

Creation Matters

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Saharan Dust – Part 2: Red Tide off Southwestern Coast of Florida by Carl R. Froede, Jr., B.S., P.G.

*He who builds His layers in the sky,... The Lord is His name
(Amos 9:6; NKJV)*

We tend to focus on weather events relative to where we live. Rarely do we contemplate the global interaction of atmospheric conditions. However, this myopic view is changing. In Part 1 of this series, we reviewed the eastward atmospheric transport of Saharan desert dust and particulates and their impact in the production of snow in the Sierra Nevada Mountains of California (Froede, 2015). Now we examine evidence that suggests Saharan dust and aerosols contribute to the outbreak of red tides along

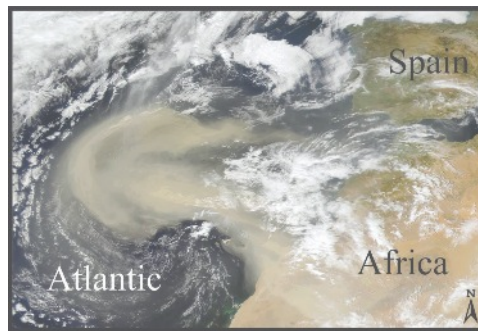


FIGURE 1. Saharan dust clouds travel thousands of miles and fertilize the water off the West Florida coast with iron, which can create algal blooms, sometimes called red tides.

Credit: NASA Scientific Visualization Studio
[<http://svs.gsfc.nasa.gov/stories/dust/>].

the West Florida coastline. What are the possible implications for a biblical worldview?

Saharan dust

Holmes (2001) reviewed the impact that dust derived from Asian deserts and the African continent has on humans. Froede (2003) documented the transport of large volumes of dust and particulates, including plant seeds/spores, insects, and small birds from the Saharan desert and related it to possible post-Flood plant/insect/animal dispersion. Rucker (2004) reported on the possible Atlantic crossing of the snowy egret (*Egretta thula*). Evidence suggests

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Common Ancestry or Uncommon Wisdom? by Terry P. Beh

Patterns and similarities abound throughout the natural universe. Electrons revolve around the nuclei of atoms much like moons orbit planets, planets orbit suns, and suns orbit galaxies. Human fingerprints, while similar, are sufficiently dissimilar to identify one individual out of the billions who inhabit the earth. Snowflakes share the same six-sided crystal structure, yet they display infinite variety, so much so that no two of the scores of billions of them formed each year are exactly the same. Are these commonalities, and countless others, the result of natural forces that made the universe by blind, random chance, or evidence of a Common Designer, Who created everything by His infinite power, knowledge, and wisdom?

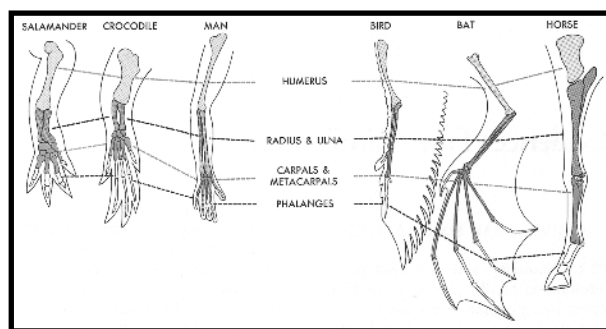


FIGURE 1. Comparison of anterior limb bones of vertebrates. Diagram from *Biology: A Search for Order in Complexity*, 1971, Creation Research Society. Used by permission.

According to the theory of evolution, all living things descended or evolved from a common ancestor, which, to the theory's proponents, explains why groups of creatures share similar traits that can be traced

back in time to the first organic cell. Thus, granting that the original living cell could evolve out of "dead" matter to begin with, all plants and animals evolved from cells arranged in an ever more complex order, in a hierarchy of structural similarities, finally arriving at man. The study of such inherited shared traits is known as "common descent" or homology and is (or has been) one of the fundamental premises of evolution (Bergman, 2001).

Ever since Darwin penned *The Origin of Species*, evolutionists have pointed to similar physical features in animals as evidence that they descended from a common ancestor. The structure of vertebrate forearm bones is a popular exam-

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Uncommon Wisdom

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ple. As Figure 1 indicates, all vertebrates from amphibians to man share a like pattern of bones in the forelimbs, including a humerus, radius, ulna, and carpals (wrist bones). Most also have five digits (fingers), though some have fewer and some, as in horses and birds, are modified and look very different.

Of course, nature is also full of examples of creatures with similarities that *could not* have come from a common ancestor, like human eyes and those of the octopus, or echolocation in bats and porpoises (Statham, 2012). To solve this dilemma, believers in evolution came up with the theory of “convergent evolution.” Also known as homoplasy, it’s the idea that such commonalities among widely different classes of living things evolved separately—that by chance these diverse groups of organisms just sort of “converged” on the same design, which evolved independently of each other.

It’s a very convenient explanation. However, does it credibly explain how, for instance, eyes could have evolved independently at least 40 separate times, including 11 distinct methods of producing images, in creatures as diverse as tiny water fleas to giant squids? The problem is multiplied when one considers that, according to evolution, the oldest eyes in the fossil record—those of trilobites, which are compound eyes like those of flies, and supposedly around



FIGURE 2. Very large compound eye (estimated 560 lenses) with “eye-shade” of the trilobite *Erbenochile erbeni*. Photo credit: Creative Commons, by Moussa Direct Ltd. Retrieved on February 17, 2015 from http://commons.wikimedia.org/wiki/File:Erbenochile_eye.JPG

530 million years old (Figure 2)—are in some ways more complex than those of “recent” man (Bergman, 2001).

Between homology and homoplasy, blind, undirected, unintelligent evolution seems to have covered all its bases. As Statham (2012) put it,

Hence, in the thinking of evolutionists, similarity with common ancestry is evidence for evolution, and similarity without common ancestry is evidence for evolution. Whatever similarity they find, then, is evidence for evolution!

Despite this “heads-I-win-tails-you-lose” reasoning that evolutionists like to employ, modern sciences such as microbi-

ology, embryology, and genetics have increasingly undermined, and essentially disproved, common ancestry/homology. For instance, studies have shown that many homologous features in different animals do not arise genetically from similar (or homologous) DNA coding, nor do they develop embryonically in the same (or homologous) way, as evolution would demand (Statham, 2012; Bergman, 2001).

Nonetheless, secular science stubbornly clings to homology as a pillar of evolutionary understanding and even as evidence against the existence of God. As one evolutionist queried (Holding, 2006; emphasis added):

Why would an infinitely powerful designer choose to repeat the same design over and over in his creations? Why, in his infinite *wisdom*, could he not use a radically different design for each of his supposedly independent creations?

Yes, of course, God could have used an infinite number of “radically different” designs for His creation if He had so chosen. But why would He? Statham (2012) has noted that this might lead people to believe there were many gods (much less an infinite number). Moreover, doing so would actually contradict God’s very nature and one of His essential attributes—wisdom.

While researching the topic of wisdom, I came across this definition (Anonymous, 2013):

Wisdom is the ability to think and act using knowledge, experience,

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understanding, common sense, and insight... It is a habit or disposition to perform the action with the highest degree of adequacy under any given circumstance. ... This involves...the willingness as well as the ability to apply perception, judgement, and action in keeping with the understanding of what is the optimal course of action...In short, wisdom is a disposition to find the truth coupled with an optimum judgement as to what actions should be taken in order to deliver the correct outcome.

