

In the News

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Introduction

In the June 26, 2007 issue of the *New York Times*, www.nytimes.com, a special issue of Science Times was devoted to evolution. In a lengthy article, Carol Kaesuk Yoon discusses “From a Few Genes, Life’s Myriad Shapes” and interviews, among other scientists, Dr. Sean B. Carroll (University of Wisconsin) about the relatively new field of evo-devo, that is, “evolutionary developmental biology”. In addition to a variety of graphics meant to illustrate various aspects of evolution, there is a video in which Dr. Carroll expounds on the “Science of Evolution” and a column containing his answers to a reader’s questions. The issue also includes Douglas H. Erwin’s essay on “Darwin Still Rules, but Some Biologists Dream of a Paradigm Shift”. Nicholas Wade writes about “Humans Have Spread Globally, and Evolved Locally”, that is, modern humans appeared 50,000 years ago, but genetic drift and natural selection have recently remolded the human clay. To round out the scope of the subject, John Noble Wilford writes “The Human Family Has Become a Bush with Many Branches”, Dennis Overbye has an essay on “Human DNA, the Ultimate Spot for Secret Messages,” and Carl Zimmer discusses “Fast-Reproducing Microbes Provide a Window on Natural Selection”. The *New York Times* web page also directs readers to previous articles about evolution and recommended blogs.

It does not happen often that paleontologists can match fossil vertebrate animals with trackways, but the excellent specimens found in the Tambach Formation in central

Germany, about 290 Ma old, is such a case. Two reptile-like species left their footprints in soft sediments and excellently preserved skeletons nearby in the same layers, clearly matching each other. Ker Than of www.livescience.com reported on the paper published in *Vertebrate Paleontology* by David Berman of the Carnegie Museum of Natural History in Pittsburgh on September 12, 2007, which describes these oldest identifiable footprints.

As indicated above, most tracks are without the associated fossil animal. Take the tyrannosaur footprint found in Montana in the Hell Creek Formation well known for *Tyrannosaurus rex* fossils. The footprint, about 2.5 ft in length, was discovered by a team including Phillip Manning of the University of Manchester in England. Jeanna Bryner of Live Science, www.livescience.com, wrote on October 11, 2007, as a result of an interview with him, that predatory dinosaurs have “much more gracile toes than their dumpy hadrosaur friends.” Although the footprint was surely a type of tyrannosaur its species, for the time being, remains unknown because the only way you would know who left the trail is to “find the animal dead in its tracks.”

Speaking of feet, Shane Van Loon was walking along the riverbank in Tsiigehtchic in Canada’s Northwest Territories and saw in the adjacent cliff a probable carcass of a steppe bison peering out of exposed permafrost. The specimen is probably older than the last glaciation, making it more than 20,000 years old. Reported on September 12, 2007 in www.cbc.ca/, the specimen consisted of the animal’s hide and bone and a large-horned skull, 1 m wide from horn to horn. Analysis of the preserved intestine could provide information about the food the animal ate and some aspects of the ecology of the area.

Not all life forms are steak or vegetable eaters. Nicola McLoughlin, a post-doctoral student at the University of

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Bergen, is looking for microbes that eat volcanic glass and may have lived 3.5 billion years ago, the same kinds that are found on the seafloor today on the mid-Atlantic Ridge. As the microbes eat the glass, they leave behind small cavities shaped like tiny bubbles or pipes. The problem is that the oldest sea floors are generally not older than 170 Ma. So she is looking for rocks in South Africa and Australia that were once ancient seafloor but have been thrust onto and sutured to continents. The report by Lars Holger Ursin on September 4, 2007 in <http://nyheter.uib.no/> indicates that these studies may have application in finding ancient life on Mars, where there is a great deal of volcanic rock.

Getting back to permafrost and ice age animals, Dmitry Solovyov reports in <http://news.scotman.com> on September 18, 2007 from a report by Reuters that, rather than fossils serendipitously, in Siberia there are ice animal hunters. Melting permafrost yielded a treasure trove of mammoths, wooly rhinos, and lions and as a result, bone-prospectors are making a living finding and selling specimens to private collectors and scientific institutions. He points out, for example, that local tribesmen in Chersky spread out across the vast tundra looking for specimens that now poke out of the soil or sometimes just lie on the surface. Mammoths are most prized and can fetch large sums of money, and many of the specimens end up not only in the Ice Age Museum in Moscow but also in the United States and South Korea.

