

# The Paleo Times

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## EMSP SOAPBOX

*By Abby Lee*

Yey, it's warm again! That's all I have to say. Get out there and go collecting ☺

### May Meeting Minutes

A big thank you to Mix Fix for his great presentation on his work with Missouri's dino site. I have heard about the Chronister site since I was quite young but I never knew the details of what was found and why we have non-marine Cretaceous deposits in Missouri. The talk was quite enlightening. The audience filled the room (largely impart to Carl's advertising at Meramec Community College (thanks Carl). I think we got a few new members as well.

The quick version recap: Missouri has a few pockets of Cretaceous land deposits in Bollinger County that were not lost to erosion in the last 75 million years. The Chronister site is considered to be a possible composite graben-paleokarst (the layers were depressed into a valley and protected from erosion). A farm near the Boothill of Missouri contains clay deposits with lightly mineralized bones of dinosaurs (hadrosaur and T. rex relative), turtles and microfossils. The site was described in the 1940s by geologists from the Smithsonian (Charles Gilmore and associates) and then largely forgotten by the scientific community. Bruce Stinchcomb saved the site by purchasing it in the 1970s. An ongoing excavation has yielded many bones. A museum now houses the bones and tells the history of the site.

## Upcoming Events

**May Meeting:** The meeting will be **Friday, May 11th** at the **St. Louis Science Center**. The speaker will be Janus Tregworthy-professor at Principia college in Illinois. She will speak about the mammoth excavation on the university's campus. The Science Center is open until 9pm. Parking is free. The meeting room is on the lower level near the space capsule.

**Mastodon State Historic Site, June 9<sup>th</sup>. Free.**  
**1050 Museum Drive (In Imperial off I-55).**

[www.mostateparks.com](http://www.mostateparks.com)

Exhibits on Missouri fossils and free admission to the historic site's museum will be featured. Bring the entire family to hunt through fossil-bearing gravel piles donated by Martin Marietta Aggregates. Members of the Eastern Missouri Society for Paleontology will display a variety of fossils spanning the geologic history of Missouri. Tours to the former excavation site will be offered. Our club is often asked to volunteer at this event.

**10<sup>th</sup> Annual Missouri Mines Rock-swap**

**Event Dates:** 06/08/2007 - 06/10/2007

Rock hobbyists from all over the United States will swap and sell rock and mineral specimens, fossils, rock jewelry and other rock-related items. The historic site's museum will be open free of charge during scheduled hours throughout the event. The historic site co-hosts the rock swap with the Mineral Area Gem and Mineral Society and the Greater St. Louis Association of Earth Science Clubs.

**75 Highway 32; Park Hills, MO; 573-431-6226**

<http://www.mostateparks.com>

**Summer Picnic.** Rich Poropat has reserved the Kirkwood park pavilion for July 29<sup>th</sup> for our annual summer picnic. The club buys the drinks and grills the meat. Members bring side dishes and dessert. Fossils show and tell, swapping, and a bit of selling usually occurs as well.

### Field Trips

**Millstadt, 3<sup>rd</sup> weekend of May.** Date to be determined at May meeting. Meet at South County Mall in front of Macy's facing Union Road and KFC. This trip is good for the family. Easy collecting of blastoids in a creek.

**Kansas River** – Canoeing for bones is postponed until water levels drop. Stay tuned.

### DUES ARE DUE

Our treasurer, Pete Smith will accept dues payment for a full year. Dues are \$15.00 per household per year and are payable on the anniversary date printed on your newsletter address label. See Pete at the next meeting or mail a check (payable to Eastern Missouri Society for Paleontology) to:

**EMSP  
P.O. Box 220273  
St. Louis, MO. 63122**

### Raffle

A new raffle item was donated by Dave Lukens. It is a Venus Clam from Rock Pit, FL thought to be 1 million years old. The clams are fossilized with nacre intact and beautiful crystals inside. The clams hit the market only recently. The sell for over \$100.00 on line and at shows. More about this at up-coming meetings.

