

## Paleontology and Evolution in the News

Sidney Horenstein

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I previously stated that it is hoped that this column provides a glimpse of the numerous articles in the media (both print and online) about paleontology and evolution. Space consideration limits the amount of space devoted to each item, but the descriptions provide a few of the salient ideas expressed in the article. The goal, of course, in providing the source information, is for the reader to view the original article and if it is of interest to the reader go further and read the original material that the article is based on.

Olivia Johnson, in her blog (<http://judson.blogs.nytimes.com/2009/08/04/dawn-at-the-museum/?scp=1&sq=Oxford%20University%20Museum&st=cse>) in the *New York Times* on August 4, 2000 describes her visit to the Oxford University Museum of Natural History. Although the building as well as many of its specimens is reminiscent of the nineteenth century, there is very modern work taking place in its laboratories. “The Oxford Museum ranks in the annals of evolutionary history because, just after it opened in 1860, it was the scene of a debate that immediately became legendary.” Samuel Wilberforce, Bishop of Oxford debated Thomas Henry Huxley, a friend, colleague, and public defender of Darwin’s theory of evolution. But it was not history that she thought about but the DNA molecule model that was on exhibit, the very object that links us all together, from Goliath beetles and pygmy shrews to iguanodons and kangaroos. She continues her blog about the importance of the old specimens in the collection and the difficulties they present during efforts to extract DNA

samples, but when they can be used she illustrates their importance by example. Hector’s dolphin, a rare coastal New Zealand species, thought to have fewer than 4,000 individuals extant, often gets tangled in fishing nets. The question: is this small population, with a low genetic diversity becoming extinct? If the natural genetic diversity is low then there may not be a problem. However, the museum has specimens that were collected as early as the 1870s, and comparing DNA from these collections with animals living today shows that genetic diversity was greater in the past. This revelation indicates that Hector’s dolphin could become extinct if they are not protected. The article also contains a link to the museum for people (students and teachers) who want to take a tour and a list of statues of the great scientists of the past, including Darwin, Newton, and Galileo, displayed at the entry hall.

Charles Q. Choi reports on August 4, 2009 in National Geographic News (<http://news.nationalgeographic.com/news/pf746109846.html>) “Pterosaur’s Wings, ‘Hair’ Unlike Any Living Animals” that the wing membrane of a Chinese pterosaur fossil “contains a complex pattern of fibers not found in any living animal.” Pterosaurs were the earliest known flying vertebrates. What is the explanation for the fibers? It is suggested that they “would have made it easier to make subtle adjustments of the wing membrane when flying...” The article states that the well-preserved “newly examined pterosaur has the hair-like fibers all over its body and parts of its wing.” Perhaps the covering of the fibers may have helped pterosaurs control their body temperatures. This fossil pterosaur, *Jeholopterus ninchengensis*, about 12 inches long with a wing span of 35 inches was found in Inner Mongolia in 2000 in shale containing numerous crustaceans and volcanic ash. This pterosaur lived about 135 million years ago during the Cretaceous

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S. Horenstein (✉)  
American Museum of Natural History,  
Central Park West at 79th Street,  
New York, NY 10024, USA  
e-mail: horenst@amnh.org

Period in a region that was volcanically very active. Perhaps the numerous specimens were victims of the gaseous emanations from the volcanoes. Because the pterosaur contains horny sheaths covering its claws, it is suggested that they lived part of the time in trees.

Reuters (<http://www.reuters.com/article/scienceNews/idUSTRE5745GJ20090805>) on August 5, 2009, on the other hand, released the following news item on the same discovery with a somewhat different emphasis that was picked up by numerous newspapers. Their report states that the researchers found that the pterosaur “had unique and complex wing fibers that enabled them to fly with the precision and control of birds...” The team of Brazilians, Germans, Chinese, and British researchers said that reptiles, when they dominated the skies during their time, were not just basic gliders. Using a new technique of shining ultraviolet rays on the well-preserved fossil brought out a detailed view of the tissue. Also found were hair-like fibers on the animal’s body that are “different from other furs we find in mammals...” These discoveries provided evidence for the researchers’ suggestion that perhaps pterosaurs were able to control their body temperature and therefore were hot-blooded animals. “This is of great importance to understanding how the pterosaur functioned.” The researchers also said that the specimen had several layers of fibers to control its wings, rather than one as previously thought, suggesting that “it had more stability and control over its flying than flying animals such as bats.” Pterosaurs became extinct about 65 million years ago, at around the same time as the extinction of dinosaurs, but when they were extant, the largest of them were “the largest creatures to have flown.”

