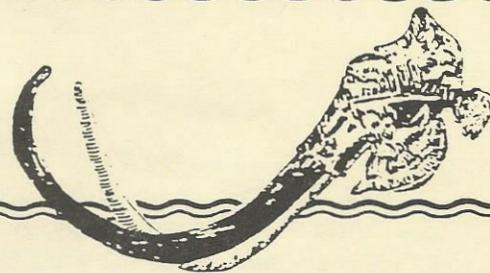


Dallas Paleontological Society

The Fossil Record

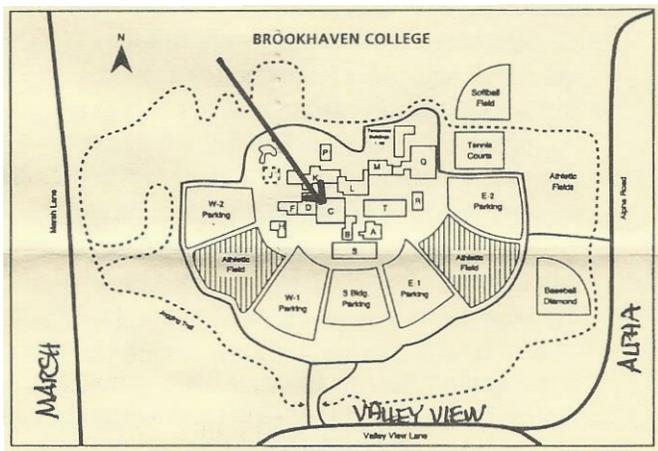
P. O. BOX 710265, DALLAS, TEXAS 75371



Vol. 11, No. 10, October, 1995

OCTOBER MEETING

Our speaker for the October meeting (note the location has changed due to the State Fair) will be Dr. Jack M. Callaway. Dr. Callaway is a professor of geology and biology at Texas A&M International University and Laredo Community College. He is also a research associate with the Rochester Institute of Vertebrate Paleontology. Callaway is a former senior naval officer and naval aviator whose life-long passion for fossils led him into a second career as a vertebrate paleontologist and educator. He received his BA in geology from the University of Wyoming, and an MS and Ph.D. in geological sciences from the University of Rochester. Callaway's special field of study is ancient marine reptiles.



For the past decade, most of Dr. Callaway's work has been directed toward the phylogeny and evolution of Triassic ichthyosaurs. He is also a part of a team of scientists engaged in a long-term study of the geology and

paleontology of Sonora, Mexico, under a grant from the Mexican government and is working on new Triassic ichthyosaur material from British Columbia. In addition to a number of published journal articles, he is chief editor of a book entitled "Sea Reptiles of the Past", soon to be published by Academic Press.

NEXT MEETING
7:30 P.M. WEDNESDAY
OCTOBER 11
BROOKHAVEN COLLEGE
AUDITORIUM, BLDG. "C"
FARMERS BRANCH, TEXAS

WHAT IS TAPHONOMY
by Jim Wyatt

*"It has been said that he who is a goad preserver of his life
Meets no tigers or wild buffaloes on land,
is not vulnerable to weapons in the field of battle.
The horns of the wild buffalo are powerless against him;
The paws of the tiger are useless against him;
The weapons of the soldier cannot avail against him,
How is it so?
Because he is beyond death. "*

Laotse 571 B.C.

According to Laotse, fossils must be the best preservers of life, for they have endured the vagaries of time beyond death, yet tell us so much about ancient life! In the understanding of the process of fossilization, the paleontologist must go beyond death. He must examine the entombment and the eventual resurrection of a specimen in order to learn as

much as possible about how an organism lived. This type of research is a branch of science known as taphonomy. A Russian paleontologist coined the word from the Greek words *taphos*, for "burial," and *nomos* for "law." George Gaylord Simpson defines taphonomy as "everything that happens to a fossil from the death of the organism until the time when whatever remains of it is on a paleontologist's work table ready for study." Simpson further details the definition by saying that taphonomy consists of three stages of investigation: from death to burial; the vast time of entombment; and finally, its resurrection and preparation for study.

