

# Creation Matters

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## Creationist Discovered Cause of Deadly Disease

by Jerry Bergman, Ph.D.

**D**r. Carl B. Fliermans is a highly respected, award-winning research scientist who was for many years a microbial ecologist for DuPont Company at the Savannah River National Laboratory. He is now President and CEO of Ecological Microbes Unlimited, Inc., in Augusta, GA. He is also an Adjunct Research Professor, Department of Toxicology, Clemson University, and was formerly Adjunct Research Professor, Department of Biology, University of South Carolina.

Fliermans was also a special consultant to the Federal Centers for Disease Control in Atlanta, Georgia, and Visiting Professor at the University of Georgia Medical School (Morris, 1993, p. 282). He now has over 100 publications, mostly in peer-reviewed scientific journals, and has served as an expert witness in 20 states. Fliermans was also on the editorial board of the scientific

journal *Applied and Environmental Microbiology*.

### Education and research

Dr. Fliermans' pre-med degree from Asbury College led, not to medical school as was his original goal, but to an M.S. from the University of Kentucky, and a Ph.D. from Indiana University in Microbiology, Limnology, and Ecology. He did his post-doctorate at The University of Minnesota.

His research led to the identification of the organism that causes legionellosis, both the Pontic fever form and the pneumonic Legionnaire's disease form that is caused by a number of the over 43 species of bacterium in the *Legionella* genus. The malady was named Legionnaire's disease, also known as "Legion fever," because it was first brought to the attention of the medical community in July 1976, when it

had killed 34 and afflicted 221 delegates attending an American Legion Bicentennial convention held in Philadelphia (Marre, et al., 2002).

Although outbreaks of Legionnaire's disease receive significant media attention, the disease usually occurs in single, isolated cases. The death rate for hospitalized patients with Legionnaire's disease is close to 50 percent. The total fatality rate for all Legionnaire's disease patients ranges from 5 to 30 percent. Most infections occur in middle-age or older adults. Young, healthy people infected with *Legionella* bacteria usually have only mild symptoms, or none at all (Fliermans, et al., 1981, 1982, 1984).

### Solving the mystery

When the new disease was first discovered,

... continued on p.3

## The 2015 CRS Conference

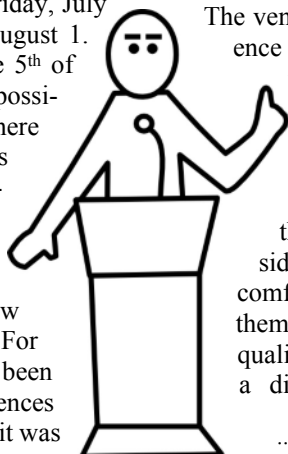
by Lindsay N. Harold, M.A.T.

**T**he 2015 Creation Research Society Conference was held at the Doubletree Hotel in Farmer's community.

Branch, Texas on Friday, July 31 and Saturday, August 1.

This conference, the 5<sup>th</sup> of its kind, was quite possibly the best yet. There were 126 attendees — the highest attendance ever. There were many who had never attended before, and many new presenters as well. For those of us who have been to all of the conferences (a shrinking group), it was

encouraging to see the conference growing in numbers and becoming better known in the creation community.



The venue made the conference quite convenient for those staying in the hotel, who had only to go downstairs to attend the sessions. In spite of the Texas heat outside, it was all very comfortable. The talks themselves were of good quality, making for many a difficult decision on

... continued on p. 2

## New Address for Memberships and Subscriptions

**B**eginning November 1, all records and correspondence regarding memberships and subscriptions will be processed through the CRS office in Chino Valley, AZ. This is the culmination of continuing efforts by the Board of Directors to centralize and consolidate all CRS operations under a single address.

Henceforth, please send your payments and direct your inquiries about memberships and subscriptions to:

Creation Research Society  
6801 N. Highway 89  
Chino Valley, AZ 86323

928-636-1153  
members@creationresearch.org

For over 30 years, the day-to-day responsibilities of processing memberships and subscriptions have resided with me, with secretarial assistance from my wife, Becky. These duties have taken up a considerable

... continued on p.4

## Conference

...continued from page 1

which ones to attend.

This year's conference was kicked off by a reception held at the Institute for Creation Research on Thursday evening. The conference proper began on Friday morning with opening remarks from Danny Faulkner. Saturday's activities began with the CRS Follies, a time for fun, jokes, and poking a little fun at ourselves. Lunches were provided free to attendees by ICR.

### Plenary talks and parallel sessions

The plenary talks were given by Kevin Anderson of the CRS and Jeffrey Tomkins from ICR. Anderson's Friday talk, titled *The Real Jurassic World*, included an update on the Creation Research Society's ongoing iDINO project to study soft tissue in dinosaur remains. Tomkins, whose plenary talk on Saturday morning was titled *New Data Debunking the Human Chromosome 2 Fusion*, discussed the supposed fusion of two chimpanzee chromosomes to form human chromosome 2, and the significant evidence that it did not happen.

After the plenary talks each morning, the conference divided into three parallel sessions of 30-minute talks, each followed by 10 minutes of Q&A. These talks were from many fields of creation science inquiry, including biology, astronomy, geology, physics, history, and theology.

### HMM Memorial Lecture

On Friday evening, the Henry M. Morris Memorial Lecture was given at a local church by his son, John Morris. This memorial lecture has been a standard feature of the conference since the beginning, and is always open to the public. Past speakers include John Whitcomb, Duane Gish, Gary Parker, and Frank Sherwin.

The conference was wrapped up Saturday afternoon with a short closing session and discussion time that allowed people to learn a little more about the Society, provide feedback on the conference, and give ideas for future meetings. After the conference, a small group of conference attendees took a field trip to the Creation Evidence Museum in Glen Rose, TX, and also examined some dinosaur tracks *in situ* at the nearby McFall farm.

### Research in process

As in previous years, most talks at the conference presented research projects that are still in process, or proposals for future research projects. In that regard, the CRS meeting is different from other conferences, providing a valuable venue for researchers to present new ideas and get feedback and input from others. Meanwhile, attendees get to hear about the cutting edge of creation science. Many talks generate significant discussion, which may be quite animated at times. Some talks are well-received by everyone, while others may be controversial. Because the talks are not finished research,

sessions are not recorded. So you really have to be there to benefit.

### Interaction and fellowship

The other great thing about the CRS conference is the interaction that it fosters between creation-minded people. It's a wonderful chance to meet and dialogue with experts in the field as well as interested lay people, to build and renew friendships, and to increase one's understanding of creation science at large. For many of us, it's also a way to put faces with names of those with whom we have interacted on CRSnet.

The less formal nature of the CRS conference provides an essential and unique forum for the exchange of ideas, while also giving Society members an opportunity to fellowship and discuss creation science with their peers. It really is a one-of-a-kind event. If you didn't make it this year, start planning for next year. You won't want to miss it.

GM

## Contents

<b>Creationist Discovered Cause of Deadly Disease.....</b>	<b>1</b>
<b>The 2015 CRS Conference.....</b>	<b>1</b>
<b>Math Matters: The Brachistochrone Problem.....</b>	<b>4</b>
<b>Speaking of Science</b>	
Worm Therapy Becoming Trendy.....	4
Underwater Marvels.....	5
Amazing Birds.....	5
Sight Is More than Having Eyeballs.....	9
"Overdose of Awesomeness": New Pluto Images.....	11
<b>Matters of Fact: A Creationist View of Natural Selection.....</b>	<b>6</b>
<b>...without excuse! The Testimony of Metastable Cellular Components.....</b>	<b>7</b>
<b>All by Design: Gearing Up for Survival.....</b>	<b>12</b>

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researchers had to determine a number of facts, including (Fliermans, 1996):

1. Was it biological or chemical?
2. From where did the pathogen, if there was one, come?
3. How was the disease spread?
4. How could the disease be prevented?