The concepts of extinctions as well as bursts in diversity are the source of numerous articles in journals. <http://www.physorg.com/print168706288.html> reports about an online paper published in the *Proceedings of the National Academy of Sciences* during the first week of April, 2009 on “climate causing biodiversity booms and busts in ancient plants and animals.” The authors compare today’s desert environment in the middle of Wyoming with the same area 50 million years ago during the Eocene epoch, when temperatures were at their highest. During that time that part of Wyoming was a tropical rainforest abundantly inhabited with lemur-like primates, small dawn horses, a variety of small forest rodents, and other mammals. The report states that “there were more species of mammals living in the western part of North America at that time than at any other times.” The study reports that diversity increased and declined with rising and falling temperatures during the Eocene epoch, but it focuses on the period named the Early Eocene Climatic Optimum (EECO) which began about 53 million years ago with a long-term temperature increase that is associated with a long-term

rise in diversity. The study indicates that the mean annual temperature increase from about 60°F to 73°F accompanied a change in vegetation as new plant forms appeared and an increase in mammal diversity from 90 genera to an all-time high of 104 genera. They report that the new appearance of mammals was due to evolutionary innovation, rather than immigration. The new mammals included rodents, carnivores, primates, camels, pigs, giraffes, and antelopes, among others. But when temperature declined again, “the number of mammal genera dropped to a low of 84 with the complete loss of many mammalian groups that were previously well represented.” Until this study, it was generally thought that “climate played only a background role in supporting the evolution of mammals during the Paleocene and Eocene (65 million to 35 million years ago).” The authors of the study were Michael Woodburne, Museum of Northern Arizona, Gregg Gunnell, University of Michigan Museum of Paleontology, and Richard Stucky of the Denver Museum of Nature and Science. Concluding the article, Woodburne said when considering today’s global warming, “the question is, on which side of the picture will mankind be found?”

Many paleontological discoveries are reported in newspapers around the world because they have compelling stories and/or are of great scientific interest, and perhaps the press release is well written. But some barely grab the interest of an editor. Take for example the news release from National Geographic News on August 4, 2009 (<http://nationalgeographic.com>) with the headline “Extinct walking Bat Found; Upends Evolutionary Theory.” One would think this would be a newsworthy story, but it hardly got a line in newspapers, although it was picked up by a large assortment of personal blogs and science news columns in magazines (e.g. [www.americanscientist.org](http://www.americanscientist.org)) and other online science blogs. In New Zealand the lesser short-tailed bat spends part of its time walking on the ground, and because it lives in a habitat that lacks predators, total flight is not necessary. Like flightless birds on isolated islands, it is thought that the bat evolved its walking way of life independently. However, it turns out that an extinct walking bat, 20 million years old, has been found in northwestern Queensland, Australia, suggesting that the modern walking bat descended from the now-extinct Australian relative. Susan Hand, a paleontologist at the University of New South Wales in Sydney, Australia said that “we are amazed to find that they” (the fossils) “were virtually identical to the bats in New Zealand today.” These bats also flew, but being able to spend time on the ground allowed it to have a much broader diet. In Australia, about 15 million years ago, the climate became cooler and drier, and the walking bats became extinct. “Of the 1100 known present-day bat species, the lesser short-tailed bat and the American common vampire bat are the only bats known to walk on the ground.”

County administrators have not decided what they will ultimately do with an ancient whale found on a Santa Cruz, California beach in Monterrey Bay. Kurtis Alexander reports for the *Mercury News* (<http://mercurynews.com/fdcp?1250129744195>) on August 1, 2009 that a thousand-pound slab of sandstone was lifted from the beach containing the partial remains of a 5-million-year-old toothed whale. During the time the whale was alive the region was covered by a shallow ocean in which the sand was deposited. The whale, six feet to perhaps ten feet long is thought to be more complete than others found in the area but that will not be known until the skeleton is excavated from the block of sandstone.

