

## Paleontology and Evolution in the News

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Published online: 23 July 2009  
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One of the goals of this column is to make teachers and students aware of the fact that there is an almost continuous stream of paleontology and evolution articles in newspapers, magazines, TV, and online news outlets. For the most part, these articles are based on press releases generated by universities, museums, individuals, and many publishers of scientific journals, and they reach outlets around the world as shown by some of the items mentioned below. Generally, an individual teacher or student would find it impossible to sample the large number of press releases. However, these press releases are distributed to various media outlets (newspapers, etc.) who then write stories related to them. Of course, there is a certain amount of subjectivity involved in determining which stories get to be published (i.e., most interesting, most dramatic). Further reduction occurs in this column for reason of space and my selection process for articles that I find interesting for one reason or another and hopefully also to the reader. One of the reasons for focusing on newspapers (print and online) is to encourage students to read easily obtained materials that are usually written in an engaging and non-technical language. Teachers then can assign students to projects based on a selected newspaper article. Using the article, the student can then expand the topic by further research on the web (and the library, if available). One aspect of the project would be to verify the correctness of the newspaper article by reading the original article on which it is based and then commenting on it.

The readers of this journal know that 2009 is the 200th anniversary of Darwin's birth and the 150th anniversary of his fundamental work, *On The Origin of Species*. *The New York Times* ([www.nytimes.com](http://www.nytimes.com)) correctly observes that, like many original works of the past, Darwin's publication is known mostly by reputation and has been read by only relatively few people who are non-biologists. To remedy this situation, the *Times* has made his book available on the web page with an added feature. It has asked a number of prominent scientists to pick their favorite passages and add a commentary on why these passages are important. The selections have been divided as follows: What Drives Evolution, Sexual Selection, What is a Species?, The Community of Life, and The Wonderful Eye. See <http://www.nytimes.com/interactive/2009/02/09/science/20090209-darwin-evolution-documents.html?ref=science>.

On May 16, 2009, the *Wall Street Journal*, as well as numerous other newspapers around the world (see for example *The Tehran Times* for May 19, 2009, [http://www.tehrantimes.com/index\\_View.asp?code=194935](http://www.tehrantimes.com/index_View.asp?code=194935)), ran stories about a new fossil discovered in Germany that "could prove to be a landmark discovery." In the *Wall Street Journal* report, Gautam Naik (<http://online.wsj.com/article/SB124235632936122739.html#>) tells us that the fossil is a 47-million-year-old primate whose features "suggest, that it could be the common ancestor of all later monkeys, apes and humans." Where does this particular fossil fit in the evolutionary tree?, he asks. Paleoanthropologists and paleontologists have long believed that humans evolved from ape-like ancestors 50 million years ago from one of two groups of ape-like creatures. One group is represented by tarsiers: small, large-eyed animals that live in Asia; the other is represented by lemurs in Madagascar. In the past, there has been considerable debate about which of the two

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groups gave rise to apes and humans. “The latest discovery, named *Darwinius masillae*, bolsters the less common position that our ape-like ancestor” was a precursor of lemurs. Keep in mind that this fossil discovery has little bearing on the separate paleontological debate related to the identity of the common ancestor of chimps and humans. Philip Gingerich, president-elect of the Paleontological Society, has co-authored a paper that will detail this discovery in Public Library of Science (PLoS; <http://www.plosone.org/article/info:doi/10.1371/journal.pone.0005723>), which is available for downloading.

Putting the evolutionary debate aside, the fossil is remarkable in that it is nearly complete and that it has left impressions of fur, and its soft body outline is clearly seen. “Even more surprising is that what may be the animal’s last meal of fruit and leaves is preserved in its stomach.”