Theories of the cause of the baffling disease ranged from nickel carbonyl intoxication and viral pneumonia, to a foreign terrorist attack against American veterans. At the Centers for Disease Control and Prevention (CDC) in Atlanta, many hypothesized that *Legionella* may have been genetically engineered by the Soviets or another communist nation because it had affected primarily American veterans (Gillen, 2007, pp. 40-41).

Fliermans and his colleagues isolated from the natural environment a previously unknown bacterium that caused the disease. Legionnaire's disease, which causes a type of pneumonia, is usually contracted by breathing mist that contains the bacteria. The mist may come from hot tubs, showers, or, most commonly, air-conditioning units in large buildings. A conservative estimate is that the disease now affects 10,000 to 50,000 people in the United States annually.

Fliermans's research on this disease has taken him to the hot spots of Yellowstone National Park, the swamps of Georgia, and the depths of the ocean floor. The research findings produced from his probing the microbiological world have elicited numerous accolades from the scientific community.

On January 18, 1977, the causative agent of the potentially fatal infectious disease was finally identified as a gram-negative, rod-shaped, aerobic bacterium belonging to the newly named genus, *Legionella*. Gillen (2007, p. 41) wrote that "Fliermans successfully isolated a suspected pathogen from the wild and grew it in pure culture, proving beyond all doubt the specific element (*Legionella*) in an infectious disease (Legionnaire's disease)."

Over 90 percent of legionellosis cases are caused by *Legionella pneumophila*, a ubiquitous aquatic organism that thrives in temperatures that range between 25° and 63°C (77° F and 145°F), with an optimum temperature of around 40°C (104°F). *Legionella pneumophila* is only one of more than

30 new infectious agents or diseases identified since 1977 (McDade, 2002, p. 2). Legionnaire's disease is caused by a more virulent form of the infection that causes pneumonia (Marre, et al., 2002). Previous to 1977, some leading medical researchers had concluded that all of the important infectious agents had already been discovered (McDade, 2002, p. 2). Fliermans's work, which helped overturn this erroneous conclusion, was achieved in this milieu.

Fliermans solved the first part of the puzzle when he discovered that the lipids and cell walls of *L. pneumophila* resemble those of the thermophilic bacteria he had discovered from his research in the thermal regions of Yellowstone National Park. He also determined from his research that these bacteria tended to live in a biofilm (commonly called scum) that is associated with a certain algae species.

While reading the Bible during his daily devotions, Fliermans noted that wise King Solomon wrote in Ecclesiastes 1:9 that "there is no new thing under the sun." This got him to thinking, causing him to alter the way his lab

...looked for the organism, since the bacterium was probably not new under the sun. After praying, planning, and exploring, Dr. Fliermans found the bacterium in thermal waters (initially isolated at 45°C [113°F] at Savannah River Laboratory) discharged from a nuclear reactor... (Gillen, 2007, p. 40).

This bacterium was later found to be thriving both in natural hot springs all over the United States and in air-conditioning cooling towers. This latter finding was the key to discovering the cause of Legionnaire's disease. He was subsequently able to develop a fluorescent antibody test which could be used to detect the causative bacteriological agent (Gillen, 2007, p. 40).

For his many outstanding achievements, Fliermans was elected a Fellow in the American Academy of Microbiology. His alma mater, Asbury College, later honored him, writing in his award biography that he was "a graduate worthy of our special recognition... with a life of integrity and a career of monumental accomplishment. We stand in awe of a giant, tall among his peers as a research scientist" (Anonymous, 1991).

## Creationist activities

Fliermans was active in promoting creationism and, in 1981, was appointed to the technical advisory board of the Institute for

Creation Research (Morris, 1993, p. 282). He acknowledges that his creation worldview was a major factor in his success in solving the Legionnaire's disease mystery (Gillen, 2007, p. 40). At a conference titled "The Collapse of the Theory of Evolution," his presentation concluded that "Modern biochemistry proves that organisms are marvelously designed and this fact alone proves the existence of the Creator" (Fliermans, 1998).

## References

- Anonymous. 1991. Dr. Carl B. Fliermans — 1991 A[lumni] Award Recipient. Asbury University. <https://www.asbury.edu/alumni/alumni-office/alumni-awards/carl-fliermans>
- Fliermans, C.B., R.J. Soracco, and D.H. Pope. 1981. Measure of *Legionella pneumophila* activity in situ. *Current Microbiology* 6:89-94.
- Fliermans, C.B., G.E. Bettinger, and W. Fynsk. 1982. Treatment of cooling systems containing high levels of *Legionella pneumophila*. *Water Res.* 16:903-909.
- Fliermans, C.B. and R.S. Harvey. 1984. Effectiveness of 1-bromo-3-chloro-5,5-dimethylhydantoin against *Legionella pneumophila* in a cooling tower. *Applied and Environmental Microbiology* 47:1307-1310.
- Fliermans, C.B. 1996. Ecology of *Legionella*: from data to knowledge with a little wisdom. *Microbial Ecology* 32:203-228.
- Fliermans, C.B. 1998. Quoted in *The Evolution Impasse, Volume 1*, by A. Oktar (H. Yahya). Istanbul, Turkey: Global Publishing, p. 134.
- Gillen, A. 2007. *The Genesis of Germs*. Green Forest, AR: Master Books.
- Marre, R., Y.A. Kwaik, C. Bartlett, N.P. Cianciotto, B.S. Fields, M. Frosch, J.Hacker, and P. Christian Lück (editors). 2002. *Legionella*. Washington, D.C.: ASM Press.
- McDade, J. 2002. Legionnaires' disease 25 years later: lessons learned. *In* Marre et al. pp. 1-9
- Morris, H.M. 1993. *History of Modern Creationism*. Santee, CA: Institute for Creation Research.

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## The Brachistochrone Problem

The title refers to a famous math problem from the 17<sup>th</sup> century. The name, pronounced 'bra-chist'-to-chrone, derives from Greek words for "shortest time." The challenge was made by Johann Bernoulli (1667–1748) in 1696: Suppose an object slides friction-free along a path from a higher to a lower level, the ending point not directly below the start. Of all possible paths between the two points, which will take the least time?

The shortest distance between two such points would simply be a straight line sloping downward. Finding the path of shortest time, however, is not trivial. After several

months the problem still awaited solution. Eventually, the mathematical challenge arrived at the desk of Isaac Newton (1642–1727) who was occupied at the Royal Mint in London. In one evening, Newton solved the problem and delivered an anonymous solution.



Johann Bernoulli

Newton made use of his recent work called the calculus of variations. With this tool Newton proved that the path of least time follows part of a curve called a cycloid. This curve is also the path traced by a point on the rim of a moving bicycle wheel. The cycloid curve is not quite circular. As the object moves in the brachistochrone problem, the initial path is steeply downward, with a high speed gained for the rest of the path which is somewhat gentler in slope. Several brachistochrone problem solutions are available today online.

Johann Bernoulli may have been trying to stump Newton, a competitor in math. However, having received the anonymous solution, Bernoulli is said to have remarked (perhaps apocryphally), "We recognize the lion by his claw." The problem illustrates creation in at least two ways. First, mathematics is the language of creation, describing the makeup and dynamics of all matter. Furthermore, elegant mathematical curves have multiple applications in nature. Second, Isaac Newton was a godly pioneer scientist. He was gifted by the Creator with extraordinary insights in math and science.

