

# ANNOTATIONS FROM THE LITERATURE

## DARWIN'S FINCHES

Baptista LF, Trail PW. 1988. On the origin of Darwin's finches. *Auk* 105:663-671.

**Summary.** The group of birds known as Darwin's finches is composed of 13 species, twelve found on the Galapagos Islands and one on Cocos Island. These species are believed to form a monophyletic group, variously described as a separate family, a subfamily of the Fringillidae, or included in the Emberizidae. They are believed to be derived from an unknown South American ancestor, whose identity has been the subject of some debate. Three species or groups have been proposed as ancestral to Darwin's finches: the grassquit *Volatinia*, the bananaquit *Coereba*, and certain emberizine genera such as *Tiaris* and *Melanospiza*. The authors believe that neither *Volatinia* nor *Coereba* are suitable ancestors. On the other hand, *Tiaris* and *Melanospiza* share several significant characteristics with Darwin's finches, and may be very closely related to them.

## DESIGN IN NATURE?

Ruse M. 1989. Teleology in biology: is it a cause for concern? *Trends in Ecology and Evolution* 4:51-54.

**Summary.** Ruse brings up the point that biological discussions often involve words that imply purpose in nature, as though there was an intelligence behind nature. This terminology seems contrary to evolutionary reasoning, which proposes that nature is the product of purely natural processes. He then argues that discussions of apparent purpose in nature are actually concerned with "the design-like effects of natural selection." The question then becomes whether evolutionary biologists should resist this kind of talk. Since Ruse finds such a change very difficult to effect, he suggests "Perhaps, therefore it is better to seek an up-dated, non-troublesome analysis of teleology..." The result seems to be an attempt to eliminate the problem by redefining the terms. But the problem persists, as in Ruse's observation: "Organisms, unlike planets and particles, really do look as if they were designed."

*Comment.* The paper ends with the surprising statement that “Perhaps, logically, in the interests of conceptual purity, one might eliminate the teleology of biology. However, one would thereby eliminate much of the fertility of biology.” Apparently, a belief in creationism might enable one to do better science.

## **EXON SHUFFLING?**

Hall DH, Liu Y, Shub DA. 1989. Exon shuffling by recombination between self-splicing introns of bacteriophage T4. *Nature* 340:574-576.

*Summary.* Proteins of differing functions may have regions of similar structure. The suggestion has been made that a given coding region (exon) may be active in the production of more than one kind of protein molecule. Different proteins might be produced by different combinations of subunits, in a process dubbed “exon shuffling”. This paper supports the possibility of exon shuffling by reporting the discovery of deletion mutants of phage T4 in which the deleted portion lies between two non-transcribed regions (introns) with homologous DNA sequences. It appears that the deletion occurred by recombination, resulting in a hybrid intron that connects two previously separate exons into a single transcribed unit. Exon shuffling presents some very interesting theoretical possibilities for change in species.

## **FLOOD GEOLOGY**

Whitcomb JC. 1988. *The world that perished*. 2nd ed. Grand Rapids, MI: Baker Book House. 178 p.

*Summary.* In this volume John C. Whitcomb presents a non-technical account of the basic concepts of flood geology. The first part of the book, based primarily on the biblical text, is devoted to a description of the Noachian flood. The second part describes the controversies that have raged over the earlier publications by the author and Dr. Morris dealing with the Genesis flood. These accounts are especially interesting.

*Comment.* The book is not in a format that will especially convince the non-Bible believer of the reality of the Noachian flood. It addresses itself more to the believer and will enrich his understanding of that event. Flood geologists might feel uncomfortable with some of the interpretations, such as the denial of thrusting in the Lewis Overthrust

as evidence of the exotic nature of the geologic column. In general the argumentation appears well thought out, and the book gives a good general overview of flood geology.

## ORIGIN OF LIFE

Joyce GF. 1989. RNA evolution and the origins of life. *Nature* 338:217-224.

*Summary.* The discovery that RNA molecules may have certain catalytic functions has stimulated speculation that RNA may have been the key molecule in the evolution of life. Although Joyce seems sympathetic to the notion of chemical evolution, he debunks the proposal that life began with RNA. Two lines of argument are followed: that RNA is not biochemically suitable to be the starting point for life, and that theoretical conditions on a primitive earth would not favor its production.