And Siberia is not the only a place where local people search for fossils. In Chaoyang, in northeast China, where paleontologists discovered feathered dinosaurs in the mid-1990s and numerous other well-preserved fossils perhaps as many as 500 new species — business is booming. On Ancient Street, over 60 stores sell fossils in what has been described as the largest commercial fossil market in the world. But to get the fossils, farmers and dealers working together destroy sites to find the specimens, as reported by Jerry Guo in www.time.com on August 27, 2007. He tells about one dealer who was exposing a 120-Ma-old fish that was going to fetch about \$3. Not only do casual buyers frequent the shops who see the specimens as curiosities but also paleontologists who are not above finding some exquisite specimen to purchase and then study.

On the other hand, an article in the *Las Vegas Sun*, www.lasvegassun.com, on September 13, 2007 reports that the Bureau of Land Management in Las Cruces did not renew a mining permit for a rock quarry near Las Cruces to “better protect a repository of pre-dinosaur fossil tracks.” Not only will this offer some protection to Permian tracks of amphibian and reptiles in the Robledo Mountains, Senators Jeff Bingaman and Peter Domenici have co-sponsored legislation to designate 5,367 acres in the mountains as a national monument. As usual, there are some oppositions to the designation, in this case by off-road groups who drive

their recreational vehicles in the Robledos. But there are also groups who support the designation, to make the fossils more accessible to public viewing.

Fossil looting is unfortunately an international problem, as indicated by a report in the *New Zealand Herald*, www.nzherald.co.nz, on October 10, 2007. “Tougher laws are needed to protect scientifically precious fossil beds from being looted and exported to overseas dealers,” complains paleontologist Hamish Campbell. Unfortunately, some sites have been stripped clean of fossils, whereas other species, like the 24-Ma-old Miocene crabs, are still available and highly desired for export. The complaint is that the laws are too lenient because you can export “almost anything and you’ll be fined only about \$250.” It is hoped that a traveling exhibit of New Zealand fossils (it will tour the country for 3 years) will have some impact, showing the public the value of the fossils as indicators and perhaps predictors of climate change, evolution, and natural disasters.

George Poinar, an entomologist, believes that he has discovered the probable egg shell fragment of a hummingbird encased in 30-Ma-old amber from the Dominican Republic. Poinari is also the discoverer of several other intriguing specimens in amber including a 100-Ma-old bee, a mushroom cap infested by a parasite, and an ancient beetle and four kinds of flowers, all from Myanmar. Richard Hill reported this story in *The Oregonian*, www.oregonlive.com, on September 10, 2007.

BBC News, <http://news.bbc.co.uk>, reported on October 9, 2007 that a “Jurassic dragon” was found in Colin Glen, Northern Ireland. Actually, it was part of the backbone of a 190-Ma-old plesiosaur, a component of a rich variety of marine fossils found in the valley, such as shark’s teeth and, in the past, an ichthyosaur. Plesiosaurs not only hunted for fish and squid but probably fed on bottom-dwelling organisms such as clams and snail.

Probably one creature that plesiosaurs did not eat was the jellyfish, which up to the present time were only known from rocks as old as 300 Ma old. Dr. Bruce Lieberman of the University of Kansas said that a newly discovered specimen from Utah pushes back the known occurrence of jellyfish to the Cambrian Period, some 505 Ma ago — a time of great diversification of life, when most animal groups appear in the fossil record. He said that the fossil record is “biased” against soft-bodied life forms, such as jellyfish, because they leave little behind when they die. This discovery was reported by the National Science Foundation, www.nsf.gov/news, on October 30, 2007.

A new study of mass extinctions in the geologic record claims that, for the first time, a close relationship exists between Earth climate and extinctions. The result of matching data sets of marine and terrestrial diversity against temperature estimates shows that global biodiversity is

relatively low during warm “greenhouse” phases and that extinctions were relatively high, whereas the reverse is true in cooler “icehouse” phases. Dr. Peter Mayhew of The University of York, co-author of the paper published in the *Proceedings of the Royal Society B*, indicates that “our results provide the first clear evidence that global climate may explain substantial variation in the fossil record in a simple and consistent manner. In the press release from the University of York and reported in Science Daily, www.sciencedaily.com, on October 24, 2007, there is the prediction that, in the coming centuries, rising global temperatures may trigger a new mass extinction event, where over 50% of the animal and plant species would be wiped out.

