

# Creation Matters

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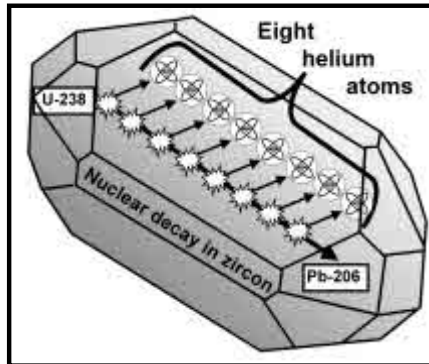
## Zircons: God's Tiny Nuclear Laboratories

by D. Russell Humphreys, Ph.D.

Recently, I was asked how lead gets inside zircon crystals. The evolutionists claim that there was no lead present during the creation of the crystals, and that the lead which is present is a result of radioactive decay of Uranium 238, which has a half-life of 4.46 billion years. They argue that if the earth were only 6,000 years old, there would not be as much lead present in the zircon crystals as is currently found.

### Retelling the story

This looks like a good time to re-tell the story of zircons and radioactivity since, after seven years of publicity about the RATE project [see reference], there are still some



*When zircons form, they chemically attract uranium atoms and chemically reject lead atoms. Afterward, the uranium decays, depositing both lead and helium within the crystal.*

people who haven't yet appreciated this marvelous evidence for creation. I say "marvelous" because it seems as if God designed zircons as microscopic nuclear laboratories specifically to show some of the amazing things He did with radioactivity.

First, in molten granitic rock today, there are lots of silicon and oxygen ions (electrically charged atoms), and some zirconium, uranium, and lead ions (as well as many other types of ion). As the melt cools, the first crystals to start forming are zirconium silicate, or zircon ( $ZrSiO_4$ ), because zircon has the highest melting point of all the minerals common in granite. Each

... continued on p. 2

## New Dating of Moon's Crust: Problems for Popular Model

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

Earth's Moon is a fascinating object in space whose surface has been carefully examined by telescopes for centuries. Its rocks, collected by the Apollo lunar missions decades ago, continue to intrigue scientists. Naturalists contend that it originated 4.55 billion years ago subsequent to an impact on Earth by an object twice the size of Mars.

In contrast, young-earth creationists believe it was created by God on Day Four of the Creation Week (Froede, 2010a). Recent radiometric age-dating of some non-mare igneous crustal rocks has raised serious questions about the popular "Magma Ocean Model" (see Sidebar, p. 3).

### Magma Ocean Model

Various theories have been advanced by naturalists regarding the formation of the Moon's crust following its violent separation from the Earth. One of the more popular ideas proposes that it formed from a magma ocean. In this theory, the moon's non-mare igneous crustal rocks would reflect mineral



*Our Moon is an intriguing body in space, perfectly matched to Earth for God's glory and mankind's survival.*

differentiation as they experienced crystalline solidification (Smith et al., 1970; Wood et al., 1970; Snyder et al., 1992). According to Borg et al. (2011, p. 70):

Evidence for a lunar magma ocean is derived largely from the widespread distribution, compositional and mineralogical characteristics,

and ancient ages inferred for the ferroan anorthosite (FAN) suite of lunar crustal rocks.

To support this hypothesis, FAN rocks have been radiometrically dated. However, the dates have yielded ambiguous results (Borg et al., 2011). Despite strong support by naturalists for the magma ocean theory, there has been little empirical evidence in its defense.

### New radiometric age-dating

Recently, FAN rocks have been radiometrically re-analyzed in an attempt to more accurately and consistently (between radiometric methods) determine the age of crustal rocks long thought to be 4.55 billion years old. The results using lead (Pb-Pb) and neodymium ( $^{147}Sm-^{143}Nd$ ) dating methods were almost identical, establishing a modeled concordance for the first time (Borg et al., 2011). The Pb-Pb age was determined to be  $4,359.2 \pm 2.4$  Myr and the  $^{147}Sm-^{143}Nd$  isochron age was  $4,367 \pm 11$

... continued on p. 3

zirconium ion has a +4 electric charge, giving it four chemical “hooks” with which it grabs onto the silicon and oxygen ions surrounding it, to start laying down a crystal lattice.

However, the uranium ions in the molten rock also have a +4 electric charge and four chemical hooks, and they are only about 20% larger than the zirconium ions. So, as a uranium ion floats by a zircon lattice that is forming, the lattice will often reach out (electrostatically), grab the uranium ion, and stick it into the place where a zirconium ion would normally go. As the crystal forms, it will have uranium ions distributed throughout it, often in up to 4% of the normally-zirconium sites. In fact, most of the uranium in crustal granites is concentrated in zircons.

### Getting the lead out

But what about the lead ions in the molten rock? It turns out that the most common type of lead ion has only +2 electric charge (only two chemical hooks) and is more than 40% larger than a zirconium ion. (There is another type of lead ion that has +4 charge and is about the same size as a zirconium ion, but at the temperature of the molten rock it is much less common than the first type.) This makes it difficult for the lead +2 ion to fit into the lattice, so the lattice rejects it. Laboratory experiments with zircons forming in lead-enriched molten

rock show that the zircons absorb very little of the lead.