When I collect a specimen, it is the taphonomy that opens the mind and allows me to see the ancient environment from which it came. Suddenly the specimen is alive in an ecosystem long since forgotten! No longer is it a mere shell or bit of bone, but it has become an ammonite being devoured by a giant mosasaur! Was it a marine environment? What other clues exist to show this? Are there other organisms preserved for study? Does the ammonite shell show any indication of predation from a mosasaur? Do they match a mosasaur's tooth impression? Is the matrix consistent with marine deposition? How was the specimen buried? Fossilized? Unearthed? Collected? Answers to these basic questions, along with many others, form the mass of data that the paleontologist looks for in trying to reconstruct the past.

It was Peter Dobson of the University of Pennsylvania who first applied taphonomy systematically to dinosaurs. In Canada's Dinosaur Provincial Park, he made the first efforts to unravel not only what dinosaurs had lived in the park, but to understand how they interacted with the environment. To detail an environment never before seen, he analyzed the fossils, ancient stream channels, growth rings of petrified wood and position of bones. He surmised that, seventy-six million years ago, the park was like a southern bayou. Its

inhabitants were small mammals, turtles, crocodiles, duckbilled dinosaurs and horned centrosaurs. The area was a flatland, cut through with small streams and dotted with trees and abundant marsh grasses. Silt and mud washed down from the mountains during floods and settled on the deltas. In the process, many animals were entombed in stream flood deposits. Dodson was able to discern that water transported the dinosaurs in the park to their final resting place. He was further able to analyze different sorting patterns in diverse aquatic environments due to the placement of the fossils. By his own admission, Dodson mistakenly thought that the duckbill and horned dinosaurs were aquatic, if not semi-aquatic.

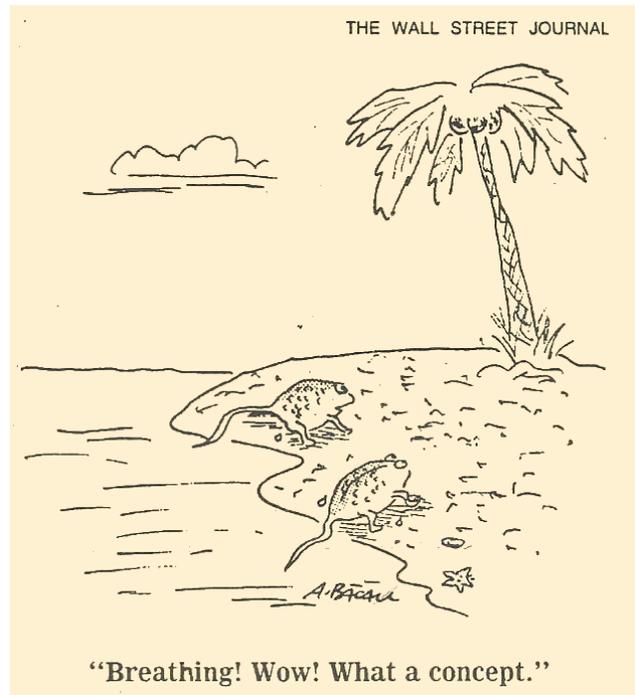
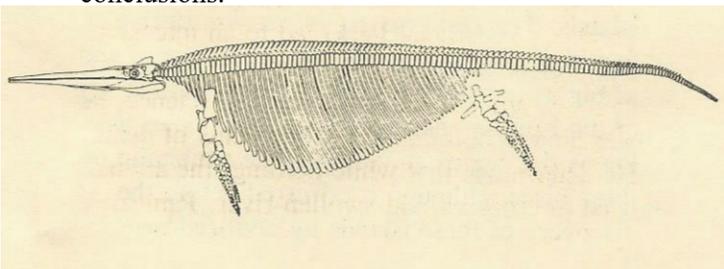
This is one of the examples where further scientific advancement allows the paleontologist to obtain a clearer picture. As Robert Bakker of the University of Colorado so aptly points out, rivers drown hundreds of steers, washing them downstream during floods and burying them in sandbars every year. Does that prove that cows are an aquatic species? Hardly! Remains can be very confusing after a few million years of entombment. We learn answers to old questions and bring new ones to light as further studies reveal more about dinosaurs. Acceptance that the duckbilled and horned dinosaurs were terrestrial herding herbivores is now widespread. Thus, it was through Peter Dodson's work with taphonomy that paleontology launched into a new age of discovery and understanding.