Notice that in this description, which I found rather insightful, words like “optimum” seem to characterize wisdom and those who possess it. In short, wisdom—at least in a practical sense and especially in terms of building things—might be defined as the ability to obtain optimal results with the minimal use of resources, or to achieve the greatest possible effects (or good) with the least amount of effort.

Therefore, if a certain design works well for one practical purpose—say, for locomotion—it behooves a wise individual to adapt it for use in as many applications as possible. Expecting God to act otherwise as evidence of His existence would be like requiring human beings to re-create the wheel over and over again to prove how smart they are. Such an exercise would not only be a complete waste of time and energy, but would actually be the opposite of

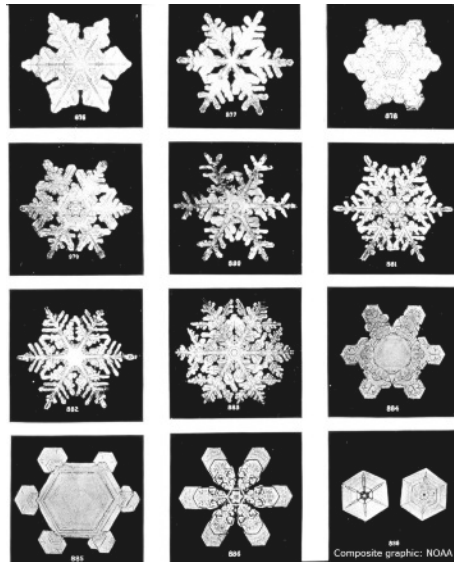


FIGURE 3. There is an endless variety of snowflakes. Photo credit NOAA.
www.noaa.gov/features/02_monitoring/images/snowflake_c_NOAA.jpg

wise; it would be stupid. In fact, it would indicate a God that was infinitely *unwise*.

Actually, the fact that God can take a basic design—like the bone structure in the forelimbs of vertebrates—and adapt it for movement in so many different creatures, from amphibians to birds to mammals to men, is proof of His amazing ability to achieve *optimum* results from minimal resources. Instead of common descent and its laughable counterpart, convergent evolu-

tion, similarity in living things is evidence of the Almighty’s uncommon wisdom and creative genius.

As the Bible tells us in Romans 1:20, we can see through the natural world that “(God’s) invisible attributes are clearly seen...even His eternal power and God-head.” Indeed, in addition to His wisdom, the similar patterns we see in nature expressed in almost endless variations, like snowflakes (Figure 3), reflect God’s very nature: a single divine Being comprised of a variety of Persons—Father, Son and Holy Spirit, co-existing in an essential unity.

References:

- Anonymous. 2013. Wisdom. *Wikipedia*, Retrieved on February 17, 2013, from <http://en.wikipedia.org/wiki/Wisdom>
- Bergman, J. 2001. Does homology provide evidence of evolutionary naturalism? *Journal of Creation* 15(1):26–33. Retrieved on November 24, 2014, from <http://creation.com/does-homology-provide-evidence-of-evolutionary-naturalism>.
- Holding, J.P. 2007. ‘Not to Be Used Again’: Homologous structures and the presumption of originality as a critical value. *Journal of Creation* 21(1):13–14. Retrieved on November 24, 2014, from <http://creation.com/not-to-be-used-again-homologous-structures-and-the-presumption-of-originality-as-a-critical-value>.
- Statham, D. 2012. Homology made simple. *Creation* 34(4):43–45. Retrieved on November 24, 2014, from <http://creation.com/homology-made-simple>.

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Math Matters
by
Don DeYoung, PhD

Imaginary Numbers

The equation $x^2 = 25$ has two solutions, $x = \pm 5$. However, how does one solve the same equation with a negative sign, $x^2 = -25$? Common sense concludes that there is no possible solution for x . After all, how could one possibly square a value for x and get a negative result? A calculator likewise gives an error message for square roots of negative numbers.

This negative square root problem was studied centuries ago and an artificial solution was suggested: $x = \pm 5i$ where $i = \sqrt{-1}$. In 1637, Rene Descartes (1596–1650) coined the term “imaginary number” for the symbol “i.” He meant it as a derogatory

term, believing that the square root of a negative number was meaningless.

Today, four centuries later, imaginary numbers are pervasive in science and technology. Combinations of real and imaginary numbers are called complex numbers, for example $10 + 5i$. Such numbers are two dimensional in nature. A typical graph has a real horizontal axis and an imaginary vertical axis.

Practical applications of complex numbers occur in electrical engineering, fluid flow, quantum theory, and elsewhere. In electronics the letter “j” often is used in place of “i” to avoid confusion with the symbol for electrical current. The description of electromagnetic waves, with complex numbers as a key mathematical component, leads to the success of cell phones and wireless Internet.

Mathematics is the overall language of creation. The entire field of mathematics was established by God to give structure and unity to His creation. To this description also can be added the terms symmetry, beauty, and elegance. Mathematics extends from real numbers to the complex, and perhaps to realms yet unexplored. As exercises, can you show that $(1 + i)(1 - i) = 2$, and $i^7 = -i$?

GM

Problem & Solution: Circulation — *Insert Miracle Here*

by Michael G. Windheuser, Ph.D.

If you want to water your grass, any number of sprinklers or branching sprinkler systems would work just fine. But let's say you wanted to water every blade of grass individually and to the same extent. That would be a problem that needed a very specialized and meticulous engineering solution.

This problem is similar to the one faced by the human body which needs to continuously provide oxygen and nutrients to and remove waste from every one of its one hundred trillion cells. We are told that the solution to this problem, a closed circulatory system under positive pressure from the heart that branches into minute vessels called capillaries, came about by unguided chance and natural selection. But this idea seems even more miraculous than the actual solution provided by the Creator which so wonderfully meets our needs.

A branching network from a single large aorta to smaller and smaller arteries, arterioles, and finally microscopic capillaries permits the surface area for gas and waste exchange to become very large while occupying a small volume. Thus, virtually every cell in the body can be reached by blood. In about 30 levels of branching, the surface area of the aorta compared to that of the capillaries increases 1000-fold, and the pressure and speed of blood flow decreases by 1000-fold.¹ This provides sufficient surface area and time for gas and waste exchange to occur efficiently. So, a branching network is the first key design element of the solution to our problem.

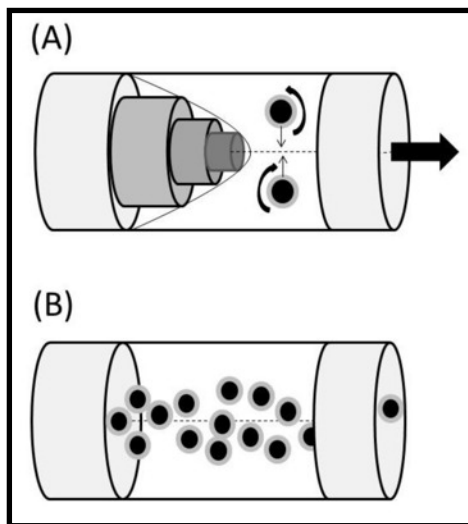


FIGURE 1. (A) Illustration of fluid dynamics. Because of friction at the inner surface of the blood vessel, blood-flow velocity is greater at the center. As a result, the individual blood cells spin. (B) Axial streaming arises as a consequence of the accumulation of blood cells at the center of the vessel.

After Denny and McFadzean, 2011, page 53 (ref. 1).

