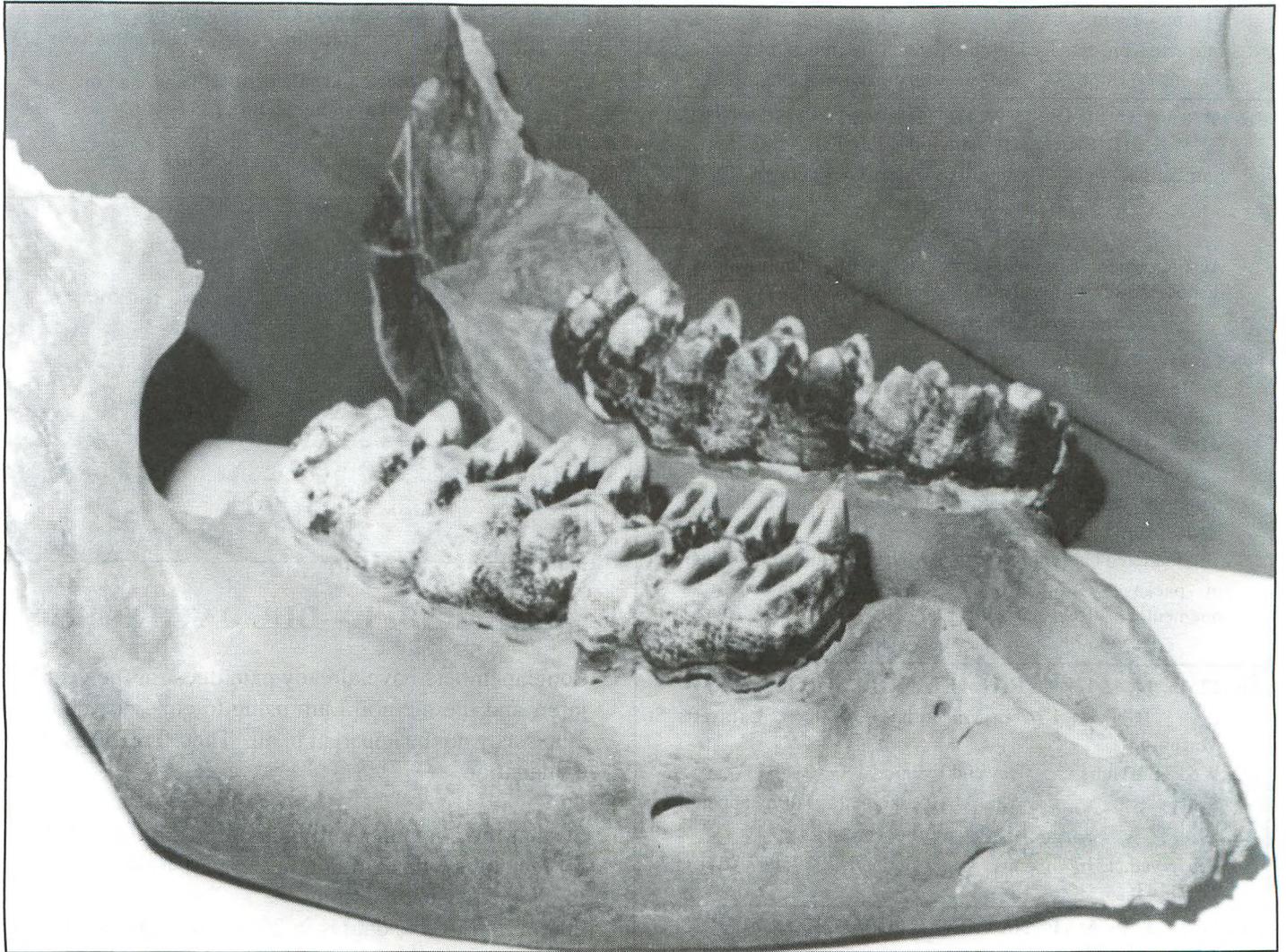


# M.A.P.S. *Digest*

Official Publication of  
Mid-America Paleontology Society

Volume 22, Nos. 7 & 8  
October-November 1999



## MARK YOUR CALENDARS

### Jan 8 IMPACTS! DINOSAURS DEMISE AND ECOSYSTEM DEVASTATION by Paul Harnik

Paleontological Research Institution, 1259 Trumansburg Rd.,  
Rte 96, Ithaca, NY

Lecture at 12:00. Can also take fossils for identification  
607-273-6623      www.english.cornell.edu/pri

### Feb 19 MAPS MEETING

Trowbridge Hall, University of Iowa, 123 N. Capital St., Iowa  
City, IA. Main Lecture Room, #125.

1:00 Board & General Meeting Combined  
2:00 Program

### Feb 19 FAMILY FOSSIL LEARNING DAY

Paleontological Research Institution, 1259 Trumansburg Rd.,  
Rte 96, Ithaca, NY

11 a.m. - 2 p.m.  
Interactive projects for kids and parents. Members/free; Others/\$2  
607-273-6623      www.english.cornell.edu/pri

### Feb 19-20 30<sup>th</sup> ANNUAL SHOW OF THE WILLIAMSON COUNTY GEM & MINERAL SOC. (Includes Fossils)

San Gabriel Park Community Center, Georgetown, TX

Sat. 10 a.m. - 6 p.m.

Sun. 10 a.m. - 5 p.m.

Austin Paleo Soc. will provide fossil identification and  
demonstrations of fossil cleaning techniques.

Contact: Rochelle Margolis 512-864-0334

### Feb 26 ALL DAY FIELD TRIP TO AMERICAN MUSEUM OF NATURAL HISTORY

Paleontological Research Institution, 1259 Trumansburg Rd.,  
Rte 96, Ithaca, NY

Guided tour by PRI paleontologist to newly renovated fossil  
halls, the world's tallest free-standing dinosaur, and the newly  
opened Hall of Planet Earth.

Chartered bus, admission to AMNH and guided tours included  
in package: Adults/Children: \$60/38 members., \$65/43  
nonmembers. Register by February 19.

607-273-6623      www.english.cornell.edu/pri

### Apr 12, 13, 14, 15 CENTRAL ILLINOIS FOSSIL SHOW

DAYS INN, Hwy 67 in Macomb, IL, 1400 N. Lafayette St.  
Macomb, IL

Wed. and Thurs.      Day and Evening

Fri. and Sat.      After MAPS show hours or by appointment

For more information, contact:

Jim Wyatt, 1517 Greentree Lane, Garland, TX 75042 Tel: 972-  
494-3443

### Apr 14, 15, & 16 MAPS NATIONAL FOSSIL EXPOSITION XXII—TEETH

Western Illinois University, Macomb, IL

Fri., Apr. 14      8 am - 5 pm

Sat., Apr. 15      8 am - 5 pm

Sun., Apr. 16      8 am - 3 pm

Full information in December Digest. Request copies from Dale  
Stout. (Address on back page).