If we venture to call Dodson the "Father" of taphonomy, then Phil Currie must certainly be the chosen son. His discovery of an enormous jumble of *Eucentrosaurus* bones (also in Dinosaur Provincial Park) led to an intensive taphonomic study. Employing time-tested methods and new advancements in science, he was able to outline the last moments of death. He determined that while herding, the animals tried to cross a flood-swollen river. Panicking,

many drowned as they climbed over each other in their attempt to cross safely. The bodies then floated downstream, possibly jamming the river or becoming stuck on the rivers edge. Predators ripped the rancid meat from the bones, leaving the broken remains of teeth, while inadvertently crushing the still fresh centrosaur bones under their feet. Spiral fractures indicated that the bones were still fresh when first broken. The next flood buried the broken remains. In time, they came to light again under the searching eye of Phil Currie. With such great concentrations of bone from a single species, many other physiologic and systematic studies will determine information on social behavior, growth, reproduction, climatic influence and pathology within the community.

Problems still face every paleontologist when it comes to taphonomy. The Green River fish fossils of Wyoming died in the thousands. Two separate layers contain preserved fish in the ancient fossil lake, but the cause of death is debatable. Several theories have been offered: sudden inversion of cold water containing hydrogen sulfide; sudden influx of excessive salinity; algae blooms and fish diving too deep to escape the hot surface water. While each interpretation has merit, it will take many more investigations to unravel the exact cause or causes of death.

Gone are the days of a fossil laundry list. No longer is it possible to ignore the wealth of information around the fossil that will tell the engrossing tale of death and resurrection! Science demands that we examine everything related, with all the tools at our disposal, in order to elucidate as clearly as possible our conclusions.



DISCOVERY

The largest carnosaur ever discovered, potentially displacing *T. rex* as the largest predator (or scavenger, as you prefer), has been found in Neuquen province of western Argentina. The journal *Nature* reported that the 42 foot, six to eight ton dinosaur was discovered in the Rio Limay formation by auto mechanic and amateur paleontologist Reuben Carolini and has been named *Gigantosaurus carolinii* (amateur paleontologist please note).

About 70% of the creature has been excavated, including a crushed skull, most of the vertebrae, the pelvic girdle, portions of the femurs, and eight inch, curved and serrated teeth. The report was written by two Argentinean paleontologists; Rodolfo Coria of the Carmen Funes museum in Neuquen, Argentina, and Leonardo Saigado of Argentina's National University of Comahue. An exact comparison with *T. rex* isn't possible because of the condition of the skull, but it appears that the animal was probably larger and up to 3 tons heavier. "This is a monstrous animal," said University of Chicago

paleontologist Paul Sereno, who has examined the find. "It's probably a bit bigger than *T. rex*."

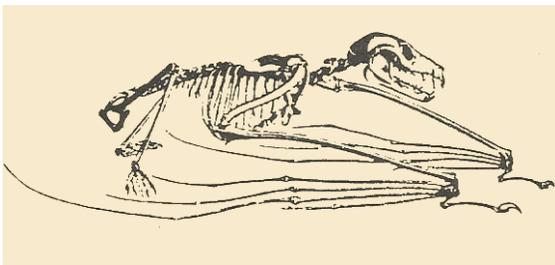
Jack Horner at the Museum of the Rockies noted that size comparisons are difficult because dinosaurs grew continuously until they died. "I don't care who's bigger. That's not the interesting question." The interesting question for Horner is whether *Gigantosaurus* was a hunter or a scavenger.

The authors note that *Gigantosaurus* and *T. rex* evolved independently from each other, *Gigantosaurus* having preceded its more famous number by about 30 million years.