*Comment.* RNA is not a reasonable starting point for life, and those who search for an explanation of life's origins must explore elsewhere.

## PALEONTOLOGY

Van Valen L. 1988. Paleocene dinosaurs or Cretaceous ungulates in South America? *Evolutionary Monographs* 10. 79 p.

*Summary.* This is a wide-ranging and very interesting paper, which includes discussions of geologic formations, paleofaunas, phylogenies and biogeography. Among the topics presented are possible Paleocene dinosaurs and the depositional environment of the Itaborai fauna.

Van Valen states that dinosaurs and primitive ungulates have been found in the same or correlative beds in Bolivia and Peru. The presence of dinosaurs suggests the beds should be classified as Cretaceous, while the ungulates suggest a Paleocene classification. Van Valen argues that the best evidence supports a Paleocene designation for these rocks. If so, some dinosaurs must have survived the end-Cretaceous event. Another implication is that most South American marsupials may be Cenozoic rather than Mesozoic. Other, more typical Mesozoic-type mammals have recently been found in South America, and these should prove an interesting subject for further study.

An interesting description is given of the rocks containing the famous Itaborai fauna. It seems the vertebrate fossils are found in clastic deposits in internal solution channels within a limestone formation. None of the fissures are known to extend to the top of the limestone. How the terrestrial vertebrates got into the fissures is not clear. The limestone also contains some fossils, but possibly only in limestone above the fissures. The vertebrates from the fissures are classified as Paleocene, while the fossils in the limestone are classified as mid-Cenozoic. Since the limestone is nearly quarried away, the explanation for this seeming anomaly may never be discovered.

## PHILOSOPHY OF SCIENCE

Kautz D. 1988. The origin of living things. Published by the author, 10025 West Nash Street, Milwaukee, Wisconsin. 68 p.

*Summary.* This large-format booklet addresses the question of the origin of the world and living things from a creationistic perspective. A broad approach is employed with the first part being devoted to an evaluation of agnosticism, atheistic evolution, and theistic evolution. The last half of the booklet discusses the scientific credibility of creationism. This is a well-presented and well-illustrated booklet that should be attractive to the high-school student.

*Comment.* Some creationists may be uncomfortable with the out-of-order-fossil-sequence argument and with the pleochroic halo argument which is used as evidence of rapid creation.

Peacocke AR. 1986. God and the new biology. NY: Harper & Row. 197 p.

*Summary.* The author is a physical biochemist and an Anglican priest. This breadth of background is brought to this volume, which is basically an antireductionist approach to modern biology. The author argues that nature can be interpreted as being the result of creation; however, this creation follows an evolutionary pattern — a form of theistic evolution. The argument for God is drawn from the minutia of molecular biology up to sociobiology. Other religious topics, such as matter and the Eucharist are also considered. The book is basically non-technical and can be easily understood by the non-scientist.

## RADIOCARBON DATING

Lowe DC. 1989. Problems associated with the use of coal as a source of  $^{14}\text{C}$ -free background material. *Radiocarbon* 31:117-120.

*Summary.* Various radiocarbon laboratories throughout the world have published radiocarbon ages for coal in the range from 25-45,000 years. There are many unpublished accounts of laboratories which have discontinued studies on coal because of inability to obtain  $^{14}\text{C}$ -free specimens. Anthracite coal, which should have the greatest geological age and be the most free from  $^{14}\text{C}$  contamination, yields  $^{14}\text{C}$  ages in the 40-45,000 year range. Lowe notes that the " $^{14}\text{C}$  content [of coal] should be insignificant in comparison to the  $^{14}\text{C}$  introduced by even the most careful sample preparation techniques used in  $^{14}\text{C}$  laboratories." He then asks, "How is it...that a material, which should show a  $^{14}\text{C}$  age indistinguishable from that produced by a combination of machine background and contamination during careful sample preparation, routinely produces a finite  $^{14}\text{C}$  age?"

In an effort to find an explanation for these observations that is consistent with prevailing concepts regarding geologic time, Lowe suggests microbial and fungal action in coal substrates. According to the process he proposes, atmospheric  $\text{CO}_2$  penetrating into the coal would be converted by these organisms into products containing  $^{14}\text{C}$ . He outlines procedures that might be used for checking the adequacy of this proposal.