Related to the announcement of the discovery is the hoopla of the coming out party of Ida, named after the lead scientist Jorn H. Hurum’s daughter. The announcement of its discovery took place at the American Museum of Natural History in New York City, which was attended by Mayor Michael Bloomberg and other officials, as well as a team of international scientists involved in its discovery. At the press conference that took place on May 19, 2009, The History Channel announced that it will air a documentary, titled “The Link,” and the publisher, Little Brown, is bringing out a book with the same name. In a related article in *The New York Times* (<http://www.nytimes.com/2009/05/19/business/media/19fossil.html>), reporter Tim Arango reports on the media event orchestrated by the scientists and the History Channel. He quotes Dr. Jorn H. Hurum, the scientist at the University of Oslo who acquired the fossil, as saying “Any pop band is doing the same thing. Any athlete is doing the same thing. We have to start thinking the same way in science.” A museum spokesman said that “We would not go forward with this, even in a hosting capacity, unless we had a sense of the scientific importance.” The reporter goes on to say that this kind of event seems to be a departure from the normal turn of events. Usually, researchers study their subject and publish their findings “but this campaign is only the latest example of the scientific blockbuster, of which the National Geographic Society has become the most successful practitioner.”

In a follow-up article by Gautam Naik in the *Wall Street Journal* (<http://online.wsj.com/article/SB124274731478535053.html>) the next day, he gives additional information about the fossils but then goes on to say that the event was “hyped to an unusual degree.” While many scientific discoveries tend to be disclosed in sober fashion, this one was heavily promoted. Philip Gingerich, a paleontologist from the University of Michigan and a member of the Ida research team was asked whether the study should have been published in some premier journal such as *Science* or

*Nature*. He replied that this was not the way he does science, but there was a book deadline to consider.

Within two days of the press conference, there were over 700 stories in the print press and online news outlets but not including an unknown number of blogs. Beyond the hype, this fossil is a wonderfully preserved specimen and could be the subject of a research project for students who study fossils. There is now a treasure trove of information available on the Internet. Although the lead researcher called the fossil a “missing link,” perhaps for the media coming out party, I would think that concept of a specimen being the missing link is rather passé. “Without giving much away one can justly say that the specimen and its interpretation will not be the last word about which branch of early primates eventually gave rise to monkeys, apes and humans.”

It did not take long for considerable negative discussion to take place in the press following the introduction of Ida. A summary of the objections can be found in an article written by Hannah Devlin in *Times Online* ([www.timesonline.co.uk](http://www.timesonline.co.uk)) on May 28, 2009. “The paleontologist who captured the public imagination ... in Ida ... disclosed yesterday that he paid near \$750,000 for the specimen.”

Here are some of the criticisms mentioned:

Scientists denounced the discovery as hype.

The purchase price could stimulate a black market in fossils.

It could lead to profiteering by amateur bone collectors.

It causes a surge in fossil prices.

It conflicts with banning of fossil exports from various countries.

There are objections to the high visibility of the purchase.

It makes it more difficult to say fossils have only scientific value not commercial value.

There is opposition to the use of the term “missing link” between humans, apes, and monkeys in reference to the fossil.

In his defense, Dr. Hurum said:

In terms of its cost, it is the only near-complete fossil primate ever found.

It makes the specimen available for scientific investigation.

If sold to a private collector, it could disappear for another 20 years.

Why should museums not acquire fossils in the same way galleries acquire art?

In the meantime, those attending the press conference may have missed an opportunity to visit the new exhibit at the American Museum of Natural History, “Extreme Mammals” ([www.amnh.org](http://www.amnh.org)). Here, you can learn that the largest land mammal that ever lived was 15 feet tall, the

smallest just 1.6 inches. Mammals hop, burrow underground, climb trees, gallop, and fly. Some use two feet, others four. As projects, students could make a list of the mammals they are familiar with, those that live in their area and those that they have seen in films or travels. How many could they list, 50, 100, or a little more? So it may come as a surprise that there are actually 5,400 mammals. The exhibit will be on display through January 3, 2010, but then it will travel to other venues. So if you miss it in New York, look at the museum's web page for information on where it will travel, or check with your local newspapers or museums to see if it will be in your area. The exhibit traces the ancestry and evolution of mammals over the course of 200 million years and will contain a cast of Ida, the fossil primate mentioned above. A highlight of the exhibit is a diorama of the Canadian arctic Ellesmere Island some 50 million years ago when the climate was warm and the land contained humid swamps and forests populated by turtles, crocodiles, and hippopotamus-looking coryphodons. The museum has produced and posted an educator's guide for the exhibit. Even if you cannot make it to the actual exhibit, you will find the guide useful ([www.amnh.org](http://www.amnh.org)).