Wikimedia Commons

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### New Address for Memberships and Subscriptions ...continued from page 1

portion of our daily lives. All of that will change, as we transfer to the AZ office the paper records and computer files that have lived with us in MO. I will remain on the Board of Directors as Membership Secretary, and will continue as editor and graphic designer for *Creation Matters*.

We are blessed by the Lord to have been a part of the everyday activities of this vital work. A kinship/friendship with many members has formed over the years through the numerous handwritten communications and phone calls. Becky even recognizes the handwriting of many long-time members. It's the end of an era. We'll miss you!

— Glen Wolfrom

GM

## Speaking of Science from the Creation-Evolution Headlines by David F. Coppedge

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

### Worm Therapy Becoming Trendy

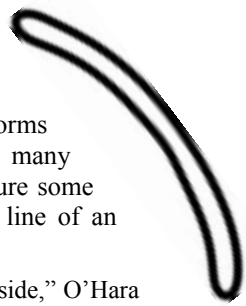
Treatment with helminths (roundworms), once considered gross, is actually proving effective.

If you can get over the "ick factor" of putting worms in your body, you might take a new look at what many patients are finding: helminths (roundworms) can cure some diseases other treatments can't. Here's the bottom line of an article from *Medical Xpress*:

"The risk-benefit ratio is so skewed to the benefit side," O'Hara said. "Helminths are **much safer than any medication I've ever put any child on, or any adult.** I really do think that this is something more and more physicians need to consider."<sup>1</sup>

Helminth therapy (the preferred term, since "worms" grosses people out) has proven effective for severe food allergies and inflammatory bowel disease. It's given some patients a new life.

Of scientific interest is whether helminths should be classed as parasites. That link is "controversial," the article says, because while





some truly do cause harm, there are other helminth species that cause no harm and bring only benefits. What's the difference in living with other internal organisms, like gut bacteria, that help us digest our food?

For creationists, this relatively recent change of opinion may be instructive about original ecology. Instead of classing organisms into simplistic, good-and-bad categories, maybe we should take a look at some things as potentially good under the right circumstances. Certainly the Genesis 3 curse caused pain and suffering in many cases, but we shouldn't assume that some organisms we have been conditioned to consider bad are in fact bad. Another case is maggots, now being used for cleaning wounds. That's something Hugh Glass knew about and benefited from (as shown in the upcoming movie, *The Revenant*, opening Christmas 2015).

Don't rush to get bit by a rattlesnake or stung by a scorpion, but keep an open mind about yucky things in nature. Grasshoppers are good sources of protein, for instance. Each case needs its own evidence.

1. Faherty, S. (2015, August 3) Scientists study the benefits of worms. *Medical Xpress*. Retrieved September 21, 2015, from <http://medicalxpress.com/news/2015-08-scientists-benefits-worms.html>

## Underwater Marvels

Check out these amazing creatures that inhabit the liquid universe of planet Earth's oceans and rivers. Only the first one is a fish.

Aquatic hunger games: Archerfish spit the distance for food (*ScienceDaily*<sup>1</sup>): "Described as **nature's sharpshooters or water pistols**, archerfish inhabit the mangroves of southeast Asia and northern Australia." Experiments show they can shoot distant targets, but prefer the closer ones.

Marine animal colony is a multi-jet swimming machine, scientists report (*PhysOrg*<sup>2</sup>): Tiny jellyfish that hang together are inspiring multi-engine underwater propulsion systems. The jellyfish, called siphonophores, use a propulsion mechanism that is "relatively rare in the animal kingdom"—squirting from multiple identical orifices. It allows them to "**turn on a dime, very rapidly.**" *ScienceDaily*<sup>3</sup> adds, "This is a **highly efficient system in which no developmental stage is wasted...It's a quite sophisticated design, for what would seem like a simple arrangement.**"

Giant sea scorpion found in Iowa (*Science Magazine*<sup>4</sup>): Fragmented fossils of a human-size sea scorpion were dug up in northeastern Iowa, presenting a conundrum for evolution: "**Either eurypterids diversified quickly** during the early stages of the **Ordovician period** (which began about 485 million years ago), **or their lineage, including yet-to-be-discovered ancestors and kin, evolved more slowly and originated even further back in time** during the Cambrian period—**possibly during the Cambrian explosion**, a period of evolutionary diversification sometimes called '**life's big bang**,' which began about 542 million years ago." Eurypterids are arthropods like trilobites.

First cephalopod genome contains unique genes involved in nervous system, camouflage (*PhysOrg*<sup>5</sup>): The genome of a California octopus surprised scientists with its complexity, comparable to the human genome. A one-minute video clip in the article shows the

octopus undergoing rapid color changes to match its surroundings, even creating half-and-half patterns. See also *Evolution News & Views*<sup>6</sup> on these findings, and the comments by Casey Luskin further highlighting the problems it creates for the evolutionary worldview.<sup>7</sup>

Rare nautilus sighted for the first time in three decades (*ScienceDaily*<sup>8</sup>): The beautiful chambered nautilus (another cephalopod) once graced the seas in large numbers and huge sizes. Now, they are rare. Peter Ward (U of Washington, co-author of *Rare Earth*) was glad to find a couple of them in the South Pacific after 3 decades without any sightings. "This could be the rarest animal in the world," he commented.

Do whales get the bends? (*National Geographic*<sup>9</sup>): There's no reason they wouldn't, except that they have specialized fat that can absorb the nitrogen bubbles that naturally form when a mammal rises to the surface too quickly. "Researchers from the University of North Carolina Wilmington investigated how marine mammals' tissues—specifically, **fat deposits in the jaws of toothed whales that are used in echolocation—absorb nitrogen gas**, one of the gases that contributes to the bends. They found that **the makeup of the fat** affected how much nitrogen gas dissolves in it—and that different species had different fat compositions."

1. Wake Forest University. (2015, August 20) Aquatic hunger games: Archerfish spit the distance for food. *ScienceDaily*. Retrieved September 22, 2015, from [www.sciencedaily.com/releases/2015/08/150820090720.htm](http://www.sciencedaily.com/releases/2015/08/150820090720.htm)
2. University of Oregon. (2015, September 1) Marine animal colony is a multi-jet swimming machine, scientists report. *PhysOrg*. Retrieved September 22, 2015, from <http://phys.org/news/2015-09-marine-animal-colony-multi-jet-machine.html>
3. Marine Biological Laboratory. (2015, September 1) Marine animal colony is a multi-jet swimming machine, scientists report. *ScienceDaily*. Retrieved September 26, 2015, from [www.sciencedaily.com/releases/2015/09/150901135107.htm](http://www.sciencedaily.com/releases/2015/09/150901135107.htm)
4. Perkins, S. (2015, August 31) Scientists find oldest known species of sea scorpion. *Science Magazine*. Retrieved September 22, 2015, from <http://news.sciencemag.org/paleontology/2015/08/oldest-known-species-sea-scorpion-uneearthed>
5. University of California – Berkeley. (2015, August 12) First cephalopod genome contains unique genes involved in nervous system, camouflage. *PhysOrg*. Retrieved September 22, 2015, from <http://phys.org/news/2015-08-cephalopod-genome-unique-genes-involved.html>
6. Anonymous. (2015, August 21) Octopus genome defies evolutionary expectations. *Evolution News & Views*. Retrieved September 22, 2015, from [www.evolutionnews.org/2015/08/octopus\\_genome098651.html](http://www.evolutionnews.org/2015/08/octopus_genome098651.html)
7. Luskin, C. (2015, August 24) The octopus genome: Not "alien" but still a big problem for Darwinism. *Evolution News*. Retrieved September 22, 2015, from [www.evolutionnews.org/2015/08/the\\_octopus\\_gen098681.html](http://www.evolutionnews.org/2015/08/the_octopus_gen098681.html)
8. University of Washington. (2015, August 25) Rare nautilus sighted for the first time in three decades. *ScienceDaily*. Retrieved September 22, 2015, from [www.sciencedaily.com/releases/2015/08/150825132804.htm](http://www.sciencedaily.com/releases/2015/08/150825132804.htm)
9. Becker, R.A. (2015, August 19) Do whales get the bends? National Geographic. Retrieved September 22, 2015, from <http://news.nationalgeographic.com/2015/08/150819-whales-dolphins-bends-decompression-sickness/>

## Amazing Birds

**B**irds never cease to astound us with their grace in the air and cheery songs, because they exhibit design at many levels.

