

# Creation Matters

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## Saharan Dust — Part 1: Circumnavigation of Earth and Snow in California 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)*

**B**eginning in the 20th century, atmospheric and geological scientists began the study of airborne dust and other microscopic particles (i.e., aerosols) in the atmosphere. Only in the last 50 years have scientists begun to discover its global impact. Research in the last ten years has revealed several surprises.

This subject is worthy of investigation, especially from a biblical perspective, because it factors into post-Flood plant, insect, and animal dispersion. The global interaction of what we view as our local weather is often not considered. A recent article on the atmospheric transport of Saharan Desert dust and aerosols reports unexpected results and these findings have implications for a post-Flood Earth.

*... continued on p. 6*



FIGURE 1. A low volume of snow (white) on the Sierra Nevada Mountains. Some of this snow was probably nucleated on particles derived from the Saharan desert. Satellite image acquired January 18, 2014. NASA image courtesy LANCE/EOSDIS MODIS Rapid Response Team at NASA GSFC.

## The Uvula: A Useless or a Multi-tasking Organ? by Jerry Bergman, Ph.D.

**T**he *uvula* (Latin, “little grape”) is a small tear-shaped projection located at the posterior edge of the center of the soft palate. It consists primarily of connective tissue containing secretory glands and diffuse interdigitated muscle fibers (*musculus uvulae*). Properly named the *palatine uvula* to distinguish it from the *uvula vermis*, a cerebellum lobe, or the *uvula vesicae* in the urinary bladder, it is often just called the uvula.

The uvula was long regarded as “a useless remnant of our evolutionary past” and a “vestigial organ in humans that has no function” (Garner, 2003). Richardson and Pullen noted that the “uvula has been classed with vestigial structures, such as the vermiform appendix” (1948). More recently, Putnam and Shelton claim that the uvula is “a vestigial nublin of connective and

glandular tissue” (1985, p. 99). Azzan and Kuehn wrote “the uvula itself is often considered as a vestigial structure serving no important function in man” (1977).

Some science teachers still teach that the uvula “does nothing,” and even some “anatomy experts think it is only a vestigial organ” (Ray, 2003, pp. 162–163). Nonetheless, from “ancient times up to the present day many different functions .... have been attributed to the uvula, many speculative and some with a more scientific basis” (Back, et al., 2004).

### Important for speech

The most well-documented function of the uvula, in tandem with the back of the tongue, the palate, and the lungs, is its role in the articulation of guttural and other

human voice sounds (Finkelstein, 1992). The uvula also allows singers to produce a vibrato sound, a wavy-soprano to bass voice. Additionally, it lowers resonance of the air column over the larynx to reduce the extremes of voice nasality (Back, et al., 2004; Kaplan, 1971, p. 298).

### Unique to humans

The uvula is unique to humans and “no comparable organization of serous and mucous glands is found in the homologous velum of other mammals studied” (Finkelstein, et al., 1992). This is logical, since its role is primarily as a speech organ. In one study, the soft palates of eight different mammals were compared. The researchers found evidence of a very small uvula-like

*... continued on p. 2*

## Uvula

...continued from page 1

structure in two baboons that, in contrast to humans', does not differ histologically from the surrounding soft palate tissue. Another similar study led to the conclusion that the uvula may be yet "another structure that differentiates man from other mammals" (Finkelstein, et al., 1992).

In humans, it varies greatly in size and shape, from a tiny knob to a size reaching across almost to the opposite side of the throat (Finkelstein, et al., 1992). The variability of the uvula's size and shape may help to explain the voice distinctions that help us to differentiate people on the basis of their speech.

### Other functions

The uvula also produces seromucous fluid to provide the proper lubrication for complicated human speech, as can be illustrated by the dry throat problem that occurs in some speakers before addressing a large group of people. Studies of patients lacking the uvula have concluded it has an abundance of seromucous glands that can produce a large amount of saliva in a very short period of time (Back, et al., 2004).

The fact that the uvula can produce and secrete large quantities of thin saliva is confirmed from the finding that a "common complication of surgery involving removal of the uvula is pharyngeal dryness ... on phonation and swallowing, the uvula swings back and forth in the oropharynx," thereby

basting the throat. This "helps keep it moist and well lubricated" (Back, et al., 2004).

For this reason, Finkelstein et al. concluded that a "major function of the uvula" is as a lubricating organ (1992). Talking causes intermittent opening and closing of the velopharyngeal valve, which provides continued lubrication that is critical for normal speech (Hand, et al., 1999). Removal of the uvula usually results in a dry throat problem, which consequently causes hoarseness (Finkelstein, et al., 1992; Back, et al., 2004).

Thus, the evidence from numerous studies is clear, "the uvula plays a very important role in moistening the oropharyngeal mucosa" (Balcerzak, et al., 2006). The uvula also has large drainage canals that help to drain excess saliva from the oral cavity towards the base of the tongue (Delavan, 1923).

### Muscle System

The uvula striated muscle, called the *musculus uvulae*, is part of the soft palate and functions as part of the velopharyngeal mechanism. Two individually identifiable bundles of muscle elevate the uvula and shorten the soft palate (Azzam and Kuehn, 1977). The uvula also triggers the swallowing reflex, and the uvula muscle allows it to stiffen, altering its shape to help seal off the breathing passage when swallowing. Some evidence also exists that the uvula may have a role in immunology (Finkelstein, et al., 1992).

## Abnormalities

Uvula abnormalities were once an argument about its lack of function. If the mucous membrane around the uvula swells, it can expand from three to five times its normal size. If the swollen uvula touches the throat or tongue, it can cause a gag reflex or choking sensation, even if no foreign matter is present. This condition may cause breathing, talking, and eating problems. An abnormally elongated uvula can also contribute to snoring, or even sleep apnea, which is treated by removal of part of the uvula.

However, this operation can also *cause* sleep apnea if scar tissue forms that decreases the velopharynx airspace. One study found that uvula removal can reduce symptoms normally caused by an abnormal uvula from 50 to 60 percent (Petri, et al., 1994). Typically, after the uvula is trimmed, sleep apnea subsides in the short term, but often returns in the long term, and is sometimes worse than it was before surgery.