## 99/11 DUES ARE DUE

Are your dues due? You can tell by checking your mailing label. It reflects dues received by October 5. The top line gives the expiration date in the form of year followed by month--99/11 means 1999/November. Dues cover the issue of the Digest for the month in which they expire.

We do not send notices but will let you know if you are overdue by highlighting your mailing label and stamping your Digest. We carry overdues for two months before dropping them from our mailing list.

Please include your due date and name exactly as it appears on your mailing label--or include a label.

Dues are \$20 per U.S./Canadian household per year. Overseas members may choose the \$20 fee to receive the Digest by surface mail or a \$30 fee to receive it by air mail. (Please send a check drawn on a United States bank in US funds; US currency; a money order; or a check drawn on an International bank in your currency.) Library/Institution fee is \$25.

**Make check payable to MAPS and mail to:**

**Sharon Sonnleitner, Treas.**

**4800 Sunset Dr. SW**

**Cedar Rapids, IA 52404**

## ABOUT THE COVER

sent by F. W. Lewis, Carmel, Indiana

This month's cover photo is the lower jaw of a mastodon, excavated from a drainage ditch in northwestern La Porte County, Indiana, by a group of volunteers and staff from Indiana State Museum. See pages 7-8 for full story.

## MAIL LABEL—DUE DATE FOR 2000+

Some members have already paid dues for the year 2000 or later, and the method I am using to code due dates on the labels may not be apparent to all. Therefore, please note this explanation.

So that the computer will pick out and print address labels for members with expiration dates past 1999 as well as those in '99, I am using the form "99 / \_\_" for due dates starting in 2000. If your due date is in 2000, your label will start with 990/\_\_. Similarly, 992/\_\_ indicates a due date in 2002, etc. With the system I now have the database on, I probably could revise the method, but I have not yet had time to experiment with it. And since I know this method works, I probably will be using it for quite a while.

**FROM THE EDITOR**

Plans for EXPO XXII—TEETH are moving forward smoothly. The next issue of the *Digest* will contain all the show information and registration form. We hope you are planning to attend.

Allyn Adams reports:

Our keynote speaker will be Bob Purdy from the Smithsonian, Museum of Natural History, in Washington, DC. The talk will be on shark teeth. I wanted someone who would talk on mammal teeth but had no luck in getting a commitment from someone.

Please note this is once again a double issue. The next issue will hopefully be out near the first of January.

**I am really in need of articles: Book reviews, Summaries of current paleo events (with references), Interesting finds, Techniques for just about anything, Etc. Please contribute if you can.**

**PROCEEDINGS OF THE BOARD**

The main item of business at the November Board meeting was the election of officers. The following will serve for 2000:

- President: Karl Stuekerjuergen
- 1st Vice President: Dale Stout
- 2nd Vice President: Marvin Houg
- Secretary: Alberta Cray
- Treasurer: Sharon Sonnleitner
- Membership: Dale Stout
- Directors: Blane Phillips (00)  
Doug DeRosear (01)  
Tom Walsh (02)

**LEGISLATION**

from *Bulletin Board*

**Uncompahgre Plateau Paleontological Society. 12/99**

The Bureau of Land Management just closed the response period for their draft of a report to be submitted to Congress, entitled "Assessment of Fossil Management on Federal and Indian Lands." In this report they recommend that any future legislation should include provision:

1. Federal fossils should be used for scientific and education and maybe for recreation.
2. Vertebrate fossil collection should be limited to

**LETTER TO THE EDITOR**

Dear Sharon:

. . . [Perhaps] you can get a notice in *MAPS Digest*. Recently I had a phone conversation with a member of the Floyd County Conservation Board concernign Fossil Park and Prairie Preserve at Rockford, Iowa. Apparently the Board has become concerned about people collecting fossils for commercial purposes at Fossil Prairie. They want to make it known collecting is permitted there for recreational purposes only. I said that I knew of no market for the fossils at Rockford and if someone did find a market, it would probably be short-lived because of the sheer abundance of material. However, I agreed that commercial collecting might have a detrimental effect on the site.

A visitor's center with displays will be opening there next spring, and I suggested that collectors stop in during set hours at the center for a free daily collecting permit. They would then check in when they leave so Board members would have an idea of what is going on. If people do want to commercially collect the material, there are many other sites in the vicinity on private property that they might want to seek permission for. The Floyd County Conservation Board should be commended on their efforts to keep Iowa's premier fossil site open to collector, and we should follow their regulations for the benefit of all collectors.

Sincerely, Robert Wolf  
President, River Valley Rockhounds

- qualified personnel and remain federal property.
- 3. Plant and invertebrate fossils should be covered also (they say mission specific management).
- 4. Penalties for stealing federal fossils should be increased.
- 5. Legislation should provide for paleontological resource inventories.
- 6. Fossils should be curated as federal property.
- 7. Management should provide for public involvement (as unpaid volunteers).

This brings forth the image of BLM agents chasing a Boy Scout over the hill because he picked up a brachiopod. What has this country come to?

**PALEONTOLOGICAL COLLECTIONS  
OF THE ST. LOUIS ACADEMY OF SCIENCE  
AND THE ST. LOUIS SCIENCE CENTER**

by Bruce L. Stinchcomb

Geology Department, St. Louis Community College at Florissant Valley, St. Louis, MO

It's a fact of history that St. Louis and science have a long (for the "New World") association and tradition. St. Louis during the last century was the "Gateway to the West," not only in settlement and westward expansion, but also in science. During most of the last century, territory which lay west of St. Louis was scientifically . The St. Louis Academy of Science was established in 1856 from an earlier and less formal organization to encourage and publish on scientific discoveries as well as to acquire and display natural history and scientific objects — natural history objects that are the nucleus of this article. The current Science Center on Oakland Avenue is the direct descendent of the St. Louis Museum of Science, which in turn was bequeathed the natural history collections of the St. Louis Academy of Science. The problem which has surfaced here is that the Science Center emphatically insists on looking forward, not backward and thus has attempted to relieve itself of, or at best ignore, its "last century" holdings and legacy; but as a "fact of history," this legacy is a significant part of the St. Louis heritage.

Missouri became a state in 1821! Even before that time there had been a scientific exploratory focus in this area. It was, among other things, the starting point of the Lewis and Clark Expedition as well as of other naturalists — explorers such as Schoolcraft and Featherstonhaugh. At the time of statehood, little was known about natural phenomena of the new state, and even less was known of its geology — that is, its rocks and most mineral resources. However, geology was at this time still not a recognized science. What was known was that southwest of the fledgling community of St. Louis occurred valuable lead deposits, lead deposits which could be worked with relative ease to yield the silvery mineral (galena) from which could be extracted lead. Concurrent with Missouri statehood was the development of the steamboat, a technological development which would make the Mississippi and Ohio rivers major transportation corridors. The first steamboats had plied the Mississippi and Ohio Rivers a few years earlier, where in the bootheel they were

greatly impeded by large numbers of rootwads from the rivers collapsed banks, a consequence of the 1811-12 earthquake.