### Distribution of the Newsletter by email

We keep adding to the list of club members who have elected to receive the newsletter by email. Many will go out by email this month. This is a cost savings measure for the club. Each newsletter currently costs 39 cents to mail. This is over \$4.00 per person each year for postage alone. A sign-up list will be available at meetings, or email Tom Lee ([motirek@gmail.com](mailto:motirek@gmail.com)) to begin to receive the newsletter electronically.

## Paleo-shorts

### Prehistoric Mystery Organism Verified As Giant Fungus (paraphrased from *Geology*, May 2007) [Science Daily](#)

A 20 foot long, 350mya spongy-looking fossil named *Prototaxites* (pronounced pro-toe-tax-eye-tees) has long escaped classification. The fossil was originally classified as a conifer. It was later thought to be a lichen or possible algae. In 1919 it was possibly thought to be a fungus that grew in 20ft tall stalks. The National Museum of Natural History in Washington, D.C and the University of Chicago did chemical analyses and looked at the internal structure of the organism. The scientists confirmed the fungus classification.

*Prototaxites* spanned worldwide from 420-350mya during the Silurian and Devonian periods. At the beginning of the Silurian plants were mainly primitive stems; lacking roots, flowers, and leaves. Only a few short vascular plants existed. Millipedes, wingless insects, and worms were the only creatures on land at this time. However, by the end of *Prototaxites* reign as the tallest organism on land, trees, ferns, seeds, roots, and leaves had evolved.

The first fossil specimen was found by Canadian paleontologist Charles Dawson. He published on the organism in 1859. In the early 1900's Francis Hueber of the National Museum used Dawson's field notes and traveled to Canada, Australia, and Saudi Arabia to collect pieces. He thin-sectioned the specimens to look at their internal structure. He believed the organism to be a fungus but had no solid evidence.

The current scientists used *Prototaxites* and other plant fossils from the area for carbon isotope analysis. Plants contain fairly uniform <sup>12</sup>C to <sup>13</sup>C ratios. *Prototaxites* contained wider variations of these isotopes- which is expected from a non-photosynthesizing organism.

The scientists speculate that the lack of existing predators allowed the fungus to grow undisturbed, allowing it to reach 20 feet in height. The height may have been advantageous for

spreading spores across the patchy swap landscapes of the era.

### **Tyrannosaurus Rex And Mastodon Protein Fragments Discovered, Sequenced**

*Science Daily* paraphrased from a news release by the National Science Foundation (published in an April issue of *Science*):

*Everyone probably heard this news. Mary Schweitzer was a name I mentioned in my talk about ancient DNA analysis and soft-tissue preservation back in November. Switzer jumped the gun on announcing the discovery of T.rex DNA in the early 1990s. This was one of the inspirations for Jurassic Park. Since then, labs have been more cautious about their extraction techniques. Papers concerning DNA and proteins from fossils are considered quality research after ~1998. In my talk I speculated on the possibility of finding preserved proteins or segments of proteins (amino acids). It appears that this may be possible. However, the amino acids found are repetitive, conserved sequences (meaning they changed little over millions of years), thus major incites may not be possible. The future will tell...-Abby*

Soft tissue begins to decay immediately after death. DNA slowly hydrolysis and breaks apart. The subunits of proteins- amino acids, slowly flip to their mirror image confirmation (racemization) and fall apart. During fossilization, common belief holds that minerals replace an organism within one million years. However, large animals like dinosaurs have a lot of mass to replace.

Researchers at North Carolina State University (NCSU) and Harvard Medical School detected and identified some protein in a 69-million year old *T.rex* femur and a leg bone from a half million year old mastodon. The *T.rex* bone is the same one found by Horner in the Hell Creek formation that cracked open, allowing professor Mary Schweitzer (at NCSU) to discover preserved red blood cells.