This same fossil site has also yielded bones of one of the largest herbivores yet found, *Argentinasaurus*.

Source: Fort Worth Star-Telegram, Sept. 21, 1995

HAPPY HALLOWEEN



THE AGE OF MAN

As the Twentieth Century nears to an end (as does my term as your editor), it seems appropriate to share the following excerpt from A Compend of Geology by Joseph Le Conte, Professor of Geology and Natural History, University of California (Berkeley), 1884, Rev. Ed. 1898, and to reflect on Professor Le Conte's observations of one short century ago regarding the "Psychozoic Era - Age of Man."

"In all previous ages there ruled brute force and ferocity. In this age alone Reason appears as ruler. The order of Nature must be adjusted to this keynote. Therefore, the great ruling mammals of the previous age must become extinct, and the mammalian class must become subordinate; noxious animals and plants must diminish, and useful ones be preserved.

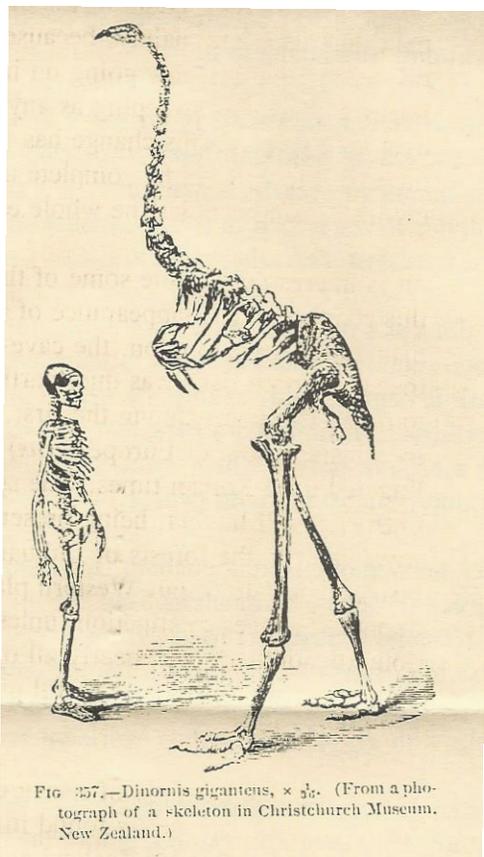
"Although in length of time this is not to be compared to an era, nor to an age, nor to a period, nor even to an epoch, yet it deserves to be made one of the primary divisions of time, not only on account of the dignity of man, but also, and mainly, because through his agency there is now going on in organic forms a change as sweeping as any which has ever taken place. This change has been going on now, but will not be complete until civilized man occupies the whole earth.

"It is interesting to note some of the steps of this change. The disappearance of the mammoth, the mastodon, the cave-bear, and the saber-tooth tiger was due, partly at least, to man. These are among the first. Some of the gigantic oxen of Europe (*urus*) lingered until Roman times. One species (aurochs) still lingers, being preserved by royal edict in the forests of Lithuania. The bison or buffalo of our Western plains is doomed to speedy extinction unless saved by domestication. In fact, nearly all of our domesticated animals and useful plants have been thus saved.

"A remarkable example of recent extinction of the Quaternary species is found in the gigantic Wingless birds of New Zealand and Madagascar. The bones of the *Dinornis* and the *Epiornis* are very abundant in these islands. The *Dinornis giganteus* was twelve feet high. The drumstick was a yard long, and as big as the legbone of a horse. A perfect egg of the *Epiornis* has been found, six times as big as the egg of an ostrich. The extinction of these birds, although it occurred before the discovery of these islands by civilized man,

was so recent that the feet have been found with dried skin upon them, and eggs with the skeletons of chicks within.

"Now, in this gradual change from the Quaternary to the present fauna and flora, when did man first appear upon the scene and become an agent of change? And *what kind* of man was this primeval man? These are questions of transcendent importance."



ASIDES by Jim Caddell

I met a biologist at a party recently, and he proposed a theory I had never heard before. Has anyone done any research on iridium

poisoning as a factor in the extinction at the end of the Cretaceous?