Many factors exist to cause the uvula to swell, including excessive smoking or inhaling of other irritants, dehydration from arid weather, snoring, an allergic reaction, or viral or bacterial infections. An aphthous ulcer that has formed on the uvula can also cause swelling and discomfort (Biblo and Gilbert, 1983).

Instead of surgery, other treatment is often preferable. If swelling is caused by dehydration, drinking fluids often improves the condition. If the cause is a bacterial infection, gargling with salt water often helps. A swollen uvula is not normally life

## Contents

**Saharan Dust — Part 1: Circumnavigation of Earth and Snow in California.....1**

**The Uvula: A Useless or a Multi-tasking Organ?.....1**

**Math Matters: Maria Mitchell: Astronomer and Mathematician.....3**

**Matters of Fact: Are Insects Alive?.....4**  
**...without excuse! The Testimony of Phosphorus.....7**

**2014-2015 CRS Board of Directors and Employees.....7**

### Speaking of Science

Densely-Packed Dinosaur Raptor Bones Found.....9  
 Theory of Early Oxygenation Undermined.....9  
 Music Is a Human Thing.....9  
 Fish Ancestry Turned On Its Head.....10  
 Humans' Groovy Language Brain.....11  
 Animals Come Pre-Equipped With Machinery.....11

**All by Design: Power Punch.....12**

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### Editor:

Glen W. Wolfrom

### Assistant Editors:

Jean K. Lightner  
 Robert Hill

**For membership / subscription information,  
 advertising rates, and information for authors:**

Glen W. Wolfrom, Editor  
 P.O. Box 8263  
 St. Joseph, MO 64508-8263

Email: [CMeditor@creationresearch.org](mailto:CMeditor@creationresearch.org)  
 Phone/fax: 816.279.2312

**Creation Research Society Website:**  
[www.creationresearch.org](http://www.creationresearch.org)

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threatening, and usually subsides, typically within a day or so. Persons with a history of extreme uvulitis can carry an EpiPens® containing adrenaline (epinephrine) to inject themselves when uvulitis occurs. Research on these problems has documented the fact that a healthy uvula is important for many normal functions, supporting the creation worldview, and not evolution, as claimed by some Darwinists.

## Conclusion

The uvula, although a small organ, is not an evolutionary leftover as believed by some evolutionists, but rather is a complex, well-designed structure that has numerous important functions in humans. In the words of Finkelstein, et al., it is “a highly sophisticated structure” that is “another marker ... that differentiates man from other mammals” (1992).

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## Math Matters

by

Don DeYoung, PhD

## Maria Mitchell: Astronomer and Mathematician

Maria Mitchell (1818–1889) was born into a Quaker family in Nantucket, MA, one of ten children and a distant relative of Benjamin Franklin. She was taught mathematics and astronomy by her father, William. As a young adult she turned her mathematical and observational skills to exploring the heavens from a rooftop observatory. This resulted at age 29 in the discovery of “Miss Mitchell’s Comet,” officially named 1847 VI. Quickly Maria Mitchell became a household name as the first professional female astronomer in North America. In this early era she was made an honorary member of the American Academy of Arts and Sciences (1842).

Maria spoke out against slavery in the years leading up to the Civil War. As a protest she refused to wear clothes made from cotton. A visit to a New Orleans slave



market touched her deeply and contributed to her activist position. These quotations from her speeches and writings show a godly and balanced view of life (Gormley, 1995).

We especially need imagination in science. It is not all mathematics, nor all logic, but is somewhat beauty and poetry.

Study as if you were going to live forever; live as if you were going to die tomorrow.

There is a God and He is good...I try to increase my trust in this, my only article or creed.

Every formula which expresses a law of nature is a hymn of praise to God.

Regarding this last quote, I have wondered about an alternate activity to the traditional special music which often occurs during formal worship services. Would it not be appropriate to have a black/white board in front of the congregation and to write out the steps of an elegant mathematical proof or physics problem solution? Since math is the language of creation, could not this activity also be a worship experience? On second thought, most audiences are not ready for such a technical display!

Maria Mitchell enjoyed a long career of astronomy and mathematics teaching and research at Vassar College in Poughkeepsie, New York. At her birthplace in Nantucket, MA, the Maria Mitchell Association was founded in 1902. An observatory, library, and science museum are maintained in her honor.

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[http://commons.wikimedia.org/wiki/File:PSM\\_V50\\_D450\\_Maria\\_Mitchell.jpg](http://commons.wikimedia.org/wiki/File:PSM_V50_D450_Maria_Mitchell.jpg)

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# 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](mailto: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 Are insects *nephesh* creatures?

A Yes, insects and other invertebrates are clearly *nephesh* creatures.

### What is *nephesh*?

The word *nephesh* is anglicized from the Hebrew (Harris et al., 2001),

נֶפֶשׁ

It is used in Genesis 1 to describe the animal life God created on days 5 and 6. For example, it is combined with another Hebrew word for life and translated as *living creature(s)* in Genesis 1:20 and 21.

And God said, "Let the waters swarm with swarms of living creatures, and let birds fly above the earth across the expanse of the heavens." So God created the great sea creatures and every living creature that moves, with which the waters swarm, according to their kinds, and every winged bird according to its kind. And God saw that it was good. (ESV)

The Hebrew word translated *bird* in these passages is actually a very broad term that can be applied to any flying creature: bird, bat, winged insect (Harris et al., 2001). In fact, flying reptiles would be included here, too.

The word *nephesh* is used in the same way in Genesis 1:24 when land creatures are mentioned.

And God said, "Let the earth bring forth living creatures according to their kinds—livestock and creeping things and beasts of the earth according to their kinds." And it was so. (ESV)

Clearly, these passages refer to all visible (i.e., not microscopic, which is not mentioned in Scripture) life in the animal realm. So invertebrates are included in these broad categories. This is further substantiated by the specific details discussed con-

cerning clean and unclean animals in Leviticus 11. For example, the creeping things of Genesis 1:24 refer to smaller land creatures, including small mammals, small reptiles, amphibians, and invertebrates (vv. 29–30, 41–42). In fact, in the summary a few verses later, the word *nephesh* is used to describe living creatures that move through the waters and every creature that swarms on the ground (Leviticus 11:46).