The other key element of the solution is blood. Blood is composed of 45% by volume of cells. This makes the viscosity of blood about twice that of water to begin with, accentuating the problem of flow in small vessels. But even if blood were just pure water, like our example of a sprinkler system, the turbulence caused by branching and the cumulative friction of water molecules against the large capillary surface area

would require a pump with power far beyond that of our heart. Instead, — *insert miracle here* — because blood behaves as a non-Newtonian fluid containing cells, and because of how these cells flow through small vessels, the resistance to flow in these small vessels actually goes **down** rather than up!

In small blood vessels water flows more swiftly in the center than at the edges, which causes blood cells to spin. This spin, in turn, causes blood cells to group along the centerline of the vessel, away from the friction-generating vessel wall. Called the *Magnus effect*, the result is axial streaming of blood cells which actually **reduces** blood viscosity in very small diameter vessels.¹ This is a very good thing for us, and somewhat miraculous when appreciated as both the elegant and precise solution to the problem of using blood flow in tiny vessels as the means of gas and waste exchange. This perfect physiologic solution is, in my view, yet another evidence of the Creator's magnificent engineering prowess, as well as His great love for us.

Reference

1. Denny, M and A McFadzean. 2011. *Engineering Animals – How Life Works*. The Belknap Press of Harvard University Press. Cambridge, MA.

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Spider Food

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and Design in the World of Spiders. Coach-whip Books, Landisville, PA.

Brown, F. S.R. Driver, and C. Briggs. 1906. BDB-GESENIUS Hebrew-Aramaic and English Lexicon of the Old Testament. Complete and unabridged. BibleWorks v. 7 (2007).

Eggs, B. and D. Sanders. 2013. Herbivory in spiders: the importance of pollen for orb-weavers. *PLoS One* 8(11):e82637.

Harris, R. L., G.L. Archer, and B.K. Waltke. 1980. TWOT — The Theological Wordbook of the Old Testament. BibleWorks v. 7 (2007).

Holladay, W.L. (ed). 1997. *A Concise Hebrew and Aramaic Lexicon of the Old Testament, Based upon the Lexical Work of Ludwig Koehler and Walter Baumgartner*. BibleWorks v. 7 (2007).

Lightner, J.K. 2009a. Karyotypic and allelic diversity within the canid baramin (Canidae). *Journal of Creation* 23(1):94–98.

Lightner, J.K. 2009b. Curious patterns of variation within the Anatidae monobaramin and implications for baraminological research. *Occasional Papers of the BSG* 13:5.

Lightner, J.K. 2009c. Gene duplications and nonrandom mutations in the family Cercopithecidae: Evidence for designed mechanisms driving adaptive genomic mutations. *CRSQ* 46(1):1–5.

Lightner, J.K. 2010. Gene duplication, protein evolution, and the origin of shrew venom. *Journal of Creation* 24(2):3–5.

Lightner, J.K. 2015. Matters of Fact ... Are insects alive? *Creation Matters* 20(1):4–5.

GM

Matters of Fact

by

Jean K. Lightner, DVM, MS

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 What did spiders eat prior to the Fall?

A Most likely plant-based foods

And to every beast of the earth and to every bird of the heavens and to everything that creeps on the earth, everything that has the breath of life, I have given every green plant for food. And it was so. (Genesis 1:30, ESV)

Biblical history

Some might argue that the above verse does not include invertebrates. After all, they are not birds. Some may creep along the ground, but they do not have lungs like mammals, reptiles, or birds. So perhaps spiders captured and ate insects before the Fall, much like they do today.

In the last issue (Lightner, 2015) we discussed the Bible's description of invertebrates. Many of the points apply in understanding this verse. First, the Bible does not have a separate term that refers to invertebrates in general. Instead, the creation accounts use very broad terms to describe that God created life in all realms: sea, air, and land.

The word translated "bird" in the passage above is a general term for a flying creature. Many Hebrew lexicons point out that it can be used of birds, bats, and flying insects (Brown et al., 1906; Harris et al., 1980; Holladay, 1997). In fact, flying insects are listed beside birds and bats in the unclean lists of Leviticus 11 and Deuteronomy 14.

Land dwelling invertebrates are listed with other creatures that move along the ground in Leviticus 11:42 (Lightner, 2015). Thus, both flying and terrestrial invertebrates would be included in the creatures mentioned in Genesis 1:30. This suggests that spiders were vegetarian at Creation and prior to the Fall.

What about the term "breath of life" in Genesis 1:30? The Hebrew more literally

reads as "everything that has in it *nephesh chayah*." In other places *nephesh chayah* is translated living creatures (Genesis 1:20, 21, 24; Leviticus 11:46). In our previous discussion, the case was made that this phrase must include invertebrates (Lightner, 2015).

Thus, it appears that Genesis 1:30 includes terrestrial as well as flying vertebrates and invertebrates.

Silk and webs

Today many spiders trap insects in strategically placed webs. If spiders were really initially vegetarian, why do they have this ability today?

First, it is recognized that insects are not the only things that spiders catch in their webs and eat. Pollen is also trapped on the sticky threads. This is not some accidental contaminant, either. The pollen is too large to be accidentally swallowed by the spiders. Instead, the spiders produce enzymes to digest the food outside the mouth so it can be consumed, just like they do when they consume insects. One study suggests that in young orb-weaving spiders, an average of 25% of their diet is pollen (Eggs and Sanders, 2014).

Secondly, silk has many important uses besides capturing food. Some spiders use silk when building homes. It can be used in several different ways for reproduction, including protection of the eggs. Silk is also an important means of transportation. For example, many species can release a thread of silk into the air which floats along until it sticks to something. Once it does, the spider uses it to walk across. Many smaller species of spiders can travel by ballooning, where they climb up high and raise their abdomen into the air releasing silk threads which catch the wind and carry them off to a distant location (Arment, 2008).

Changes in history

When God created life, he intended for creatures to reproduce and fill the earth (Genesis 1:22, 28; Isaiah 45:18). After the Flood, creatures reproduced and filled the earth again (Genesis 8:15–19). By comparing creatures that come from the same created kind, we find that a considerable amount of variety has arisen since the Flood.

For example, dogs are unclean animals, so only two of their kind were on the Ark. Yet today they have more variability in many of their genes than could have been present in those two ancestors (Lightner, 2009a).

Genes that seem to exhibit the most variety often are genes related to how the animal interacts with its environment. In dogs, this includes genes affecting the immune system and smell. In ducks, there is considerable variety in an enzyme that is part of the egg white (Lightner, 2009b). Changes in enzyme specificity also appear to be responsible for allowing leaf-eating monkeys to thrive on their unusual diet, and for the appearance of toxins in other creatures, such as venom found in some shrews (Lightner, 2009c; Lightner 2010).

It is important to recognize that these changes are not the onward-and-upward changes required to support the evolutionary paradigm. In fact, many of the changes are degenerative on the molecular level, meaning they "break" something in the already complex system. Other times, it may be just an adjustment that helps the animal do better in its environment. These changes are certainly not just random accidents, but evidence of amazing design that enables God's creatures to reproduce and fill the earth!

There is considerable variety in spider silk seen in our world today (Arment, 2008). Given the observations in other animals, it is reasonable to suggest that much of the amazing variety in spider silk may have originated after creation. The originally-created spiders would have had the ability to produce silk, and the underlying genetics would have been complex enough to allow for adaptive changes.

In a similar way, spiders and other animals were designed such that, after the Fall, they were allowed to adapt to eating meat. Thus, God created the world very good, but some of the adaptive changes that have occurred since creation are clear evidence that our world is fallen.

References

Arment, C. 2008. *Eight-Legged Marvels: Beauty*

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Saharan Dust, Part 2

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that more than dust has traveled westward across the Atlantic Ocean from the African continent.

