

TABT Updates and URLs of the Week – October 2009

Item 1 – Teacher Survey Request

Teacher Empowerment Survey for Exploring the Professional Growth Continuum

The Teacher Empowerment Survey for Exploring the Professional Growth Continuum is a National Science Foundation funded project intended to identify pivotal experiences of career science teachers that have promoted their advancement. It is supported by the Texas Regional Collaboratives for Excellence in Science and Mathematics Teaching. Implications for use of the data include the identification and implementation of effective professional development models and experiences that enhance science teachers' retention and effectiveness. Your willingness to contribute to the body of knowledge about classroom teachers will be appreciated and responses will be added to data from hundreds of other teachers. Your personal, individual responses will be secure and completely anonymous. To participate, go to <http://vovici.com/wsb.dll/s/f8c2g38ab3>.

Item 2- Science in the News

Dongyu Hu, *et al.*, “A pre-*Archaeopteryx* troodontid theropod from China with long feathers on the metatarsus”

(*Nature*, 461:7262, 1 October 2009, Pages 640-644)

The early evolution of the major groups of derived non-avian theropods is not well understood, resulting in the ‘temporal paradox’ argument against the theropod hypothesis of avian origins. Here, a small theropod specimen collected from the earliest Late Jurassic of China is recovered that is referable to the Troodontidae, which are among the theropods most closely related to birds, thus refuting the supposed ‘temporal paradox’. Furthermore, the extensive feathering of the specimen sheds new light on the early evolution of feathers.

Ann Gibbons, “A New Kind of Ancestor: *Ardipithecus* Unveiled”

(*Science*, 326:5949, 2 October, Pages 36-40)

In this special issue, a multidisciplinary international team presents the oldest known skeleton of a potential human ancestor, 4.4-million-year-old *Ardipithecus ramidus* from Ethiopia. This rare skeleton is not the oldest hominin, but it is the most complete of the earliest specimens. It includes most of the skull and teeth, as well as the pelvis, hands, and feet – parts that the authors say reveal an “intermediate” form of upright walking, considered a hallmark of hominins. To some researchers' surprise, the female skeleton doesn't look much like a chimpanzee, gorilla, or any of our closest living primate relatives. Even though this species probably lived soon after the dawn of humankind, it was not transitional between African apes and humans. Instead, it and pieces of at least 35 other skeletons reveal a new type of early hominin that was neither chimpanzee nor human.

Item 3 – Quote of the Week for October 5

“I was taught that the way of progress is neither swift nor easy.” – *Marie Curie, physicist*

Item 4 – URL of the Week 10/5

Devonian Times

This site is about the “Age of Fishes” that witnessed major changes in aquatic animals, including the evolution of lobe-finned and ray-finned fishes and the definitive emergence of sharks. This newspaper-like site contains a basic background on the plants, animals, and geology of the period. There is also a “Who's Who” of fossil organisms from Red Hill, an important Devonian site in Pennsylvania.

<http://www.devoniantimes.org/>

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Item 1 – You and TABT

TABT Elections and Committee Appointments Need Your Input

The election of the next TABT president elect is underway. You should have already received an email with instructions on how to vote. If you didn't receive the email, contact Alton Biggs (altonb@ix.netcom.com) as soon as possible. If you would like to volunteer for a committee assignment in TABT, let Alton know what you'd be interested in doing.

Item 2- Science in the News

Teri A. Manolio, *et al.*, “Finding the missing heritability of complex diseases”

(*Nature*, 461:7265, 8 October 2009, Pages 747-753)

Genome-wide association studies have identified hundreds of genetic variants associated with complex human diseases, but most confer small increments of risk. There seems to be a large component of heritability somehow evading detection. Possible explanations for this ‘missing heritability’ include great numbers of small-effect variants yet to be found, rare structural or epigenetic variation not detected by current genotyping technology and hard-to-detect gene-gene and gene-environment interactions. These authors examine the research strategies most likely to distinguish between these and other possible explanations.

Qiang Ji, *et al.*, “Evolutionary Development of the Middle Ear in Mesozoic Therian Mammals”

(*Science*, 326:5949, 9 October 2009, Pages 278-281)

The mammalian middle ear is defined by the loss of embryonic Meckel's cartilage and disconnection of the middle ear from the mandible in adults. It is a major feature distinguishing living mammals from non-mammalian vertebrates. These authors report a Cretaceous mammal with an ossified Meckel's cartilage in the adult, showing that homoplastic evolution of the mammalian middle ear occurred in derived therian mammals. Reabsorption of embryonic Meckel's cartilage to disconnect the ear ossicles from the mandible is patterned by a network of genes and signaling pathways. This fossil suggests that developmental heterochrony and gene patterning are major mechanisms in the evolution of the mammalian middle ear.