Hummingbird tongue is a micro pump (*Science Magazine*<sup>1</sup>). The

... continued on p.8

# 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 Isn't natural selection designed by God to weed out genetic problems, enabling organisms to adapt to different environments?

A The Bible certainly does support the idea that God cares for his creatures (Psalm 147:7–9; Matthew 6:26; Luke 12:6–7), even in this fallen world. However, once you recognize what natural selection is and how it generally operates, it seems theologically inconsistent to suggest it is a process designed by God for the benefit of his creatures—at least when referring to creatures like birds or mammals.

Natural selection can be defined as the process by which organisms with more adaptive traits tend to survive better and leave more offspring. Thus, those traits will become more common in the next generation. In theory, this is supposed to enable the population to become more adapted to its environment. However, that is not always how it works.

### Weeding out problems?

The elimination of severe genetic problems does occur, and would qualify as natural selection. We can see this when a baby with a severe genetic disorder dies. However, God created life; death is a result of the curse. So, to suggest that natural selection is a process designed by God leads to theological problems because of its association with death. However, DNA repair mechanisms can certainly be seen as designed by God to preserve life, because they correct errors and enable life to continue. Not so with natural selection.

Secondly, natural selection is not very efficient at removing harmful alleles unless they have a dramatic effect. Not only that, but many genetic problems are recessive. This makes them “invisible” to natural selection when the frequency is relatively low. Natural selection cannot affect them until

they are common enough that some individuals inherit them from both parents. These points have been brought out by the work of creationist John Sanford and his colleagues (Gibson et al., 2011; Rupe and Sanford, 2013). So it also seems unreasonable to claim that natural selection was designed by God, if it is so ineffective at removing harmful alleles.

### Enabling adaptation?

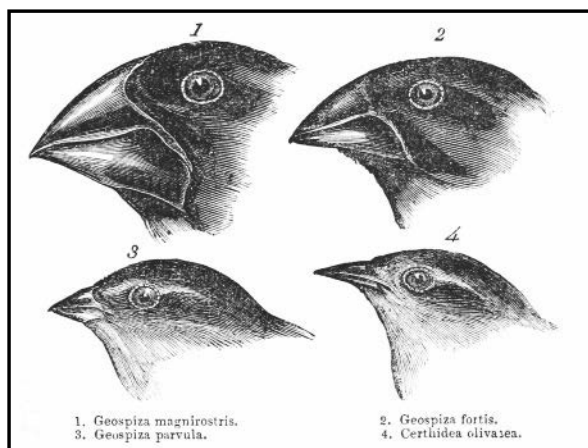
In theory, natural selection should enable a population of organisms to become more adapted to their environment. To evaluate whether this is generally the case, it may help to look at the work of evolutionists Peter and Rosemary Grant, on the island of

There were several times during their study when the Grants were able to document natural selection strongly affecting the finches. Those times were during environmental extremes—more specifically, droughts. During the droughts, the food supply of the birds dwindled and many birds died of starvation. The medium ground finch (*Geospiza fortis*), studied by the Grants, has a range of beak sizes. This allows the population to make use of the variety of seeds available, ranging from small and soft to larger and harder. In the first drought, the small, soft seeds were depleted, and the birds with smaller beaks were more severely affected. Needless to say, the average beak size was larger in the next generation.

To better understand what was going on, it might be instructive to ask a few questions. What was happening to the birds when natural selection was operating? Otherwise healthy birds were dying of starvation. Did it affect any traits in the finch population? Yes, the average beak size increased. Did it help the finches adapt to their environment? No—instead, it eliminated useful variety from the population. When the rains returned, so did the smaller and softer seeds. The Grants noted that some of the lost variability was eventually restored from the finches' hybridizing with several closely related species (i.e., the cactus finch, *G. scandens*, and small ground finch, *G. fuliginosa*).

There was another detail about natural selection that the Grants pointed out: it oscillates in direction. In the years prior to one of the other droughts they observed, the weather had been unusually wet. There was an incredible abundance of the plants bearing smaller seeds. This time, when the drought hit, it was the larger seeds that were depleted first, and the larger-beaked finches that preferentially died. Again, this did not help the birds become better adapted to their environment. It simply killed off a portion of the population that ate seeds which were normally more abundant on the island.

Another detail often lost in the “just-so



Darwin's Finches

Daphne in the Galápagos (Grant and Grant, 2014).

Most studies attempting to identify natural selection look at a pattern today (e.g. in DNA sequence differences), and by application of various statistical tests that are capable of revealing non-random patterns, infer that natural selection has occurred. The problem is that there are a number of factors besides natural selection that can result in a similar pattern. In contrast, the Grants actually followed the birds through a 40-year study, making numerous direct measurements. This enabled them to more clearly identify when natural selection was operating. The results are not what the evolutionists expected.

stories” about natural selection is that it does not create anything new. It only can eliminate a portion of the variety already present. In fact, if the droughts had eliminated all birds in the population, it suddenly would not be considered natural selection. This shows that natural selection is a bit of a convoluted way to understand the natural world. The emphasis on natural selection largely obscures the underlying reasons why creatures are able to adapt to new or changing environments, because it never accounts for the origin of adaptive traits.

## Seeing God’s provision

Creationists have the most viable explanation for the origin of adaptive traits—a wise and caring Creator. God told humans and animals to reproduce and fill the earth (Genesis 1:22, 28; 8:17), and through His incredible wisdom He has allowed this to happen. Not only did He create the many genes we needed for life, he also designed processes

which allow them to vary in ways that add diversity and enable adaptation. Through genetic research, we are beginning to understand the complex genetic and epigenetic mechanisms involved (see Lightner, 2013a and Lightner, 2013b). It is awe inspiring!

In the research of the Grants, we can see an additional means by which God cares for his creatures. By finches’ splitting into different populations that rarely interbreed, they can fill a variety of niches. Scientists refer to this as speciation. Then, when harsh environmental conditions occur and eliminate a sizable portion of a population, hybridization allows for the reintroduction of useful variety. Thus, creationists recognize that speciation is a means by which God cares for his creatures so they can fill the earth.

## References

Gibson, P., J.R. Baumgardner, W.H. Brewer, and J.C. Sanford. 2011. Can purifying natural se-

lection preserve biological information? In *Biological Information: New Perspectives: Proceedings of a Symposium held May 31 through June 3, 2011 at Cornell University*. World Scientific: Hackensack, NJ, pp. 232–263.

Grant, P.R. and B.R. Grant. 2014. *40 Years of Evolution: Darwin’s Finches on Daphne Major Island*. Princeton University Press: Princeton, New Jersey.

Lightner, J.K. 2013a. Directed mutations? *Creation Matters* 18(1):6–7.