## REWORKED DINOSAURS?

Eaton JG, Kirkland JI, Doi K. 1989. Evidence of reworked Cretaceous fossils and their bearing on the existence of Tertiary dinosaurs. *Palaios* 4:281-286.

*Summary.* The presence of dinosaur teeth in lower Tertiary deposits has been used to claim that dinosaurs survived into the Tertiary. The postulated survival of some dinosaurs through the Cretaceous-Tertiary boundary presents problems for theories attempting to explain the extinction of the dinosaurs as due to an impact with a comet or asteroid. The authors of this paper note three Tertiary deposits where dinosaur teeth are found with Cretaceous marine sharks and Tertiary mammals. The three deposits are the Paleocene Shotgun Fauna of central Wyoming, the Eocene Raven Ridge fauna in eastern Utah, and the

Eocene San Juan Basin Fauna in New Mexico. The authors reject the reliability of identifying reworked specimens on the basis of abrasion. Their criteria for identifying reworking of specimens include the presence of mixed marine and freshwater taxa, or the presence of a stable taxon following a long stratigraphic gap in its record. They conclude that the evidence for Tertiary dinosaurs is weak, and await confirmation by discovery of articulated material in fine-grained deposits.

**Comment.** The possibility of reworking of fossils from the Cretaceous Mesaverde Formation into the Eocene Wasatch Formation should be considered in interpretations of the Eocene Green River Formation, which intertongues with the Wasatch Formation.

### **SOME NOTABLE INVERTEBRATE FOSSILS**

Michener CD, Grimaldi DA. 1988. The oldest fossil bee: Apoid history, evolutionary stasis, and antiquity of social behavior. *Proceedings of the National Academy of Sciences (USA)* 85:6424-6426.

**Summary.** A fossil stingless honey bee (genus *Trigona*) found in Cretaceous amber from New Jersey, is very similar to living species found in the New World tropics. This find shows that these bees have undergone no significant morphological evolution since their first appearance, and that bees were social insects even then. In addition, the genus *Trigona* is reportedly one of the most derived bee genera, and not “primitive”.

Shear WA, Schawaller W, Bonamo PM. 1989. Record of Palaeozoic pseudoscorpions. *Nature* 341:527-529.

**Summary.** Pseudoscorpions are a group of small carnivorous arthropods comprising an order in the class Arachnida. Two pseudoscorpion fossils have been discovered in Middle Devonian black shale from New York state, which is considered to be 380 million years older than previous records. Prior to this find, the oldest known pseudoscorpion fossils were from Oligocene Baltic amber, estimated at 35 million years. The recently discovered fossils have all the characteristics of modern pseudoscorpions, but in a combination not known in any living species. These fossils indicate that pseudoscorpions were already a distinct group when the Devonian sediments were deposited.

## SPECIATION

Wrigley JM, Graves JAM. 1988. Karyotypic conservation in the mammalian order Monotremata (subclass Prototheria). *Chromosoma* 96:231-247.

**Summary.** The G-banded karyotype of the New Guinea echidna is reported for the first time and compared with karyotypes for Australian echidna and platypus. The two echidnas have nearly identical karyotypes, and share some unique features with that of the platypus. However, it was not possible to reconstruct an ancestral karyotype for the monotremes as a group. The karyotypes of the monotremes are distinct from those of any other group.

## VARIABILITY IN THE GENETIC CODE

Kawaguchi Y, Honda H, Taniguchi-Morimura J, Iwasaki S. 1987. The codon CUG is read as serine in an asporogenic yeast *Candida cylindracea*. *Nature* 341:164-166.

**Summary.** The genetic code is virtually the same for all organisms. Each codon, or base triplet, specifies the same amino acid in nearly all species. However, a few exceptions are known in certain microorganisms, including *Paramecium*, *Mycoplasma*, *Tetrahymena*, and *Escherichia coli*. This paper reports another exception, a yeast. The codon CUG specifies the amino acid leucine in all known organisms, except in *Candida*, where it specifies serine. The authors are looking for CUA codons in *Candida* to determine whether they also code for serine.

**Comment.** Exceptions to the universality of the genetic code pose interesting questions for evolutionary theory.