show the robustness of the creation model over that of evolution.

Cosmology: What Data Does the Bible Provide?

While the Bible does not provide exhaustive information about the world around us, it does make available important details which are essential to building biblically-sound scientific models. In the Spring 2017 *Creation Research Society Quarterly* (*CRSQ*) special issue on Astronomy, Jake Hebert explores various biblical passages that may be valuable in informing cosmological models.

Hebert discusses the importance of clearly understanding the "expanse" of Genesis 1:6–8, and the "waters above" it. At one time, the expanse was believed to correspond to the earth's atmosphere, with the "waters above" forming a pre-Flood vapor canopy. Attempts to model this have been disappointing, as it would result in intolerably hot conditions on the surface of the earth.

Humphreys has proposed that the "waters above" are beyond the galaxies, in outer space. This would explain why they still exist after the Flood (Psalm 148:4), but it brings up a variety of other questions, including "what is on the other side of the waters?" Hebert discusses this and a variety of other interesting ideas in a way that is intended to promote further discussion on the subject.

Hebert, J. 2017. Have creationists overlooked an abundance of biblical cosmological data? *CRSQ* 53: 286–296.

Time Dilation: Is there Biblical Evidence Supporting It?

In a separate article in the Spring 2017 *CRSQ* special issue on Astronomy, Russ Humphreys considers biblical passages that discuss the future appearance of the heavens. He reviews a number of passages indicating that heavenly bodies will become old, wear out, and fall from their positions (Isaiah 34:4; Psalm 102:25–26; Matthew 24:29; Hebrews 1:10–11; Revelation 6:13–14).

Humphreys then examines two creationist cosmologies to see how well they can account for these events that, it would seem, will occur in the relatively near future (i.e., within thousands, but not in millions of years). He explains in detail how his second time-dilation cosmology (Humphreys, 2008) can account for such a phenomenon. In contrast, the Anisotropic Synchrony Convention (ASC) cosmology, proposed by Jason Lisle, would not provide for rapid aging of celestial bodies in the not-too-distant future.

Humphreys, D.R. 2008. New time dilation helps creation cosmology. *Journal of Creation* 22(3):84–92.

Humphreys, D.R. 2017. Biblical evidence for time dilation in the cosmos. *CRSQ* 53:297–305.

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Thanks to all who have contributed!

*Summaries compiled by J. Lightner.

The Tablet Model: Does Genesis Appear to be a Compilation of Previous Historical Documents?

The need to carefully examine Scripture is not limited to developing or evaluating cosmological models. It is expedient to compare all our ideas to Scripture (Acts 17:11). In the Summer 2017 issue of the *CRSQ*, Lee Anderson does this as he evaluates the Tablet Model for the origin of the Book of Genesis.

The Tablet Model has been a popular idea among many creationists since Henry Morris voiced support for it. The model posits that Moses transcribed the historical events in Genesis from clay tablets documenting the lives of Adam, Noah, and the Patriarchs. The boundaries between sources are believed to be indicated by the Hebrew word ***tôlēdôt***, which is commonly translated "generations."

In his evaluation, which considers numerous details from the biblical text, Anderson finds the arguments for the model unconvincing, unfounded, and sometimes even detrimental. He then examines other lines of evidence that call into question some of the premises of the model. In the end, he concludes that any reliance by Moses on previously existing sources is a hypothetical suggestion, at best. Based on consistency of word usage in the text (which covers many generations of history), it certainly seems that Moses did not copy verbatim from any previously existing texts.

Anderson, L. 2017. A critical evaluation of the Table Model: Considerations on the origin of the Book of Genesis. *CRSQ* 54: 5–26.

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All by Design

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

The Language of Trees, Part 2

"The Wood Wide Web"

This clever phrase (see reference 3) aptly captures the message of this, Part 2 in our series. We have seen that many trees can emit chemicals to signal other, nearby trees to take action to protect themselves from predation by various animals, such as ethylene gas released by wounded acacia trees.

Wounded oak trees can signal nearby oaks to increase the concentration of bitter tasting, toxic tannins in their leaves to discourage insect predation. In the same way, wounded willow trees signal nearby willows to produce salicylic acid.

As one would expect from intelligently-designed organisms, signaling between trees gets even more complicated. Given the limitations of wind dispersal of aerial signals, trees use a "Plan B" by working in tandem with underground networks of fungal hyphae, miles of which exist per teaspoon of forest soil.

NOAA/Dept. of Commerce

Researchers at the University of British Columbia found that trees send out chemical as well as electrical warning signals through their root tips. These signals are picked up and carried to other trees' root tips by fungi. A single fungus can network through miles of forest, acting like a fiber-optic cable in passing messages between trees, at a rate of about 0.33 inch per minute, even between the roots of distant trees.

As is seen in every example throughout nature, biological systems exist due to complex processes that must work from their first appearance, and could not possibly develop by chance, slowly, over eons.

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