Thus, zircons forming naturally will start out containing a lot of uranium and very little lead. Most of the uranium is the most common uranium isotope, uranium 238.

However, it turns out that zircons in pre-Cambrian granites have quite a bit of lead, almost all of it being lead 206, the isotope descended from uranium 238 decay. Relatively little of the lead isotope that is not descended from nuclear decay, lead 204, is in the zircons. (If there are significant amounts of thorium 232 in the zircon, then significant amounts of its descendant, lead 208, will be there also. Lead 207, the descendant of the relatively scarce uranium 235, is also in zircons in small amounts.)

Zircon is also a very hard crystal with a tight lattice, so once it has solidified, very little uranium and lead can enter or leave it.

### Helium for the ages

Lastly, of course, there is the helium produced by uranium decay. It is there in the zircons, in large amounts — consistent with the amount one would expect from the amount of lead 206 in the zircon if it were produced by nuclear decay. Helium atoms, being lightweight, fast-moving, and not chemically sticky, would depart from microscopic zircons in only thousands of years. The fact that helium is still there is the conundrum for long-agers upon which the RATE project team seized.

It follows that the only answer to the original question (how does lead get into the crystals?) which I can imagine is that most of the lead — on the order of a billion years’ worth at today’s decay rates — got into the zircons **by nuclear decay of the uranium 238 that was in the zircons from their beginning**. Yet we know from Scripture that there were only thousands of years available for the decay to take place. So billions of years worth of decay took place within thousands of years ... accelerated nuclear decay. The young helium diffusion ages we got for RATE’s zircons confirm that.

### Reference

Humphreys, D.R. 2005. Young helium diffusion age of zircons supports accelerated nuclear decay, ch. 2 of *Radioisotopes and the Age of the Earth, Volume II, Results of a Young-Earth Creationist Research Initiative*, L. Vardiman, A. A. Snelling, and E. F. Chaffin, editors, Institute for Creation Research, El Cajon, CA and Creation Research Society, Chino Valley, AZ, pp. 25-100. Archived at: [www.icr.org/i/pdf/technical/Young-Helium-Diffusion-Age-of-Zircons.pdf](http://www.icr.org/i/pdf/technical/Young-Helium-Diffusion-Age-of-Zircons.pdf)

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## *Creation Matters*

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Myr (Borg et al., 2011). In comparison, the oldest radiometrically dated rocks on Earth come from metasedimentary deposits in Jack Hills, Western Australia, where a single zircon was age-dated at  $4,404 \pm 8$  Myr (Wilde et al., 2001). These results present a problem for geologists, who had supposed that the Moon's crust was older than Earth's.

In an effort to reconcile the younger age for the FAN rocks, Borg et al. (2011) offered several possible answers. They first proposed that the magmatic differentiation of the Moon and Earth could have theoretically occurred within 40 Myr of each other, but recognize that it is not likely. Another possibility was that no magma ocean ever existed, but this idea is currently unacceptable to lunar geologists. Another possibility was that the younger-than-expected age reflects a more recent impact-generated melting event. Finally, they suspect that during magmatic crystallization, cumulates overturned due to density variability or magmatic intrusions penetrated an already formed lunar crust (Borg et al., 2011).

This new and younger age calculated from FAN rocks has not been challenged. Rather, lunar scientists are now calling for the redating (using more modern methods developed by Borg et al. [2011]) of the former crustal rocks purported to be 4.55 billion years old.

### What's next for proponents

The new age-dates of these FAN rocks call into question a long-standing theory regarding the formation of the Moon's crust by magmatic differentiation. Drake (2011) pointed out that the new age-date creates a 150-million-year gap between predictions

of the existing theory and empirical radiometric evidence. While this does not appear to be a dramatic difference on the scale of over 4.5 billion years, it seriously challenges the popular magma ocean model and demonstrates the problems that radiometric dating can create for naturalistic models.

However, since radiometric dating allows for user subjectivity (Froede, 2010b), the age of the Moon's crust will probably eventually be resolved to the satisfaction of the naturalists. This will involve choosing the right mineral, mineral suite, or rock matrix, and using the deemed-to-be appropriate radiometric dating method. I suspect that the eventual age of the Moon's crust will be reestablished around 4.55 billion years because their model of natural history requires it.

### Another view

Alternatively, as young earth creationists, we know that the Sun, Moon, and stars were created on Day Four, because God tells us in His Word. We do not have to apply radiometric dating methods or attempt to accelerate naturalistically-derived age-dates to determine the age of our Moon. Likewise, we know that God formed the Moon and hung it in space to provide a means of tracking "time and seasons" which serves a useful purpose for mankind.