This is the law about beast and bird and every living creature that moves through the waters and every creature that swarms on the ground, ... (ESV)

Thus, the Bible indicates that all living creatures created on days 5 and 6 are *nephesh* creatures. If one is going to maintain that invertebrates are not *nephesh* creatures, then either they are to be included among the plants created on day 3, or the Bible is silent about their origin. Further, plants are not discussed under the categories of clean and unclean foods; animate life, including invertebrates, is.

### Different views

Today there are different views on this subject that can be found among young earth creationists. Some doubt whether insects are *nephesh* creatures, while others state emphatically that they are not. When I traced the latter idea back through references, they appear to have originated with a zoologist who wrote an article about how many animals were on the Ark (Jones, 1973). He concluded that insects were not among those required to be on the Ark (though he suspected there would be free-loaders).

The Bible mentions that the life (*nephesh*) of a creature is in the blood and, therefore, blood is not to be eaten (Leviticus 17:11, 14; Deuteronomy 12:23; Genesis 9:4). To some creationists these verses suggest that invertebrates are not *nephesh* and would not need to board the Ark. There are several problems with this argument. First, the point of the passages is not to define *nephesh*, but to give a clear explanation of why eating blood is prohibited. If one were to press the argument, perhaps humans aren't alive until they have reached the point in development where there are circulating blood cells. It is highly unlikely

that God intended to convey such an idea.

Second, many invertebrates do have blood. This was chronicled in detail by Stambaugh (1992) in an article in which he examined both biblical and scientific evidence regarding the issue of what the Bible considers life. Stambaugh majored in biblical Hebrew and library science for his Master's degrees. Though he held some reservations about all invertebrates being *nephesh*, in his original summary he stated: "Nevertheless, according to the Bible the 'living' things include insects, mollusks, fish, crustaceans, spiders, reptiles, amphibians, birds, mammals, and humans." This is consistent with the biblical passages in Genesis 1 and Leviticus 11.

Finally, though the broad groupings of animals mentioned in the Flood account (Genesis 6–8) are those identified in Genesis 1 as *nephesh* creatures, the Hebrew word *nephesh* does not appear in the account of the Flood. While it may be technically correct that Noah was only required to take pairs of terrestrial and flying *nephesh* (and the food to feed them) on board the Ark, the Flood account is not worded with that focus. The issue with insects is perhaps a bit more complex. There are some differences in wording between the Creation and Flood accounts that may hold significance. Additionally, many insects have aquatic larval forms or might have been able to survive outside the Ark by other means. Jones (1973) and others have grappled with these issues in their writings (Woodmorappe, 1996).

Jones (1973) mentioned two specific phrases found in Leviticus 11 that are used exclusively to refer to particular invertebrates. One is used for flying insects; the other refers to other arthropods.\* Neither phrase is found in the Flood account. Jones argued that these groups were excluded from the Ark because Noah was not given any specific instructions concerning them. The problem with this approach is that the phrases do not appear in the creation account either. Would that imply they were not created? The groupings of animals mentioned in regard to the Flood (Genesis 6–8) are broad and general, and largely mirror the terms used in the creation account (Genesis 1).

# Are Insects Alive?

Jones had examined the Hebrew as it related to created kinds in a previous article (Jones, 1972). While he mentioned in this article that Hebrew is a language, and words can vary in meaning according to context, he portrayed the relevant words he found in a figure that appears much like a dichotomous key used by biologists for taxonomic purposes. As a biologist myself, I understand the natural tendency to think this way. However, as many Hebrew scholars have pointed out, Hebrew is a language through which God communicated to us. We cannot evaluate Hebrew words as a series of scientific data points that we put within our cultural framework (Lightner, 2010). Arguments that a Hebrew word is never used of invertebrates, in addition to sometimes being incorrect (as with *nephesh*), seem to overlook another important detail.

## Does the Bible mention invertebrates?

The Bible does naturally divide creatures into plants and animals, much like we do. However, the Bible does not distinguish between creatures based on the presence or absence of a vertebral column. Instead, it describes animal life in a way that an ordinary person from any culture can relate to. In Genesis 1, invertebrates were clearly included with the living creatures that swarm in the sea, the birds (flying creatures), and the creeping things on the earth.

An example of this point can be found in the specific descriptions found in Leviticus 11. The unclean creeping things are not classified by backbone, but by how they move. Here it is stressed that all are unclean by mentioning three different modes of locomotion.

Whatever goes on its belly, and whatever goes on all fours, or whatever has many feet, any swarming

thing that swarms on the ground, you shall not eat, for they are detestable. Leviticus 11:42 ESV

So what creatures move on their bellies? These would include snakes, legless lizards, caecilians (a type of amphibian), worms, and gastropods (snails and slugs). Some of these creatures are vertebrates; others are not. Of course, the only creatures that have many feet are certain arthropods such as spiders, centipedes, and crustaceans. So while the Bible does use some terms that we would recognize as referring to a small subset of invertebrates (i.e., flying insects in Leviticus 11:20-23; including other arthropods\* in Leviticus 11:42), it never promotes the idea that life is naturally divided based on internal anatomy.

## Why does it matter?

Understanding the world around us involves understanding the origin and natural history of life. There are two key events in natural history that the Bible describes in addition to creation: the Fall and the Flood. Prior to the Fall, only plant life was consumed by terrestrial creatures, including humans (Genesis 1:29, 30). Some have even wondered whether insectivorous animals existed as such prior to the Fall. For example, did spiders capture unsuspecting insects in their webs and devour them? Or might an invertebrate have been stepped on and squished?

The second issue concerns what was carried on the Ark. This issue may be a bit more complex given the unique life cycles and other characteristics of invertebrates that Jones (1973) and Woodmorappe (1996) point out. A more detailed analysis of the Hebrew involved would be warranted. Such a discussion is not well suited for a short article, but all creationists could probably agree that God brought to Noah whatever needed to be on the Ark (Genesis 6:20).

It is important to have as accurate an understanding as possible of what the Bible tells us (and what it doesn't tell us). This gives us a strong basis for understanding various branches of science including biology, especially in regards to how living creatures have changed. It can help us ask productive questions and make predictions (Lightner 2014). So what might spiders have eaten prior to the Fall if they did not eat insects? That discussion will have to wait until another time.