Numerous articles in newspapers and web sites appeared on March 11, 2009 reporting on new dating of human fossils from China, generally known as Peking Man. The analysis uses new methods of dating quartz-bearing sediments in which the quartz contains isotopes of aluminum and beryllium that allow more precise dating of the sediments and the fossils they contain (see <http://news.bbc.co.uk/1/hi/sci/tech/7937351.htm>). The fossils are now thought to be about 750,000 years old, some 200,000 years older than previously thought. The results of the study were published in the journal *Nature* ([www.nature.com](http://www.nature.com)). The caves of Zhou Kaudian near Beijing are one of the most important Paleolithic sites in the world. It is a UNESCO World Heritage Site. The original fossils were found in 1921, but since then, the site has yielded tens of thousands of stone tools and hundreds of bone fragments from about 40 early humans that are classified as *Homo erectus*. The fossils are found in sediments in caves developed in Ordovician-age limestone. An American geologist Amadeus W. Grabau gave the fossils their popular name, Peking Man. But the fossils collected prior to 1941 were lost. Fortunately, a paleontologist made casts of the fossils before they went missing. The pre-war specimens' disappearances have generated numerous books and articles. The search for them contains the ingredients of a suspense novel. The fossils were kept at the Cenozoic Research Laboratory in Peking (now Beijing), which was part of the American-owned Peking Union Medical College. As the threat of war escalated, arrangements were made in November 1941 to ship the fossils to the safety of the US. They were thought to have been loaded

on the *S.S. President Harrison* and escorted by a detachment of US marines leaving China for the Philippines. But the ship and the marines were captured by the Japanese and never reached port. But somehow the specimens were also lost, and both the Japanese during the war and the US Army afterwards led unsuccessful attempts to locate them. This saga captured the imagination of writers, both fiction and non-fiction (search Google, [www.google.com/books](http://www.google.com/books), for examples). Even as late as 1973, a wealthy US stockbroker offered a \$5,000 reward for information leading to their whereabouts (*New York Times*, February 4, 1973, [www.nytimes.com](http://www.nytimes.com)).

*The Hindu* of March 13, 2009 reports that a preserved fossil shark provides evidence for determining the origin of white sharks ([www.hindu.com/the\\_hindu/holnus/00820090313145.htm](http://www.hindu.com/the_hindu/holnus/00820090313145.htm)). The article states that there has been a debate among paleontologists about the exact nature of the evolution of the white shark. It turns out that a team at Florida University has concluded that the great white shark did not evolve from *Carcharodon megalodon* but from the broad-toothed mako shark. They were fortunate to have a well-preserved four- to five-million-year-old complete jaw from Peru containing 222 teeth and 45 vertebrae. Based on tooth size and growth ring analysis within the vertebrae, it is estimated that the animal was about 20 years old and 17 to 18 feet long. Knowledge about shark evolution is poor because sharks lack bony skeletons. They are made of cartilage, resulting in a poor fossil record. The specimen described here was actually found in the Peruvian desert in 1988 in the Pisco Formation. Another interesting aspect of the fossil is that unlike other shark fossils, the teeth in the jaw of this specimen were in their natural position. Most of the time, the teeth are isolated and the location of the jaw dentition is based on the arrangement of modern sharks. Mr. Dana Ehret, a graduate student at the Florida Museum of Natural History, is the lead author of the paper published in the *Journal of Vertebrate Paleontology* ([www.vertpaleo.org](http://www.vertpaleo.org)). The well-known fossil shark *Carcharoides* (*Carcharodon*) *megalodon* was a contemporary.