We know that high levels of iridium were present in the atmosphere long enough to form a detectable marker at the KT boundary. We know that heavy metals can sometime concentrate in the tissues of animals. We also know that some animals are more vulnerable to heavy metal poisoning than others.

If one wants an example of how small amounts of a toxin can have a marked effect on wildlife, then one need only examine the effects of DDT on birds here in the US.

Paleontology was not my friend's field. Biology is not mine. Has anyone ever heard this one before?

"THE LAZARUS THING"

Raul Cano, a microbiologist at California Polytechnic State University in San Luis Obispo, claims that he has revived bacterial spores from Cenozoic amber. The claim was made in a recent issue of Science.

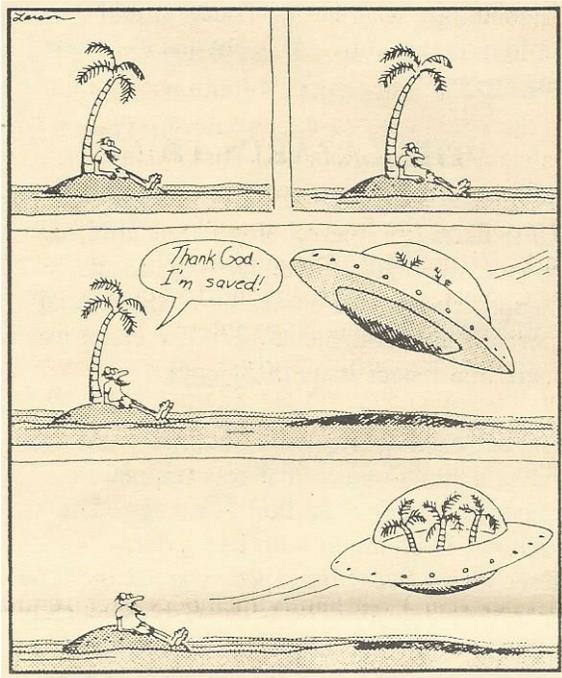
The bacterial spores were obtained from the gut of a stingless bee that was trapped in amber some 25-40 million years ago. The bacteria, in common with its modern descendants, went into spore state at the time of the bee's death. The bacteria is genetically similar to *Bacillus sphaericus*, a common organism found in the guts of modern bees.

Unfortunately, this same bacteria is commonly found in modern soil, "making the prospect of contamination of the sample much more likely.

Researchers familiar with Cano's work maintain that the safeguards he used are most extensive. It still remains for an independent entity to replicate the experiment. Cano says he has replicated it several times and "I know it's reproducible."

In addition to the potential benefit to the study of bacterial evolution, Cano hopes that the discovery may prove valuable in other ways. He has formed a company, Ambergene Corporation, that is exploring the possibility of pharmaceutical application for the bacteria. In response to inevitable comparisons with "Jurassic Park," Cano says: "The difference between a dinosaur and a bacterium is quite a few orders of magnitude. You really would have to do the Lazarus thing. "

Source: Earth, October, 1995



LADONIA FOSSIL PARK

Editor's Note: This article was excerpted from The Paris News Sept. 10, 1995. Our thanks to H. Charles Martin for submitting it.

Ground-breaking ceremonies were held Friday near the Sulphur River Bottom here for the

Pete Patterson Fossil Gorge Park. "Our purpose is to try to bring people to Ladonia and maybe generate some business in town. Our council has worked real hard on it, and I'm pleased with what we've done," Mayor Leon Hurse said of the Texas Parks and Wildlife project that incorporates a 50-50 matching grant from the state.

The 10 acre park will sit on donated land, and will include a group picnic shelter, a children's play area, 12 individual picnic units with barbecue grills, a baseball diamond with bleachers, an exercise walking trail, a river access ramp, 4,511 square yards of parking, restrooms and landscaping.

The attraction, however, is for those looking for something a little different that takes only a few minutes to reach: Fossil hunting. The Sulphur River is rich in fossils, natural history and northeast Texas heritage.