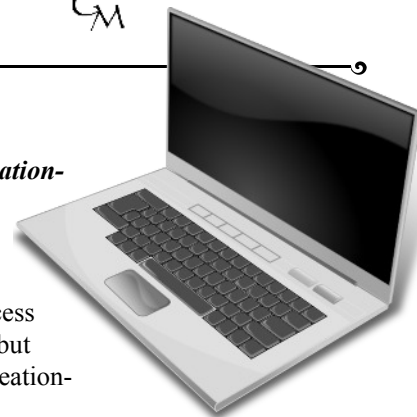
## Acknowledgement

I would like to thank CRS member Nicholas Petersen, who holds a M. Phil. in Hebraic and Cognate Studies, for helpful comments and discussion on this topic.

## References and notes

- \*This would also include some larval forms of flying insects, i.e., caterpillars.
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## What Are Creationists Thinking about ...?

*As new scientific discoveries make the headlines, have you ever wondered how your fellow creationists are reacting? Have you ever thought of a "crazy" new idea about origins and wanted to bounce it off another creationist?*

Now you can keep in contact daily with creationists from all around the world. The Creation Research Society sponsors **CRSnet**, an online community of CRS members who have e-mail access to the Internet. Not only do participants discuss the latest scientific findings related to origins, but they also receive news about the CRS — its research, publications, and activities — and other creation-related news.

For more information, send an e-mail message to Glen Wolfrom at [contact@creationresearch.org](mailto:contact@creationresearch.org). Participation is limited to CRS members in good standing.

## Saharan dust

The topic of dust in the environment was reviewed by Holmes (2001). Her subject-specific chapters deal with various aspects of dust, derived from Asian deserts and the African continent, and its effect on our lives. The interested reader is encouraged to review that work for further information. Much has also been written in the naturalistic (i.e., non-biblical) scientific literature about Asian and African dust and aerosols and their effect on the western hemisphere.

Surprisingly large volumes of particulates from the Saharan desert can be lifted and transported westward across the Atlantic in a matter of days (Froede, 2003). However, recent research indicates it also plays an important role in the precipitation of snow in California.

## Precipitation as snow across the Sierra Nevada of California

Creamean et al. (2013) conducted a study of the snowpack across California's Sierra Nevada Mountains (Figure 1). They sought to determine the terrestrial sources and particulate composition of the nuclei responsible for snow accumulation. Dust and aerosols from the Asian desert had previously been identified, but in this new study, Creamean et al. (2013) recognize additional source areas including the Saharan Desert and Middle East.

Dust and other aerosols derived from the Saharan desert typically travel westward across the Atlantic Ocean. However, this new study identified Saharan desert particles traveling *eastward* in mid-level clouds (13,100 to 16,400 feet above mean sea level, msl) around the globe (Figure 2). Of the different kinds of particles examined, bacteria were identified as the best source for ice nucleation (Lemonick, 2013). The results of this study suggest that the snowpack of California's Sierra Nevada Mountains is derived from dust and aerosols sourced from geographically diverse areas and transported by air currents that circumnavigate the Earth.

As a footnote, a recent study correlated volcanic ash layers in northern Greenland and Western Europe to volcanic eruptions from the Wrangell volcanic field of southeastern Alaska (Jensen et al., 2014). Wind transported the ash *eastward* thousands of miles dropping the particles with a loss of the heat that originally lifted them into the atmosphere.

## Implications for biblical history

The Bible states that wind blew across subsid-

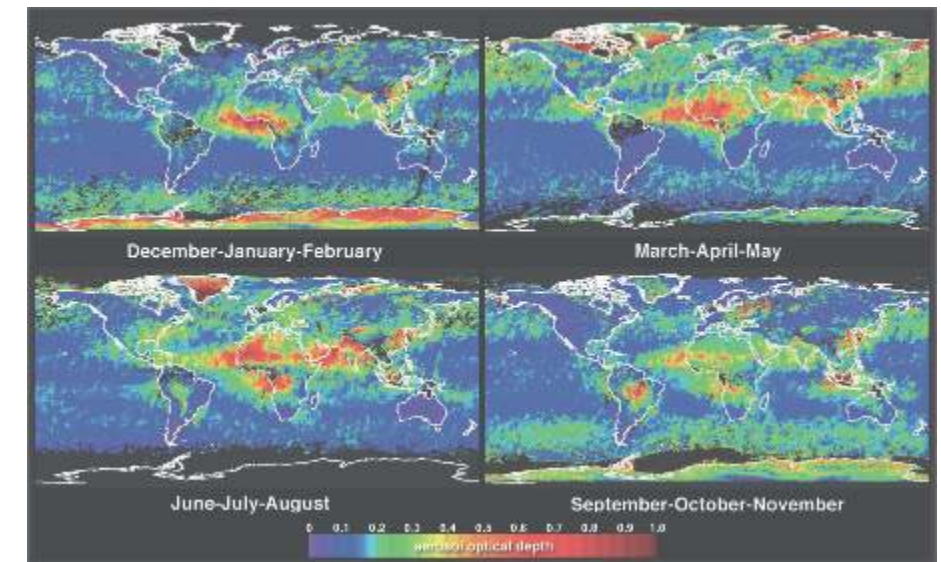


FIGURE 2. Global and seasonal aerosol distributions from NASA's Multi-angle Imaging SpectroRadiometer (MISR). Seasonal shifts in trade winds move Saharan desert dust and aerosols westward across the Atlantic Ocean and also eastward across the Asian continent. It is the eastern transport of particulates that contributes to snowfall across the Sierra Nevada Mountains of California. Image from 2003, and courtesy of NASA/JPL-Caltech.

ing Floodwater (Gen 8:1). These winds probably continued for some time and eventually stabilized into the global atmospheric circulation patterns (and layers) we observe today. However, creationists have not studied possible wind patterns prior to modern conditions and past variations are certainly possible. Further study of post-Flood atmospheric conditions is warranted.

The movement of air is important in understanding the modern transport of dust and aerosol materials. These studies should be of great interest to creationists, because atmospheric transport likely played a role in plant, insect, and animal dispersion following the global Flood of Genesis (Froede, 2003; Rucker, 2004).