The decade of the 1820s saw the developing of the science of geology, with its potent realization of immense spans of time. Concepts of geology in turn led to the realization that a geological survey could document rock strata as to type, age and potential for raw materials, would greatly assist in discovery and development of resources as new states came into the union. To accomplish this goal, Congress authorized a position of U.S. geologist to oversee such geologic exploration. Appointed to fill this position was David Dale Owen, son of Robert Owen, a Scottish immigrant who, near the beginning of the 19<sup>th</sup> century, had established a commune, which he named New Harmony, in southern Indiana.

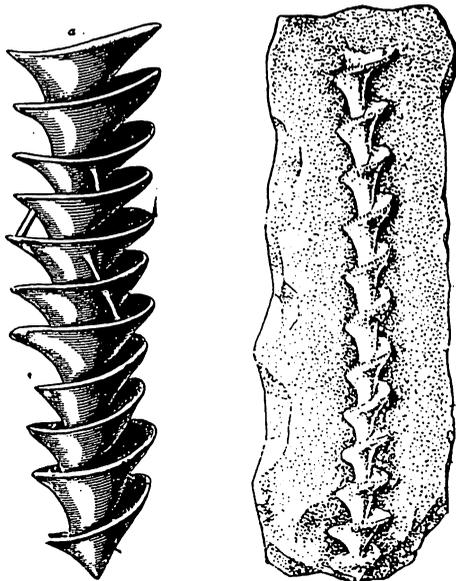


*D. D. Owen.*

David D. Owen, trained in medicine, was fascinated by the new science of geology and diligently oversaw this program of initial geologic exploration of the territories of Arkansas, Iowa, Minnesota and Wisconsin.

Incidental to this geologic documentation would also be investigations of Missouri, particularly the northern half of the state where he would search for coal beds — coal beds to supply fuel to the nascent steam engine. Owen led arduous expeditions up tributary streams of the little known west side of the Mississippi. His crews would work their way upstream in canoes on the Cuiver, Salt, Fabius, and Wyaconda Rivers and on into Iowa and Minnesota Territories, noting and surveying rock strata, fossils and minerals. (Owen's geologic reports are still some of the best guides to the rock exposures along these rivers.) Collected specimens were taken by canoe back to the Mississippi, where they were then shipped by steamboat to St. Louis. Scientific acquaintances of Owen in St. Louis, and future founders of the Academy, would be the first to see them.

Owen led many of these long and arduous trips himself, but he also appointed assistants like Benjamin F. Shumard to lead others. Some of these assistants focused on the hard (and potentially mineral rich) rocks of Minnesota and Wisconsin Territories (the Canadian shield of the upper Mississippi and Lake Superior regions). Others, like Owen, concentrated on the fossil-rich, "soft rocks" of Northern Missouri, Iowa and Southern Wisconsin. This exploratory work started in the 1830s, continued through the 1840s and was crowned by a series of geologic reports in 1852.



*Archimedes worthini, the corkscrew fossil which was found by David Dale Owen to be a guide as to whether associated strata could or could not contain coal seams.*

Wisconsin are often well exposed along the rivers and documentation of them was Owen's speciality. His concern with fossils had an economic bent, for it was realized that only the younger strata incorporated coal beds and such strata could be identified by its fossils. A peculiar corkscrew-like fossil names *Archimedes wortheni* was particularly useful (after Amos H. Worthin, a St. Louis Academy correspondent). If *Archimedes* was found in strata, coal beds would not be found in associated layers or in underlying layers, even though these older layers looked just like those which did contain coal seams. This ordering of strata by associated fossils was of both scientific and practical importance.

Geologic understanding and success would really come in the 1850s. At that time the broad geologic picture of the Midwest began to emerge: a pattern showing very ancient rocks, which contained minerals deposits like lead, iron ore and copper, in southern Missouri; and younger, often fossil-rich strata, some of which contained valuable coal seams, in northern Missouri and Iowa. The 1850s also saw the formal founding of the St. Louis Academy of Science, an organization which would offer an outlet for publication of scientific discoveries.

First president of the Academy was Benjamin F. Shumard, previously one of Owen's exploratory assistants. Benjamin Shumard and his younger brother George G. Shumard became noted in the annals of geology in their geologic exploration of Texas, shortly after it relinquished its status as a republic to join the Union. Both of the Shumards had a penchant for fossils like that of Owen, and this served admirably in their discovery of Mesozoic (age of reptiles) strata in Texas. The Shumards shipped many of their Texas fossils to St. Louis, where they were examined, scientifically described and made a part of the Academy's collection. Some of the Texas ammonites, with their now dirty, handwritten labels, went to St. Louis by wagon train over dusty Indian trails from Texas.

Another fossil enthusiast, and a corresponding member of the Academy, was a close friend of both Owen and the Shumards, Dr. Lunsford P. Yandell. Dr. Yandell lived in Louisville, Kentucky, and collected extensively from ancient fossil coral reefs at the Falls

The fossil-rich rocks of northern Missouri, Iowa and

of the Ohio, an area which is now a state park focusing on these fossils. Yandell shipped numerous specimens to the academy. (River freight by steamboat was both cheap and reliable.) Many of these large coral heads now load shelves of the Science Center collection's warehouse, and his Kentucky sea lilies (crinoids) in the collections also attest to Dr. Yandell's paleontological enthusiasm.

This legacy of 19<sup>th</sup> century historic geologic and paleontologic "bringbacks" resides at the Science Center, a link with the initial phase of geologic exploration of this part of the planet. The specimens

brought to St. Louis by Owen, the Shumards and Yandell are geologic specimens representative of explorations of the last century. They reside alongside later discoveries and with lunar specimens and, in the future, may reside along with "bringbacks" of a Mars spacecraft mission. The focus of the Science Center on the future is great, so long as the opposite end of the time (and exploration) spectrum is not ignored. A place exists for both at the Science Center, for St. Louis has had a proud past of scientific exploration. This past can and should complement that of discovery and exploration into the coming century, and century (and a millennium) which looms just over the horizon.

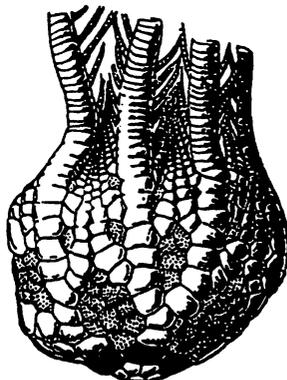
## AN UNUSUAL CRINOID

by Virginia Friedman

from *Paleo Newsletter*, Jean Wallace, ed. 11/99

*Uintacrinus* is a crinoid that appeared only during a brief interval in the Late Cretaceous. It resembled Paleozoic camerate crinoids because it had a globular, multiplated calyx, but it defied conventional crinoid morphology because it lacked a stalk or any other means of attachment. These features, the shifting of its mouth to the side of its body, and the fine, comblike pinnules near its mouth are evidence of a close evolutionary affinity to the living stemless crinoids on reefs.