Unfortunately, naturalistic science rejects a worldview that sees that the purpose and design of God's created universe is to show His glory. The Moon was created separately from the Earth, as a unique satellite, clearly demonstrating purpose and form. We should thus expect both similarities and differences in comparison to Earth. The similarities arise from common design, while the differences from the distinct purposes of the two bodies. Ongoing studies attempting to re-establish the 4.55-billion-

year age of the Moon demonstrate the futility of naturalism. The true history of the Moon will always be unknown to them and will prove to be a frustrating pursuit as new evidence overthrows popular theories which have been established on a faulty premise.

### Conclusion

Finally, this new anomalous age for the Moon's crust (according to the popular magma ocean model) should be an object lesson to young-earth creationists to exercise the proper amount of uncertainty in their own historical models and theories. While the Bible provides an outline of Earth history, we should be careful in defining what we believe to be the details. We need to test our ideas, defend them with empirical evidence, and be ready to change them as data demand.

The "model" should not drive the results, as happens so often in the naturalistic framework. At times, the best answer is that we do not have an answer (at least at the time), realizing that everything we could muster to explain the origin, process, or product is just pure speculation. Let us continue to keep our models in perspective as we seek to define the world around us consistent with Biblical history.

### 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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Froede, C.R., Jr. 2010a. Lunar madness: Integrating

on the Moon, and older than all crustal rocks found on Earth, too. Naturalists believe that the size and composition of the Moon allowed it to crystallize faster than did the Earth.

The recent discovery that FAN rocks do not age-date consistently with the expectations of the Magma Ocean Model raises two serious questions. Either 1) the model is incorrect, or 2) the radiometric age-dating used for this study is inaccurate. The discovery of a concordant

date using a different radiometric method shifts the issue to the Magma Ocean Model.

—CRF

Naturalists contend that the Moon slowly solidified in orbit around the Earth following its violent separation approximately 4.55 billion years ago. As its outer crust cooled from a magma ocean, various igneous rocks would have crystallized and formed its crust. Sampling of the Moon's surface rocks during various Apollo missions identified three main groups of igneous rocks believed to have crystallized from the original magma ocean (Hopkins, 2010):

1. ferroan anorthosite suite (FAN)
2. magnesian suite
3. alkali suite

The Magma Ocean Model requires that these non-mare igneous rocks radiometrically age-date older than all other rocks

*The Magma Ocean Model*

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## Math Matters

by  
Don DeYoung, Ph.D.



### Unlucky Number

**T**riskaidekaphobia is the technical term for a fear of the number 13. The Greek roots in this word include tris (3), kai (and), deka (10) and phobia (fear). The origin of this phobia is uncertain. Some have suggested a connection with the 13 people at the last supper, including Christ and his 12 disciples. Presumably in this view, Judas was an omen of bad luck. It is illogical, however, to combine "bad luck" with biblical history.



Whatever the origin of the phobia, it is very prevalent.

Many people feel uneasy when the thirteenth day of the month falls on a Friday, which happens in months that start with Sunday, usually 1 to 3 times a year. In numbering floors or rooms in motels and high-rise buildings, the number 13 is often skipped over.

A fear of the number 13 may be self-fulfilling, as people watch for examples of misfortune. Consider Apollo 13, the third manned landing mission to the moon. The craft was nearly destroyed by an on-board explosion. The accident occurred two days after the vehicle was launched at 13:13 CST on April 11, 1970, or 4/11/70. Adding these numbers twice, in the following manner, results in the number "13."

$$4 + 11 + 70 = 85, \text{ then } 8 + 5 = 13$$

This arbitrary manipulation of numbers to achieve the number 13 has no special meaning. One can produce any number whatsoever by arbitrary manipulation of digits. It should be added that the three Apollo 13 astronauts returned safely to earth.

A counter example to the negative superstition of number 13 is the "baker's dozen," where one extra item is added to the usual 12 to make 13. Consider also the 13 original American colonies and their stripes on our flag. There is nothing inherently unlucky about the number 13. Christian theology is based on certainty, not luck or superstition.

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### 2012 Staff and Board of Directors of the Creation Research Society



The staff and Board of Directors of the Creation Research Society met for their annual meeting in Denver, CO on June 7-9. Pictured from left to right are: Glen Wolfrom, Kevin Anderson, Robert Hill, Diane Anderson, Jean Lightner, Don DeYoung, Mike Oard, Gene Chaffin, Danny Faulkner, Mark Armitage, Ron Samec, and Gary Locklair. Not pictured are John Reed and Russ Humphreys. Kevin (Director) and Diane (Administrative Assistant) are professional staff located at the Van Andel Creation Research Center.

*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 What are nested hierarchies? Are they evidence for evolution?

A A nested hierarchy is a way of arranging items so that one or more are included in a larger category. It is a common way to arrange things and can be used for clothing, buildings, silverware, vehicles, and so forth (Figure 1). It is also used to classify living things (Figure 2).

It is often stated that evolution predicts that life will be arranged as a nested hierarchy (Anonymous, n.d.). The more closely related two organisms are, the greater the number of characteristics they should share. It is claimed that this is what we see when we look at the living world and the fossil record. Of course, the nested-hierarchy system of classification preceded Darwin's *Origin of Species*, dating back at least to Aristotle (Anonymous, n.d.), so in reality this is at best a post-diction rather than a prediction.