As atmospheric precipitants, dust and other aerosols can affect our biosphere in ways that were previously not recognized. Research suggests that Saharan desert dust and particulates may produce seasonal red tides along the coastline of the southwest Florida peninsula (Figure 1).

Dust and aerosol precipitation across the southwestern Florida coastline

Atmospheric modeling. A recent study by Lenes et al. (2012) used an atmospheric model to test the relationship between African dust and the outbreak of red tides along the west coast of the Florida peninsula. Atmospheric models are some of the most complex in the sciences and their predictability and results can vary (see below “Cautions regarding computer modeling”). For this effort, scientists integrated computer models with known weather patterns and actual dust particulate data collected over many years from several areas in the panhandle and West Florida peninsula.

Through extensive air sampling, Prospero (1999a) identified Saharan dust deposits over Florida and the eastern Gulf of Mexico. Over the course of his multi-year study, he was able to link atmospheric deposition of the African dust to the late spring position of the Bermuda High (Prospero, 1999b). On average, the greatest period of dust deposition across south Florida occurs with summer rainfall between June and August, with an estimated 80% or more of the particulates removed from the atmosphere (Prospero et al., 1987). More recent work confirms the link between seasonal wet weather and the removal of African dust from the atmosphere (Prospero et al., 2010). Does the deposition of dust and aerosols derived from the Saharan desert have any impact on the land or in the Gulf of Mexico?

Biological Impact. For many years, marine scientists have known of the relationship between nutrients and life—essentially that life in the oceans can be stimulated through the addition of specific minerals. Iron is believed to be an important element in the proliferation of microscopic life within the surface water of the euphotic zone (0 to 600 feet). The addition of iron to the environment was tested in the laboratory, measured

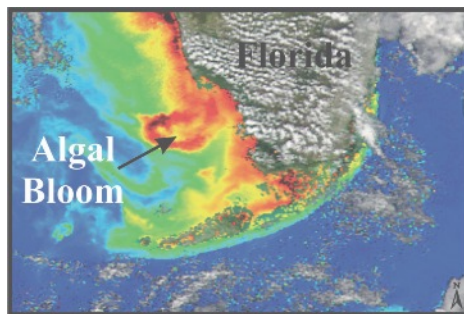


Figure 2. The red tide is clearly visible as the oval-shaped red area to the west of the shore in this November 21 image from the Sea-viewing Wide Field-of-view Sensor (SeaWiFS) flying on the OrbView-2 satellite. Credit: SeaWiFS images courtesy the SeaWiFS Project, NASA/Goddard Space Flight Center, and OR-BIMAGE. MODIS fluorescence image courtesy the Institute for Marine Remote Sensing (IMaRS), College of Marine Science of University of South Florida.

from an area where it was added to the open equatorial Pacific Ocean, and remotely measured from a naturally enriched area west of the Galapagos Islands. When iron was added to oligotrophic seawater containing low-levels of planktonic life it created blooms of these life-forms (Martin, 1990; Martin et al., 1991; Martin et al., 1994). While subsequent studies have not produced the same level of results, the correlation between the addition of iron to seawater and corresponding blooms has been corroborated (Wells et al., 1995).

Large volumes of iron-rich dust are deposited annually into the oceans (Duce et al., 1991; Prospero et al., 1996). These particles can provide a significant source of bioavailable iron to planktonic life (Jickells and Spokes, 2001). African dust deposition has been linked to periodic blooms of the pelagic marine cyanobacterium *Trichodesmium* off the west coast of Florida (Lenes et al., 2001; Walsh and Steidinger, 2001). Can an atmospheric computer model aid in understanding the interaction between these data?

Modeling Results. The atmospheric modeling of Saharan-derived dust over the south Florida peninsula conducted by Lenes et al. (2012) reached the following conclusions [brackets mine]:

1. Generally, the highest percent of deposition [of Saharan dust and particulates was] observed during the summer months (June–August) as a consequence of both maximal dust delivery from Afri-

ca and the highest precipitation rates (p. 7).

2. The model results demonstrated the spatial and temporal dependence upon both aeolian dust and precipitation. Wet deposition estimates were 4–13 times greater than dry deposition, with a majority of dust/iron input occurring in the summer between Tampa Bay and Charlotte Harbor (p. 8).
3. Given the high Fe-demand needed to carry out biological nitrogen fixation, the late June fertilization event further alleviated Fe-limitation of the N-fixing cyanophyte, *Trichodesmium erythraeum*, leading to a significant increase in biomass (10×) and the subsequent release of “new” nitrogen to the water column as dissolved organic nitrogen. This pattern is consistent with annual summer blooms of *Trichodesmium* on the WFS [West Florida shelf] (p. 7).

It should be noted that the cyanobacterium *Trichodesmium spp.* is not the cause of red tide outbreaks along the coast of southwest Florida. Rather, it is likely the first step in a cascade of chemical processes initiated by the addition of newly-dissolved

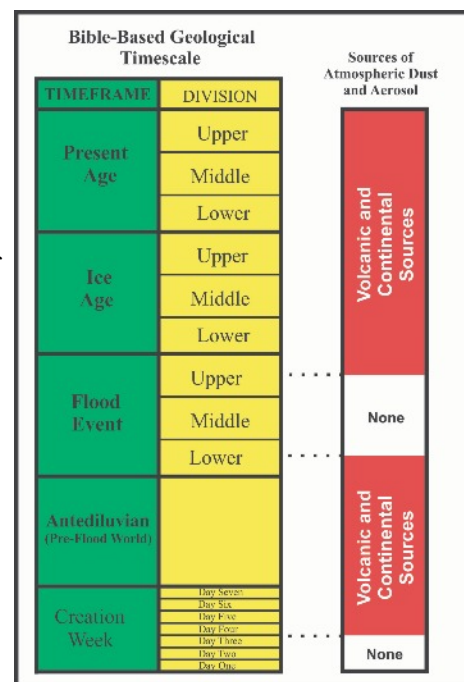


FIGURE 3. A biblical geologic timescale showing possible periods of atmospheric-transported dust and aerosols. The deposition of these particles could have stimulated plankton blooms, possibly before, during, and following the Flood. Further study is required.

organic nitrogen, which is converted to urea and ammonium and stimulates growth of *Gymnodinium breve*, the dinoflagellate responsible for red tides along the West Florida coast (Lenes et al., 2001) (Figure 2).

Implications for biblical history

The global Flood of Genesis was a unique event in Earth history. The uniformitarian mantra, “The Present is Key to the Past” has limited use in defining biblical history. We can only speculate on the events associated with the Creation and Flood in an attempt to collect data to support our ideas. However, we can occasionally gain an understanding of past processes from those operating in the present. The annual atmospheric transport of Saharan dust westward across the Atlantic continues as it likely has from the close of the Flood Event Timeframe to the Present Timeframe (Figure 3). Evidence can be found in the thin red misidentified “soil” layers throughout the Bahamas and Florida Keys. (It has also been identified in soils in the Amazon River Basin.) On land, these Saharan dust deposits have contributed iron and possibly other nutrients to plant growth.

African dust is also deposited through atmospheric precipitation to seawater. Science has confirmed that it can stimulate the growth of cyanobacteria, changing marine chemistry, and possibly promote the onset of red tides capable of killing marine life. Fortunately, these events are of short duration and cover a limited area. The study of Saharan dust as it relates to the production of *Trichodesmium spp.*, and possibly the dinoflagellate *Gymnodinium breve*, occurs in the present. The possible impact of prehistoric red tides to the West Florida coastline from a historical Bible-based perspective is a matter of conjecture. But it remains an interesting area for further investigation. Are large concentrations of dinoflagellates preserved in sedimentary layers on the Florida continental shelf, that might be indicative of past red tide events? Only further study can answer this question.