Roger Dobson reports in *The Sunday Times*, www.timesonline.co.uk, on October 8, 2006 that Michael Simms, curator of paleontology at the Ulster Museum in Belfast, and his team members believe that a huge meteorite hit the Irish Sea some 200 Ma ago causing a tsunami that swamped large parts of Europe, left a crater the size of Surrey, and caused changes in the Earth’s climate. This event caused some species to die out and others to become dominant, allowing for example, the dinosaurs to rapidly expand.

One result of the dinosaur expansion allows for the discovery of a new meat-eating form, described as one of the largest found — uncovered recently in the collections of the University of Chicago. Actually, specimens of the genus *Carcharodontosaurus* have been found previously. The first specimens were found in the 1920s but were lost, whereas specimens dug up in Egypt were destroyed in the bombing of Munich in 1944, and *Carcharodontosaurus saharicus* was discovered in the Moroccan Sahara. A report by Russell Jackson in *The Scotsman*, <http://news.scotsman.com/uk>, on December 12, 2007 describes how the student Steve Brusatte from the University of Bristol discovered the specimen—the specimen was just lying around in the museum but actually came from the Republic of Niger, excavated in 1997 and currently named *Carcharodontosaurus iguidensis* because it was obviously different from other species. This 14-m-long creature with teeth the size of “bananas” lived 95 Ma ago during the Cretaceous Period.

A rather large glyptodont was discovered by a team of American and Chilean scientists in the northern Chilean Andes at 14,000 ft. This large relative of armadillos did not live at that elevation, most likely at more reasonable 3,000 ft above sea level, but were carried to that height as the Andes Mountains rose. John Flynn, a paleontologist at the American Museum of Natural History and co-author of the study, named the animal *Parapropalaehoplophorus*

septentrionalis and indicated that “this new 18-million-year-old species is one of the earliest and most primitive of its family.” Jennifer Viegas reported in *Discovery News*, <http://dsc.discovery.com>, on December 12, 2007 that the specimen is thought to weigh about 200 lbs.

Most people interested in paleontology are aware of the iridium layer that marks the end of the Cretaceous Period and the beginning of the Tertiary Period. Most scientists associate iridium, which is found worldwide, with an asteroid impact that set off the extinction of a large group of animals including the dinosaurs and ammonites. John Noble Wilford in the *New York Times*, www.nytimes.com, on November 6, 2007 describes the discovery by Neil Landman, a paleontologist and curator at the American Museum of Natural History, of ammonites that were found above the iridium layer in central New Jersey. These specimens provide additional information that the standard theory of one asteroid strike caused the Cretaceous extinction may be incorrect but, in fact, that it may be an oversimplification and that the dinosaur-ending disaster may be more complicated, involving more than one impact and also involving the massive volcanic eruptions in India, which occurred at approximately the same time. How long after the iridium layer these animals lived is hard to say, perhaps tens or hundreds of years, says Dr. Landman, but not 300,000 as other researches have suggested.

Andrew Fraknoi of Foothill College contributes the following item. “The American Astronomical Society (AAS) has published ‘The Ancient Universe,’ an illustrated guide explaining how astronomers know that the cosmos is old and that it changes with time. In several US states, there have been demands that discussions of the Big Bang and the vast age of the universe be excluded from science curricula in K-12 classrooms. In response, the Astronomy Education Board of the AAS put together an article first published in a newsletter for teachers on the Astronomical Society of the Pacific web site: <http://www.astrosociety.org/education/publications/tnl/56/index.html>. This article has now been expanded into a booklet designed for school boards, principals, parents, and anyone who wants to see the scientific perspective on the age of the Earth and the physical world. The 20-page non-technical booklet is available for free downloading on the web site: <http://education.aas.org/publications/ancientuniverse.html>.”

The authors explain the evidence showing that we live in a universe that is between 10 billion and 15 billion years old and that both the universe and its contents undergo evolutionary change. A list of written and web resources for teachers and non-specialists is also included.