While some claim this pattern is expected if evolution is true, others disagree. If evolved traits are lost and replaced at a high rate, then there would not be an apparent nested hierarchy pattern. So in reality the theory of evolution doesn't make such a prediction. Instead, it is malleable enough that it can accommodate a nested hierarchy or any other pattern. Further, it has been argued that a nested-hierarchy pattern is more in line with the creation model

(ReMine, 1993). Certainly, since people often categorize things in this way, it is possible that God created life in this pattern to help us make sense of the world around us.

However, there is some question as to whether life fits the hierarchical pattern as well as is often implied. This is particularly true in ways that affect the evolutionary idea of universal common ancestry. For example, in birds there have been numerous taxonomic changes proposed based on a test which evaluates similarity in the DNA sequence (Sibley and Monroe, 1990). If common ancestry is true, it would seem that animals which are similar in appearance would be consistently more similar at the DNA level, too. However, this is often not the case, so evolutionists must explain many physical similarities as convergence; i.e., the same trait occurs in two different species that is *not* the result of common ancestry.

This problem is not limited to birds. There have been numerous rearrangements in mammals as well. For example, the elephant shrew is a small rodent-like mammal that was once placed with other mammals which are similar in appearance, such as shrews and tree shrews. Now these mammals are placed far apart taxonomically. The elephant shrew is now considered more closely related to elephants and manatees; tree shrews are considered more closely related to monkeys and flying lemurs; and shrews are placed near cattle and whales. Another bizarre grouping is horses being placed closer to bats and dogs than to other hoofed mammals such as cattle (Nishihara et al., 2006).

These bizarre groupings are not nearly so difficult for the creationist to defend. They merely seem to indicate that shrews, tree

shrews, elephant shrews, elephants, manatees, flying lemurs, whales, horses, bats, dogs, and cattle are derived from separately created kinds. By removing the assumption of universal common ancestry, these patterns are more easily explained.

In reality, then, while life can be classified in a nested-hierarchy pattern, it does not neatly fit the type of nested hierarchy that would be most logically expected if universal common ancestry were true.

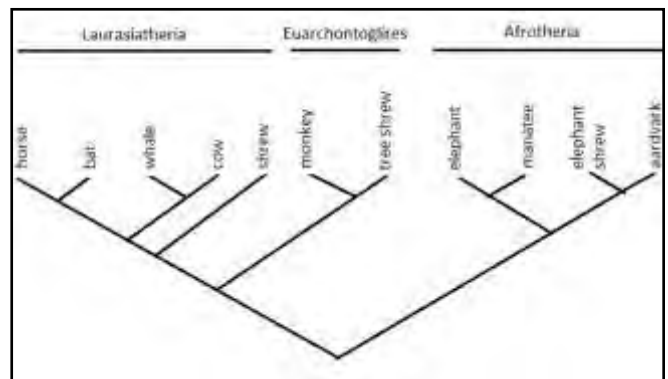


Figure 2. In this mammal cladogram based on Nishihara et al. (2006), notice that the shrews, tree shrews and elephant shrews are currently placed in three separate clades (groups). Additionally, large quadrupeds (horse, cow, elephant) are not placed together as they once were. These groupings, based on DNA evidence, illustrate how groupings based on DNA similarity often conflict with groupings based on morphology.

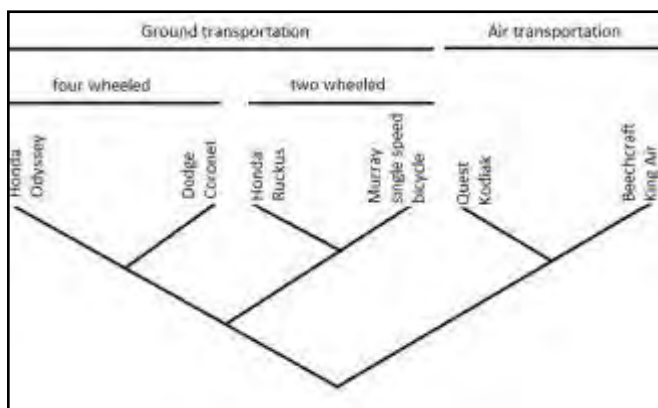


Figure 1. Vehicles can be grouped as a nested hierarchy according to primary means of locomotion. It is pictured here as a vehicle cladogram, which is typically used in biology.

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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. Opinions expressed herein are his own. Additional commentaries and reviews of news items by David, complete with hyperlinks to cited references, can be seen at: <http://crev.info/>. Unless otherwise noted, emphasis is added in all quotes.

## Ready, Aim, Flower

How does a plant know when to flower? A new study describes a process involving genes, sunlight sensors, switches, clocks, feedback loops, and messages.

The research, published in *Science*,<sup>1</sup> focused on a protein that is sensitive to day length. The longer the day, the more the protein is produced. Its activity is controlled by the circadian clock, a set of genes and proteins that keep time in all plants and animals.