Cautions regarding computer modeling

Great care must be exercised in the development and use of computer models. The quality of the model is only as good as the data used in its construction. Providing a sense of scientific objectivity, a computer model can be perceived to carry more significance than the data actually allow (Oreskes et al., 1994; Bredehoeft, 2005). To prove effective, the model should produce

results consistent with new data that were derived over extended periods of time. As new data are discovered, the model must be revised accordingly.

Atmospheric computer models are some of the most complex tools in science. We interact with daily weather forecasts that extend from the present into the future. Even with the best available data, the weather may not prove to be accurate beyond a single day. However, some atmospheric patterns are predictable enough to allow for a general understanding of expected seasonal conditions. Such is the case with the study by Lenés et al. (2012).

Acknowledgments

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References

CRSQ: *Creation Research Society Quarterly*

Bredehoeft, J. 2005. The conceptualization model problem—surprise. *Hydrogeology Journal* 13:37–46.

Duce, R.A., P.S. Liss, J.T. Merrill, E.L. Atlas, P. Buat-Menard, B.B. Hicks, J.M. Miller, J.M. Prospero, R. Arimoto, T.M. Church, W. Ellis, J.N. Galloway, L. Hansen, T.D. Jickells, A.H. Knap, K.H. Reinhardt, B. Schneider, A. Soudine, J.J. Tokos, S. Tsunogai, R. Wollast, and M. Zhou. 1991. The atmospheric input of trace species to the ocean. *Global Biogeochemical Cycles* 5:193–259.

Froede, C.R., Jr. 2003. Dust storms from the sub-Saharan African continent: Implications for plant and insect dispersion in the post-Flood world. *CRSQ* 39:237–244.

Froede, C.R., Jr. 2015. Saharan Dust — Part 1: Circumnavigation of Earth and deposition as snow in California. *Creation Matters* 20(1):1.

Holmes, H. 2001. *The Secret Life of Dust: From the Cosmos to the Kitchen Counter, the Big Consequences of Little Things*. Wiley, New York, NY.

Jickells, T.D., and L.J. Spokes. 2001. Atmospheric iron inputs to the oceans. In: Turner, D.R., and K. Hunter, (editors), *The Biogeochemistry of Iron in Seawater*, pp. 85–121, Wiley, Chichester, UK.

Lenés, J.M., J.M. Prospero, W.M. Landing, J.I. Virmani, and J.J. Walsh. 2012. A model of Saharan dust deposition to the eastern Gulf of Mexico. *Marine Chemistry* 134/135:1–9.

Lenés, J.M., B.P. Darrow, C. Catrall, C.A. Heil, M. Callahan, G.A. Vargo, R.H. Byrne, J.M. Prospero, D.E. Bates, K.A. Fanning, and J.J. Walsh. 2001. Iron fertilization and the *Trichodesmium* response on the West Florida shelf. *Limnology and Oceanography* 46(6):1261–1277.

Martin, J.H., 1990. Glacial-Interglacial CO₂ change: The iron hypothesis. *Paleoceanography* 5:1–13.

Martin, J.H., R.M. Gordon, and S.E. Fitzwater. 1991. The case for iron. *Limnology and Oceanography* 36(8):1793–1802.

Martin, J.H., K.H. Coale, K.S. Johnson, S.E. Fitzwater, R.M. Gordon, S.J. Tanner, C.N. Hunter, V.A. Elrod, J.L. Nowicki, T.L. Coley, R.T. Barber, S. Lindley, A.J. Watson, K. Van Scoy, C.S. Law, M.I. Liddicoat, R. Ling, T. Stanton, J. Stockel, C. Collins, A. Anderson, R. Bidigare, M. Ondrusek, M. Latasa, F.J. Millero, K. Lee, W. Yao, J.Z. Zhang, G. Friederich, C. Sakamoto, F. Chavez, K. Buck, Z. Kolber, R. Greene, P. Falkowski, S.W. Chisholm, F. Hoge, R. Swift, J. Yungel, S. Turner, P. Nightingale, A. Hattton, P. Liss, and N.W. Tindale. 1994. Testing the iron hypothesis in ecosystems of the equatorial Pacific Ocean. *Nature* 371: 123–129.

Oreskes, N., K. Shrader-Frechette, K. Belitz. 1994. Verification, validation, and confirmation of numerical models in the Earth Sciences. *Science* 263:641–646.

Prospero, J.M. 1999a. Long-term measurement of the transport of African mineral dust to the southeastern United States: implications for regional air quality. *Journal of Geophysical Research* 104:15,917–15,927.

Prospero, J.M. 1999b. Long-range transport of mineral dust in the global atmosphere: Impact of African dust on the environment of the southeastern United States. *Proceedings of the National Academy of Science* 96(7):3396–3403.

Prospero, J.M., R.T. Nees, and M. Uematsu. 1987. Deposition rate of particulate and dissolved aluminum derived from Saharan dust in precipitation at Miami, Florida. *Journal of Geophysical Research* 92:14,723–14,731.

Prospero, J.M., W.M. Landing, and M. Schulz. 2010. African dust deposition to Florida: Temporal and spatial variability and comparison to models. *Journal of Geophysical Research* 115, D13304. doi:10.1029/2009JD012773.

Prospero, J.M., K. Barrett, T. Church, F. Dentener, R.A. Duce, J.N. Galloway, H. Levy Jr., J. Moody, and P. Quinn. 1996. Atmospheric deposition of nutrients to the North Atlantic Basin. *Biogeochemistry* 35(1):27–73.

Rucker, B.R. 2004. Stormy arrival for African cattle egret in the New World. *CRSQ* 40:220.

Walsh, J.J., and K.A. Steidinger. 2001. Saharan dust and Florida red tides: The cyanophyte connection. *Journal of Geophysical Research/Oceans* 106:11,597–11,612.

Wells, M.L., N.M. Price, K.W. Bruland. 1995. Iron chemistry in seawater and its relationship to phytoplankton: A workshop report. *Marine Chemistry* 48:157–182.

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...without excuse!

by Timothy R. Stout

THE TESTIMONY OF GOD'S UNLIMITED UNDERSTANDING

*There is no wisdom or
understanding or
counsel against the LORD*
(Proverbs 21:30, NKJ)

Evolutionists would do well to heed this warning. On February 4, 2014, there was a widely-publicized debate between Ken Ham, a Bible-believing creationist, and Bill Nye, an evolutionist who rejects creation by the living God. The debate is available on video (1) and by transcript (2).

Several times in the debate, Mr. Nye asked Mr. Ham a question, "What predictions can be made using the biblical model?" Although this is not what Mr. Nye meant by the question, I submit that because of the above verse, there is a very good prediction we can make, viz., "Any and all arguments evolutionists dream up against the biblical model, and that might seem strong initially, will in time be shown to be false."

This prediction is further confirmed in Isaiah,

"Present your case," says the LORD, "Bring forth your strong reasons," says the King of Jacob. "Let them bring forth and show us what will happen; let them show the former things, what they were, that we may consider them, and know the latter end of them; or declare to us things to come....Indeed you are nothing and your work is nothing; he who chooses you is an abomination" (Isaiah 41:21–24; NKJ)

Let all the nations be gathered together, and let the people be assembled. Who among them can declare this and show us former things? Let them bring out their witnesses, that they may be justified; or let them hear and say, "It is truth." (Isaiah 43:9, NKJ)

These passages acknowledge that those opposing God might claim strong reasons for their rejection. However, God declares that these reasons will not stand up. They are nothing. So are those who present them. And, those who choose to follow them are

an abomination. In other words, "There is no counsel against the Lord."