Another unusual discovery to report this quarter is the discovery of a fossil turtle with a clutch of eggs inside—the first such occurrence in the US and the second anywhere. This was discovered in a remote area of southern Utah in the Grand Staircase-Escalante National Monument in the 75-million-year-old sandstone from the Cretaceous Kaiparowits Formation. The eggs were not discovered until a volunteer was reexamining the specimen two years after it was found. Mike Stark reported on the study in the *Great Falls Tribune* of May 9, 2009 (<http://www.greatfallstribune.com/article/20090509/DC5/905090331>). He reports that Michael Knell, a graduate student at Montana State University, thinks that the turtle was about a week away from laying the eggs. The turtle belongs to a group of

turtles called *Adocus*, a water-loving turtle that resembles some of today's soft-shelled turtles. It lived in a part of Utah that contained warm lush swamps. It has been CT-scanned in the hopes of finding more eggs.

In *The BBC News*, science reporter Victoria Gill wrote a story about a discovery in China that has prompted researchers to question the scaly image of dinosaurs (<http://news.bbc.co.uk/1/hi/sci/tech/7950871.stm>). The dinosaur fossil named *Tianyulong confuciusi* contains body filaments that are the precursors of modern feathers. It had been thought that feathered dinosaurs appeared about 150 million years ago, but this discovery suggests that feathers evolved much earlier. “This has raised the question of whether many more of the creatures have been covered with similar bristles or ‘dino-fuzz.’” Why is this feathered dinosaur a surprise? Many feathered dinosaurs have been found in the past. Dinosaurs can be classified into two large groups or families—the Saurischia and the Ornithischia. Saurischians include the theropods, which are thought to be the ancestors of modern birds. Some fossils of these dinosaurs contain feathers. However, the new fossil dinosaur is a member of the Ornithischians, which are thought to have been covered with reptilian scales. One of the paleontologists, Lawrence Witmer of Ohio University, says this discovery “really muddies the waters” of what researchers know about the origin of feathers. “The bad news is that something we thought was neatly wrapped up is now not so neat. But the good news is that we can now look at existing evidence with new eyes—going back to old fossils and asking if there is evidence of any of these filaments.” It is suggested that the function of these bristles were for display and body warmth. *Tianyulong confuciusi* was found in Early Cretaceous rocks of western Liaoning Province, China, an area well known for amazing fossil discoveries, some of which have been mentioned in previous columns. It was named after the Tianyu Museum for Nature where the fossil is being studied and housed and for the philosopher Confucius to reflect how it has changed the modern view of dinosaurs.

In a news item from *Reuters* on May 26, 2009 by Carlos Valdez (<http://www.reuters.com/article/scienceNews/idUSTRE54P0H520090526>), a nearly intact fossil of a five-million-year-old sloth was discovered in Peru. The fossil is about four million years older than those found earlier in the Americas. Unlike most other fossils that are found as a result of a deliberate search within rock outcrops, this one was found by accident when workers were installing a water system in a house in the Andean region of Espinar in southern Peru at about an elevation of 13,000 feet. The report also states that part of a giant armadillo was found nearby. A brief video accompanies the report showing the removal and cleaning of the ten-foot-long herbivore that Rodolfo Salas of Peru's Natural History Museum said lived

in the Mio-Pliocene era. He told the reporter that “it is the first complete skeleton of its kind that is 5 million years old in the Americas.” Illustrations of fossil sloths can be seen on the sloth web page of Wikipedia ([http://en.wikipedia.org/wiki/Ground\\_sloth](http://en.wikipedia.org/wiki/Ground_sloth)).