In the lab plant *Arabidopsis*, this protein, named FKF1, is allowed (when the days become long enough) to activate another protein that activates flowering. This second protein, though, has to travel from the leaves where it is made, to the tips of the stem. There, it turns on the flowering system. The paper described the complexity of the system:

The FKF1 photoperiod sensor uses **multiple, partially redundant switches** to allow strong activation in long days. As the Sun rises higher in the sky each day when spring approaches, **plants can sense the increased intensity in the blue-light range of the spectrum** each afternoon through **multiple photoreceptors**, including FKF1. **The complexity of this mechanism even in a temperate species such as *Arabidopsis* suggests that it has the flexibility to regulate successful reproduction in a wide range of environments.**

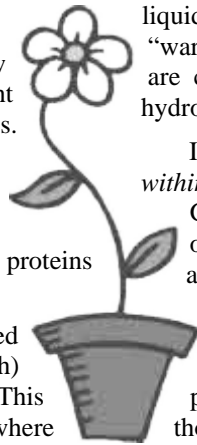
In other words, their lab plant has probably one of the simpler systems. Seasonal response is probably even more complex in some plants and animals, but even bacteria are known to have circadian clocks of Paley-like complexity. Neither the paper nor the summary on *PhysOrg*<sup>2</sup> mentioned evolution.

1. Song, Y.H., R.W. Smith, B.J. To, A.J. Millar, and T. Imaizumi. 2012. FKF1 conveys timing information for CONSTANS stabilization in photoperiodic flowering. *Science* 336 (6084):1045–1049.
2. University of Washington. It's in the genes: Research pinpoints how plants know when to flower. *PhysOrg*. Retrieved June 15, 2012, from <http://phys.org/news/2012-05-genes.html>

## Titan Lake News: Throwing Caution to the Wind

Recently, planetary scientists cautiously suggested the possible presence of an equatorial lake on Saturn's moon Titan. You wouldn't know that from the headlines.

In *Nature*, Griffith et al. announced the "**Possible tropical lakes on Titan** from observations of dark terrain" (italics added).<sup>1</sup>



"Possible" is the operative word; the discovery depends on interpretation of spectral signatures obtained by the Cassini orbiter flying by the giant moon of Saturn. Most lakes have been found in polar regions. This would be the first semi-permanent body of liquid methane found in "tropical" (in other words, equatorial, not "warm," since Titan is -290 ° F). Most of Titan's mid-latitudes are covered with sand dunes made of icy grains coated with hydrocarbons.

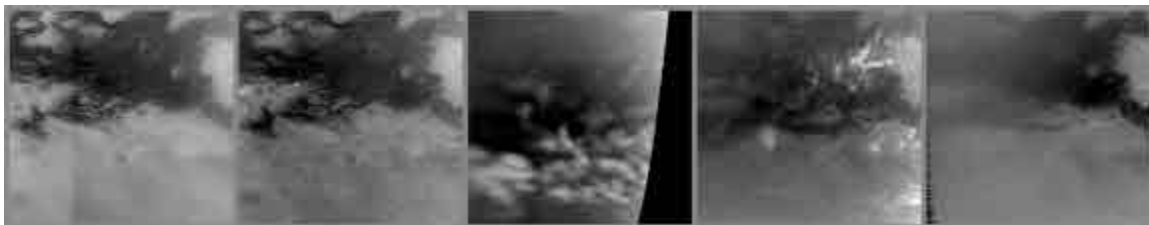
In short, *if* the scientists interpret the color bands correctly, *within the margin of error*, a dark oval patch about the size of Great Salt Lake *might* be a lake of liquid methane. But other options are possible from the data — for instance, it could be a mudflat, a rain puddle, or a patch of dry hydrocarbon-coated sand. Cautiously, the scientists could only state that the data are *consistent* with its being a liquid methane lake as the best explanation. But even that hypothesis raises new problems, because lakes in tropical regions on Titan are thought to be unstable due to prevailing winds that pile up sand grains into giant dunes. So *if* it is a lake, the scientists *surmised* that the methane would have to come from below, like groundwater in marshes or oases on Earth, instead of from the atmosphere. But they can't tell (if it is a lake) how deep it is, or how long it has been there, other than to note it has been observed since 2004.

A lake — an oasis — a marsh — tropics — those suggestive words were all the news media needed to go nuts with visions of certainty. Here's how it got reported:

- *LiveScience*: "**Giant Tropical Lake Found** on Saturn Moon Titan" (Charles Q. Choi).<sup>2</sup>
- *PhysOrg*: "**Lake detected** near equator of Saturn's moon Titan."<sup>3</sup>
- *NewScientist*: "**Titan's tropical lake** hints at **hydrocarbon wells**."<sup>4</sup>
- *National Geographic*: "**Saturn Moon Has Tropical 'Great Salt Lake,' Methane Marshes**" (Andrew Fazekas).<sup>5</sup> This one even had artwork.
- *CNN*: "A moon of Saturn **may have 'tropical' lakes**."<sup>6</sup>

All but *LiveScience* tied the report in with "building blocks of life," but what they didn't report is that even if this is a methane lake, it is a paltry pittance of one, compared to what scientists expected in the 1990s to find: a global ocean of liquid ethane and methane several kilometers deep. And only *LiveScience* went into any detail about the problems with the lake hypothesis.