Thus, man in his own wisdom is incapable of deriving truth about the former things, including the creation of the Heavens, of the Earth, and of living organisms. Evolutionary theory is ultimately doomed to failure from its beginning. Instead, we are dependent on God to reveal the former things to us. God has specifically designed the creation so that a person will not be able to explain, truthfully and accurately, origins,

the life that is in it. He deliberately made them in such a way that they reveal Him and His basic attributes (Romans 1:20). He declares that there is no excuse for the person who refuses to say of His testimony, "It is true."

We as creationists have the privilege of presenting the strong reasons of God to a world which desperately needs to know and understand them. Let us present them aggressively, faithfully, and without compromise.

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apart from the testimony He has given us in Scripture. It is important that we grasp the significance of this and not waver when challenging those who challenge God.

In Isaiah 43, above, God extends His challenge to all nations, not just the Jews. He mocks those who reject Him and His testimony, commanding them to bring out their witnesses for the *former things*. Ultimately, God declares that these people need to hear and pay attention to what God has revealed and then say of His Word, "It is truth."

What are some of these former supposed strong arguments for evolution? It is not the purpose of this short article to delineate these. With only a little effort one could accumulate a substantial list by perusing the pages of the Creation Research Society's *CRS Quarterly* and *Creation Matters*. Books like *Icons of Evolution* (3) and *Refuting Evolution* (4) document the demise of many of the former evidences of evolution.

In Psalm 147:5 (NIV), the Bible declares the glory of God: "Great is our Lord and mighty in power; His understanding has no limit." One way in which our Lord reveals His unlimited understanding is the manner in which He made the universe and

References

1. Nye, B. and K. Ham. 2014. *Bill Nye Debates Ken Ham*. Answers in Genesis, February 4, 2014.
www.youtube.com/watch?v=z6kgvhG3AkI
2. Browning, B. (ed.). 2014. *Transcript of Ken Ham vs Bill Nye Debate*. Rocky Mountain Creation Fellowship.
www.youngearth.org/index.php/archives/rmcf-articles/item/21-transcript-of-ken-ham-vs-bill-nye-debate
3. Wells, J. 2000. *Icons of Evolution—Science or Myth: Why Much of What We Teach about Evolution Is Wrong*. Regnery Publishing, Inc., Washington, DC.
4. Sarfati, J. 2007. *Refuting Evolution*. Creation Ministries International, Powder Springs, AR.

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Speaking of Science

Editor's note: Unless otherwise noted, S.O.S. (Speaking of Science) items in this issue are kindly provided by David Coppedge, editor of "Creation-Evolution Headlines" at <http://crev.info>. Opinions expressed herein are his. Unless otherwise noted, emphasis is added in all quotes.

Backward Wiring of Eye Retina Confirmed as Optimal

You can't get any better performance out of an eyeball than the way it's designed, backward wiring and all.

The "mystery of reverse-wired eyeball" is solved, according to a press release from the American Physical Society.¹ Erez Ribak, of Technion — Israel Institute of Technology, believes that, for the first time, his research team has discovered why the photoreceptors are positioned behind a tangle of neurons.

Previous experiments with mice had suggested that **Müller glia cells**, a type of **metabolic cell** that crosses the retina, play an **essential role in guiding and focusing light** scattered throughout the retina. To test this, Ribak and his colleagues ran **computer simulations** and **in-vitro experiments** in a mouse model to determine **whether colors would be concentrated in these metabolic cells**. They then used confocal microscopy to produce three-dimensional views of the retinal tissue, and **found that the cells were indeed concentrating light into the photoreceptors**.

"The retina is **not just the simple detector and neural image processor, as believed until today**," Ribak added. "**Its optical structure is optimized for our vision purposes**." The discovery of Müller cells acting as light concentrators and waveguides dates back to May 2007.²

The counter-intuitive "backward" wiring has long been used by evolutionists as evidence for bad design, the argument being that a Creator would never design an eye this way. It must have evolved, they claim, because natural selection is a "tinkerer" that cobbles together parts just to get something that works.

Surprisingly, this same article that found optimal structure in the retina also attributed it to evolution. The press release begins,

From a practical standpoint, the wiring of the human eye — **a product of our evolutionary baggage** — **doesn't make a lot of sense**. In vertebrates, photoreceptors are located behind the neurons in the back of the eye — resulting in **light scattering** by the nervous fibers and **blurring** of our vision. Recently, researchers at the Technion — Israel Institute of Technology have confirmed **the biological purpose for this seemingly counterintuitive setup**.

It's not clear if those are Ribak's views or if the appeal to evolution was invented by the press release author.

Perhaps the best proof that retinas are well-designed is shown by attempts to mimic them. *PhysOrg*³ tells about attempts at one institution to create "**image sensors that behave like biological retinas**." The interviewee says, "Our sensor, on the other hand, is based on the 'Dynamic vision sensor' (DVS) principle, which is itself **inspired by the way biological retinas work**." It's very hard to imitate, though. "**Well naturally real biological retinas are more complex**, with many different types of pixels (**cells**)

which are also communicating with their neighbours," he explains. "**Such properties would be very complicated or impossible to develop with standard CMOS technology**."

How, then, could a blind process of evolution come up with an image sensor vastly superior to what our top-notch engineers are capable of designing with purpose and planning?

1. American Physical Society (2015, February 27). Mystery of the reverse-wired eyeball solved. Retrieved March 10, 2015, from http://www.eurekalert.org/pub_releases/2015-02/aps-mot022715.php
2. Franze, K., J. Grosche, S.N. Skatchkov, S. Schinkinger, C. Foja, D. Schild, O. Uckermann, K. Travis, A. Reichenbach, and J. Guck. 2007. Muller cells are living optical fibers in the vertebrate retina. *PNAS* 104(20): 8287–8292.
3. CORDIS (2015, February 18). Image sensors that behave like biological retinas. Retrieved March 10, 2015, from <http://phys.org/news/2015-02-image-sensors-biological-retinas.html>

Crinoid Pigment: 240 Million Years and No Evolution?

Pigments from crinoids fossilized in early Mesozoic strata are identical to modern counterparts.

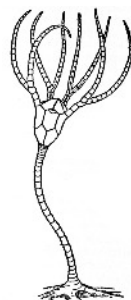
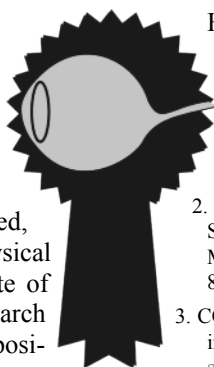
In 2013 there were reports of fossilized crinoids from Paleozoic strata (Mississippian, 350 million years) with preserved pigments produced by the organisms. That finding was since cast into doubt, but Klaus Wolkstein of the University of Göttingen has something almost as good: unambiguous pigments from Mesozoic crinoid fossils (Triassic, 240 million years up to Jurassic, ~150 my) from multiple locations around the world (Europe, Africa, and the Middle East) that are virtually identical to modern examples.

The pigments he studied are "secondary metabolites" made by cellular machines in the organism. Secondary metabolites "**usually are not preserved**," he says. These complex organic molecules with 9 or 10 carbon rings sometimes have bromine atoms attached in living examples; the bromines are not found in the fossil examples, probably due to diagenesis (chemical changes between deposition and fossilization) and the fact that chemical bonds of bromine to carbon are not as stable as carbon-carbon bonds.