“The remains of 200 million year old Loch Ness-style creature found” is the headline in the June 1, 2009 of the *Telegraph* ([www.telegraph.co.uk](http://www.telegraph.co.uk)). It states that archeologists have spent months piecing together thousands of bones found encased in limestone of Britain's Jurassic Coast by a local fossil hunter. After the separated bones were fit together, it turns out that the skeleton, which is 70 percent complete, is that of a 12-foot-long plesiosaur, a marine reptile. The article continues by stating that the fossil reptile resembled the Loch Ness monster with its long thin neck and tail, four large flippers, and razor-sharp teeth. An illustration of a plesiosaur can be downloaded in the accompanying article. Plesiosaurs existed in the Jurassic Period 150 to 200 million years ago in what was then a shallow, tropical sea. The remains were found on Monmouth Beach near Lyme Regis in Dorset. Over 150 vertebrae bones were found along with parts of its skull and jaw. A unique feature of the skeleton was that there were teeth marks on some of the bones and “you can see how the skeleton was torn apart by some marine reptile, perhaps a carnivorous ichthyosaur.” After the original find was made by an amateur, a team from Jurassic Coast World Heritage Site and Natural England carefully extracted the fossils. Jurassic Coast is a UNESCO World Heritage Site, the first such designation in England. It covers 95 miles of coastline from East Devon to Dorset and obtained this status because it depicts a geological “walk through time” not only for the Jurassic but also the earlier Triassic and later Cretaceous periods ([www.jurassiccoast.com](http://www.jurassiccoast.com)). “Natural England's mission is to conserve and enhance the natural environment for its intrinsic value, the well being and enjoyment of people and the economic prosperity that it brings.” It is hoped that the skeleton will go on public display at the Lyme Regis Museum, which not only has a good display of local fossils but is known for its history and literary galleries and its connections with Jane Austen and John Fowles, among others. Fowles wrote many of his well-known stories in Lyme Regis, one of which, *The French Lieutenant's Woman* (1969), and the film based on the book, made the town and its geological setting world famous. He served as curator of the museum from 1978 to 1988.

During the time the plesiosaur was being rearticulated, the fourth Lyme Regis Fossil Festival, a three-day event, began on Friday, May 22, in which thousands of people, adults, and children participated. “Evolution Rocks!” was the theme of this year's event. Several institutions were

involved who provided a range of programs including fossils walks along the beach and talks by experts. In addition, the town played host to such organizations as the National Museum of Wales and the British Antarctic Survey.

The following article by Steve Koppes is extracted from the University of Chicago *Chronicle*, vol. 28, no. 17, May 28, 2009 ([www.chronicle.uchicago.edu/090528/jablonski.shtml](http://www.chronicle.uchicago.edu/090528/jablonski.shtml)). During a seminar at another institution several years ago, university paleontologist David Jablonski fielded a hostile question: Why bother classifying organisms according to their physical appearance, let alone analyze their evolutionary dynamics, when molecular techniques had already invalidated that approach? Scientists using molecular techniques assert that the field of genetics more accurately determines evolutionary relationships than does a comparison of the kinds of physical characteristics—the morphology—preserved in fossils. But how inaccurate, really, were those aspects of form used to infer evolution? Jablonski and the University of Michigan's John Finarelli have published the first quantitative assessment of these assumed discrepancies in the *Proceedings of the National Academy of Sciences*, online early edition of April 27–May 1 (PNAS 2009, vol. 106, pp. 8262–8266).

They compared the molecular data to data based on the kinds of features used to distinguish fossil lineages for 228 mammal and 197 mollusk lineages at the genus level (both wolves and dogs belong to the genus *Canis*, for example).

No matter how they looked at it, the lineages defined by their morphological features “showed an imperfect but very good fit to the molecular data,” Jablonski said. The fits were generally far better than random. It was all very well to have a “good” fit between morphology and molecules, but was it good enough to ask evolutionary questions rigorously? They looked at the fits again, but this time focused on geographic range and body size—two key features for many questions in evolution, ecology, and conservation biology. The result was a “spectacularly robust” match between the morphological and molecular data. Jablonski interprets the results as good news for evolutionary studies. “Our study also points the way toward new partnerships with molecular biology, as we straighten out the mismatches that we did find,” he said.

This year is a cause for another celebration—the discovery of the Burgess Shale fauna by Charles Doolittle Walcott 100 years ago. Burgess Shale contains a unique and diverse suite of soft-tissue animals that lived during the Cambrian Period. Val Berenyi, in the May 12, 2009 issue of the *Calgary Herald* posted on Canada.com ([www.canada.com](http://www.canada.com)), points out that there are two stories related to the discovery of the fossils. The legend is that Walcott, a self-taught paleontologist from New York State, was on a working summer holiday with his family in what is now