The problem gets even worse. The final paragraph of the *Nature* article pointed out that scientists are puzzled how any methane could still remain after the presumed 4.5 billion years of Titan's existence, given that methane is destroyed rapidly:



Left: Series of images showing changes to Titan's methane clouds and equatorial surface during methane rains.

Photo credit: NASA/JPL/SSI

General circulation models demonstrate that **long-lasting tropical lakes several metres deep must be replenished**, depending on the ethane content, **within a ten-thousand-year timescale**. Taken together, tropical lakes and studies of Titan's lakes **suggest that, currently, subterranean liquid supplies methane** to Titan's surface and atmosphere. A supply of on average  $6 \times 10^{-4} \text{ kg m}^{-2} \text{ yr}^{-1}$  is **needed to explain** the composition of Titan's atmosphere, **because methane, the progenitor of the moon's organic species, is destroyed in 10–100 million years through solar ultraviolet photolysis**. More observations are needed to determine whether this 4.5-billion-year-old moon is **undergoing a specific recent flourish of geological activity, because it is freezing and its orbit decaying**.

What that last sentence implies is that scientists are being forced by the evidence to consider special conditions — **“a specific recent flourish of geological activity”** — to account for the presence of methane on Titan at all. At most, the methane on this bizarre moon would all be gone in 100 million years, *one fortieth the assumed age of Titan*, unless it were constantly being supplied from somewhere.

Underground reservoirs might provide a convenient (unobservable) hiding place for the stockpile, but that solution arouses geological puzzles about how deep the methane would need to be, how it would form, and how it could erupt onto the surface. Added to that are indications that since Titan is freezing and its orbit is decaying, there should be less geological activity, not more.

Secular scientists are generally reluctant to invoke any “specific recent flourish” of activity occurring right at the time humans are around to observe it. Why now, and not throughout Titan's existence? The contrast between scientific caution in the paper and media exuberance provides a case study in how science is communicated to the public.

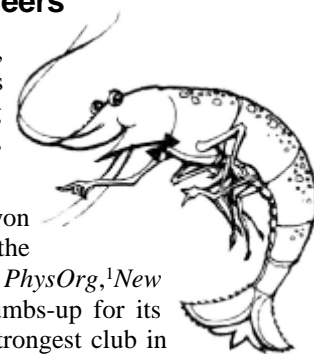
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## Animal Olympians Inspire Engineers

Here are more stories about animals, plants, and cells attracting scientists with their astonishing capabilities, proving that biomimetics is one of the hottest trends in science.



**Nutcracker sweet:** The mantis shrimp won another gold medal after triumphing in the circularly-polarized eye competition. *PhysOrg*,<sup>1</sup>*New Scientist*,<sup>2</sup> and *LiveScience*<sup>3</sup> all gave it thumbs-up for its club-like hammer claw, found to be the “strongest club in the world,” able to deliver a force 1,000 times its own weight without breaking. Not only that, the clubs accelerate to 10,000 g's, have the fastest moving parts in the animal kingdom (23 m/sec), and are so durable they deliver a thousand blows before the next molt replaces them.

Unsurprisingly, manufacturers of body armor are raising eyebrows with visions of joining the “club.” Mantis shrimp use their weapons to break open molluscs and crabs. They have been known to break aquarium glass with their little karate choppers. The clubs survive breakage by their being constructed of hard, then medium, then soft layers that distribute the force and inhibit cracks from forming. The original paper in *Science* calls the claw **“A Formidable Damage-Tolerant Biological Hammer.”**<sup>4</sup>

**Al G. Lightner, NRC:** Algae and bacteria accomplish a feat green engineers drool over: the ability to harvest light efficiently for energy. Artificial fuel cells need their secrets to make green energy competitive with fossil fuels (which, by the way, are by-products of plants that used photosynthesis to make the complex hydrocarbons). *PhysOrg*<sup>5</sup> reported on new attempts at Lawrence Livermore Labs to use X-ray diffraction to probe the secrets of Photosystem II, the plant antenna where the magic happens and water is decomposed into hydrogen, oxygen, and electrons. The article paid customary lip service to Mother Nature and long ages without explaining how the complex process arose:

**For more than two billion years, nature** has employed photosynthesis to oxidize water into molecular oxygen. **Photosystem II, the only known biological system that can harness visible light for the photooxidation of water,** produces **most of the oxygen in Earth's atmosphere** through a **five-step catalytic cycle** (S0-to-S4 oxidation states). **Light-harvesting proteins** in the **complex** capture solar photons that energize the manganese-calcium cluster



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and drive a series of oxidations and proton transfers that in the final S4 state forms the bond between oxygen atoms that yields molecular oxygen.