Lightner, J.K. 2013b. What is epigenetics? *Creation Matters* 18(6):7–8.

Rupe, C.L. and J.C. Sanford. 2013. Using numerical simulation to better understand fixation rates, and establishment of a new principle: Haldane’s ratchet. *Proceedings of the Seventh International Conference on Creationism*, Pittsburgh, PA: Creation Science Fellowship.

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...without excuse!  
by Timothy R. Stout

# THE TESTIMONY OF METASTABLE CELLULAR COMPONENTS

In 1967 it was shown that certain “plant viruses self assemble under *in vitro* conditions in a solution that contains the molecular components of that virus....” The importance of self assembly “is that it allows for the formation of viruses inside infected cells without complex regulatory pathways or consumption of chemical energy.... It remains one of the most spectacular examples of self-assembly in biological systems” (Morozov, *et al*, 2009).

When this phenomenon of self assembly was first discovered, it seemed an isolated oddity, and no one anticipated its ultimate significance. Far from being an isolated occurrence, there is growing evidence that the self assembling of internal components is a major characteristic of living cells.

There are actually two kinds of self organization: static and dynamic. Self assembly of a virus is an example of *static* assembly. When the conditions are right, and with the proper components in a suitable concentration, the components self-assemble into a fully-formed virus. In the case of static assembly, once the object is formed, a change takes place that prevents its ready decomposition into its original constituents.

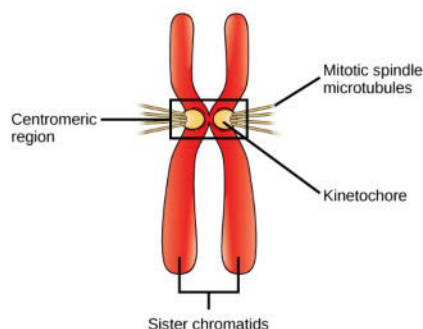
In contrast to the permanently-assembled structure of a virus, some of the structures and processes used in a living cell are metastable, i.e., *dynamic*. They are dissipative, meaning that they form only under far-from-equilibrium conditions, needing a constant supply of raw materials and/or energy in order to continue in existence. Otherwise, they dissipate (decompose) into their original constituents.

A tornado is a good illustration of a functioning dissipative structure. It forms only in an unstable, out-of-equilibrium environment. A number of different variables

are required to be within very narrow limits, or it doesn’t form. It decays very rapidly once the required conditions have disappeared.

Likewise, if the conditions are just right in a cell—that is, the proper components exist in the proper concentrations, and the cell provides the right environment—self organization can create certain structures that perform various processes which are useful to a cell. What appears to be unique about such self assembly is that, typically, the components that are required to form a temporary structure do not assemble until the structure is actually needed. These components then quickly decay when the structure is no longer needed.

For instance, in mitosis the separation of the replicated chromosomes is brought about by a complex machine with many moving parts called the *mitotic spindle*. It is constructed from microtubules and their associated proteins. At an early stage of mitosis, the cell signals the mitotic spindle to begin to self assemble. Long microtubules rapidly respond to the signal by degrading into shorter, more numerous, and more dynamic microtubules. The newly-



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formed components then assemble into the mitotic spindle, which will separate the chromosomes into their proper location for a new cell to form around them. When the operation is finished, the mitotic spindle degrades into its initial components, ready to be reassembled into another spindle, or possibly some other function, as needed by the cell (Alberts, *et al.*, 2002).

Kurakin (2005) has provided several other examples of metastable cellular processes: the cytoskeleton, DNA transcription and repair, and the formation and operation of the Golgi apparatus. Experimental data favor a new appreciation of the cell as a dynamic, integrated system of interlinked and interdependent metastable molecular organization.

I have heard evolutionists talk about how self organization is a natural, spontaneous process. They give the impression that it is so natural, and so simple, that it takes place as a matter of course. Although it is true that self organization can occur, the truth is that it is hard enough to design a component to accomplish a particular function. However, to design a component that not only can perform the function, but is also capable of self assembly, adds yet another layer of complexity to the problem. The use of structures in a cell which can assemble themselves, when needed, and then degenerate into more basic components when not needed, increases the complexity of a cell by a staggering amount. Johnson and Lam (2010) explain the situation:

Considering the sensitivity of self-organizing processes, let us discuss whether a biological instance of self-organization can be considered an intrinsic property. First, an organism has to go to great lengths to create the conditions for a self-organizing

process to commence. In the case of many cellular self-organizing mechanisms, this means ensuring that the necessary interactants are present at high concentrations within a confined compartment. Further, finding elements, gene products or otherwise, that can interact with one another in a self-organizing process capable of doing work is not trivial....Further, in the case of self-organization, because the ongoing dynamics of self-organizing processes are sensitive to environmental perturbations, mechanisms must be in place to maintain the conditions necessary for the process. Organisms are full of such regulatory procedures for maintaining homeostasis in the face of environmental perturbations, whereas self-organizing processes in isolation have no such ability.

The mechanism for how a cell does work in this case is inherent to the properties of membranes and is not contained in the DNA. The cell's DNA, in contrast, contains instructions for how to take advantage of the membrane's properties at the appropriate time and in the correct manner. Further, such genetic information would be useless without a fully functional membrane, inherited from a parent, on which to act.

The self-organizing pattern-formation processes we observe, in contrast, are sensitive to environmental conditions, and in many cases happen either in their entirety or not at all. Thus, selection does not always build complexity step by step at the molecule level; rather, natural selection discovers complexity.

Johnson and Lam (2010) have also acknowledged that the gradual, small, in-

cremental steps of evolutionary processes are incompatible with the requirements to form a usable metastable system.

...self-organizing mechanisms do not seem to be the products of slow, incremental change.

...the evolution of the self-organizing process is dependent on an initial qualitative jump in phenotype.

All of the requirements they discussed need to first appear in a single step. A person is certainly without excuse who refuses to see the hand of God in the creation of a living cell that is built using a complex, interacting arrangement of metastable features.

## References

- Alberts, B., A. Johnson, J. Lewis, et al. 2002. *Mitosis. Molecular Biology of the Cell*. 4th edition. New York: Garland Science. Retrieved September 23, 2015, from [www.ncbi.nlm.nih.gov/books/NBK26934/](http://www.ncbi.nlm.nih.gov/books/NBK26934/)
- Johnson, B. and S. Lam. 2010. Self-organization, natural selection, and evolution: cellular hardware and genetic software. *BioScience* 60(11):879. Retrieved January 27, 2015, from <http://bioscience.oxfordjournals.org/content/60/11/879.full.pdf+html>
- Kurakin A. 2005. Self-organization versus Watchmaker: stochastic dynamics of cellular organization. *Biol. Chem.* 386:247–254. Retrieved September 23, 2015, from [www.deepdyve.com/lp/de-gruyter/self-organization-versus-watchmaker-stochastic-dynamics-of-cellular-b0E9OlzvnO](http://www.deepdyve.com/lp/de-gruyter/self-organization-versus-watchmaker-stochastic-dynamics-of-cellular-b0E9OlzvnO)
- Morozov, A.Y., R.F. Bruinsma, and J. Rudnick. 2009. Assembly of viruses and the pseudo-law of mass action. *The Journal of Chemical Physics* 131:155101. Retrieved September 23, 2015, from [www.deepdyve.com/lp/american-institute-of-physics/assembly-of-viruses-and-the-pseudo-law-of-mass-action-Zdp7FqDaOy](http://www.deepdyve.com/lp/american-institute-of-physics/assembly-of-viruses-and-the-pseudo-law-of-mass-action-Zdp7FqDaOy)

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## Speaking of Science ...continued from page 5

scientists who discovered in 2011 that the hummingbird tongue is a nectar trap rather than a capillary tube (see *Illustra* animation<sup>2</sup>) have taken it one further. The two scientists from the University of Connecticut have found, after filming dozens of hummingbirds for five years, that the tongue is also a micro-pump. The bird collapses the twin tubes as the tongue exits the beak. The tubes spring back into shape inside the nectar pool, drawing the fluid into the tongue. The flaps then close over the nectar, sealing it into the tubes for delivery in



the beak. All this happens automatically without need of muscles or nerves. With repeated licks, the hummingbird can pump its tongue 14 times a second for maximum filling. For more information, see *Evolution News & Views*.<sup>3</sup>

**Detecting turbulence** (*ScienceDaily*<sup>4</sup>): An article about how flying insects navigate in turbulent air says that birds have their own methods. Insects respond to wind directions; birds apparently rely on visual cues, even at night.