Item 3 – Quote of the Week for October 12

“I’m an idealist. I don’t know where I’m going, but I’m on my way.” – Carl Sandburg, Pulitzer Prize-winning American poet

Item 4 – URL of the Week 10/12

SciVee

This new video-sharing site from the Public Library of Science, the National Science Foundation, and the San Diego Supercomputer Center allows posts of short videos, or pubcasts, in which latest papers are explicated. The site offers advice on video production and posting. So far it contains open-access papers in biology, but it will expand to include other subjects and types of publications.

<http://www.scivee.tv/>

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Item 1 – Science in the News

Christopher D. Harvey, *et al.*, “Intracellular dynamics of hippocampal place cells during virtual navigation”
(*Nature*, 461:7265, 15 October 2009, Pages 941-946)

As we navigate, spatial information is encoded in both rate and temporal codes by place cells located in the hippocampus. The intracellular dynamics of place cells were measured *in vivo* in mice navigating a virtual-reality environment. Three sub-threshold signatures of place fields are identified that underlie the primary features of place-cell rate and temporal codes.

Paul C. Sereno, *et al.*, “Tyrannosaurid Skeletal Design First Evolved at Small Body Size”

(*Science*, 326:5951, 16 October 2009, Pages 418-422)

Nearly all of the large-bodied predators on northern continents during the Late Cretaceous were tyrannosaurid dinosaurs. These authors show that their most conspicuous functional specializations were present in a new, small-bodied, basal tyrannosauroid from Lower Cretaceous rocks in northeastern China. The specializations, which were later scaled up in Late Cretaceous tyrannosaurids with body masses approaching 100 times greater, drove the most dominant radiation of macro-predators of the Mesozoic.

Item 2 – Quote of the Week for October 19

“I think we may safely trust a good deal more than we do.” – Henry David Thoreau, American transcendentalist and writer

Item 3 – URL of the Week 10/19

Medicine in the Americas

This collection from the U.S. National Library of Medicine houses scanned versions of eight medical books published between the early 18th and early 20th centuries. Michael North plans to add 100 more titles on medicine throughout the Americas.

<http://www.nlm.nih.gov/hmd/americas/americanashome.html>

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Item 1 – You and TABT

TABT Election and You

The TABT president election is complete and the winner is Sarah Joy Anderson of Texas Tech University. If you come to CAST in a couple of weeks, please stop by the TABT booth to let us know how you'd like to help your association this next year. The incoming president, Karen Hewitt, will have several vacancies to fill on committees when she takes office in January. Won't you help by volunteering? If you're not going to be at CAST you can always email Alton Biggs (altonb@ix.netcom.com) with your suggested area of service and he'll pass the information to Karen.

Item 2- Science in the News

Jun Kitano, *et al.*, “A role for neo-sex chromosome in stickleback speciation”

(*Nature*, 461:7266, 22 October 2009, Pages 1079-1083)

Closely related species often have different sex-chromosome systems, but it is not known whether sex-chromosome turnover contributes to the evolution of reproductive isolation between species. A neo-sex chromosome is identified in only one member of a sympatric species pair of stickleback fish in Japan. The newly evolved sex chromosome is found to contain genes that contribute to speciation, suggesting that sex-chromosome turnover might have a greater role in speciation than was previously appreciated.

Jamie Voyles, *et al.*, “Pathogenesis of Chytridiomycosis, a Cause of Amphibian Declines”

(*Science*, 326:5952, 23 October 2009, Pages 582-585)

The pathogen *Batrachochytrium dendrobatidis* (*Bd*), which causes the skin disease chytridiomycosis, is one of the few highly virulent fungi in vertebrates. It has been implicated in worldwide amphibian declines. However, the mechanism by which *Bd* causes death has not been determined. These authors show that *Bd* infection is associated with physiological changes that lead to mortality in green tree frogs (*Litoria caerulea*). In diseased individuals, electrolyte transport across the epidermis was inhibited by >50%, plasma sodium and potassium concentrations were respectively reduced by ~20% and ~50%, and cardiac arrest resulted in death. Because the skin is critical in maintaining amphibian homeostasis, disruption to its function may be the mechanism by which *Bd* produces morbidity and mortality across a wide range of amphibian taxa.

Item 3 – Quote of the Week for October 26

“An investment in knowledge always pays the best interest.” – *Benjamin Franklin, American inventor, statesman*

Item 4 – URL of the Week 10/26

Bioclips

The French government sponsors the virtual multiplex displays entrants from the last four rounds of the Cinema of the Cell festival. Researchers and students present their educational Web films, which use techniques from traditional animation to stop-motion with Lego blocks. There are more than 30 shorts ranging from “A Day in the Life of a Social Amoeba” to the establishment of cell polarity in nematodes from the University of Wisconsin, Madison.

<http://www.bioclips.com/>

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