In his paper in *PNAS*¹, Wolkstein leaves no doubt that he is an evolutionist; he claims the pigments evolved by natural selection. "**Structural conservatism** in natural products **over geological time** indicates that the **compounds had functions that were important** for the organisms that produced them," he says.

Still, he couldn't help but be surprised at the "exceptional preservation" of these molecules. He used the words "persistent" and "widespread" often in the paper. Here are some other surprising aspects of the story:

1. **Multiple proofs**: "However, most interesting are **chemical proofs** of these pigments in **Jurassic** representatives of **two orders that still exist today** ... **allowing direct comparison of ancient and modern** crinoid pigments **within the same clade**."
2. **Oxygen surprise**: "It is **striking** that fossil crinoids with preserved hypericinoid pigments **generally are found**



associated with hardgrounds, oolitic limestones, or reefal carbonates ..., which were deposited in well-oxygenated environments where exceptional preservation of organic substances usually would be least expected.

3. **Sandstone surprise:** “In the case of the Tendaguru locality, which is mainly known for the discovery of dinosaur remains, the pigments are preserved even in fossils from a sandstone-dominated coastal lithofacies. The embedding sediments are predominantly light colored and show low contents of organic matter.” However, pigments were not found in bituminous sediments, like shale, even though one famous lower-Jurassic site in southern Germany, the Posidonia Shale, contains “well-preserved isocrinids and fossils with organic tissue material.”
4. **Rapid burial:** “It is also striking that the pigments generally are preserved in articulated crinoid remains, suggesting rapid burial of the animals, and in more massive structures such as the roots of millerocrinids.” Crinoids are delicate and usually fall apart (disarticulate) easily after death.
5. **Global distribution, longevity, and diversity:** “...the spatial distribution of hypericrinoid pigments among fossil crinoids is almost worldwide, the stratigraphic distribution ranges at least back to the Middle Triassic, and the taxonomic distribution comprises representatives from at least four (Encrinida, Isocrinida, Comatulida, and Millericrinida) of the eight post-Paleozoic crinoid orders.” The qualifier “at least” implies more might be found.
6. **Remarkable stasis:** “Almost the same pigments were found in all samples independent of occurrence, stratigraphy, or taxon of the crinoids... Despite minor diagenetic changes ... the pigments preserved in the fossil crinoids show astonishing similarities to those of their extant relatives.”

The paper includes photos of some of the fossils that are so detailed, they look as if living crinoids were spray-painted with acrylic. The original pigment colors are clearly evident. Wolkenstein doesn’t rule out the possibility older examples will be found; “the occurrence of hypericrinoids and related pigments in Paleozoic crinoids cannot be excluded,” he says.

Still, finding intact molecules from delicate creatures said to be 240 million years old is remarkable, to say nothing of the fact that they have escaped evolutionary change in all that time.

1. Wolkenstein, K. 2015. Persistent and widespread occurrence of bioactive quinone pigments during post-Paleozoic crinoid diversification. *PNAS* 112(9): 2794–2799.

“Natural Evil” May Be Broken Good

Things in nature we consider nasty are sometimes good systems that have broken.

Allergic shock: Our immune systems can sometimes turn on us and trigger a violent reaction like asthma or allergic shock. The culprit is a powerful antibody called IgE that is usually present in small quantities—100,000 times less than similar antibodies in the immunoglobulin family. *ScienceDaily*¹ describes how IgE is regulated under

normal conditions:

During evolution, our bodies have thus developed several self-restriction mechanisms around one of their most powerful immune “weapons,” IgE. Because a cell carrying IgE can no longer move, it can only survive for a brief period — just long enough to play a short-lived protective role against parasites, toxins and poisons. It then self-destructs by committing a sort of “hara-kiri” which strongly reduces IgE production and hence the triggering of allergies.

When this tightly-regulated defense weapon proliferates due to the breakdown of regulatory mechanisms, the condition “can trigger extremely violent allergic reactions.”

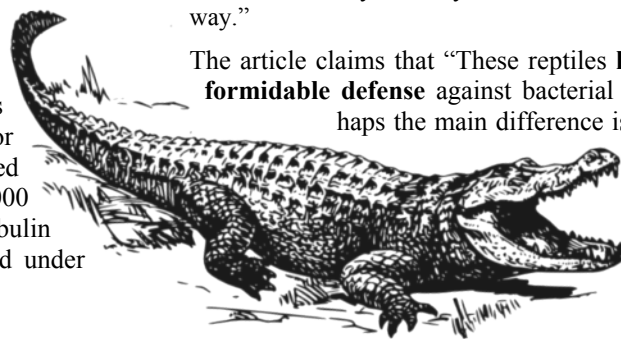
Friendly fire: The gut has a large population of mercenaries (gut bacteria) that aid in digestion. Certain types are normally beneficial—but when they multiply out of control, they become “too much of a good thing,” *PhysOrg*² says. Most insects have Wolbachia in their digestive tracts. Normally, these microbes form a cooperative partnership, but “a single genomic change can turn beneficial bacteria into pathogenic bacteria, by boosting bacterial density inside the host.” How many human pathogens started out that way?

Derailed development: Birth defects are a tragic experience for many parents. Development from embryo to adult is a carefully-orchestrated process, but sometimes things can go wrong. *ScienceDaily*³ discusses how cells communicate when forming into tissues. They send signal molecules, such as Wnt, through protrusions in the membrane called filipodia. A researcher at the Karlsruhe Institute of Technology describes what can happen when these communication pathways are disrupted: “Distribution of these signal molecules has to be controlled precisely,” Dr. Steffen Scholpp, head of a research group of the KIT Institute of Toxicology and Genetics (ITG), explains. “Smallest changes of the concentration or the transport direction may cause severe damage, such as massive malformations during embryonal development or formation of cancer.”

Alligator defense: The possibilities for avoiding infection in filthy environments can be appreciated by studying alligators. “Alligators live in bacteria-filled environments and dine on carrion,” *ScienceDaily*⁴ says, “Yet this ancient reptile rarely falls ill.” Researchers at George Mason University want to find out why. They know that alligators produce antibacterial peptides that respond before the immune system can generate antibodies. Humans generate these, too; it’s part of “your generalized immune response to the world.” Monique van Hoek wants to see if we can develop treatments by understanding the alligator’s heightened protection from bacteria:

“The reason why we’re so interested in them: they are part of nature’s way of dealing with the onslaught of bacteria and viruses that we face every day. Every breath that you take, everything that you eat, you’re constantly exposed to bacteria and your body needs to fend them off in some way.”

The article claims that “These reptiles have evolved with a formidable defense against bacterial infections,” but perhaps the main difference is in the activity level of innate systems that serve all animals, depending on their environment.



Friendly fungi: Think of fungus and you may picture moldy bread. Actually, a friendly fungus can help barley plants grow stronger with better yield. *PhysOrg*⁵ reports on good prospects for improving harvests of barley, the fourth leading cereal crop:

Botanists from Trinity College Dublin have made a **break-through discovery** that could save barley farmers sleepless nights and millions of Euro each year: **naturally occurring plant-friendly fungi** prevent crop-ravishing diseases from spreading, and also **aid plant survival** in testing environmental conditions.

Importantly, **these amazing little organisms** cause **no harm to the plant roots** in which they take up their abode. However, their **gift of immunity** against common seed diseases greatly **reduces the need for farmers to spray environmentally damaging chemicals**, which can affect ecosystems in a plethora of negative ways.