This new study suggests that airborne dust and aerosols from African and Eurasian sources contribute to the deposition of snow located on the other side of Earth! This finding has implications for the development of alpine and continental glaciers following the Flood. The combination of dust and aerosols derived from Earth's exposed un-vegetated landmasses combined with ash propelled into the atmosphere from erupting volcanoes would have served as nucleation sites for precipitation.

Although undocumented at present, the buildup of snow across the Earth following the Flood was probably a function of available atmospheric dust, particulates, and high levels of water vapor. The removal of these materials from the atmosphere in the centuries following the Flood along with a decrease in water vapor levels has likely served to reduce the volume of precipitation falling on Earth today.

## Acknowledgments

I am grateful for my wife's continuing support of my research and writing efforts. I thank Jerry Akridge and John Reed for their review and helpful comments. Any errors that may remain are my own. Glory to God in the highest! Proverbs 3:5-6.

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...without excuse!  
by Timothy R. Stout

# THE TESTIMONY OF PHOSPHORUS

**P**hosphorus (P) is one of the major chemicals essential for life. In addition to being a major component of tooth enamel and bones [in the form of hydroxyapatite, or calcium phosphate;  $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$ ], it is a structural component of the nucleotides which form the molecular backbones for RNA and DNA. It also functions as a major constituent of adenosine triphosphate (ATP, Figure 1) which serves as the energy currency of the cell. Other P-containing molecules are required as sources of phosphorus/phosphate to form ATP (e.g., phosphocreatine).

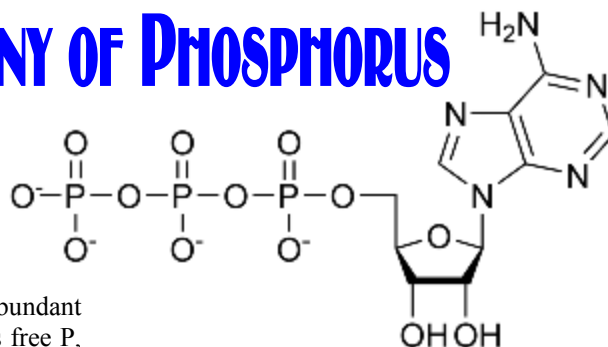
For these reasons, P is considered an essential element for the origin of life. In a recent article Pasek et al. (2013) stated,

Synthesizing RNA and other organophosphates under plausible early Earth conditions has proved difficult, with the incorporation of phosphorus (P) causing a particular problem because phosphate, where most environmental P resides, is relatively insoluble and unreactive.

Although it is the 12th most abundant element on Earth, it is not found as free P, other than in the occasional meteorite (Sanderson, 2014). It is highly reactive, combining with other elements and forming a variety of salts, principally calcium phosphate (apatite). The resulting minerals are very insoluble, unreactive, and thus unavailable as sources of P for prebiotic chemical syntheses. This is a well-understood problem and the reason behind the difficulty acknowledged by Pasek et al. (2013).

Bacteria and plants are able to extract phosphorous directly from their environments. The extracted phosphorous then proceeds up the food chain to meet the requirements of other organisms. One of the major difficulties facing abiogenesis is the provision of a reasonable source of P for use in RNA and ATP fabrication *before* bacteria and plants existed. We find yet another of the many “chicken or egg” paradoxes, characteristic of abiogenesis.

FIGURE 1. Chemical structure of adenosine triphosphate (ATP).



## Phosphites, apatites, volcanoes, and meteors

There has been a long, ongoing discussion in the journals about potential sources of naturally occurring P for use in chemical evolution, but these are all problematic. For instance, Schwartz (2006) acknowledged a variety of problems that had so far thwarted the finding of a plausible scenario for supplying P. He then proposed three new, alternative solutions:

1. reduction of phosphate to phosphite under certain environmental conditions
2. the volatilization of  $\text{P}_4\text{O}_{10}$  from apatite during volcanic eruptions
3. the presence of phosphide (combination of P with a metal; e.g.,  $\text{Fe}_3\text{P}$ ) in the mineral schreibersite, found in meteorites

One supposed advantage provided by the first proposal above, is that phosphite salts of calcium are more soluble than is apatite (Schwartz, 2006). However, living systems use phosphates, not phosphites, as building blocks and energy currency. So, at some point a con-

### Phosphorus Chemistry Notes\*

<b>phosphate</b>	inorganic chemistry: $\text{PO}_4^{3-}$ , (organic chemistry: an ester of phosphoric acid)
<b>phosphite</b>	inorganic chemistry: $\text{PO}_3^{3-}$ , salt of phosphorous acid
<b>phosphide</b>	inorganic chemistry: combination of phosphorous with less electronegative element(s); e.g., $\text{Na}_3\text{P}$ , $\text{Ca}_3\text{P}_2$

\*Sources: Wikipedia entries for [Phosphate](#), [Phosphite](#), and [Phosphide](#), retrieved January 26, 2015.

## 2014-2015 Creation Research Society Board of Directors and Staff



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Not pictured are Mark Armitage and John Reed.

**\*PROFESSIONAL STAFF:** Kevin Anderson is Director of the Van Andel Creation Research Center. Diane Anderson and Becky Wolfrom are support staff.

version back to phosphates needs to occur.

The discussion around the second proposal indicated that the actual amount of P released volcanically is very low—likely too low to be of use for chemical evolution (Schwartz, 2006).

Regarding Schwartz's third proposal, phosphide in water is converted to phosphites (Pasek et al. 2013). Even though meteoritic phosphide is more soluble than apatite, the available concentration of P still "seems low" (Schwartz, 2006). Pasek et al. (2013) also looked to meteoritic schreibersite as a solution for the P problem. Meteorites as a long-term, steady source of phosphate does not seem plausible, as it is required by all life forms in more than trace amounts.

Proposals involving phosphite seem to avoid consideration of prebiotic ATP synthesis. ATP basically cycles back and forth between ATP, the energized form, and ADP plus a phosphate molecule, as the de-energized form. An external source of energy enzymatically combines ADP with a phosphate molecule to form ATP, requiring the continual availability of phosphate molecules. Phosphite does not resolve the need for a continuing supply of free phosphate in ATP-related reactions during abiogenesis.