Chemical and molecular analysis indicated the presences of proteins. The samples were sent to her colleagues John Asara and Lewis Cantley at Harvard to confirm the preservation of protein. They identified the sequences as collagen- which constitutes the fibrous material found in bones. Schweitzer demineralized the bone (removed the

calcium minerals); and to her surprise the organic collagen matrix of modern bones was found. "This information will help us learn more about evolutionary relationships, about how preservation happens, and about how molecules degrade over time, which could have important applications in medicine," Schweitzer said.

The collagen was examined by electron microscopy and atomic force microscopy. Antibodies that react with collagen were used on the extracted material as another indicator of the collagen's identity. "This is the breakthrough that says it's possible to get sequences beyond 1 million years," said Cantley. "At 68 million years, it's still possible." Asara and Cantley successfully sequenced the dino and mastodon proteins to confirm their identity. The sequences were compared to a database of protein sequences. *T.rex* collagen was similar to a chicken and the mastodon's collagen was more closely related to mammals- including elephants.

"Most people believe that birds evolved from dinosaurs, but that's based on the 'architecture' of the bones," Asara said. "This finding allows us the ability to say that they really are related because their sequences are related."

Scientists had long assumed that the material in fossil bones would not be preserved after millions of years of burial," said Enriqueta Barrera, program director in NSF's.

### **Geologists discover world's largest fossil forest in the ceiling of an Illinois coal mine**

*Paraphrased from  
ST. LOUIS POST-DISPATCH  
04/24/2007 by Eric Hand  
-maybe we could arrange a talk about this for a meeting?*

Two coal mines in Vermilion County Illinois have serendipitously discovered the largest and best preserved rain forest remains from the Carboniferous era 300 mya. Coal miners noticed large logs 250 feet down in the ceiling of the mine. Eventually, Scott Elrick of the Illinois State Geological Survey and others were called in to study the fossils. Their findings are published in the May issue of *Geology*. Some of the fossils include a 100 ft log and tree stumps 5 feet in diameter. Elrick compared the state of preservation to that of insects in amber. The ancient rainforest may be 40 square miles in area.

The mine is thought to have formed when a swampy forest was hit by a large earthquake, caused a pit to form, and then silt and mud filled in the depression- preserving the plant matter. The layer turned shale with a coal seam below it. Everything was preserved *in-situ*, meaning the trees are preserved in their vertical growth position. The area of preservation is large; and continues to grow as the mine expands.

Specimens found thus far include 100 foot tall giant club-mosses and ferns that grew to a 30 ft high canopy. Trees, leaves, and root-balls have been found as well. In the Carboniferous, flowering plants did not exist. Insects of the period ruled the land, including dragonflies with 3ft wingspan; and 6 foot long millipedes.

Paleobotanist and lead author Bill DiMichele from the Smithsonian Institute has found subtle changes in species across the survey areas, which include some nearby mines that span a half-million years.

### **The Emerging Fate of Neandertals**

*Washington University Press release April 24, 2007.*

Washington University professor Erik Trinkaus, Ph.D has focused his research on fossil evidence of the fate of Neandertals. Since the discovery of Neandertals in Europe, the relationship of them to modern humans has been debated. Neandertals may either have gone extinct, or they could have been related enough to mix into the direct ancestors of modern humans. Trinkaus sees evidence of Neandertal traits in early modern humans from Romania, Czech Republic, and France. His pooled research and review of the known early human fossils will appear in the Proceedings of the National Academy of Sciences. "When you look at all of the well dated and diagnostic early modern European fossils, there is a persistent presence of anatomical features that were present among the Neandertals but absent from the earlier African modern humans," Trinkaus said. "Early modern Europeans reflect both their predominant African early modern human ancestry and a substantial degree of admixture between those early modern humans and the indigenous Neandertals." This suggests that Neandertals were absorbed into modern human groups. Based on

material and social culture, the Neandertals were likely seen as equals.