Overall, though, the article was about how human designers, using cutting-edge tools to probe the “photosystem II complex” for secrets, have been unable to duplicate what single cells accomplish. “Doing this study was a **monumental achievement** that required a large team to make it happen,” one noted. Why so much effort? “**We hope to learn from nature’s design principles** and apply that knowledge to the **design** and development of artificial photosynthetic systems.”

**DNA Disk:** Hey, DNA is “the molecule that already stores the genetic blueprints of all living things,” *PhysOrg*<sup>6</sup> says. Why not use it for a hard drive? Drew Endy, a pioneer in synthetic biology at Stanford, was interviewed in the article to explain how he intends to “**turn the basic building blocks of nature into tools for designing living machines.**” He’s thinking ahead to applications for waste treatment, medicine, manufacturing, and others he can’t even imagine. As for his DNA hard drive, he didn’t say how the USB interface might work, but he did share his feelings a bit:

What we’re likely to end up with will not look like classical electronics. **Biology is beginning to teach us how to be a little bit more sophisticated in our engineering designs, which is a lot of fun.**

**Current trends:** “Biomimetic” is a trendy word, more frequently encountered in scientific papers every year, as in this paper’s title, “Biomimetic emulsions reveal the effect of mechanical forces on cell–cell adhesion.”<sup>7</sup> The research team in that paper not only studied cells for ideas about adhesion, but used a “biomimetic approach” to doing their science. The emphasis in these sciences is on (1) understanding and (2) application, for the benefit of mankind. Though not mentioned in the paper and articles cited above, these discoveries also point to the awesomeness of the Designer, the Lord God our Creator.

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## Rapid Undersea Geology Observed

An undersea volcano near the Cook Islands was observed to grow and shrink rapidly in a fortnight, rivaling the rapid changes in Vesuvius and Mt. St. Helens.

The *BBC News*<sup>1</sup> reported that a research team from Oxford “recorded **huge changes in height in just two weeks.**” In fact, they were glad they weren’t there during an explosive phase, or else “rocks could have hit the hull of the ship — that could have been potentially dangerous.”

Submarine geology is “little known,” the article said. Sonar images of the undersea volcano before and after showed rapid changes had occurred:

Later the ship returned to the scene and the scientists were **surprised to see how much the volcano had changed.** In the space of a fortnight, one part of the volcano’s summit had collapsed by as much as 18.8 m while new lava flows had raised another area by 79.1 m. Most striking was the creation of **an entirely new volcanic cone.**

The researchers believe the **changes are larger than at most other volcanoes.** Only Vesuvius and Mount St Helens have recorded larger growth rates.

The paper says **the speed of growth and change is “a reminder of how rapidly geological processes such as submarine landsliding and volcanism can occur.”**

The article stated that some 32,000 undersea mountains have been identified, many believed to be volcanic in origin. Lead author Tony Watts called this “a **wake-up call that the sea-floor may be more dynamic than we previously thought.**” He remarked, “**I’ve spent my career studying the seabed and have generally thought it pretty stable so it’s stunning to see so much change in such a short space of time.**”

*LiveScience*<sup>2</sup> called the volcano the Monowai Seamount. Based on sonar measurements from 2007, Tony Watts’ team figures the volcano must have undergone 10 to 13 similar eruptions — perhaps 2 or 3 “large, quick eruptions each year,” the article said. If submarine geology is indeed little known, there could be many other examples of rapid undersea volcanic changes that have so far been out of sight, out of mind.

Why was he stunned? Undoubtedly, it’s due to the fact that he was indoctrinated as a student into Lyell’s uniformitarianism and Darwin’s vision of millions of years of slow, gradual changes. His own words show that such doctrines put geologists into the bad habit of thinking inside an artificial box.

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...without excuse!

by Timothy R. Stout

# THE TESTIMONY OF SOAP SCUM

David Deamer is a professor in the Department of Chemistry and Biochemistry at the University of California at Santa Cruz. He is one of the world's foremost research scientists studying the origin of life. As such, he was chosen by the Cold Springs Harbor Laboratories to be a co-editor of a 19-article collection on the most recent advances in the study of abiogenesis (Deamer and Szostak, 2010).

Prior to this he had a rather original thought for a chemical evolutionist (Deamer *et al.*, 2006). Instead of mimicking assumed pre-life processes under the controlled conditions of a laboratory, he would find a place on the current earth which might reasonably represent such conditions, introduce a supply of raw chemicals, and see what happened.

He was surprised at the results, though perhaps he shouldn't be. A number of unanticipated obstacles prevented success.

Volcanic aquifers are potential models of a prebiotic environment that may be conducive to synthetic organic reactions... To test this idea, we have performed preliminary experiments in geothermal sites in Kamchatka, Russia and Mt Lassen, California, in order to determine how a set of pertinent organic compounds behave in such settings. ...At both the Kamchatka and the Mt Lassen sites, we added a defined set of primary molecular constituents of life to the hot springs. This included four amino acids (glycine, L-alanine, L-aspartic acid and L-valine, 1 g each), four nucleobases (adenine, cytosine, guanine and uracil, 1 g each) sodium phosphate (3 g), glycerol (2 g) and myristic acid (1.5 g). We expect that this mixture is a useful guide for monitoring degradation reactions, in addition to serving as a potential source of reactants for any synthetic reactions that might occur.