This unusual crinoid has been known since the last century when spectacular slabs found in Kansas bearing hundreds of *Uintacrinus* fossils were found and transported to the major museums of the United States and Europe. Unfortunately, these impressive slabs lacked stratigraphic as well as locality data.



*Uintacrinus*

In 1991, a team from the University of Wisconsin Geology Museum and the Denver Museum of Natural History recovered well-documented material from the Niobrara Fm. of Kansas and the Mancos Sh. Of Colorado, respectively. It is expected that this material will contribute new evidence in the search for answers concerning

paleoecology, taphonomy and also, undoubtedly, will give rise to more new questions.

*Uintacrinus* represents a crinoid genus with many paradoxes. First of all, the genus has challenged taxonomic morphology of Paleozoic crinoids by possessing, within one species, individuals having a single ring of plates below the arm-forming radials (monocyclic) as well as having individuals having two rings (dicyclic). Normally this would be two different species. Besides this bizarre calyx, each arm may reach up to 1.25 meters in length — an all-time record. Recent studies of its strange morphology have raised questions about its ability to float or swim continuously to maintain buoyancy. It is possible that at its larvae-stage it was free-swimming, and in adult life it became sessile and lived on the muddy sea floor, being a passive suspension feeder as all crinoids.

On the other hand, the crinoids slabs found are so exquisitely preserved that even soft tissues can be studied. This is a very unusual fact because, as a rule, crinoids disarticulate and decay very fast after death. The preservation style of *Uintacrinusocialis* remains another mystery.

The spectacular slabs found in Kansas show a peculiar spoke-like pattern. These taphonomic features remain also to be elucidated.

In addition to the fact that this crinoid was probably not pelagic, but rather a passive suspension feeder forming dense aggregations on the sea floor, its preservation style is also intriguing. The nature of the event that killed these crinoids and buried them rapidly enough to prevent total disarticulation remains a mystery and may supply evidence of as yet undocumented catastrophically violent times in the Cretaceous epicontinental sea.

## DISCOVERY OF FROZEN MAMMOTH MAY LEAD TO A CLONE

Source: "Scientists may try cloning mammoth"  
by Marilyn August in *Chicago Sun Times*, 10/24/99. p. 39A  
sent by John Kelso

Unearthed from the frozen tundra of Siberia, the world's first intact mammoth may provide DNA for a clone. In order to clone the animal, scientists must obtain quality DNA, which is no easy task. Team members working on the mammoth say that DNA can survive at minus 22 degrees or lower, but the temperature in the ice cellar where the animal will be kept will range between minus 14 degrees and 4 degrees.

If DNA can be recovered, the mammoth could possibly be cloned in 15 to 20 years. The process would involve putting DNA from the mammoth into an Asian elephant's egg that has been stripped of elephant genes. So the newborn animal would be a mammoth, not a hybrid of elephant and mammoth. However, because the mammoth's natural environment no longer exists, even if the cloning were successful, it is doubtful that an environment could be found where the animal could survive.

Although cloning would be the most exciting way of resurrecting the mammoth, some scientist have suggested using its frozen sperm to try to breed it with elephants, thereby creating a hybrid.

The carcass, discovered in 1997 by a family herding reindeer, was determined to be that of a 47-year-old, 11-foot-tall male that died near a watering hole on the Taimyr Peninsula. When the frozen tundra was removed from the burial site, the scientists were treated to the pungent smell of elephant dung. The quality of the tusks and fur were so good that the animal looked newly deceased. It was removed from the rock-hard permafrost, where it had lain for 20,000 years, with jackhammers and flown to Khatanga, where it will be thawed gradually with hair dryers. It will remain in Russia, eventually being displayed in a cold museum.

The team studying the beast is led by a group of Frenchmen and includes members from the United States, Netherlands, and Russia. The project was funded by the Discovery Channel, the French magazine Paris Match and other unnamed private sources.

## TIDBITS OF MAMMOTH PROPORTIONS

by Jim Konecny

Lately the news media has been highlighting the recovery of a complete frozen woolly mammoth in Siberia. This mammoth is to be preserved in its frozen state in a cave in Seberia where the temperature never gets above freezing. However, the big story is that scientists hope to recover some DNA and attempt to clone this animal. This will be worth watching.

Here are a few tidbits about mammoths:

- ▶ It is estimated that the earliest ancestors of the mammoths first appeared about 55 million years ago in Africa.
- ▶ From Africa they spread to Asia and Europe about 1.5 million years ago and then to North America by way of a land bridge between Siberia and Alaska.
- ▶ Mammoths evolved into over 150 varieties.
- ▶ The modern African elephant is more closely related to the mammoth than the Asian elephant is.
- ▶ The largest species was the Columbian Mammoth, *Mammuthus columbi*, — height 13 feet, weight 10 tons.
- ▶ The Woolly Mammoth, *Mammuthus primigenius*, was much smaller — height 9-11 feet, weight 4-6 tons.
- ▶ Their diet was mostly grass and herbaceous plants — 200 lbs. per day.
- ▶ Mammoths were grazers as opposed to Mastodons which were browsers.
- ▶ They had four large molars for grinding their food and chewed by moving their jaws from side to side. In their lifetime they went through six sets of teeth.
- ▶ When embarking on their voyage into the territory of the Louisiana Purchase, Lewis & Clark received a letter from President Jefferson asking them to be on the lookout for mammoths that might still be living in the primeval forests of the territory.
- ▶ In the U.S. a number of mammoth sites with spear points associated with them have been found, some with the spear points actually imbedded in bone.
- ▶ Their life-span is estimated to have been between fifty and eighty years.

## DRAINAGE DITCH DID NOT SURRENDER AGELESS TREASURE WITHOUT A FIGHT

by F. W. Lewis

reprinted with the permission of the Indiana State Museum, Indianapolis, Indiana

IT'S SUNDAY MORNING, AND MOST PEOPLE ARE IN CHURCH or getting ready to watch some type of sports activity. But not our crew of Indiana State Museum volunteers and staff.

No, we're waist deep in a drainage ditch, digging for mastodon bones, of course.

Our ISM volunteers are a diverse lot, consisting of science teachers, both retired and active; retired engineers; a jeweler; and antique dealer-collector; staff from other disciplines and interested people who don't mind a little hard work.

This particular episode began on April 18, 1998, when a farmer in Northwestern La Porte County was deepening a drainage ditch with a backhoe and came up with an excellent specimen of a mastodon skull. The farmer called Purdue University's Dr. Criss Helmkamp, who in turn alerted Ron Richards, the ISM's curator of paleobiology.

That led ISM volunteer Victor Porter and Dallas Evans to travel to the Gurnz farm to view the skull and other miscellaneous bones that had been stored in a barn. With the farmer's permission, Vic and Dallas brought the bones back to the museum for further investigation.

The skull — packed with mud, peat and weeds from its several thousands of years' resting underground — required considerable cleaning.