**Something to crow about: New Caledonian crows show strong evidence of social learning** (*ScienceDaily*<sup>5</sup>): Here's more evidence these black birds are smarter than Aesop thought. They can learn things and apparently pass that



knowledge on to their offspring and even refine it—a talent once considered a unique human achievement.

Birds circle and stick together to help them fly in dense fog (*New Scientist*<sup>6</sup>): Sandhill cranes migrate long distances, but in heavy fog sometimes they circle and fly close together, or settle down till better conditions. Other birds, however, are known to navigate at night, using their instrument qualifications:

But if some birds avoid flying in fog, how come many other species are happy to fly at night? Kirsch says that most birds that do so typically set off at sunset, when there is enough light available for them to orient themselves.

**And like airplane pilots, night-time flyers don't rely only on vision.** They also navigate using **acoustic and magnetic cues**, as well as the **positions of the stars and moon**, says Andrew Farnsworth of Cornell University in Ithaca, New York.

Darwin's fast-evolving finches use a natural insect repellent (*New Scientist*<sup>7</sup>): The Galapagos finches that supposedly inspired Darwin have another trick: they have “evolved” behaviors to ward off insect parasites. Even though they arrived on the islands two to five million years ago in the evolutionary timeline, they just learned this behavior recently, since humans brought invasive species.

Study of birds' sense of smell reveals important clues for behavior, adaptation (*ScienceDaily*<sup>8</sup>): The remarkable way the sense of smell works—at least for fish—is animated in Illustra's new film *Living Waters*. The same basic principles work for other vertebrates, including birds and humans. This article discusses differences in olfactory receptors between different species of birds. Each species appears to have receptors tuned to its dietary needs.

Songbirds make mysterious altitude changes during nighttime migratory flights (*PhysOrg*<sup>9</sup>): Geolocators have shown that some songbirds, like Swainson's thrush, make sudden altitude changes during flight. The scientists are trying to figure out the reasons for the surprising data.

The bird that flies 16,000 km across the Pacific for no reason (*New Scientist*<sup>10</sup>): Canadian scientists can't figure out why the ancient murrelet crosses the entire North Pacific and back again. The feeding grounds and breeding circumstances are similar in western Canada and in Korea or Japan where they land. Maybe it's just fun.

Researchers find way for eagles and wind turbines to coexist (*PhysOrg*<sup>11</sup>): We end with a sad story. It's not clear the title delivers on its promise of co-existence. One thing is clear: right now, magnificent golden eagles are being slaughtered at alarming rates:

An estimated 75 to 110 golden eagles die at a wind-power generation operation in Altamont, California each year. This figure represents about one eagle for every 8 megawatts of energy produced.

And that's just at one wind farm. What would happen to coal and oil producers if they wiped out this eagles every year? The usual environmentalists don't seem to be saying much. It's time for ordinary people to speak up. Another article on *PhysOrg*<sup>12</sup> describes the migratory habits of eastern golden eagles, a species endangered by wind farms. “Golden Eagles are a priority species for conservation,” the article says,



without any recommendations of how they can be protected from spinning blades.

1. Perkins, S. (2015, August 18) Watch: Hummingbird tongues are tiny pumps. *Science Magazine*. Retrieved September 25, 2015, from <http://news.sciencemag.org/plants-animals/2015/08/watch-hummingbird-tongues-are-tiny-pumps>
2. Illustra Media. (2013, June 18) Flight: The genius of birds – hummingbird tongue. *YouTube*. Retrieved September 25, 2015, from <https://www.youtube.com/watch?v=dMw3RO7p9vg>
3. Anonymous. (2015, September 11) Hummingbird tongue design gets an upgrade. *Evolution News & Views*. Retrieved September 25, 2015, from [www.evolutionnews.org/2015/09/hummingbird\\_ton099231.html](http://www.evolutionnews.org/2015/09/hummingbird_ton099231.html)
4. Cell Press. (2015, August 31) Nocturnal, compass-guided insects have a sense for turbulence too. *ScienceDaily*. Retrieved September 25, 2015, from [www.sciencedaily.com/releases/2015/08/150831135832.htm](http://www.sciencedaily.com/releases/2015/08/150831135832.htm)
5. University of California – Santa Barbara. (2015, August 26) Something to crow about: New Caledonian crows show strong evidence of social learning. *ScienceDaily*. Retrieved September 25, 2015, from [www.sciencedaily.com/releases/2015/08/150826113817.htm](http://www.sciencedaily.com/releases/2015/08/150826113817.htm)
6. David, R. (2015, August 27) Birds circle and stick together to help them fly in dense fog. *New Scientist*. Retrieved September 25, 2015, from <https://www.newscientist.com/article/dn28104-birds-circle-and-stick-together-to-help-them-fly-in-dense-fog/>
7. Blaszcak-Boxe, A. (2015, August 27) Darwin's fast-evolving finches use a natural insect repellent. *New Scientist*. Retrieved September 25, 2015, from <https://www.newscientist.com/article/dn28103-darwins-fast-evolving-finches-use-a-natural-insect-repellent/>
8. Molecular Biology and Evolution (Oxford University Press). (2015, July 29). Study of birds' sense of smell reveals important clues for behavior, adaptation. *ScienceDaily*. Retrieved September 25, 2015, from <http://www.sciencedaily.com/releases/2015/07/150729110736.htm>
9. The Auk. (2015, August 12) Songbirds make mysterious altitude changes during nighttime migratory flights. *PhysOrg*. Retrieved September 25, 2015, from <http://phys.org/news/2015-08-songbirds-mysterious-altitude-nighttime-migratory.html>
10. Anonymous. (2015, August 12) The bird that flies 16,000 km across the Pacific for no reason. *New Scientist*. Retrieved September 25, 2015, from <https://www.newscientist.com/article/mg22730341-700-the-bird-that-flies-16000-km-across-the-pacific-for-no-reason/>
11. University of Waterloo. (2015, August 27) Researchers find way for eagles and wind turbines to coexist. *PhysOrg*. Retrieved September 25, 2015, from <http://phys.org/news/2015-08-eagles-turbines-coexist.html>
12. The Condor. (2015, August 12) Migratory patterns of eastern Golden Eagle population revealed. *PhysOrg*. Retrieved September 25, 2015, from <http://phys.org/news/2015-08-migratory-patterns-eastern-golden-eagle.html>



## Sight Is More than Having Eyeballs

The brain is integrally involved with eyes to make vision meaningful and responsive.

A computer is useless without software. In the same way, the “hardware” of the eyes does not see anything. It's the integration of the eyes with the brain and with programmed processes that allows us to make sense of the visual world—including reading this article right now. Here are a few of the fascinating ways this

interaction works, as revealed in new scientific discoveries.