## RNA instability

A fundamental, underlying problem is the instability of RNA. Under some conditions, RNA can degrade in only a matter of days or less (see for example, Johnston et al., 2001). A major proposed step in advancing

toward life's abiogenic origin is the appearance of a self-replicating RNA molecule. Yet, even if such a molecule did appear, its continued existence would depend on a steady, uninterrupted supply of raw materials, including phosphate. Any interruption in the supply of P for a significant length of time would stop the replication process, and natural decay would relatively quickly destroy the replicators, undoing any progress.

Pasek et al. (2013) propose that the ancient meteor bombardments landed in the primordial ocean, releasing large quantities of phosphate in the form of dissolved schreibersite. This brings up several difficulties. First, there is a lot of water in the ocean, which would tend to dilute the P excessively. Additionally, over the geologic timeframe required for abiogenesis, one could expect the oceans to have an abundance of calcium, leading to the precipitation of phosphate as apatite or similar minerals (Schwartz, 2006). Thus, phosphate would be rendered unavailable.

Furthermore, most abiogenists today believe that life did not start in an ocean, because none of the raw materials would be sufficiently concentrated, including P. Instead, they prefer a small pond or other isolated location. However, small, isolated locations would be characterized by an erratic flux of incoming meteorites. This would not provide the required steady supply of P.

## Conclusion

The problem for evolutionists is to incorporate P into a fully functioning metabolic system by building it one step at a time. Creationists believe God formed complete metabolic systems in a single step. It is yet another example of God's providing evidence of Himself, through His creative handiwork—evidence for which rejection is "without excuse."

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Source of Figure 1:

[http://commons.wikimedia.org/wiki/File:ATP\\_chemical\\_structure.png](http://commons.wikimedia.org/wiki/File:ATP_chemical_structure.png)



## Speaking of Science

...continued from page 11

sate, at least in the short term, for the loss of individual functional components is well known. "However, **the degree** to which the histone acetylation system is **able to accomplish this feat was a big surprise**," Becker adds, "and it **illustrates the complexity of the circuitry** that links the various epigenetic signaling pathways."

**Motorcycles:** There's an elaborate transportation network inside cells. So small we can't even see them, cells are actually filled with mechanized transporters going to and fro. If you imagined yourself shrunk down to the size of one of these transporters, you would behold a vast network of highways called microtubules all around you, crowded with walking machines carrying cargo.

One of the motorized transporters, called dynein, is described in more detail on *PhysOrg*<sup>4</sup> alongside a model of how it looks. Using an ATP molecule for energy at each step, dynein transfers this energy

some distance down a stalk to the moving foot. Biochemists at RIKEN, who had no hesitation calling this a "molecular machine" or "motor," learned that the structure of the stalk at the microtubule interface harnesses the energy to give it directionality, which would otherwise wobble randomly under Brownian motion. When these transport machines don't work, serious health problems can result.

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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.

## Densely-Packed Dinosaur Raptor Bones Found

A stunning matrix of densely-packed bones from multiple carnivorous dinosaurs has been found in a big block of Utah sandstone.

*National Geographic*<sup>1</sup> announced a nine-ton block of sandstone in Utah with multiple *Utahraptor* individuals (six so far), old and young, densely packed together. The location was found in 2001 but has been analyzed for the past decade by James Kirkland and team.

The **densely packed dinosaurs** (in some places, fossils are stacked three feet thick) **may have died at different times as they blundered into quicksand, or perhaps they died together** in a social supper gone horribly wrong....

The recent finds include **never-before-seen bones that are already changing scientific views** of the *Utahraptor* anatomy.

Some details seem problematic with the theory that the raptors were attracted to a prey animal, an iguanadont, in a pool of quicksand. For one, it's a unique interpretation: "We believe it's going to be the **first example** of dinosaurs trapped in quicksand en masse in the fossil record," one of the scientists said. Another is the density of the bone matrix: "**every time we tried to cut in, we kept hitting legs and vertebral columns,**" he said. A third is that "**it will take years** to reveal the block's true tale."

*National Geographic* added imaginary feathers to the fossils: "Covered in feathers, with a huge sickle claw on each second toe, *Utahraptor* looked like a pumped-up version of the *Jurassic Park* star *Velociraptor*," reporter Brian Switek wrote.

The evidence so far looks like they were buried in a flood. We will have to hear more details to make a case. Are the bones articulated? Is the finding of individuals in the "dinosaur death pose" indicative of drowning? What other species are found in the sandstone tomb? Anyway, it looks interesting so far. Nothing in the data indicated the presence of feathers. Switek added them because they fit the current evolutionary dreamscape.

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## Theory of Early Oxygenation Undermined

Fossils in and around newly-discovered methane seeps have cast strong doubt on a leading theory of earth's climate history.

For a long time, evolutionary geologists have inferred the oxygen levels of ancient oceans by the fossils of marine organisms, particularly foraminifera (forams for short). That inference fed into theories of how life was evolving and how earth's climate was changing. Now, studies of living forams in and around the seeps



shows that forams live both close to the seeps and away from them.

The seeps were accidentally discovered by scientists last summer.<sup>1</sup> *PhysOrg* reports that the new fossil work by Indiana State was serendipitous, surprising, and monumental. Finding forams has been an index of oxygen levels in the past — or so it was thought.

So, **finding this species in abundance in both seep and non-seep environments where oxygen is limited was unexpected**. Based on their research, Rathburn and Burkett speculate that **it's not the abundance of oxygen that determines where these creatures are located**. It may simply be that they're present where there are hard surfaces on the sea floor for them to live on.

The finding threatens to undo models of past climate change.

Burkett presented her surprise findings this past October to the scientific community at a meeting of the Geologic Society of America in Vancouver, Canada. The response was positive.

"At this meeting, **we shocked people with our results,**" Rathburn said. "(Our research) **will shake up our ideas about how to use these creatures in the interpretation of the environments of the past.**"

A lot was built on this index: past climate and evolutionary transitions. Those will now be called into question.

Inferences about past conditions are always indirect, dependent on some "index" that supposedly represents the changing conditions. When the index is shown to be flawed, all the baggage loaded on it comes tumbling down. No doubt, textbooks, TV, and science articles will continue to blindly continue their story of when earth's oxygen surged. It will be like speaking out the window of a collapsed house of cards.

Those of us who know this new evidence should speak boldly to the evolutionists, telling them they cannot know past climate or evolution with this evidence; the world is consistent with a recent creation that always had habitable conditions for complex life. We should also speak to the climate alarmists, pointing to the unexpected finding of all these methane seeps as evidence that the future of the climate cannot be known because of the number of unknowns.