The second trip to the Gurnz farm came on April 16 and involved Richards, Porter, Evans, Larry Swann and Bill Snyder, a retired science teacher from Plymouth. That trip netted a pelvis, a tusk and miscellaneous fragments.

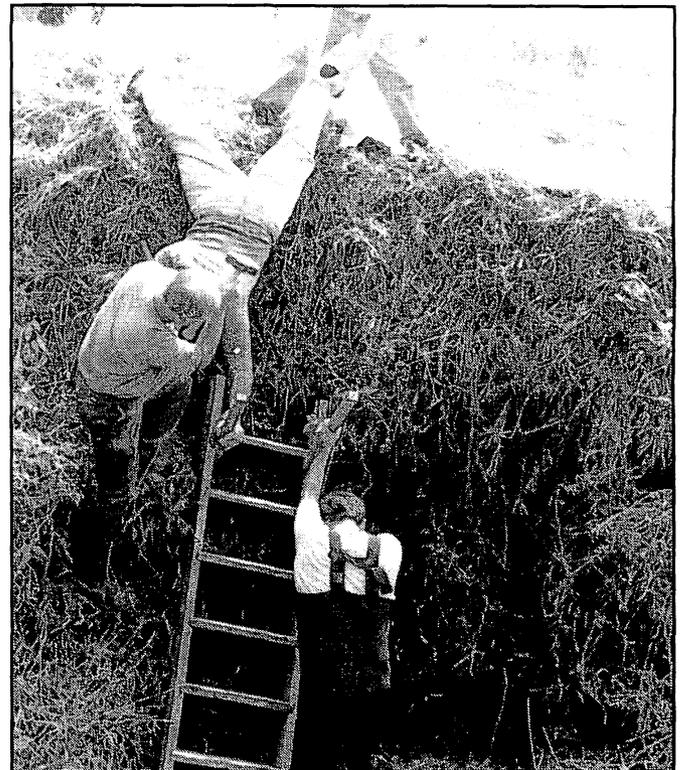
On Sunday, September 27, Richards invited me to accompany him on a return trip to the La Porte County site, along with Swann, Porter, Evans and Dale Ogden, the museum's curator of history. My mission was to photograph the collecting of more mastodon bones from the drainage ditch.

This particular Sunday was a cool but bright and sunny day. I was expecting a small farm ditch, surrounded by fields of corn and soybeans, but this ditch looked more like Greece's Corinth Canal. The ditch ran through a large, wedge-shaped groove in the ground, 30 feet across, tapering down sloping sides to the water level 10 feet below. The stream of water was murky and was flowing at an estimated rate of five

miles per hour.

This ditch is part of the Kankakee watershed, drained years ago. Residue from the tons of chemicals used to fertilize the soil filter into these ditches, as do the surplus swamp and rain water.

Waist high weeds covered both banks, so it was necessary to clear the overgrowth with a weed-whacker and build a ladder down the slope so that we could wade into the filthy water.



*Being an acrobat is not required by amateur or professional paleontologists, but it sometimes helps. Erecting a ladder in the deep ditch requires the help of Larry Swann (bottom), Ron Richards, ISM curator of paleobiology (with hammer), Dallas Evans (holding the stake) and Vic Porter (holding Evans from slipping into the ditch).*

Swann donned fisherman waders while Richards climbed into a scuba diver's wetsuit — purchased for \$185 for this occasion — as he drew upon the lessons learned about cold water during his submersion of the April 26 trip. Evans and Ogden, meanwhile, were only wearing shorts and t-shirts. Entering the stream, the men stepped into a foot of gooey, boot-clinging mud.

The water — besides being filthy and cold — was, I'm sure, full of all kinds of bacteria. It was no place to receive a cut or quench your thirst.

Before any serious work could begin, a line was developed to enable mapping of the exact location of each bone found, using the surface of the water as a vertical base line.

To locate bones it was necessary for the men to shuffle their feet, feeling for any object that could be a missing part of the mastodon. After a couple hours of probing and dexterous footwork, the cry went up, "I think I have found something." Everyone slowly trudged through the muck to the spot. Reaching and straining, they came up with the first piece — an excellent section of tusk. Parts of a vertebra and many other small bones were then found.

A large plastic tub was brought into use to assist in the collecting. Since this would continually float downstream, often nearly escaping, it was promptly dubbed "Moses's boat."

As the excitement began to build, Porter — who had been doing the mapping — jumped, fully clothed, into the dirty brew. He did, however, leave his wallet with me on dry land.

About midday I noticed Ogden and Evans had begun using the tactic of sitting in the chilly goo, with only their heads projecting above the water. They said it was easier to feel the bones with their hands than stumbling

around in the gummy bottom mud. The major difficulty in reaching to dislodge any object in the mud was trying to keep their faces out of the water.

After several hours, another part of the tusk was found buried deep in the edge of the bank. The clinging mud, suction from both the mud and water, plus the weight of the tusk made extraction difficult, but at 5:00 p.m. it was successfully lifted from its watery grave.

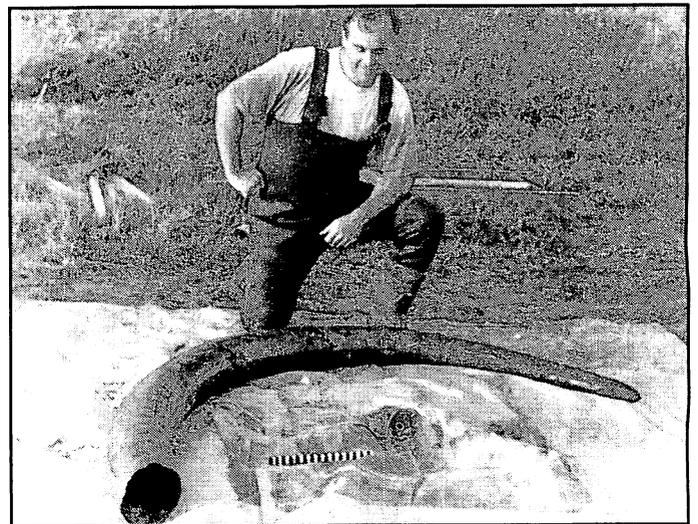
Now they had all the pieces for a complete tusk, weighing some 137 pounds and measuring 108 inches in length. Two other missing pieces of a tusk were found, matching the partial tusk found along with the skull earlier in the year.

As a result of these finds, the museum would have both tusks of this mastodon. At dusk it was necessary to call it a day — a successful day. More of this mysterious mastodon is still buried in the bottom of the canal, waiting for ISM amateur volunteers and professionals to return on a full-scale one- to two-week-long excursion to finish the story nature created some 12,000 years ago.

The only casualty — if it could be called a casualty — a skin irritation Ogden developed. It persisted for several days, resulting from his time spent covered with mud during his Sunday outing. And so one additional discovery was added to the trip: Dale Ogden has sensitive skin.