*On a side note: some ancient Neandertal and early human DNA has been recovered. Thus far papers have argued both disappearance scenarios based on molecular evidence. This debate is likely to continue for some time. FYI, the "h" in Neandertals was officially removed.*

### **Bones of prehistoric camel found at Wal-Mart site** *CNN 4/28/07 AP*

Workers in the Mesa suburb of Phoenix, AZ uncovered an ancient camel while digging a hole for a tree at a new Wal-Mart site. Brad Archer, the museum curator at the geology museum at Arizona State University, came to excavate the bones after hearing that nursery owner John Babiarz was cautiously excavating the bones at the bottom of the hole for the tree. "There's no question that this is a camel; these creatures walked the land here until about 8,000 years ago, when the same event that wiped out a great deal of mammal life took place," Archer told The Arizona Republic. Wal-Mart and the nursery owner agreed to allow Babiarz to stabilize the bones and put them on display at the geology museum. In fifteen years at ASU Babiarz has only found 6 or 7 important finds of this kind. This is his first camel. He has also been involved with local horse and mammoth excavations. This camel is estimated to be 10,000 years old.

### **THE CARNIVORE'S DILEMMA**

*From Clarence Zacher*

Land mammals that eat meat fall into two camps: the kiddie-menu crowd and the supersize-me set. Small carnivores usually go after bite-size prey, such as worms and mice, which don't take much effort to hunt. But even the most proficient hunter can catch only so many small prey a day. As species get bigger, the energy gained from catching small prey soon lags behind rising metabolic needs and hunting costs. For carnivores weighing more than about forty pounds, the size of a coyote, it pays to switch to large prey, so large carnivores hunt animals closer to their own size.

A new model developed by Chris Carbone, a biologist at the Zoological Society of London, and two colleagues explains how the balance between

gains and expenditures in energy determines—and limits—the carnivores’ size and their prey selection. According to the model, as body size surpasses forty pounds, the metabolic costs of hunting rise more steeply than the energy gained. A carnivorous mammal weighing more than about a ton couldn’t catch enough prey—no matter how large—to survive. That’s a good fit with reality: the largest known mammalian predators, such as the extinct short-faced bear, max out at around a ton. Those and even somewhat smaller meat-eaters probably live close to the edge in maintaining their delicate energy balance. Indeed they have advanced energy-conservation tactics, such as lions’ long bouts of inactivity or bears’ hibernation. Carbone thinks that explains why more large carnivores run a bigger risk of extinction than small carnivores or vegetarians: they’re more vulnerable to changes in the availability of prey. As nature’s self-appointed custodians, we should take note. (PLoS Biology)—S.R.

*Natural History, April 2007, p. 14*

*Another take on some Pleistocene predator extinctions (see last month’s issue) as a result of their unmet dietary needs following the disappearance of the megafauna.*

# hWhat is EMSP?

**The Eastern Missouri Society for Paleontology (EMSP) is a not-for-profit organization Dedicated to promoting the enjoyment of fossil collecting. It is open to all individuals interested in learning about the history of life on earth. The club membership includes professional paleontologists as well as amateur hobbyists. The EMSP provides an open forum for the exchange of information and access to expertise on collecting, identifying, preparing and displaying fossils.**

**EMSP meetings are held on the second Friday of every month (except July, August and December) at 7:30pm in the Earth and Planetary Sciences Building on the campus of Washington University. Each meeting includes an informal exchange of information and speakers on a variety of fossil-related topics.**

**Weather permitting, field trips to fossil collection localities around the St. Louis area are held each month. Led by experienced collectors, these trips are a fun way to augment discussions at the monthly meetings. The club participates in joint field trips with other paleo clubs, visiting fossil sites throughout the United States. EMSP is also a proud to be involved in partnerships with the St. Louis Science Center and the Greater St. Louis Association of Earth Science Clubs, Inc.**

**Eastern Missouri Society For Paleontology  
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**FIRST CLASS MAIL**