Circuit in the Eye Relies on Built-in Delay to See Small Moving Objects (*ScienceDaily*<sup>1</sup>). A programmed delay keeps us from getting overwhelmed with detail when moving our heads. “When we move our head, the whole visual world moves across our eyes,” the article says. “Yet we can still make out a bee buzzing by or a hawk flying overhead, **thanks to unique cells** in the eye called **object motion sensors**.” The programmed delay ensures that “information from the central field of view and from the periphery arrive at the object motion sensor at the same time.” All this involves specific cells, proteins, and genes at the molecular level, but that’s why you can detect the difference between a hawk flying slowly and the clouds in the background.

Neuroscience: Tiny Eye Movements Link Vision and Attention (*Current Biology*<sup>2</sup>). You try to hold a camera steady, but eyes are not like cameras. “A new study shows that the **tiny eye movements** we make while holding our gaze on a point of interest are associated with **brief, attention-like changes in the sensitivity** of visual neurons,” Adam P. Morris writes. These movements, indeed, are essential to vision, even though we are unaware of them.

Textbooks sometimes use the **analogy of a camera** to teach students about human vision. Although the analogy has value, it **encourages the false notion** that our brain constructs our **visual experience from still images** of the outside world. **The brain’s cameras — the eyes — are never truly stationary, even when we feel that our gaze is locked on a point in the visual scene.** As a result, the input to the brain is **a jerky, drifting, and disjointed image stream.** **How does the brain make sense of this input?** A study by Chen *et al.* published recently in *Current Biology* suggests that a class of tiny eye movements known as ‘**microsaccades**’ are closely linked with **mechanisms that prioritize how visual information is processed over space and time.** Recording from single neurons in alert macaque monkeys, the authors show that neurons in the frontal eye fields and superior colliculus **become especially sensitive to visual input just before the onset of these tiny eye movements** .... Moreover, **this enhancement is spatially specific** — albeit coarsely — such that the **region** of the visual field that is **prioritized** depends on the **direction** of the eye movement .... These changes in visual sensitivity resemble those seen in experiments that manipulate visual attention. **This suggests that, even at very fine temporal and spatial scales, sensory and oculomotor systems act in concert to coordinate visual processing.**

Morris has no explanation for how this arose, except to say in passing it makes for a nice “evolutionary strategy for vision in primates.”

How the brain can stop action on a dime (*ScienceDaily*<sup>3</sup>). Don’t take for granted your ability to slam on the brakes when seeing a red light. Rapid response is critical for everyday function. Neuroscientists at Johns Hopkins identified the part of the brain that makes this possible: the basal forebrain, a part of the brain mostly known for regulating sleep. Counterintuitive as that sounds, the researchers pinpointed the area during experiments with rats offered rewards in response to flashing lights. “Understanding how these cells are involved in this form of **self-control** expands our knowledge of the normal **brain circuits involved** in everyday decision-making,” one of the researchers explained, “and will be absolutely critical to developing future treatments and therapies

for diseases and disorders with impaired reactive inhibition as a symptom.”

Shifts of Gamma Phase across Primary Visual Cortical Sites Reflect Dynamic Stimulus-Modulated Information Transfer (*PLoS Biology*<sup>4</sup>). This technical paper relates “complex and flexible behavior” to the individual neurons that fire in the visual cortex. “By recording neural activity and measuring **information flow between multiple locations in visual cortex during the presentation of Hollywood movies**,” they say, “we found that the **arrangement** of the phase of gamma oscillations at different locations indicated the presence of **waves** propagating along the cortical tissue.” As they watched the watchers, they found that “the propagation of gamma oscillations may reconfigure dynamically the **directional flow of cortical information** during sensory processing.”

We’ve all got a blind spot, but it can be shrunk (*Current Biology*<sup>5</sup>). Perhaps you’ve done the finger experiments that reveal your blind spot. Since the optic nerve contains no rods or cones, its exit from the retina leaves a portion of vision absent. You would be aware of holes in the visual field if your brain did not “fill in” those spots with similar details detected by the retina surrounding those spots. For what it’s worth, Australian researchers found that you can reduce the size of the blind spot by about 10% with training, but it only works with one eye at a time. What’s worthwhile, *ScienceDaily*<sup>6</sup> notes, is that similar training might help those with macular degeneration partially compensate for lost vision.

Attentive tracking of sound sources (*Current Biology*<sup>7</sup>). Just as the brain can make the eyes focus on something interesting in the visual field, it can tune the ears to pay closer attention to a sound in a noisy environment. We’ve all experienced the “cocktail party problem,” trying to focus on a friend’s voice in a noisy room. Researchers found that even when nothing about a sound is kept constant (timbre, pitch, or semantics), participants were able to “track sound sources through feature space with a movable focus of attention.”

Like a foreman, brain region keeps us on task (*ScienceDaily*<sup>8</sup>). “If you sometimes feel like you have a little foreman in your head who keeps you on track while you work step-by-step through a sequence of tasks, you aren’t far off,” this article begins. “In new research, Brown University scientists report evidence that a particular part of the brain is responsible for exactly that function.” This everyday task of internally monitoring our inputs is routed through a network called the “rostromedial prefrontal cortex (RLP-FC), an area of neurons situated in the front of your brain.” It’s the first step in cognitive control of our actions. “The health consequences are big” when this area is disrupted.

“The seeing eye, and the hearing ear, the Lord has made them both” (*Proverbs 20:12*).

1. NIH, National Eye Institute (NEI). (2015, August 31) Circuit in the Eye Relies on Built-in Delay to See Small Moving Objects. *ScienceDaily*. Retrieved September 25, 2015, from [www.sciencedaily.com/releases/2015/08/150831124357.htm](http://www.sciencedaily.com/releases/2015/08/150831124357.htm)
2. Morris, A.P. 2015. Neuroscience: Tiny eye movements link vision and attention. *Current Biology* 25(17): R769–R771.
3. Johns Hopkins University. (2015, September 17) How the brain can stop action on a dime: Researchers identify neurons that can abruptly halt a planned behavior. *ScienceDaily*. Retrieved September 25, 2015, from [www.sciencedaily.com/releases/2015/09/150917135227.htm](http://www.sciencedaily.com/releases/2015/09/150917135227.htm)
4. Besserve, M., S.C. Lowe, N.K. Logothetis, B. Schölkopf, S. Panzeri. 2015.

Shifts in gamma phase across primary visual cortical sites reflect dynamic stimulus-modulated information transfer. *PLoS Biology* DOI: 10.1371/journal.pbio.1002257

5. Miller, P.A., G. Wallis, P.J. Bex, D.H. Arnold. 2015. Reducing the size of the human physiological blind spot through training. *Current Biology* 25(17):R747–R748.
6. Cell Press. (2015, August 31) We've all got a blind spot, but it can be shrunk. *ScienceDaily*. Retrieved September 25, 2015, from [www.sciencedaily.com/releases/2015/08/150831135828.htm](http://www.sciencedaily.com/releases/2015/08/150831135828.htm)
7. Woods, K.J.P. and J.H. McDermott. 2015. Attentive tracking of sound sources. *Current Biology* 25(17):2238–2247.
8. Brown University. (2015, September 23) Like a foreman, brain region keeps us on task. *ScienceDaily*. Retrieved September 25, 2015, from [www.sciencedaily.com/releases/2015/09/150923133519.htm](http://www.sciencedaily.com/releases/2015/09/150923133519.htm)

## “Overdose of Awesomeness”: New Pluto Images Show Unpredicted Activity

More images have been released from New Horizons’ July 14 flyby of Pluto, showing youthful mountains, glaciers, and an escaping atmosphere.