*Swann and Porter with two pieces of the mastodon tusk*



*Swann admiring the complete mastodon tusk from the day's collection*

## METHODS USED IN PREPARING AND PRESERVING YOUR FOSSILS

by Eric Kendrew

from *Bone Valley Fossil News*. Bill & Doris Prokopi, ed. 5-6/95

Many people ask me about preparing their fossils and how to preserve them. There are a few techniques used. But whatever works for you, is what you should stick with.

First, we must look at the state of preservation in which a fossil is preserved. Ask yourself, "Is the fossil you found hard, porous, disarticulated, or brittle? What type of minerals have replaced the structure of your fossil?"

Listed below are six different **EXAMPLES**, dealing with different states of preservation. Hopefully this will help you handle most situations.

### **EXAMPLE I:**

Certain mineral replacements react certain ways when exposed to the air and sun. The most violent reaction I have seen is fossils found in rivers where there is a lot of salt water intrusion. Once these fossils start drying out, they will start cracking and sometimes explode.

The best method here, of course, is to carry jars of fresh water with you. Then place your fossils directly in the jars once you have brought them out of their natural resting place. You should also change your water every day and rinse your fossils well with fresh water. Do this for about a week. Then, since your fossils are water soluble, use a water soluble solution for treating them. The best way is to use Elmer's Glue — 50/50 mixture with water. Make this up in a vat and place your fossils directly in it. Leave it for a few days. Then you can remove your fossils and let dry. The Elmer's glue will dry clear, and your fossils will be well preserved.

### **EXAMPLE II:**

Porous fossils, as well as disarticulated ones, require a lot of tender loving care.

**POROUS FOSSILS** means: very brittle and crumbly.

**DISARTICULATED FOSSILS** means: broken but in place (in situ), and a jaw or skeleton that may be

separated.

Of course, all these fossils will probably require a plaster jacket. Several methods can be used to seal these fossils in the field, before a plaster jacket is applied.

### **Method 1:** (The old method)

Used in many parts of the world today, it is a 50/50 mixture of shellac and alcohol.

### **Method 2:**

A 70% solution of acetone and 30% Butvar B-76.

### **Method 3:**

A 50/50 mixture of Elmer's glue and water.

### **Method 4:**

An agate sealer.

### **Method 5:**

A can of clear acrylic Krylon spray.

I have tried all these methods. They all work, but I prefer the acrylic Krylon spray. It's already mixed and comes in a spray can. Of course, the other sealers are also good. Just make sure you pre-mix them before going out in the field. **\*\*Caution: do not put your sealer in a glass jar — it might break!\*\*** Most paint stores carry empty cans for your needs. You will also need a cheap nylon brush. Once you have finished your work, your brush will become hard. But do not worry. As soon as you put it back in the sealer you're using, it will become soft and pliable again. Another cautionary step is when sealing a porous fossil, do not have your brush come in contact with this fossil. You will only pick up pieces of the fossil on your brush. Take your brush and use a slinging method when applying your sealer, or you can put your sealer in a squeezable bottle and squirt your sealer on your fossil.

### **EXAMPLE III:**

When collecting your fossils, leave the matrix (sand, clay, mud, rock, etc.) On your fossil. You do not have to leave a lot of matrix on your fossil — just enough to help protect it. This is nature's natural preservative. All sealers mentioned in **EXAMPLE II** will either soak through to your fossil or provide a coating on the

outside of the matrix. The matrix will also be helpful in determining the formation in which you found your fossil.

Make sure you write down all the information you can on where you did your collecting — like how many feet or meters from what road or nearest town. (Using a Topo [topographic] map, if possible, or a compass for direction is handy.) Remember, this information is more important than the fossil you have collected, and without it, you really have **nothing at all**.

#### **EXAMPLE IV:**

Once you return home with your fossils, you are ready to start preparation. Fossils found in a wet matrix need to go through a drying stage. Do not attempt to remove any matrix at this time. You can wrap your fossil with newspaper or stuff newspaper into your plaster jacket. The newspaper will absorb the water and allow the drying time to be cut in half.

Do not attempt to pull all your pieces out of your plaster jacket at one time. Your fossil will become disarticulated and you may forget where all the pieces went.

**Step 1:** Start at one end of your fossil and pull one piece out at a time. Clean the matrix off with a dental pick or any tool that works for you. Clean any excess sealer off with acetone. Then set aside.

**Step 2:** Then pull out the next adjoining piece. Do the same with this one as you did with the first. Then glue the two pieces together. Many glues work well. (Examples are: Butvar B-76 50/50 with acetone, Duco cement, Elmer's glue, hot glue gun, super glue, etc.) Again, use what works for you.

**Step 3:** Using a sand box for holding your pieces together, also works well. You can build the sand up around those odd shapes to hold them together while they are gluing. Then you are ready for your third piece. Continue **Steps 1, 2, and 3** until your fossil is completed.

(Do not discard your matrix. . . You will be

surprised sometimes when you look at it under a magnifying glass or microscope. Put it in a zip lock bag and label it with the same number as your fossil.)

**Step 4:** Now your fossil is ready for a good coat of sealer, or several coats. But do not overdo it. Too much sealer will become discolored and gaudy-looking.

**Step 5:** Label your fossil. Give your fossil a catalog number. On white or tan colored fossils you can use a non-washable black ink. On black or dark fossils you can use white-out to make a small rectangle. Then use black non-washable ink over the white-out.

#### **EXAMPLE V:**

Many fossils that are found are not always complete. They may be missing a distal end of a leg bone, a tip of a tooth, or a large area on the bone surface, etc. These fossils can be repaired by using certain fillers. If you have ever done body work on a car, it's nearly the same thing.

**Step 1:** For recreating a distal end of a leg bone: You can use a molding clay or plaster of Paris, 50/50 with paper mache first. Then apply fiberglass cloth over the clay or plaster of Paris. Fill in the rest of the area, once dried, with more plaster of Paris, sculpture mold, Bondo or a fiberglass filler or a water putty.

**Step 2:** For large surfaces: You can fill with plaster of Paris and fiberglass cloth and finish it off with Bondo or a fiberglass filler or a water putty.

**Step 3:** For connecting large legs or jaws, as from a mastodon: You will have to insert wire or some type of rod or pipe down the middle of the leg or jaw. I usually wrap fiberglass cloth around the wire, pipe or rod first. Then follow **Step 2**.

**Step 4:** For enamel surfaces: Bondo seems to work the best; a coat of primer, then a coat of enamel paint. The enamel paint will adhere well and give off a shiny look — just like the tooth.

**EXAMPLE VI:**

Now your fossils are ready for a sealer. Any of the sealers mentioned in this article will work. If you want to paint these filled-in areas, an acrylic paint is the one you should use. There are many colors on the market, and you can mix them to your desired color. Also, stains work well for those darker colors you need to match. If you use a lot of acrylic paint on large areas, make sure you use an acrylic sealer. All the other sealers will not soak through to your fossil and the paint will rub off. Enamel paint does not need a sealer.

These are all examples of how to prepare your fossils. There are a lot more ways than this. If you have a way you prepare your fossils now that is different from any of these mentioned and it works for you, please, by all means, stick with it!