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## Music Is a Human Thing

Many animals make sounds; birds and whales can sing; but there's nothing to compare with the human brain's capacity for music.

**Universality:** A couple of news stories reveal interesting things about humans and music. One study, reported by *Medical Xpress*,<sup>1</sup> found that the emotional responses to music appear to be universal in humans. Forty Canadians and forty African pygmies were given chances to evaluate the emotional



impact of short musical pieces, some Western and some pygmy. The pygmy subjects had no electricity, radios, or TV, and were most likely unfamiliar with Western music; similarly, the Canadians were not familiar with pygmy songs. The repertoire ranged from happy to sad, and from anxious to calm. All showed similar emotional responses using “emoticons” to indicate how the music made them feel. The scientists concluded that music cuts across cultures, and that certain aspects of music appear universal.

**Perfect Pitch:** Neuroscientists at the University of Zurich were interested in discovering more about why some people have absolute pitch, sometimes called perfect pitch. This is the ability to predict the pitch of a named tone, say an A, C# or F, without hearing any note first. (Many people have relative pitch: they can judge these notes after hearing another note and its name.) According to *Medical Xpress*,<sup>2</sup> two separate brain regions join forces in this skill, possessed by only 1% of people, though up to 20% of musicians. People with this ability have a strong default linkage between the left-hand auditory cortex and the left-hand dorsal frontal cortex. “This coupling enables an especially efficient exchange of information between the auditory cortex and the dorsal frontal cortex in people with absolute pitch,” Stefan Elmer says, “which means that the perception and memory information can be exchanged quickly and efficiently.”

**Development:** Could playing Tchaikovsky’s “Nutcracker” help your child’s brain development? *ScienceDaily*<sup>3</sup> thinks so, based on a study at the University of Vermont. “In a study called ‘the largest investigation of the association between playing a musical instrument and brain development,’ a child psychiatry team has found that musical training might also help kids focus their attention, control their emotions and diminish their anxiety.” It almost seems that music is necessary for normal brain development, and the more musical training, the more it helps develop multiple beneficial traits.

Music is a gift of God to man. It is evolutionarily useless. In other animals, such as birds, whales, and monkeys, the tweets, grunts, and screeches are linked to sexual display, alarm signaling, and group identity. As complex as some bird songs and whale songs are, they follow no mathematical theory of harmony, and no rules of melody. Some birds can mimic very well; there are YouTube videos of parrots singing opera; but parrots do not compose operas.

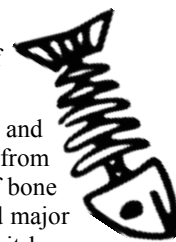
Humans will hum and sing to themselves just for the joy of it, with no apparent survival value. Music can elevate the spirit, rouse a mind to alertness, and calm a baby to sleep. The complexities of a Berlioz Requiem or Beethoven Symphony vastly exceed the capabilities of any animal, including our supposed nearest common ancestors, the great apes, who show little interest or comprehension of what moves us so. Music is “useless beauty” that our Creator made possible by giving us brains equipped for it, vocal chords to produce it, and souls to compose it and enjoy it. Think of how drab a world it would be without this gift from a loving heavenly Father. Choose to appreciate sublime music that elevates the soul.

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‘Nutcracker’ and other music improve kids’ brains? *ScienceDaily*. Retrieved January 17, 2015, from <http://sciencedaily.com/releases/2014/12/141223132546.htm>

## Fish Ancestry Turned On Its Head

A so-called “primitive” bony fish with traits of sharks confuses the usual story of fish ancestry.



They’re calling it *Janusiscus*, part two-faced Janus and part *piscus* (fish). This fragmentary two-faced fossil from Siberia, claimed to be 415 million years old, has lots of bone but also some traits from cartilaginous fish—the second major branch of fish that includes sharks and rays. Because it has a mosaic of features, *Science Magazine* says it “**may rewrite [the] fish family tree.**”<sup>1</sup>

Although the fossil had previously been classified as a bony fish based on its external features, such as the shape of the skull roof and the enamel on the scales, the CT scan revealed **a surprising mosaic of features** from both cartilaginous and bony fish. For example, the fish’s skull was made of large, bony plates similar to today’s bony fish, but the traces of the nerves and blood vessels around the brain more closely resembled those of cartilaginous fish.

*PhysOrg*<sup>2</sup>, which displays a 3-D model of the fossil, quotes an Oxford paleontologist who says, “It tells us that **the ancestral jawed vertebrate probably doesn’t fit into our existing categories.**” Despite her pro-Darwin spin on the fossil, Laura Geggel in *LiveScience*<sup>3</sup> admits that the fossil shows that sharks, **often considered less evolved** than bony fish, “**are more evolved than had been previously thought.**”

The lead author of the paper in *Nature* says, according to *Science*, “These findings as a whole **could correct the misconception that cartilaginous fish are more primitive** than bony fish.” *PhysOrg* quotes him saying of that notion, “The results from our analysis **help to turn this view on its head.**” The evolutionists seem surprised that natural selection would cause cartilaginous fish to lose the bones their putative ancestor had.

**Lateral line:** Many people may not know this, but fish have a “sixth sense.” Another *PhysOrg*<sup>4</sup> article describes the “lateral line” in fish, a line of sensors along each flank that detects water flow patterns, allowing them to quickly respond to changes in their environment. “It is well known that **fish respond to changes in their fluid environment,**” the article explains. “These include **avoiding obstacles, reducing swimming effort by slaloming between vortices, or whirlpools, and tracking changes in water flow** left by prey—even **without the aid of vision.**”

Geggel says of the fossil fish that it appears to have had this sixth sense: “The **incredibly detailed scans** show that the **fish has sensory line canals on its skull,**” she writes. “**Bony fish use these canals, located on the outside of the body, to sense changes in pressure** around them and avoid predators.” This means this network of sensors and brain responders was already present in the ancestor, 415 million years ago in evolutionary time.