Yoho National Park near Field, British Columbia. While exploring the area on horseback high above Emerald Lake along the Burgess Pass Trail, the horse of Walcott's wife tripped on a piece of shale that had fallen down from the slopes of Mount Wapta. The stone split open, revealing shiny strange-looking fossils that were entombed in the rock. Apparently, the real story is that, although Walcott was without formal training, he obtained great distinction in his field within the scientific community to become the director of the United States Geological Survey and head of the Smithsonian Institution. His field of specialty was Cambrian fossils, and he had received a report in 1907 who “stone bugs” or trilobites were discovered by workmen who were building the Canadian Pacific Railroad's Spiral Tunnels through Mount Stephen. After exploring the area, he came upon the treasure trove of Burgess Shale fossils, beautifully preserved soft-bodied sea creatures that provided a view of the diverse nature of Cambrian time.

Mr. Berenyi reports that the celebration includes a historical reenactment of the fossil discovery, the introduction of specially labeled beer called Shale Ale, lectures, and the ten-hour-guided walk up a steep mountain to see Walcott Quarry, which is located on a ridge on Mount Wapta. This quarry is where Walcott spent eight years extracting more than 65,000 fossil specimens. The trips are sponsored by the Burgess Shale Geoscience Foundation. Susan Eaton, a geologist/geophysicist is on the 2009 centennial organizing committee. She said “The main mission of the foundation is to increase science literacy through education about earth sciences, environment and climate change science. Our lab for teaching is the Burgess Shale.” Trips are organized between July and mid-September and led by a certified guide. Could this be a wonderful experience for students?

Students have an opportunity to read about these fossils in a book that became a bestseller, *Wonderful Life*, by Stephen Jay Gould, published in 1989. In the book, you will learn about these remarkable diverse soft-bodied creatures, their geological setting, and how they fit into the evolution of life. Here's another strange story about the Burgess Shale. One day some years ago, when I was walking through Central Park in New York, I noticed a loose slab of rock that did not look like any rock found naturally in the park. It was simply lying on some bare soil. So, being inquisitive, I picked it up and, you guessed it, it was Burgess Shale with its distinct fossils. My guess is that it came from someone's collection, perhaps inherited and not wanted, so the park was used as a dumping ground. It now resides in the American Museum of Natural History collection.

Apolinari Tairo reports in the *East African Magazine* of May 18, 2009 (<http://www.theeastafrican.co.ke/magazine/-/434746/599072/-/15oy7qk/-/>) that Tanzania will celebrate

the golden jubilee (50 years) of the discovery of the skull “of the oldest man on earth” by archeologists Louis Leakey and his wife Mary in Olduvai Gorge. “Celebrations and a conference will take place in August at the site, attracting historians, archaeologists and natural history scientists from all over the world. The skull discovered by the Leakeys is over 1.75 million years old.” The conference will include a special workshop about the Leakeys. Originally, Mary and Dr. Louis Leakey named the humanoid skull *Zinjanthropus*, and it helped to determine that human evolution began not in Asia as previously thought, but in Africa. Today, Olduvai Gorge is known as the cradle of mankind. *Zinjanthropus* was later named *Australopithecus boisei*, after Charles Boise who funded the Leakeys’ research. Two decades later, hominid footprints were found at Laetoli, south of Olduvai. They were 3.5 to four million years old. Excavations at Olduvai Gorge are still going on. At least three other species of hominids have been found there, as well as specimens of extinct animals and plants. Other discoveries include *Homo habilis* and *H. erectus*—which are closer to modern man. There are many web pages devoted to Olduvai for students to delve deeper into this major locality for human evolution. One example, “Investigating Olduvai,” is a promotion for Indiana University’s CD-ROM but contains sample images and text of its contents. The CD-ROM comes with an instructor’s guide (<http://www.indiana.edu/~origins/teach/Olduvai.html>).

Katherine Harmon’s writing in *60-Second Science* blog published by *Scientific American* about the new evidence for volcanoes as a source of mass extinction (<http://www.scientificamerican.com/blog/60-second-science/post.cfm?id=new-evidence-for-volcanoes-as-sourc-2009-05-28>) is one of numerous newspaper, TV, and web blogs that covered the publication of an article in *Science* for May 29, vol. 324, no. 5931, pp. 1179–1182.