One final point I would like to bring out to those new fossil buffs is that many of the fine quality fossils (at least 90%) that you see in museums, private collections and at fossil shows have taken many man-hours, and sometimes years, to prepare. You just don't find fossils that are not in need of cleaning and preparin

**WHAT IS TAPHONOMY**

by Jim Wyatt

from *The Fossil Record*. 10/95

via *Paleo Newsletter*. Jean Wallace, ed. 11/95

*It has been said that he who is a good 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 the 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 into 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 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 the 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 river's 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 systemic studies will determine information on social behavior, growth, reproduction, climatic influence and pathology within the community.

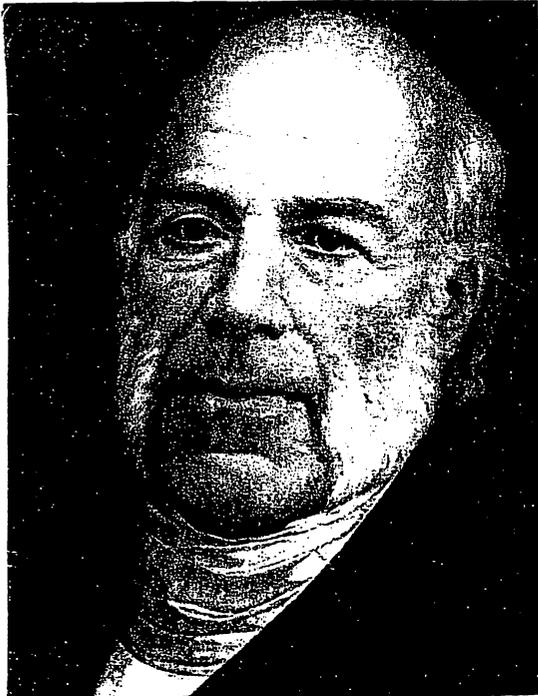
Problems still face every paleontologist when it comes to taphonomy. The Green River fish fossils of Wyoming died in the thousands. Two separate layers contain preserved fish in the ancient fossil lake, but the cause of death is debatable. Several theories have been offered: sudden inversion of cold 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.

**JOACHIM BARRANDE**

(1799-1883)

by Jim Konecny



Nineteen ninety-nine is the 200<sup>th</sup> anniversary of the birth of Joachim Barrande. Aside from a few trilobite aficionados, I doubt that very many amateur paleontologists know who this man was. Joachim Barrande was born on August 10, 1799, in southern France near the small town of Saugues. Early in his life his intellect was recognized, and after finishing his studies in Paris in 1824, he was known as a scholar in mathematics and the natural sciences. His reputation reached the French Royal Court, and he was called upon to tutor the young grandson of Charles X, Prince Henry Count Chambord.

The revolution of 1830 resulted in the expulsion of the Bourbons from France, and they left for exile in Scotland. Barrande, being faithful to the Royal Court, left with them. The Royal Court did not remain in Scotland very long; however, the stay was long enough for Barrande to become acquainted with Sir Roderick Murchison, the famous English geologist. At the time, Murchison was involved in the investigation of the Paleozoic sediments and fossils of England. This was apparently the beginning of Barrande's interest in paleontology.

Sometime in 1831 the Royal Court left Scotland and moved to Bohemia, settling in the capitol, Prague. (Note: The present Czech Republic was at that time part of the Kingdom of Bohemia. Hence the reference of the Czech lands and people as Bohemian.) Barrande's lofty position enabled him to meet many of the Czech scholars; among them was the paleontologist Kaspar Sternberg. Soon he began to spend more and more time studying the fossils in the area and became so absorbed in this field that in 1833 he dropped his tutorship in order to devote all his time to paleontology. Also, at this time he became the administrator managing the property of Count Chambord. This position gave him both time and money to pursue his desired study.

From 1840-1846 he traveled throughout Central Bohemia, employing quarrymen to collect fossils for him. In those times it was common for quarrymen to collect and sell fossils to augment their meager wages. In 1852 his first work, *Système Silurien du Centre de la Bohême*, was published. The accuracy of his descriptions and perfection of his drawings was heralded by the scientific community. He followed this work by publishing on various phyla, starting with trilobites and continuing with crustaceans, cephalopods, brachiopods and bivalves. A total of 22 volumes was published, comprising over 6,000 pages and 1,160 lithographic plates. The number of species described totals 3,557. The last volume was published when he was 82 years old. He was also the first to describe and illustrate the ontogenetic stages of trilobites. In the species *Sao hirsuta* he pointed out that the shape of the carapaces of juveniles differs from that of adults by showing the various configurations during ontogeny.

Barrande also prepared material, describing 1,500 additional species — crinoids, bryozoans, gastropods, corals and miscellaneous organisms. This work was published after his death. He died in a town near Vienna on October 5, 1883. In his will Barrande not only designated the person who should continue his work, but he also left him the financial means to do so.

His work in the lower Paleozoic was monumental for the time. The Czech government has honored him by naming a district in Prague after him — Barrandov.

