

# ANNOTATIONS FROM THE LITERATURE

## GENETICS: SELF-CORRECTION OF MUTATIONS

Lolle SJ, Victor JL, Young JM, Pruitt RE. 2005. Genome-wide non-mendelian inheritance of extra-genomic information in *Arabidopsis*. *Nature* 434:505-509.

**Summary.** HOTHEAD (HTH) is a gene that coordinates development of flowers parts so that they grow in the same location. When *Arabidopsis* plants homozygous for mutations that disrupt the function of HTH were bred, the offspring reverted to the ancestral functional form at rates from 1-10%. This rate is far greater than would be expected from random mutations back to the ancestral sequence. Explanations such as additional copies of the HTH gene were eliminated as a possible reason for this along with other known mechanisms which might account for such an unexpected outcome. On the basis of this and anomalous findings in several other organisms, the authors propose a template driven process in which RNA from ancestors acts as a backup copy of the genome which is activated when organisms are stressed.

**Comment.** These findings are so extraordinary that they should be approached with some degree of caution before they are embraced. If they are born out, they directly challenge certain aspects of the neo-Darwinian synthesis. On an obvious level, production and storage of an ancestral RNA-sequence cache presents yet another level of complexity that is difficult to reconcile with the random mutation/natural selection mechanism. This also represents another of the many mechanisms by which mutations are prevented and in this case, there appears to be a direct challenge to at least one scenario for allopatric speciation. This strategy involves isolation of a small population in which certain mutations rapidly become fixed due to inbreeding. Even if the mutations are not necessarily beneficial, they might survive in isolation from the more fit ancestral population. If the phenomenon reported in *Arabidopsis* is generalized to other organisms, it seems to preclude isolation from more fit ancestral populations as the ancestral state will

appear at relatively high frequency in the isolated population, thus any mutant trait that is less fit than the ancestral state will be selected against and will not become fixed in the population. Even if a mutation is beneficial, when the organism is under stress it may revert back to the ancestral state at a significant rate.

## **GEOLOGY: UPHEAVAL DOME AN ERODED IMPACT CRATER**

Kenkmann T, et. al. 2005. Structure and formation of a central uplift: a case study at the Upheaval Dome impact crater, Utah. *Geological Society of America Special Paper* 384:85-115.

**Summary.** Upheaval Dome is the remains of an extraterrestrial impact that produced a crater about 7 km in diameter, with a central uplift that was raised about 250 meters. Some 2000 meters of sediment has been eroded from the crater, leaving a remnant structure about 5 km in diameter. A large number of faults, folds, and clastic dikes are associated with the crater. The impact probably occurred during deposition of the Upper Cretaceous Mancos Shale. Alternative proposals for the origin of the crater, such as a salt dome or volcanic activity, do not explain the observed features

**Comment.** The origin of Upheaval Dome has long been in enigma, but it appears a consensus is forming that it was caused by an extraterrestrial impact. Extraterrestrial impacts probably played an important role in the violence of the flood.

## **HUMAN PALEONTOLOGY: LARGE ABILITIES IN A SMALL SPACE**

Falk D, Hildbolt C, Smith K, Morwood MJ, Sutikna T, Brown P, Jatmiko, Saptomo EW, Brunnsden B, Prior F. 2005. The brain of LB1, *Homo floresiensis*. *Science* 308:242-245. Comment in *Science* 307:1386-1389.

**Summary.** The skull of *Homo floresiensis*, the fossil pygmy human discovered in Indonesia, was subjected to three-dimensional computed tomography to reconstruct the brain size and shape. Results indicate a cranial capacity of 417 cm<sup>3</sup>, yielding a brain/body size ratio similar to the australopithecines. Modern pygmies usually have cranial capacities greater than 1000 cm<sup>3</sup>, ruling out this explanation for the Indonesian pygmy. The brain shape has several brain features distinct from the australopithecines, and resembling (Asian) *H. erectus* more closely than

any other known species. Other features, such as the highly convoluted frontal lobes, appear more like modern humans than like *H. erectus*. Certain features of the occipital region distinguish the Indonesian pygmy from *H. erectus* endocasts. The endocranium was distinctly different from the single modern microcephalic studied. The authors did not rule out the possibility that *H. erectus*, and by implication, *H. floresiensis*, might represent an unknown form of secondary microcephaly, but this possibility was not pursued. The authors conclude that the Indonesian pygmy does not appear to be a miniaturized version of either *H. erectus* or *H. sapiens*, but might share an unknown, small-brained common ancestor with *H. erectus*.