On the opposite side of the continent near Richmond Virginia, a partial skeleton of a 14-million-year-old Miocene whale was found in a quarry which is considered the state's best fossil site. "It's just incredibly rich" said Alton C Dooley Jr., a paleontologist at the Virginia Museum of Natural History. "I can dig here for the rest of my life and we won't get it all done." At least a dozen whales have been found in the quarry, "whales piled up on top of each other, dolphins and sea turtles alongside pieces of land animals such as a horse, camel, a tapir and a peccary" as well as thousands of shark and ray teeth. A study of diatoms indicated that the depth of water was brackish and no deeper than 50 feet. Carmel Church, writing for HamptonRoads.com in August, 2009 (<http://hamptonroads.com/520044>), says that Mr. Dooley and his team have been excavating the largest and longest whale skeleton discovered so far. They have not figured out why so many whales and other animals are found in such a small space—a narrow fossil bed that is about 400 feet long. Some of the specimens seem to be in the place where they died and were quickly buried by sediment, but other fossil whale bones are scattered and contain bite marks of sharks. One of the interesting aspects of the whale skull is that its jaw was broken but had new bone growing around the broken ends, indicating that the animal lived about a week after the injury.

An article in Canada.com (<http://www.canada.com/technology/Canadian+scientist+unearths+first+tree+climbing+creature/1854708/story.html?id=1854708>) by Randy Boswell of CanWest Newservice on August 2, 2009 describes fossil evidence for a 260-million-year-old Late Paleozoic vertebrate animal with a tree-climbing lifestyle and opposable thumb. The fossil, *Suminia getmanovi*, was found in the Kirov region of central Russia in 1990. When the original study was published in 2001, the half-meter-long fossil was described as the oldest land vertebrate able to grind vegetation with its teeth rather than just swallowing leaves whole. "The chewing adaptation would become a major evolutionary step for mammals, although it didn't ultimately protect *Suminia* from extinction." Further study

of the fossil reported here by Robert Raisz, University of Toronto and Jorg Frobisch, Chicago's Field Museum, show that *Suminia* was pioneer in "two other key innovations for land animals that would also prove crucial much, much later for our own primate ancestors: a dexterity-aiding inner digit on its hand and a knack for moving about trees to escape predators, find food and take shelter." A photograph of the fossil accompanies the article. *Suminia* is a 20-inch, long-tailed, lizard-like creature, a member of a dead-end family of proto-mammals, a synapsid that disappeared 30 million years before the age of dinosaurs. It shares a distinctive skull structure with mammals that distinguishes it from lizards and birds. Additional skulls and more than a dozen exceptionally well-preserved complete skeletons were removed from a block of red mudstone. It is thought that the animals were killed during a flood and rapidly buried in the mud. Until now the earliest tree-dwelling vertebrates were drepanosaurid reptiles, but they appeared 30 million years after *Suminia*. One of the few newspapers to publish this story was the Tehran Times ([www.tehrantimes.com](http://www.tehrantimes.com)).

CCTV.com, the Chinese news outlet, reports on August 14, 2009 that "China's biggest dinosaur fossil, 27 meters long, is to be displayed in the NEW CSTM" (New China Science and Technology Museum) in Beijing's Olympic Park. Three rare dinosaur fossils excavated from Chuxiong Yi Autonomous Prefecture in Yunnan Province including "China's first dinosaur," the oldest dinosaur fossil excavated on China, a late Triassic prosauropod, and *Chuanjiesaurus*, the largest, a Jurassic sauropod. Great care is being provided to ensure that the fragile specimens arrive safely to their new home. The specimens were completely dismantled and flown to Beijing, where they will be transported by special anti-shock truck in cushioned containers. Throughout the entire trip strict requirements for temperature and humidity were to be met to prevent damage to the skeletons. "The fossils would be protected by 50 guards day and night." They will be displayed in a setting where the *Chuanjiesaurus* is looking down on the two other skeletons, which will appear to be attacking one another.

I would be remiss not to have at least two dinosaur stories to report because, usually, it seems, they are released on a daily basis. Matt Kaplan writing for National Geographic News on August 11, 2009 (<http://news.nationalgeographic.com/news/pf/730097341.html>) states that "A mighty hunter has fallen—at least in the eyes of countless kids who admire the fearsome *Tyrannosaurus rex*." He says that contrary to films and books *T. rex* rarely attacked full-grown adult dinosaurs but was more likely to go after defenseless youngsters. Based on what is known about modern predatory animals such as lions and tigers, like them, the large carnivorous dinosaurs probably went after

the weak and inexperienced. This article is based on the work of David Hone, Institute of Vertebrate Paleontology, Beijing and Oliver Rauhut, a paleontologist at Ludwig Maximilian University of Munich, Germany. They say the proof lies in the markings—or lack of them—on fossil bones from prey animals. Predators that died with meals in their stomach usually contained only a small number of bones, and these bones rarely showed any bite marks. They believe that is so because the juvenile bones were most likely swallowed whole, and “since they are softer than adult bones they were more easily dissolved in stomach acids.” The authors point out that dinosaur nests contain large number of eggs, but in the fossil record the juvenile dinosaurs are relatively rare. Maybe there are so few specimens because many of them have been eaten by predators. Confirming this may be difficult, but another explanation is that juvenile bones do not preserve well or they lived in environments that did not easily preserve them.