“Paleontologists have found more solid evidence that volcanoes set off the Guadalupian mass extinction in the Middle Permian about 260 million years ago.” Geologists have been aware for some time that vast volcanic activity seems to have coincided with some of the earth’s mass extinctions, but there has been no direct link.

A site in the Emeishan province in southwest China has turned up a telling layer of volcanic rock between sedimentary layers of an old shallow seabed, reports the paper. An analysis of fossils in the sedimentary rock directly above (i.e., after) the volcanic layer shows a sharp change in the number and types of marine life, namely algae and foraminifera.

“This abrupt extinction of marine life we can clearly see in the fossil record firmly links giant volcanic eruptions with global environmental catastrophe,” Paul Wignall, a professor of paleontology at the University of Leeds and lead author on the study, said in a statement.

How could a large volcanic event change the environment so drastically? These eruptions were massive and produced about one million cubic kilometers of lava that entered the shallow sea, creating an explosion like a massive version of “throwing water into a hot frying pan.” The explosion would have thrown large amounts of sulfur dioxide into the stratosphere, causing cloud formation, cooling the earth, limiting photosynthesis, long periods of acid rain, and spelling death to many of the sea’s creatures. This event happened just prior to that global mass extinction. The fact that the rocks in the area are well exposed due to uplift made the analysis of the fossil content before and after the eruptions relatively easy. This little-known extinction occurred prior to the well-known Permian–Triassic mass extinction that occurred 250 million years ago that led, perhaps, to the loss of nine out of every ten marine animals and may also have been caused by the release of lava known as the Siberian Traps, or a meteorite impact, or both. Most geologists and paleontologists agree that the extinction of dinosaurs at the end of the Cretaceous Period 65 million years ago was due to a massive asteroid impact with the earth. Perhaps, most other extinction events were the result of major volcanic activity.

Christopher Mills wrote on May 14, 2009 the following story in the *Grande Prairie Daily Herald Tribune* (<http://www.dailyheraldtribune.com/ArticleDisplay.aspx?e=1570550>): “Researchers believe they may have discovered yet another new dinosaur species.” The discovery coincides with the finding of a 73-million-year-old nesting site near Grande Prairie that included the remains of infant plant-eating dinosaurs and the teeth of a predator. It is believed that the bones are from dinosaur hatchlings that were killed near their nest by a predator that left some of its own teeth strewn with the bones of their victims.

“Tetsuto Miyashita, a University of Alberta student from Japan, and Frederico Fanti, a paleontology graduate student from the University of Bologna, Italy, along with members of the Paleontological Society of the Peace (PSP), made the discovery of the duck-bill dinosaur hatchlings and their occurrence at this locality indicates dinosaurs nested further north than believed.” It is suggested that the carnivore’s teeth came from an agile bird-like dinosaur named *Troodon*. They think the babies were the size of a guinea pig and that they would have grown to be as large as elephants. Miyashita said that before this find there were no significant areas between Alaska and the southern part of Alberta with a variety of dinosaurs present and certainly none that showed dinosaurs nesting so far north. “It established that dinosaurs were nesting at this high latitude,” he said. “This small northwest area was basically the only portion of Alberta and Saskatchewan that was above sea level 73 to 75 million years ago, providing habitat for land animals whose remains we collected,

studied and described.” Couple that with the fact that Fanti and Miyashita discovered the bones of freshwater fish and reptiles that were unlikely to have survived in the cold of Alaska, and the duo believes northern Alberta was a mixture of northern and southern faunas, where animals from high and low altitudes co-existed.