At the end of analysis, the samples were examined by phase-contrast and fluorescence microscopies for possible bacterial growth, but none was found.

It is important to realize that Deamer did not start with typical products of first-stage abiogenesis processes, such as those which were represented by Miller's famous

experiment. These processes invariably produce a wide variety of products. This is by nature — simple molecules containing carbon and nitrogen are typically assumed to represent the initial starting raw materials for abiogenesis. It is characteristic of both carbon and nitrogen that they easily form multiple thousands of different kinds of molecules. When a broad, non-specific, uncontrolled energy source is applied to molecules featuring these two elements, a wide variety of products can be and will be produced.

These products are inherently not compatible with the requirements of abiogenesis (Stout, 2010). So, Deamer and colleagues started with an idealized source of chemicals of his own choosing, at the ratios with each other he believed would be most conducive to achieving positive results, and at concentrations that he hoped might produce reportable results. If any scenario should demonstrate realistic progress towards abiogenesis, it seems that this would be it.

## Surprising results

The results of the experiment surprised this research team. Here are some representative quotes (Deamer *et al.*, 2006):

A white scum appeared in the Kamchatka pool within minutes of adding the organic mixture. The precipitate is probably a mixed iron and aluminum soap, which would remove the fatty acid as a potential reactant.

The phosphate and added amino acids were below detectable limits in minutes to hours.

The observation that organic compounds were below detection limits so rapidly was surprising.

The origin of life in a natural setting would have had a variety of possible fates other than those observed in a laboratory setting, where pure compounds react in glass containers.

The last two quotes taken together represent perhaps the greatest significance of the entire experiment. Deamer is one of the foremost biochemists in the world. Yet, he was still unprepared for how much harsher a natural environment is than a laboratory setting. In so many words he effectively acknowledged that there can be all kinds of unexpected glitches that would be capable of thwarting abiogenesis in a natural setting,

although he was more discrete in his wording. This is particularly significant when one considers that even with all of the advantages of a "laboratory setting, where pure compounds react in glass containers," naturally occurring roadblocks have so far thwarted every effort to provide a clear, successful demonstration of an advance in abiogenesis at any stage. Yet, in the wild we should expect worse results than observed in a laboratory, even as the experiment demonstrated.

Actually, Deamer had yet another unexpected result. Many articles have been written proposing clay surfaces as a means of concentrating monomers such as amino acids and nucleotides in order to promote their concatenation into proteins and nucleic acids. But the exact opposite happened in the experiment. The initial concentration of supplied reactants was higher than might reasonably be expected in a natural setting, except possibly at the edges of the pool. The clay served to isolate the molecules attached to it, not force them together. After examining the results of his experiments he observed, "Perhaps more important is that even if the reactants are concentrated by adsorption to a mineral surface, they are likely to be isolated from one another." This is not what was supposed to happen!

I found it rather humorous that the article was named, "Self-assembly processes in the prebiotic environment." The only thing assembled in this experiment was *soap scum*. This does not bode well for those who are staking their eternal destiny on the validity of abiogenesis. Indeed, God gives clear testimony of Himself by His creation. This testimony is so clear that *He* considers a person who does not receive it to be *without excuse*.

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## All by Design

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

# A Second Heart

According to the Bible, each kind of animal was deliberately designed by an intelligent Creator. If this is so, then it is logical to assume that the Creator designed them in such a way that they could reproduce and fill the earth as he intended. Often, such marvelous design is manifested by a number of physical structures working together in an amazing way that benefits the creature. A constant companion to mankind throughout the millennia, the horse can be cited to illustrate this point.

It is evident that the horse's leg is eloquently designed for rapid locomotion and optimum maneuverability for an animal its size. The horse's lower leg, however, has no muscles to assist the flow of venous blood back to the heart. Arterial blood flowing through arteries from the heart has no difficulty reaching the horse's feet. Venous blood must return to the heart in a timely, cyclical fashion, or severe tissue damage ensues. How then does blood get back to



the heart? Relax — the horse's hoof is specially designed to solve this potential problem.

There is a vast network of veins within the hoof, called a plexus. As the horse steps down onto one of its feet, this plexus is squeezed between structures called the plantar cushion, the lateral cartilage, and the third phalanx or "coffin bone" of the hoof.

The net result is a pumping action, in effect a second heart, which pushes venous blood back up the leg toward the heart. Special, one-way valves in the veins prevent flow of blood back down toward the feet.

Each time the hoof is raised, the plexus opens up, allowing it to again fill with arterial blood. Compression of the plexus also serves to trap blood in special veins just below the plexus, which serves as a hydraulic cushion during weight bearing.

This amazing design allows the horse to fill its unique role in the world. It is interesting to contemplate that this peculiar but effective design must have worked perfectly from day one and could not have developed in stages, sharply contradicting the evolutionist's viewpoint that all this occurred over millions of years by blind chance. Which view requires more faith?

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