Here is a third story from *The Times of India* published on August 19, 2009 (<http://timesofindia.indiatimes.com/articleshow/4909746.cms>). Paleontologists have discovered what they claim are the largest dinosaur footprints found in Europe. They were found at 3,300 meters on a mountain side in the Ela Nature Reserve, Switzerland. The three-toed animal, about 15 to 20 feet long, walked through what is now the Swiss Alps more than 210 million years ago. The 15-inch-long prints belonged to a predator that would have been the largest at the time and lived in what was a tropical coastal environment long before the rocks were folded and uplifted to form part of the Alps.

A UPI.Com story ([http://www.upi.com/Science\\_News/2009/08/26/Color-found-in-40-million-year-old-fossils/UPI-36201251315558/](http://www.upi.com/Science_News/2009/08/26/Color-found-in-40-million-year-old-fossils/UPI-36201251315558/)) “Color found in 40 million-year-old fossils” was posted on August 26, 2009. Richard Plum and Derek Briggs of Yale University say they discovered evidence of vivid iridescent colors existing in a feather fossil more than 40 million years old. They said “their findings represent the first evidence of a preserved color-producing nanostructure in a fossilized feather.” Their “feathers produced a black background with a metallic greenish, bluish or coppery color at certain angles—much like the colors we see in starlings and grackles today.” Using an electron microscope to make their discoveries, they indicate that the technique could be used in determining color features of other ancient birds and possibly even dinosaurs.

“Diving Deep in the Quest for a Living Fossils” was published in the *New York Times* on August 25, 2009 ([http://www.nytimes.com/2009/08/25/science/25fossil.html?\\_r=1&ref=science](http://www.nytimes.com/2009/08/25/science/25fossil.html?_r=1&ref=science)). William Broad tells the exciting story of Peter Rona of Rutgers University and his quest to find an elusive animal “more than two miles below on the

muddy seabed of the North Atlantic.” The animal, of unknown affinities, *Paleodictyon nodosum*, is known as a fossil that was thought to become extinct 50 million years ago. For 33 years Dr. Rona has studied the fossils and pursued the living form by plunging down more than two miles to the sea floor in a submersible. It’s a small creature, a little larger than a poker chip, which has many holes in it arranged in six-sided patterns. He said it takes more than two hours to descend into the darkness, and he has been able to photograph thousands of them but has not been able to capture one of them. The deep, dark environment where they are found is around deep sea hot springs where life teems with millions of shrimp and other animals, some of which are “evolutionary throwbacks, their bodies changed very little, such as sea lilies that date back 400 million years.” Included with the online edition of the story is a series of photographs of the deep-sea animals encountered on the sea floor voyages as well as an illustration of the *Paleodictyon*. In addition, a series of articles written with a team of a dozen colleagues has been published in Volume 56 of *Deep Sea Research Part II*. The fact that an attempt to capture the animals has been unsuccessful has led to a debate as to what the animal is and how it lives. Samples taken of the hexagonal patterns turn out to yield nothing when the sediment is examined. Are the patterns burrows, body parts, or vacant spaces where the animal once lived? One of Dr. Rona’s colleagues, Dr. Adolph Seilacher of Yale University, thinks that “the many holes at the surface of its abode link up below in a labyrinth of subsurface tunnels.” He also says that the earliest forms of the animals date from “the explosion of complex life in the Cambrian Period some 500 million years ago.” He sees “the tunnels as a kind of farm where an unknown type of worm or other organism raises micro-organisms to eat.” But Dr. Rona sees “the holes as body parts, perhaps a type of compressed sponge.” Although the animal is described as a living fossil, nowhere in the article is there a description of what it is. The concept of a living fossil, introduced by Charles Darwin, describes a plant or animal that has not changed from its ancestors over millions of years and once had an extensive geographic range while today the range is limited.