"I think it's neat we can do this," State Representative Pete Patterson, after whom the park is named, said, calling the park a unique attraction. "I think it's a park that will really be used, not only by the citizens of Fannin County, but all kinds of people."

The anonymous land contributor has also agreed to donate as much as \$20,000. Local citizens have already raised \$15,000 of matching funds for the grant, and the Texas Department of Transportation has agreed to help with gravel and grading work for ramps. Officials hope to begin construction in the near future, with the park opening before the first of the year, weather permitting.

ODDS AND ENDS

A site high in Spain's Pyrenees mountains was once a seaside nesting site for thousands of dinosaurs, scientists report. The site, littered with ancient eggshells, nests and even some bones, may give paleontologists insight into the behavior of the creatures that lived there more than 65 million years ago.

"The Arenisca de Aren sites represent the first unambiguous evidence of dinosaurs nesting at a seashore," scientists in Spain and France wrote, recently in the journal Nature.

The scientists, from the Universidad Autonoma and the Univesidad Complutense in Madrid, Spain, and the Universite de Montpellier in Montpellier, France, uncovered the remains of 24 nests, each with one to seven eggs in it. The nests were spaced surprisingly closely together - Within eight feet and scientists estimate that the entire area of almost six square miles contains the remains of about 300,000 eggs.

The authors suggest that the ancient beach was a nesting ground, and that dinosaurs may have returned to the area during several reproductive seasons. Some form of territoriality may have prevented dinosaurs from destroying nests of previous residents, the authors propose, and limited resources may have made them nest so closely together.

Source: The Dallas Morning News

EDITOR'S NOTES

-Whomever is chosen by the membership for the privilege of being your next editor will need your help. Your help in preparing The Fossil Record and especially your help with the final preparation of Volume III of

The Occasional Papers. Start thinking about what you can do to participate in the preparation and typing of the large amount of material that has been submitted.

-FOSSILMANIA is just around the corner. Plan to attend on October 27-29 at the Somervell County Convention Center in Glen Rose, Texas.

SOCIETY PURPOSE

The Dallas Paleontological Society was founded in 1984 for the purpose of promoting interest in and knowledge of the science of paleontology. It is intended that the Society be a network for the exchange of data between professionals and serious amateurs in this field. The Fossil Record is published monthly, on the second Wednesday of each month at the Dallas Museum of Natural History in Fair and several field trips are arranged annually. Meetings of the Society are held at 7:30 p.m. Park. Visitors are welcome. Membership in the Society is open to anyone 16 years of age or older who has an active interest in promoting the purposes of the Society. Dues for active membership are \$25 per year, on a calendar-year basis. (An associate membership, designed primarily for those individuals who do not desire active monthly participation in Society business and who do not wish to vote or hold office, is available for \$15 per year.) All family members over 16 are included. Dues are \$12.50; \$7.50 after June.

Typed or legibly handwritten copy is acceptable; final word processing is done in WordPerfect 5.1 (3.5 inch or 5.25 inch disk). Deadline is the third Wednesday of each month.

Contributions to The Fossil Record are encouraged from all interested parties. Please send material to the address of the editor.

FOR YOUR CALENDAR

October

- 11 DPS Monthly Meeting, Brookhaven College, Auditorium, Bldg. "C", 7:30 pm.
Program: Dr. Jack M. Callaway
- 14-15 Fort Worth Gem and Mineral Society Show, Will Rogers Memorial Center, Poultry
Exhibit Bldg, Fort Worth, Texas
- 21-22 Tri-City Gem & Mineral Society Show, Mayborn Civic and Convention Center, Temple, Texas 27-29
FOSSILMANIA, Somervell County Expo Center, Glen Rose, Texas

November

- 14 Society of Vertebrate Paleontology, Annual Meeting, Pittsburg, PA
- 4-5 Dallas Gem & Mineral Society, Big Town Shopping Center Exhibition Hall, Mesquite, Texas
- 8 DPS Monthly Meeting, TBA
- 17-19 Austin Gem & Mineral Show, Palmer Auditorium, Austin, Texas

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