Here is a press release from *ScienceDaily* (<http://www.sciencedaily.com/releases/2009/05/090518103229.htm>) that did not receive much attention: the discovery of a new fossil “giant” shrew nearly one million years old found in Spain and weighing about 60 grams. The report says that the new shrew had red teeth, was large in size compared with others in the same family, and was more closely related to Asian than European shrews. Shrews are small insect-eating mammals that look like long-nosed mice but are not rodents, nor are they closely related. The new shrew was found in 780,000- to 900,000-year-old deposits in Atapuerca, Burgos, Spain. The scientists suggest that the animal lived during a time characterized by a warm, wet and relatively stable climate and during that time migrated from Asia. Study of teeth size allowed the researchers to estimate the size of the overall body, which they concluded was a giant among shrews. The lower incisors also contained a “narrow and conspicuous channel” that the researchers conclude was used to inject toxic saliva into their prey the same way snakes do. This mechanism is similar to modern solenodons that are relatives of the shrews but are much larger and live in Haiti and Cuba. It turns out that remains of shrews are frequently found in deposits, due to the feeding habits of birds of prey. After finding and eating these small creatures, they regurgitate their skin, hair, and bones in the form of pellets, which are dropped to surface and become incorporated in the sediments. Atapuerca is also well known for the remains of early humans, and good photographs of the excavations can be found in the Wikipedia entry for Atapuerca (<http://en.wikipedia.org/wiki/Atapuerca>).

*The Latin American Herald Tribune* (<http://www.laht.com/article.asp?ArticleId=334796&CategoryId=14090>) for May 14, 2009 reports that the National Museum in Rio de Janeiro on Thursday presented the first reconstruction of the skeleton of a large Brazilian carnivorous dinosaur put together from fossil material found in the country’s northeastern region. *Angaturama limai* lived about 110 million years ago on the plains of Araripe de Ceara state and is the central exhibit in the exposition. “To rebuild the dinosaur, which is almost 6 meters (19.5 feet) long, experts used a number of fossilized bones representing about 60 percent of the animal’s skeleton, including the pelvis, parts of the backbone and bones in the legs and feet.”

The dinosaur, a species in the Spinosauridae family, lived during the Middle Cretaceous Period in Brazil and some parts of Africa and is characterized by its large skull

and teeth similar to modern-day crocodiles, a fact indicating that its diet consisted mainly of fish.

The exhibition also has a section that describes the Araripe plains, an area that contains one of the main locations for fossils in Brazil that is also well known for its pterosaur fossils. Part of the Araripe area was covered by a saltwater lagoon from which just over the horizon the African continent loomed, separated by a sliver of the young Atlantic Ocean.

Along with *A. limai*, the museum is exhibiting original fossils of insects, plants, tortoises, toads, lizards, and fish, as well as the skeleton of another dinosaur—*Tupandactylus imperator*—which lived in the same region some 115 million years ago.

It is not often that there are stories about fossil invertebrates, but if one would guess which animal it would be, trilobites would probably be among the first choices. *National Geographic* for May 11, 2009 (<http://news.nationalgeographic.com/news/2009/05/090511-giant-trilobites-swarms-picture.html>) reports on a study finding “swarms of up to a thousand giant trilobites roamed prehistoric seas.” These extinct arthropods 465 million years old from the Ordovician Period were up to 35 inches in length and have been found clustered together. The specimens were found in a roofing slate quarry in northern Portugal. The article indicates that they may have clustered to mate and molt as well as avoid predators. Although some of the specimens in the clusters are dead animals, others are molts. Finding complete specimens more than 12 inches long is rare, and finding these specimens is “remarkable.” The trilobites lived at high latitudes close to the South Pole during the Ordovician Period. The article speculates that oxygen-rich, cold-water habitat may have contributed to these trilobites’ gigantic sizes and that a lethal influx of oxygen-starved water may have led to their demise.

In another news release from *National Geographic* on April 22, 2009 is the report of the discovery of a seal with “arms” described (<http://news.nationalgeographic.com/news/2009/04/090422-seal-evolution-missing-link.html>). The 20–24-million-year-old animal is about three and a half feet long with heavy, muscular limbs like those of a land animal, a long tail, and webbed feet that are not fins. Researchers say that the animal, unlike the shuffling seals of today, may have walked as gracefully as it swam. “Many marine mammals, such as whales and manatees, are believed to have roots on land—an idea that originated with Charles Darwin 150 years ago.” The new find named *Puijila darwini* may be a transitional form between land dwellers and fully marine forms. Up to now, this new species of pinniped (seals, sea lions, and walrus) is the most primitive fossil yet found. It was discovered in the northern Canadian island of Devon.