The *Chicago Tribune* ran a story from the Associated Press on August 18, 2009 ([www.chicagotribune.com/news/chi-ap-in-mastodonbones,0,7063154.story](http://www.chicagotribune.com/news/chi-ap-in-mastodonbones,0,7063154.story)) describing the discovery of a partial skeleton of a mastodon in southwestern Indiana, about 30 miles south of Terre Haute, in a construction pit. The fossil bones, more than 12,000 years old, consisting of tusks, ribs, a skull, and other skeletal parts, were found in a backhoe shovel during work on the project. The workers notified the Indiana Division of Reclamation of their discovery and were appropriately thanked for notifying the agency. Mastodons lived in North America from 3.75 million years ago until about 11,000 years

ago before becoming extinct. Early humans hunted both mastodons and their larger cousins, mammoths—perhaps one of the causes for their extinction.

Geoff Kirbyson wrote in the *Winnipeg Free Press* (<http://www.winnipegfreepress.com/local/crocs-remains-a-rare-discovery-54698007.html>) about a Manitoba lawyer, Chris Tait, on August 25, 2009, who moonlights as a part-time paleontologist. Walking along the Wilson River he saw a rib sticking out of the riverbank which compelled him to dig down about eight feet. As a result he uncovered the legs, backbone, and scales of a large predator, a marine crocodile. While the majority of marine reptiles in the Canadian Fossil Discovery Center in Morden, Manitoba are 80 to 83 million years old, this specimen is believed to be 90 million years old. Accompanying the article is a drawing of a fossil marine crocodile.

A story in Softpedia (<http://news.softpedia.com/news/Experts-Find-150-Million-Year-Old-Squid-Ink-119701.shtml>) on August 20, 2009 describes the discovery of a fossil squid in Chippenham, Wiltshire in the United Kingdom, of a fossil squid estimated to have lived some 150 million years ago during the Jurassic Period. To their amazement they found a one-inch ink sack when the rock which encased the animal was split open. The leader of the dig was Dr. Phil Willby of the British Geological Survey. BBC News reported that the team excavating the site believed that the ink was in such good condition they dipped a pen inside it and used the ink to draw the fossil and write its name. “The amazing site has been excavated almost continuously since Victorian times. Hundreds of excellently preserved fossils were discovered there...”

The *Montreal Gazette* published the news that an “Ancient Horse roamed Canada’s North with mammoths, camels” written by Randy Boswell on August 22, 2009 (<http://www.calgaryherald.com/technology/Ancient+horse+>

[roamed+Canada+North+with+mammoths+camels/1920752/story.html](http://www.calgaryherald.com/technology/Ancient+horse+roamed+Canada+North+with+mammoths+camels/1920752/story.html)). A frozen ice-age horse dug up in 1993 by gold miners in the Klondike has been put on public display at the Yukon Beringia Interpretive Centre in Whitehorse. The article contains a painting of the 26,000-year-old horse that had been found frozen in permafrost with only some of its carcass intact—foreleg, hide, mane, and tail. The light-colored, pony-sized horse *Equus lambei* lived in a grassland that existed until about 10,000 years ago in “a glacier-free zone covering present-day Siberia, Alaska, and Yukon.” Smell attracted the discoverers of the horse, who originally thought it was a decaying pack mule left over from the days of the Klondike gold-rush that became frozen in the ground. The horse lived at a time when Canada’s northwest was an ice-free grassland populated with camels, steppe bison, scimitar cats, and mammals.

Fossilized footprints of an ancient sea scorpion—a eurypterid—was placed on view in the Carnegie Museum of Natural History writes Deborah Deasy on August 18, 2009 in the *Pittsburgh Tribune-Review* ([http://www.pittsburghlive.com/x/pittsburghtrib/ae/museums/s\\_638903.html](http://www.pittsburghlive.com/x/pittsburghtrib/ae/museums/s_638903.html))

The prints from the seven-foot-long animal were found in Elk County on a slab of sandstone that may have been deposited in a river or a brackish bay about 350 million years ago during the Mississippian Period. Sea scorpions are related to horseshoe crabs and had six pairs of legs, a tail, and a pair of large claw-like appendages. The specimen is described as the world’s largest “eurypterid trackway,” and in addition to the feet impressions, it contains a faint groove that was probably made by the animal’s tail. Originally found in 1948 and given the scientific name *Palmichnium kosinskiorum*, named after the discoverer, in 1983 it was placed in storage until “rediscovered” recently. Accompanying the article is a photograph of the footprints as well as an illustration of a eurypterid.