**Comment.** The data reviewed here seem to rule out the possibility that the Indonesian fossil was an ordinary pygmy modern human, or an australopithecine. Its ancestry may be linked with that of the erectines, fossils found from China to Africa. Island populations often show significant differences in size, but the report does not seem to favor interpreting *H. floresiensis* as an island dwarf of *H. erectus*. Exactly how these fossils fit into earth history is not yet understood, but their apparent ability to build boats and navigate to the Indonesian islands seems compelling evidence they should be considered as part of the human family.

## ORIGIN OF LIFE: FORMATION OF PEPTIDE BONDS IN WATER

Leman L, Orgel L, Ghadiri MR. 2004. Carbonyl sulfide-mediated prebiotic formation of peptides. *Science* 306:283-286.

**Summary.** Carbonyl sulfide (COS) is a gas produced by volcanoes in low concentrations (less than 0.1%), and hence is a plausible component of a prebiotic earth. Reaction of carbonyl sulfide with L-phenylalanine in alkaline solution resulted in formation of phenylalanine thiocarbamate, which condensed to form dipeptides, even in the presence of water. Yield was higher in the presence of some oxygen, although oxygen is not necessary for the reaction. The reaction also produced dipeptides in buffered, filtered Pacific Ocean water. When an excess of oxidizing agent was reacted with phenylalanine thiocarbamate, an intermediate product in the reaction, yield of peptides was as high as 80%, with peptide chains up to five amino acids in length. Peptide bonds were formed in mixtures of L-phenylalanine and either

L-serine, L-leucine, L-tyrosine or L-alanine. The gas COS hydrolyzes in water, so is likely to be available only near volcanic sources. This is the first report of peptide bond formation under ambient temperatures and in the presence of water.

**Comment.** This report adds to our knowledge of chemistry, and shows that volcanic gases can condense L-amino acids into dipeptides. However, it does not do much for the hypothesis of the abiotic origin of life. Even if COS preferentially condensed L-phenylalanine from a racemic mixture (there is no report of this happening), the production of peptide chains does little to explain the origin information-containing proteins, or of living cells.

## PALEONTOLOGY: FOSSIL DINOSAUR BLOOD VESSELS

Schweitzer MH, Wittmeyer JL, Horner JR, Toporski JK. 2005. Soft-tissue vessels and cellular preservation in *Tyrannosaurus rex*. *Science* 307:1952.

**Summary.** Parts of a dinosaur femur were demineralized in a weak acid, removing the hard bony tissue and leaving a mass of soft tissue containing apparent blood vessels. The vessels are soft and pliable, and in some cases retain their shape after repeated stretching. The vessels were compared with similarly prepared vessels from ostrich bone, and the two types of vessels were virtually indistinguishable. The vessels contain small round objects resembling cells with nuclei. Further analysis is needed to determine the possibility of preservation of molecular and subcellular components. The *Tyrannosaurus rex* specimen was collected from the Hell Creek Formation of Montana.

**Comment.** This is an extraordinary discovery that challenges our views of the rate of breakdown of organic molecules and opens the possibility that scientists may be able to recover organic molecules from other well-preserved fossils. Creationists will naturally wonder if this discovery is evidence of a young age of the fossils and evidence against long ages. However, it would be wise to be cautious when considering such claims. If organic molecules can be preserved for thousands of years inside fossil bone, as seems to be the case, we do not know how much longer they might remain preserved if the bones are undisturbed.

## PALEONTOLOGY: RAPID PETRIFICATION OF WOOD

Akahane J, Furuno T, Miyajima H, Yoshikawa T, Yamamoto S. 2004. Rapid wood silicification in hot spring water: an explanation of silicification of wood during the Earth's history. *Sedimentary Geology* 169:219-228.

**Summary.** Alder wood has been observed to become petrified less than 36 years under natural conditions. The wood had naturally fallen into an overflow stream from Tateyama Hot Spring in central Japan. Water from the hot spring (70°C, pH 3) has a high silica content and silica granules are deposited in spaces in the wood as the water seeps through it. Pieces of wood experimentally deposited in the stream were nearly 40% petrified in seven years. Petrified wood produced by hot spring water was compared with Miocene fossil wood, and the two samples showed the same type of mineralization, indicated the same process was involved in petrification. Most petrified wood in the fossil record is associated with volcanic sediments, and it is likely that most fossil petrified wood was produced in a similar manner as hot ground water laden with volcanic ash permeated the wood.

