

## GEOSCIENCE NEWSLETTER

Number 35 October 2013

### TEACHERS' 2014 FIELD SCHOOL IN DENVER



Dr. Raúl Esperante examines a possible location for a field trip, in preparation for the Field School for Teachers in Denver, July 13-23, 2014. For more information, visit <http://grida.org/2014-field-school-for-teachers/>

### GRI ACTIVITIES

#### Teaching Origins



Dr. Socrates Quispe reports on the GRI Resource Center in Peru.

Scientists and graduate students met near Cincinnati, Ohio, from August 2-5 to discuss research and teaching relating to origins. Highlights of the meetings included reports from the GRI centers around the world, and field trips to the creation museum in Florence, Kentucky, and a roadcut with marine fossils of the famous Cincinnati Arch.



Finding abundant Ordovician marine fossils in a roadcut during one of the field trips.

### New DVD Includes GRI's Tim Standish



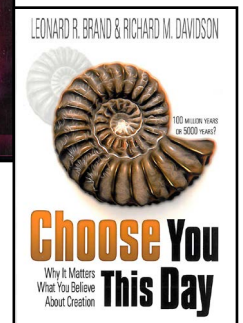
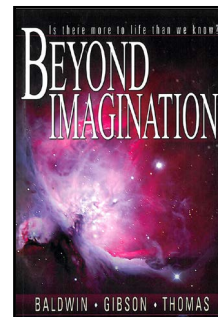
Dr. Tim Standish (center) with Lad Allen (left) and Paul Nelson (right) discussing the new documentary *Flight: The Genius of Birds*, at its Southern California premiere in September.

*Flight: The Genius of Birds* is the latest documentary by Illustra Media. Spectacular footage of birds is presented along with cutting-edge research and animations illustrating how birds fly. In the film, experts, including Tim Standish of GRI, point out the design so clearly demonstrated in these amazing creatures. To see clips from the documentary, visit: <http://www.flightthegeniusofbirds.com>.

### NEW BOOKS FOR A GENERAL AUDIENCE

*Baldwin JT, Gibson LJ, Thomas JD. Beyond Imagination. Nampa, ID: Pacific Press. 128 pages. \$2.59. Brand LR, Davidson RM. Choose You This Day. Nampa, ID: Pacific Press. 126 pages. \$2.49.*

*Beyond Imagination* and *Choose You this Day* cater to a general audience with the purpose of sharing the story of a good Creator God. Each covers similar material but approaches the issues in different ways as they examine the Galileo affair, the problem of evil, and look forward to a new creation.

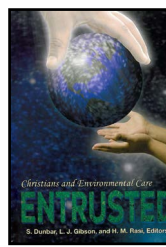


*Beyond Imagination* appeals to design in nature as evidence of a Designer. The biblical story explains how evil entered the world, and the gospel explains how God will eliminate the evil.

*Choose You This Day* spends more time on the biblical text and on the nature of science, and considers how one may relate to the interface of science and Scripture.

### ANNOUNCEMENT

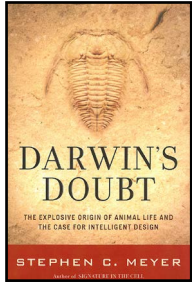
The recent book, *Entrusted: Christians and Environmental Care*, can be ordered from [adventus21.com](http://adventus21.com).



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## Revisited

Meyer SC. 2013. Darwin's Doubt: the explosive origin of animal life and the case for intelligent design. NY: HarperOne. 512 pages. \$28.99.



*Darwin's Doubt* gives an excellent commentary on the abrupt appearance of metazoan disparity in the Cambrian. See

our blog on this topic at <http://grisd.wordpress.com/>.

## Evidence of Function for the Beta Globin Pseudogene

Moleirinho A, Seixas S, Lopes AM, et al. 2013. Evolutionary constraints in the beta-globin cluster: The signature of purifying selection at the gamma-globin (HBD) locus and its role in developmental gene regulation. *Genome Biology and Evolution* 5(3):559-571. Doi:10.1093/gbe/evt029.

**Summary.** Oxygen is carried in the blood by molecules of hemoglobin, which are composed of two pairs of subunits. The subunits involved change during embryonic development. In adult humans, most of the hemoglobin is made



Bleeding finger. Photo courtesy of Wikimedia.

of two subunits of G-alpha globin and two subunits of B-beta globin. Less than 3% of human hemoglobin is made of two units of G-alpha globin and two units of D-beta globin.

The beta globin genes are clustered on chromosome 11 in a sequence of three embryonic genes, a beta pseudogene, and

two adult globin genes. The sequence of genes on the chromosome matches the chronological sequence in which the genes are active.

The purpose of this research was to study genetic variation in the D-beta globin gene and its surroundings, including the beta pseudogene. The expectation was that these genes are not important and therefore are likely to show quite a bit of variation compared with the B-beta globin gene.

Surprisingly, there was less variation in both the D-beta globin gene and the beta-pseudogene than in the D-globin gene. This indicates that these two genes may have important, if unrecognized, activities. Since they are not major components of the blood hemoglobin, their importance must lie in some other function.

Other studies have shown that the D-globin gene and beta-pseudogene interact with the Locus Control Region, which suggests a role in gene regulation. This is in line with suggestions made thirty years ago, based on the location of the beta-pseudogene between the embryonic and adult beta-globin genes. The pseudogene may act as a switch to turn off the embryonic globin gene and turn on the adult form.

Chimpanzees have the same pattern of beta globin gene activity, and very likely the same function for the beta-globin pseudogene.

**Comment.** Until recently, pseudogenes have been interpreted as junk DNA, the result of genetic mistakes. The beta-globin pseudogene shared between humans and chimps has been used as a strong argument for their common ancestry. This argument, although seldom challenged, was not based on experimental demonstration, but rather on philosophical prejudices and ignorance of their genetic role. As our understanding of these genes has increased, their function is being better understood, and the old argument has been shown to be invalid. You may like to read what was written on this topic some 20 years ago in our journal, *Origins* - <http://www.grisda.org/origins/21091u.pdf>.

## Improving Your Genes By Exercise



Photo courtesy of Wikimedia.

Ronn T, Volkov P, Davegarth C, et al. 2013. A six months exercise intervention influences the genome-wide DNA methylation pattern in human adipose tissue. *PLoS Genetics* 9(6):e1003572. (16 pages)

**Summary.** This paper reports on a test of the relationship between exercise and activity of genes in fat cells. The study focused especially on genes with possible effects on development of type II diabetes.

This study showed that men who followed an exercise regimen for six months showed increased methylation on 18 out of 53 genes associated with obesity and 21 of 39 genes thought to contribute to type II diabetes.

Methylation is the chemical addition of a methyl group to a gene. It generally results in a decrease in the activity of that gene. Thus, the conclusion is that exercise reduces the risk of type II diabetes by increasing the rate of methylation of genes associated with the disease.

**Comment.** It has long been known that exercise benefits health, but we have not known exactly how this was accomplished. Studies such as this one show that exercise produces better health by stimulating methylation of DNA, causing a decrease in expression of genes whose products contribute to disease — in this case, type II diabetes.

## ANNOUNCEMENT

Dr. George Javor's latest book, *A Scientist Celebrates Creation* (Brushton, NY: Teach Services, 2012), is available from Amazon.com.