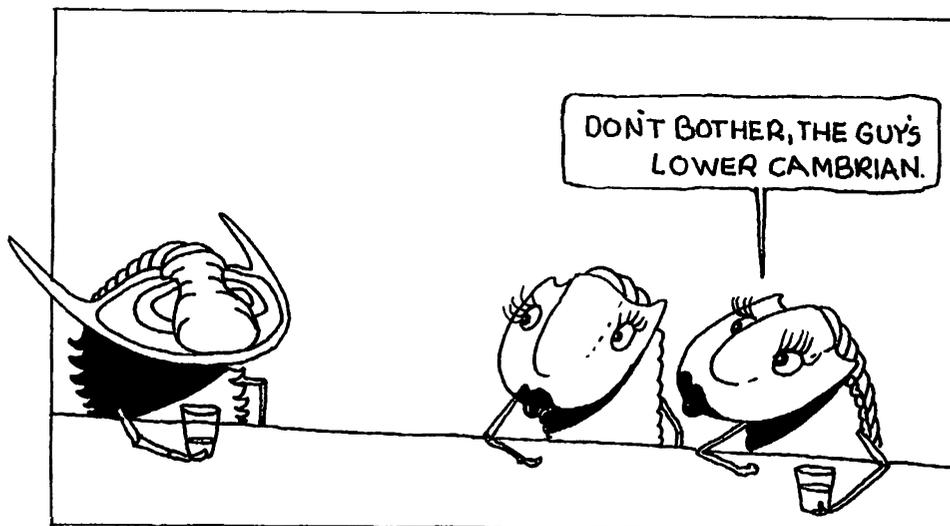
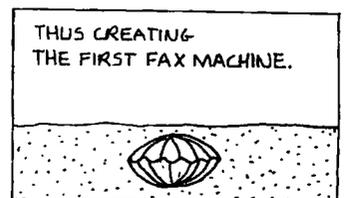
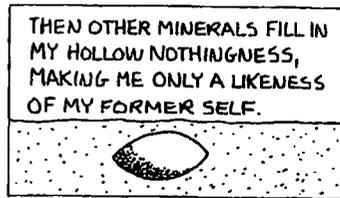
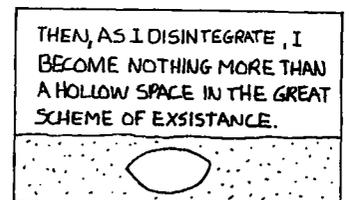
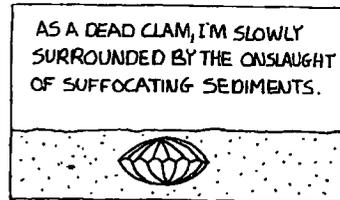
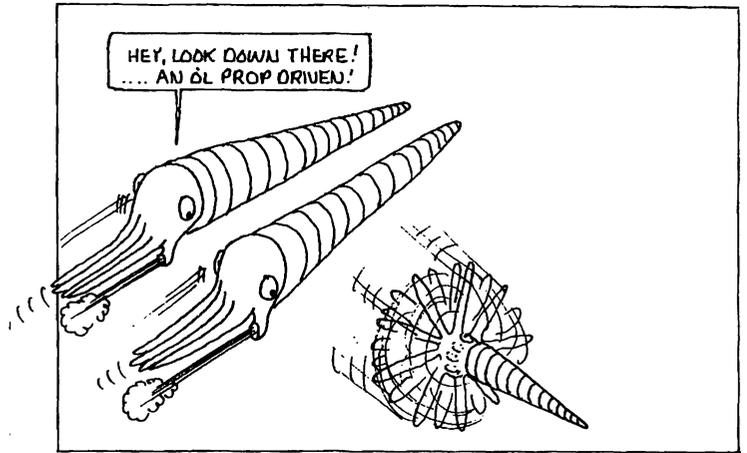
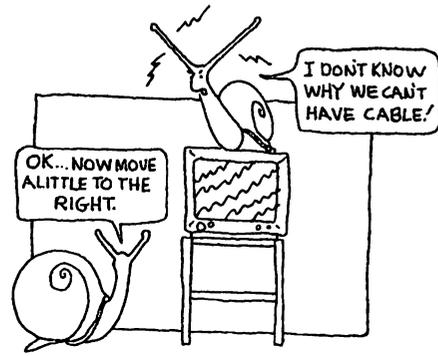
**FIRST FAMILIES—A PRIMITIVE VIEW**

by Larry Steinrock, James E. Conkin & Barbara Conkin  
 Hycliffe Publishing, P.O. Box 7434, Louisville KY 40207-0434  
 \$7.95 plus shipping  
 review by Alan Goldstein, Jeffersonville, IN

I was a big fan of Gary Larson's *The Farside* cartoons. The way he poked fun at the sciences and the human-spin on non-human subjects was my type of humor. Alas, Gary retired from that career to head in another direction. Of course, as most *Farside* aficionados know, Gary poked fun at dinosaurs and their paleontologists—leaving the invertebrate fossils to fend for themselves. How many scientist have copies of *Farside* cartoons attached to office doors, bulletin boards and office furnishings?

This collection of cartoons assembled by Larry Steinrock, James E. Conkin & Barbara Conkin fills the void left by the retired Larson. Worms, starfish, crinoids, trilobites, clams, cephalopods—even sponges—find themselves being the objects of rather dry humor in an aquatic environment. I can imagine many of these being taped to the walls of biologists' and paleontologists' offices! Bryozoan and brachiopod-lovers may be disappointed, but the other phyla are well-represented.

Many of the cartoons can be used in an educational setting to promote the discussion of what we know about fossils, evolution, and lifestyles of the rich and boneless. The artwork is simple but accurate; the text is generally Spartan—the humor is imaginative. What more could you want in this type of book?



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**FEATHERED, FLYING DINOSAUR LINKS ANCIENT LUMBERING LIZARDS TO TODAY'S GRACEFUL BIRDS**

source: Recer, Paul. Researchers find fossils of primitive flying dinosaur: Prescott, AZ Daily Courier. 10/17/99

One of the recently discovered feathered fossils from China is the first dinosaur found to be capable of flight. The 120-140-million-year-old *Archaeoraptor liaoningensis* was the size of a small turkey. It had a full set of feathers; its hands formed part of the wing structure; and its shoulder girdle and breast bone resembled that of modern birds. It had hollow bones that were strong but light enough to enable it to fly. Its tail was long and stiff, which helped it maneuver in flight, but also indicated it would not have been a good flier.

Two other dinosaurs from the collection unveiled in Washington resemble birds. The *Sinornithosaurus millenii* (Chinese bird-reptile of the millennium) was similar in size to the *Archaeoraptor*. It also had bird-like features and short downy feathers. However, it was probably not able to fly.

The third animal was about 7 feet long and also was probably flightless. It appears to have had stiff, narrow feathers that helped keep it warm.

All three specimens are theropods, the group that includes T. rex. Findings by the scientists (including Phil Currie) who analyzed the fossils suggest that even T. rex may have had feathers at some point in its development. Perhaps the hatchlings were covered with a coat of down that was shed as they grew.

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dlwhitney@worldnet.att.net

Interested in Cambrian and Paleozoic invertebrates.

**THESE ARE A FEW OF MY FAVORITE TEETH\***  
sung to the tune "These Are a Few of My Favorite Things"

sent by Donald S. Miller

*(This appeared in a display at the Delaware Valley Paleo Society (PVPS)  
Fossil Fair in February)*

*If Julie Andrews had been studying to be a paleontologist instead of a nun  
in The Sound of Music, perhaps the title and words to this popular song  
might have been different.*

Elephants and ground sloths, hippos and rhinos,  
I collect fossil teeth; even some dinos.  
Eaters of leaves and eaters of meat,  
These are a few of my favorite teeth.

Bear-dogs and horses, tapirs and llamas  
Surely delight kids, daddies and mamas.  
I have no interest in vertebrae or feet,  
But these are a few of my favorite teeth.

When the Dire wolf bites,  
When the ray stings,  
When I'm feeling sad,  
I simply remember my favorite teeth,  
And then I don't feel so bad.

\* from The Sound of Mammoths

The Mid-America Paleontology Society (MAPS) was formed to promote popular interest in the subject of paleontology; to encourage the proper collecting, study, preparation, and display of fossil material; and to assist other individuals, groups, and institutions interested in the various aspects of paleontology. It is a non-profit society incorporated under the laws of the State of Iowa.

Membership in MAPS is open to anyone, anywhere who is sincerely interested in fossils and the aims of the Society.

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MAPS meetings are held on the 2nd Saturday of October, November, January, and March and at EXPO in April. A picnic is held during the summer. October through March meetings are scheduled for 1 p.m. in Trowbridge Hall, University of Iowa, Iowa City, Iowa. One annual International Fossil Exposition is held in April.

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