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## Humans' Groovy Language Brain

**M**ore features have been discovered that set humans apart from apes.

**Groovy brain:** An asymmetric groove in the brain is completely absent in other primates, including chimpanzees, *NewScientist* says.<sup>1</sup> Clare Wilson writes, "The groove's function is unknown, but its location suggests it played a role in the evolution of our communication abilities." She also notes that the human brain is about three times larger than a chimpanzee brain. A French researcher commented, "We think that [this asymmetry] is related to either speech or social cognition, which are both abilities for which humans outperform other primates."

**Invariance solved by baby:** The "invariance problem" in human speech involves our ability to recognize dramatically different syllables that start with the same consonant, such as bo, ba, and be, as similar. A Harvard study reported by *Medical Xpress*<sup>2</sup> found that infants as young as 6 months can solve the invariance problem. Specially designed tests showed that they were not surprised at the different syllables like they were when hearing unfamiliar ones. This suggests that infants recognize how sounds are made, not just what they represent.

**Brain update:** Your brain has a method for keeping memories up to date. According to *Medical Xpress*,<sup>3</sup> new information replaces old or inaccurate information by a pruning process. Without this, our minds would be cluttered by noisy, false data that would confuse us. "An experiment conducted by researchers from Princeton University and the University of Texas-Austin shows that the **human brain uses memories to make predictions about what it expects to find** in familiar contexts," the article says. "When those **subconscious predictions are shown to be wrong**, the **related memories are weakened** and are more likely to be forgotten." The bigger the error, the more it is likely to be pruned, the article says.

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## Animals Come Pre-Equipped With Machinery

**G**uidance systems, compasses, switchboards, motors, robotic machines: we're talking about systems inside animals—and you.

**Internal compass and route finder:** Many animals travel long distances. It's been known that animals as diverse as birds, turtles, and fish are able to form mental maps of their routes using environmental cues like smells, light and the earth's magnetic field. Mammals, in particular, have a portion of their brains devoted to route memorization, so that they can find their way back: it's in the entorhinal complex of the hippocampus. There are specialized neurons called grid cells and place cells, *Medical Xpress*<sup>1</sup> explains,



that respond to movement and even the directions the head turns.

These **grid cells** fire in a tessellating pattern when an animal travels and **seem to operate a bit like graph paper**, providing an animal with **a sense of the distance travelled**. Information about direction is stored in **head direction cells**, which fire when an animal is **facing** a particular direction (north, for example).

All these pieces of information are fed into the **place cells**, which **bring it all together** — hence, why we really can consider the hippocampus to contain **our own internal, spatial map**. This was so significant to our understanding of how the brain operates that the 2014 Nobel Prize in Physiology was awarded to John O'Keefe, who was the first to identify place cells, and Edvard and May-Britt Moser, who discovered grid cells.

New work published in *Current Biology*<sup>2</sup> adds to this knowledge by locating the compass. A map is not good enough alone; one needs to have a compass to be able to use it. "The paper's authors have established **where this information is stored** in the brain, and **how it might be used to orient** a human or animal." Using fMRI on human subjects put into virtual environments, the researchers found that the compass can work even when the person has his or her eyes closed:

**Interestingly**, the **pattern** of neuronal firing is **remarkably similar when someone is facing in the goal direction** to when they simply **imagine the direction** of the goal. The researchers suggest that the **brain can use this property** of the neurones **to simulate the intended direction in the brain** without actually moving. They assume that **head direction cells switch from one role to another**, so that they are **initially involved in representing the current heading direction, before switching to simulating the goal direction**. In this way, the neurones **can aid in planning the route home**.

Some people are better at navigating with their "internal compass," but apparently the skill can be improved with practice. Many mammals rely heavily on this ability; maybe it explains the old song, "The Cat Came Back."

**Switchboard circuitry:** A library needs to control the flow of information. Having all the instructions to build something can be "TMI" (too much information) without being able to access it in the right order at the right time. DNA is like that; what gene should be translated, and when? Those decisions are regulated epigenetically ("above the genes") by a large squad of little machines called acetyltransferases that put tags on genes, controlling which ones need to be translated and which should be sealed off. Higher mammals have up to 60 of these taggers, and fruit flies have 40, all employees of a company of switchboard operators in the nucleus of the cell.



This amazing "**epigenetic switchboard**" is described in a press release from Ludwig Maximilian University<sup>3</sup> in Munich, Germany. The system, conserved throughout the animal kingdom, is as elegant in fruit flies as it is in humans. It's very robust, too:

"Our **most surprising finding** was that the depletion of single acetyltransferases often leads to the attachment of novel acetylation tags at nearby sites, so that the overall level of acetylation is often very similar to the normal one," says Feller. **The ability of biological systems to compen-**

... continued on p. 8



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## All by Design

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

## Power Punch

The creationist view of living things is that they were created by an intelligent Designer and are not the products of random chance (evolution). One remarkable animal testifying to a planned creation is the peacock mantis shrimp (*Odontodactylus scyllarus*).

This shrimp has specialized forelimbs called raptorial appendages. Mantis shrimp use these club-shaped limbs to smash open crab and snail shells for food and to defend themselves from predators. The limbs strike so quickly (up to 52 miles per hour) that they vaporize the water at the strike zone, causing cavitation bubbles, which then collapse, releasing additional energy in the forms of heat, light, and sound.

With each strike, there is one force from the initial strike of the first limb, followed by a second force from the collapse of the cavitation bubble, repeated by the same forces from the second limb. The peak forces can reach 1,500 N (newtons), which is over 2,500 times the body weight of the animal. Imagine a 170 lb person punching



A female *Odontodactylus scyllarus* mantis shrimp. Photo by R.L. Caldwell.

with over 375,000 lbs of force! Parts of this limb act as a spring and latch, storing large amounts of potential energy, allowing it to crush crab and mollusk shells (or your finger).

The outer part of the club-shaped limb is made of hydroxyapatite in a regular pattern to give it strength. Inside are flattened spirals of sugar fibers stacked slightly asymmetrically upon each other, which absorb shock when striking hard objects. Additional sugar fibers wrap around the sides of the club, preventing swelling and cracking upon

impact, in the way a boxer's hand-tape protects the hands.

This animal survives by eating hard-shelled prey and has unique physical traits allowing it to do that efficiently. How could these specific traits have developed by degrees and completely by accident?

### References:

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<http://en.wikipedia.org/wiki/File:OdontodactylusScyllarus2.jpg>