Cancer tipping point: One single DNA base mutation can cause chaos leading to cancer, *Medical Xpress*⁶ reports. This “cancer-specific mutation... has **an unexpectedly deep and broad impact** on the phenotypic properties of the cell.” Another article on *Medical Xpress*⁷ links melanoma metastasis to a breakdown in RNA editing of a certain enzyme.

1. CNRS (2015, February 13). Immune cells commit suicide to prevent allergy. *ScienceDaily*. Retrieved March 11, 2015, from <http://www.sciencedaily.com/releases/2015/02/150213081519.htm>
2. Instituto Gulbenkian de Ciencia (2015, February 10). Too much of a good thing: Extra genes make bacteria lethal. *PhysOrg*. Retrieved March 11, 2015, from <http://phys.org/news/2015-02-good-extra-genes-bacteria-lethal.html>
3. Karlsruhe Institute of Technology (2015, January 14). How cells communicate. *ScienceDaily*. Retrieved March 11, 2015, from <http://www.sciencedaily.com/releases/2015/01/150114072703.htm>
4. George Mason University (2015, February 11). Alligator blood contains naturally strong germ fighters. *ScienceDaily*. Retrieved March 11, 2015, from <http://www.sciencedaily.com/releases/2015/02/150211184703.htm>
5. Trinity College Dublin (2015, February 9). Friendly fungi: How they could help barley growers feed the world without chemicals. *PhysOrg*. Retrieved March 11, 2015, from <http://phys.org/news/2015-02-friendly-fungi-barley-growers-world.html>
6. Danbrot, S.M. (2015, February 10). Of cancer and chaos: Single base mutation induces cancer-like gene profile and major unexpected impact on phenotype. *Medical Xpress*. Retrieved March 11, 2015 from <http://medicalxpress.com/news/2015-02-cancer-chaos-base-mutation-cancer-like.html>
7. Nature Cell Biology (2015, February 16). Lack of RNA ‘editing’ leads to melanoma growth and metastasis. *Medical Xpress*. Retrieved March 11, 2015, from <http://medicalxpress.com/news/2015-02-lack-rna-melanoma-growth-metastasis.html>

Adult Brain Can Build New Neurons

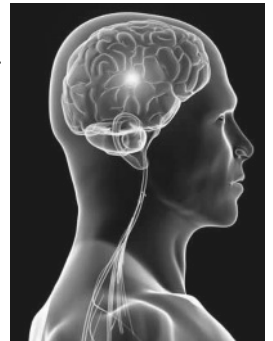
A dogma-challenging find raises a question: does the environment create the mind?

A team of Princeton neuroscientists seems intent on finding a naturalistic explanation for a surprising discovery about the brain: “Newborn neurons in the adult brain may help us adapt to the environment.” *Medical Xpress*¹ explains the problem:

The **discovery** that the **human brain continues to produce new neurons** in adulthood **challenged a major dogma in the field of neuroscience**, but the **role** of these neurons in behavior and cognition is **still not clear**. In a review article

published by Cell Press February 21st in *Trends in Cognitive Sciences*, Maya Opendak and Elizabeth Gould of Princeton University synthesize the vast literature on this topic, reviewing **environmental factors** that influence the birth of new neurons in the adult hippocampus, a region of the brain that plays an important role in memory and learning.

The authors discuss how the **birth of such neurons may help animals and humans adapt to their current environment and circumstances in a complex and changing world**. They advocate for testing these ideas **using naturalistic designs**, such as allowing laboratory rodents to live in more natural social burrow settings and observing how circumstances such as social status influence the rate at which new neurons are born.



So was there a clear evolutionary link to this discovery?

Gould and her collaborators recently **proposed** that **stress-induced decreases in new neuron formation** might **improve the chances of survival by increasing anxiety and inhibiting exploration**, thereby prioritizing safety and avoidant behavior at the expense of performing optimally on cognitive tasks. **On the other hand, reward-induced increases in new neuron number** may reduce anxiety and facilitate exploration and learning, **leading to greater reproductive success**.

The problem with this explanation is that it explains opposite outcomes. Fewer neurons inhibit exploration and improve survival. More neurons encourage exploration and improve survival. This flaw in the theory seems to have gone unnoticed by Gould and the team. Here’s what they say they know at this point:

Because many studies that investigate adult neurogenesis use **controlled laboratory conditions**, the **relevance** of the findings **to real-world circumstances remains unclear**.

1. Cell Press (2015, February 21). Newborn neurons in the adult brain may help us adapt to the environment. *Medical Xpress*. Retrieved March 11, 2015, from <http://medicalxpress.com/news/2015-02-newborn-neurons-adult-brain-environment.html>

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All by Design

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

Extraordinary Eyes

Evolution teaches that living creatures and their unique physical properties developed, by chance, over immense periods of time. Hmmm... let's ask the mantis shrimp about this! In the last issue we marveled at the powerful striking force of the shrimp's forelimbs. Let's take a look at this creature's unique vision.

Each of the mantis shrimp's two eyes sits upon an independently rotating stalk. Theirs are compound eyes, with thousands of separate visual units, each of which detects light independently. Three areas in the center of the eye are specialized for color and ultraviolet (UV) light detection. Most animals that see in "regular" colors (red through violet) do so because their brains make comparisons of the outputs of red, green, and blue photoreceptors (light-detecting cells) in their retinas. Some animals (birds, reptiles, even some fish and insects) have a fourth type of photoreceptor that also detects UV light.

Mantis shrimp have up to *sixteen* types of photoreceptors, most used for covering the visible light spectrum you and I can see. Six types of photoreceptors are each tuned to

different wavelengths of UV light. Two types of light-sensitive proteins called opsins help form visual pigments that react to different wavelengths of light.

Light entering the visual units of the eye first passes through a crystalline cone before striking the photoreceptors. Protein building blocks called mycosporine-like amino acids (MAAs) within the cones block slightly different wavelengths of UV light. Various arrangements of MAAs and the two opsins form the six separate classes of UV photoreceptors. Interestingly, MAAs are not even produced by the mantis shrimp, but rather are somehow acquired from their environment. Two of the MAAs in mantis shrimp have never been seen anywhere else before, so the mantis shrimp must be able to modify them for their unique purposes.

Mantis shrimp are extremely intelligent, brightly colored, and lead intricate social lives. Their specialized vision helps them survey their coral reef environment, identify food, and communicate with each other through UV patterns reflecting off their bodies. Oh, one more thing — the photoreceptors that detect

colors from red through violet are connected to different nerves than are the UV receptors, and they connect to different parts of the mantis shrimp's brain. If this creature were the product of chance, evolution must have designed a complicated visual system *twice*, once for color, and once for UV!

Reference:

- Kwok, R. 2013. This shrimp packs a punch. *Science News for Students*. Retrieved March 9, 2015, from <https://student.societyforscience.org/article/shrimp-packs-punch>
- O'Quinn, J.C. 2015. Power punch. *Creation Matters* 20(1):12.
- Yong, E. 2014a. The mantis shrimp sees like a satellite. *NationalGeographic.com*. Retrieved March 9, 2015, from <http://phenomena.nationalgeographic.com/2014/01/23/the-mantis-shrimp-sees-like-a-satellite/>
- Yong, E. 2014b. Nature's most amazing eyes just got a bit weirder. *NationalGeographic.com*. Retrieved March 9, 2015, from <http://phenomena.nationalgeographic.com/2014/07/03/natures-most-amazing-eyes-just-got-a-bit-weirder/>