**Comment.** This report confirms previous suggestions that petrification of wood might not take as long as had once been thought. Rapid mineralization is consistent with the excellent preservational state of some petrified wood. For additional comment, see [www.grisda.org/origins/05113.htm](http://www.grisda.org/origins/05113.htm); [www.icr.org/pubs/imp/pdf/imp-379.pdf](http://www.icr.org/pubs/imp/pdf/imp-379.pdf)

## RADIOCARBON DATING: CARBON-14 IN COAL

Baumgardner JR, Snelling AA, Humphreys DR, Austin SA. 2003. Measurable <sup>14</sup>C in fossilized organic materials: confirming the young earth creation-flood model. In: Ivey RL, Jr., editor, *Proceedings of the Fifth International Conference on Creationism*, August 4-9, 2003. Pittsburgh, PA: Creation Science Fellowship, p 127-142.

**Summary.** A major advance toward the agreement we can expect between time specifications obtained from the Bible and from scientific investigation has come from research on the carbon-14 content of coal. With the accelerator mass spectroscopy (AMS) technique, the RATE (Radioactive Age of The Earth) group has determined that all coal contains C-14 in [concentrations] between 0.1% and 0.4% (mean 0.247% + 0.11) of the C-14 concentration in the present environment.<sup>1</sup>

The rock levels from which this coal is obtained have been assigned geological ages ranging from 40 million to 300 million years. Since 40 million years is 7,000 C-14 half-lives, the conventional geological age assignments do not indicate real-time intervals, and the “oldest” coal has a conventional C-14 age around 57,000 years (0.1% of the present biosphere concentration).

**Comment.** The transition from the C-14:C-12 ratio in the pre-Flood biosphere, before the formation of coal beds, to its current ratio is evidently covered by conventional C-14 ages in the range between 60,000 and 4,000 years, since there is satisfactory equivalence with real time over the past 4,000 years. (Contributed by Robert H Brown, Ph.D.)

#### ENDNOTE

1. See also Russell BR. 2004. Evolutionary explanations for anomalous radiocarbon in coal? *Creation Research Society Quarterly* 41(September):104-112.

#### RADIOHALOS: POST-CREATION POLONIUM HALOS

Snelling AA, Armitage MH. 2003. Radiohalos — a tale of three granitic plutons. In: Ivey RL, Jr., editor, *Proceedings of the Fifth International Conference on Creationism*, August 4-9, 2003. Pittsburgh, PA: Creation Science Fellowship, p 243-267.

**Summary.** The presence of polonium radiohalos in granitoid rocks has been used to argue that the granites must have been created instantaneously, by fiat, when the earth was created. This study reports the presence of polonium radiohalos in three granitic bodies that intrude fossiliferous sediments. This discovery falsifies the hypothesis that granites containing polonium radiohalos must have been created by fiat.

The three granite plutons are the Stone Mountain granite in Georgia (Upper Carboniferous); the La Posta granite, located east of San Diego, California (mid-Cretaceous); and the Silurian Cooma granite in southern New South Wales, Australia. Each of these granite plutons was pushed into sediments containing fossils, showing that the granites formed after the fossils were buried. Hydrothermal fluids are probably responsible for transporting polonium atoms and their radon-222 precursor over short distances to sites where the local chemistry favored

their deposition. These sites became the centers of the developing radiohalos. Zircons in the granites likely served as the source for the radioactive atoms, which were frequently concentrated along cleavage planes in biotite.

Although the authors express their disappointment that the fiat creation hypothesis for granites is falsified, they note that the argument for rapid cooling of granites still stands. The flow of hydrothermal fluids might help explain rapid cooling of the rocks and rapid deposition of many metallic ore deposits.

**Comment.** Readers of *Origins* may recall the publication many years ago of a review pointing out the perceived flaws in the radiohalo argument.<sup>1</sup> This study conclusively confirms the position taken by *Origins*, and shows the value of hypothesis testing by creationists.

#### ENDNOTE

1. Brown RH, Coffin HG, Gibson LJ, Roth AA, Webster CL. 1988. Examining radiohalos. *Origins* 15(1):32-38. Available online at: <http://www.grisda.org/origins/15032.htm>