Dr. Phil Metzger’s tweet “Overdose of awesomeness!” sums up the feelings of scientists looking over the latest images posted by NASA’s New Horizons mission.<sup>1</sup> The stunning panoramas (see NASA photo on right), taken just 15 minutes after closest approach last July 14, show mountains rivaling the Rockies or Sierras (about 11,000 feet high) adjacent to the smooth plains of Sputnik Planum. Additional high-res images show nitrogen glaciers flowing from the mountains onto the plains, and shadows cast by the mountains onto apparent ground fog. The thin nitrogen atmosphere also shows unexpected structure, with over a dozen layers visible.

Recently (Sept. 10), a press release from New Horizons summed up Pluto’s surface this way: “It’s complicated.”<sup>2</sup>

New close-up images of Pluto from NASA’s New Horizons spacecraft reveal **a bewildering variety of surface features** that have **scientists reeling because of their range and complexity**.

“Pluto is showing us **a diversity of landforms and complexity of processes** that **rival anything we’ve seen in the solar system**,” said New Horizons Principal Investigator Alan Stern, of the Southwest Research Institute (SwRI), Boulder, Colorado. “If an **artist** had painted this Pluto before our flyby, I probably would have called it **over the top** — **but that’s what is actually there**.”

New Horizons geologist Jeff Moore described Pluto’s surface as **“every bit as complex as that of Mars”** — a remarkable description for a body a third the diameter of Mars and 26 times farther from the sun. Laws of physics demand that smaller objects lose heat faster, and objects more distant from stars should be the coldest. Sources of heat are limited: radioactive elements should be depleted this late in Pluto’s assumed age, and Pluto is not

subjected to significant tidal forces.

New images also show the **most heavily cratered — and thus oldest** — terrain yet seen by New Horizons on Pluto **next to the youngest, most crater-free icy plains**. There might even be a field of dark **wind-blown dunes**, among **other possibilities**.

“**Seeing dunes on Pluto** — if that is what they are — **would be completely wild**, because Pluto’s atmosphere today is so thin,” said William B. McKinnon, a GGI deputy lead from Washington University, St. Louis. “Either Pluto had a thicker atmosphere in the past, or some process we haven’t figured out is at work. It’s a head-scratcher.”

The surprise extends to the satellites of Pluto:

Discoveries being made from the new imagery are not limited to Pluto’s surface. Better images of Pluto’s moons **Charon, Nix, and Hydra** will be released Friday at the raw images site for New Horizons’ Long Range Reconnaissance Imager (LORRI), revealing that **each moon is unique** and that big moon **Charon’s geological past was a tortured one**.

Surprise, not vindication, is clear from quotes by the scientists. “Now we can study geology in terrain that we **never expected to see**,” John Spencer said on Sept. 10th. “Pluto is surprisingly Earth-like in this regard,” Alan Stern remarked today, “and **no one predicted it**.”

Additional images and data from the encounter will trickle down over the 10 months.

Hey, Alan! *We* predicted it. On July 9, before the encounter, we

predicted: (1) active geology and evidence of resurfacing, (2) atmospheric escape rates too rapid for billions of years, (3) moons that will challenge the idea they were formed by a collision, (4) reporters would leap from evidence of water ice to speculations about life.<sup>3</sup> We haven’t found the L-word — *life* — in the press releases yet, but our first 3 predictions have been confirmed.

1. NASA. (2015, September 17) Pluto ‘wows’ in spectacular new backlit panorama. *New Horizons*. Retrieved September 22, 2015, from <http://www.nasa.gov/feature/pluto-wows-in-spectacular-new-backlit-panorama>
2. NASA. (2015, September 10) New Pluto images from New Horizons: It’s complicated. *The Johns Hopkins University Applied Physics Laboratory*. Retrieved September 22, 2015, from <http://pluto.jhuapl.edu/News-Center/News-Article.php?page=20150910>
3. CEH. (2015, July 9) Will Pluto surprise scientists? *Creation Evolution Headlines*. Retrieved September 22, 2015, from <http://crev.info/2015/07/will-pluto-surprise-scientists/>



A synthetic perspective view of Pluto based on images taken as New Horizons flew past on July 14, 2015, from 50,000 miles.  
Credits: NASA/Johns Hopkins University Applied Physics Laboratory/Southwest Research Institute

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## All by Design

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

# Gearing Up for Survival

The basic idea of biological evolution is that random genetic mutations, over immense periods of time, have led to the appearance of physical or other traits that have provided organisms with a survival advantage. Consequently, because the surviving organisms, whether plant or animal, have had more reproductive success, new species have developed and, gradually, this process has brought about more and more varied types of living things.

A study of Darwin's writings will reveal the immutable rule that those newly developed traits must have conferred a survival advantage in order to become more prevalent in the population. A sticking point is the issue of "transitional forms," viz., those organisms which had not yet completely "evolved" certain traits. Darwin found that the fossil record is sorely lacking in transitional forms, and he pondered why they were not "embedded in countless numbers in the crust of the earth." (Darwin, 1861)

Thus, a major counterpoint to Darwin's theory is that any biological structure (e.g., the eye) must work properly from the start, or the poor creature possessing only a partly "evolved" body would not be the most fit for survival.

Take for instance the hind legs in planthop-



**Left:** Adult stage of planthopper *Issus coleoptratus*.

Gears have been found only in the nymph stage.

**Right:** Detail of functioning gear mechanism, by discoverers Malcolm Burrows and Gregory Sutton (University of Cambridge).

per nymphs, which jump to escape predators. The inside part of each of the hind legs literally has cogs, or gears, which allow synchronized jumping of both hind legs (to within 30 microseconds of each other) in a straight direction, with acceleration measured at 400 to 500 times the force of gravity.

For creatures whose survival relies on their ability to jump incredibly quickly, it is not logical that these animals could have ever jumped efficiently, and thus survived, if their leg gears were incompletely "evolved."

## References

- Anonymous. (12 September 2013). Functioning 'mechanical gears' seen in nature for the first time. *University of Cambridge, Research News*. Retrieved October 13, 2015, from [www.cam.ac.uk/research/news/functioning-mechanical-gears-seen-in-nature-for-the-first-time](http://www.cam.ac.uk/research/news/functioning-mechanical-gears-seen-in-nature-for-the-first-time)
- Darwin, C. 1861. *On the Origin of Species by Means of Natural Selection*, Third Edition. London: John Murray, p.190.
- Nuwer, R. (31 December 2014). Picture of the Week: Plant-hopper Gears. *Science Friday.com*. Retrieved October 13, 2015, from [www.sciencefriday.com/blogs/12/31/2014/picture-of-the-week-plant-hopper-gears.html?series=31](http://www.sciencefriday.com/blogs/12/31/2014/picture-of-the-week-plant-hopper-gears.html?series=31)
- Photos courtesy of Wikimedia Commons: [https://commons.wikimedia.org/wiki/File:Interactive\\_gears\\_in\\_the\\_hind\\_legs\\_of\\_Issus\\_coleoptratus\\_from\\_Cambridge\\_gears-3.jpg](https://commons.wikimedia.org/wiki/File:Interactive_gears_in_the_hind_legs_of_Issus_coleoptratus_from_Cambridge_gears-3.jpg)
- [https://commons.wikimedia.org/wiki/Issus\\_coleoptratus#/media/File:Auchenorrhyncha\\_fg01\\_20060709\\_Nied.JPG](https://commons.wikimedia.org/wiki/Issus_coleoptratus#/media/File:Auchenorrhyncha_fg01_20060709_Nied.JPG)

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