M·A·P·S Digest

Official Publication of
Mid-America Paleontology Society

Volume 26, Number 7 & 8
October-November 2003

A LOVE OF FOSSILS BRINGS US TOGETHER

MARK YOUR CALENDARS

Jan 10: MAPS MEETING
Trowbridge Hall, University of Iowa, 123 N. Capital St. Iowa City, IA. Main Lecture Room, #125.
1:00 Board and General meeting
2:00 Program: "Jane" the Dinosaur, presented by Michael Henderson, Director of Earth Sciences from the Burpee Museum in Rockford , Illinois
http://www.burpee.org/janeteam.htm
http://www.burpee.org/index.htm

Feb 14: MAPS MEETING
Trowbridge Hall, University of Iowa, 123 N. Capital St. Iowa City, IA. Main Lecture Room, #125.
1:00 Board and General meeting
2:00 Program: "Herbarium Specimens: A Vital Link to the Natural World" presented by Diana Horton - curator of the vascular plant and bryophyte portion of the herbarium.

The University of Iowa herbarium is a repository for dried and fossil plant specimens from all over the world but the primary focus is Iowa and North America. There are approximately 175,000 collections of vascular plants, 80,000 bryophytes and 5000 fossils. This herbarium is larger than 92% of nearly 600 herbaria in the U.S. and houses the only major collection of bryophytes and fossil plants in the state. We will be allowed to look at the collection, which is in danger of being moved from Iowa City due to budget cuts. Iowa is not alone in facing the threat to university natural science collections - the chancellor at the University of Nebraska has announced the elimination of several collections and all research divisions at the state museum (and, yes, it did affect their paleontology department). For an update on another threat to our hobby and a chance to see a great fossil plant collection - be sure to attend.

http://www.cgrer.uiowa.edu/herbarium.
http://www.aibs.org/biosciencelibrary/vol53/jun03ww.html

Mar 26-28, 2004: MAPS NATIONAL FOSSIL EXPOSITION XXVI – Paleo Techniques: Discover, Develop, Display
Western Illinois University, Western Hall, Macomb, IL
Fri., Mar 26 8 am - 5 pm—Keynote Speaker @ 7:30
Sat., Mar 27 8 am - 5 pm—Meeting & Live Auction @ 7:00
Sun., Mar 29 8 am - 12 noon
Information will be included in the December 2003 issue.

ABOUT THE COVER

Sent by Bruce Stinchcomb

Ozark Trilobite
Stenopilus latus
Eminence Formation
Potosi "mini" – lagerstatten
(See MAPS Digest Vol 24, No. 4 2001)
Approximately 1.5"
(See other photos in next column and on page 16.)

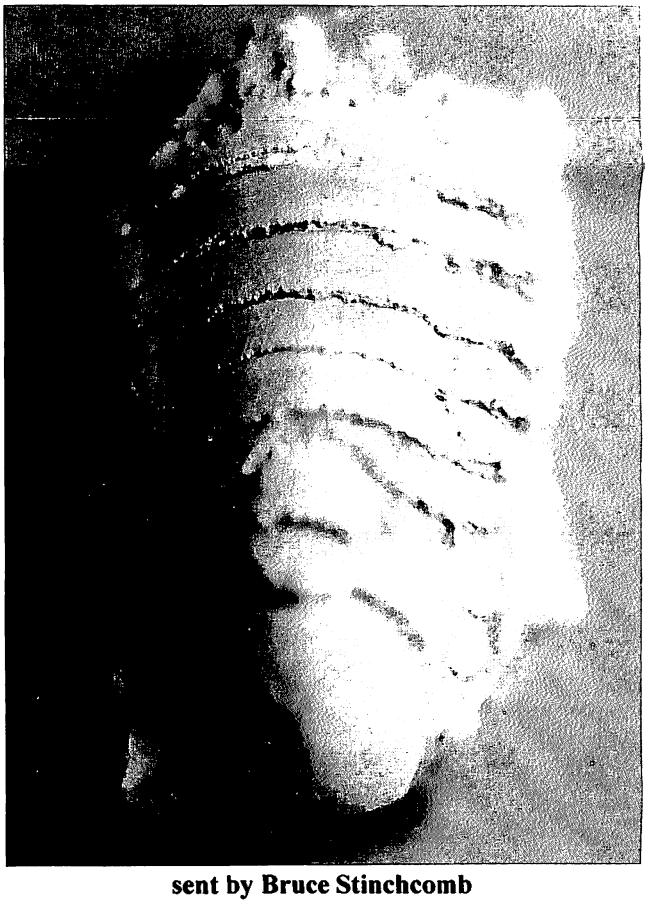
2003/10 & 2003/11 DUES ARE DUE

Are your dues due? You can tell by checking your mailing label. It reflects dues received by November 30. The top line gives the expiration date in the form of "year" followed by "month" – 2003/10 means 2003/October. 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 issues before dropping them from our mailing list.

Please include on your check 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



sent by Bruce Stinchcomb
Headless trilobite
Stenopilus sp.
Eminence Formation
Potosi "mini" lagerstatten
Potosi, MO
Probably a molt!

REMINDER: 2004 EXPO TO MOVE TO WESTERN HALL (WIU GYM)

MAPS Expo will move from the Union at Western Illinois University to Western Hall for the 2004 show. Several factors influenced our decision to move the show: the Gym is 234' x 116' while the Union is 146' x 74'; wiring and lighting are better at the Gym; the Gym offers ground floor unloading and free parking; the auction and programs can be held in an adjoining ground floor room; and there is a food stand in the adjoining room.

Please pass the word to anyone you know who attends Expo. The Union will advertise the change with an electronic sign during at the Union during the show.

As a result of the move, the table limit will be raised to TEN per membership. The table fee will be $15 for the first two tables and $30 for each additional table up to the limit of ten.

CORRECTION ON APRIL-MAY '03 (Vol.26 No. 4) MAPS DIGEST COVER

by B.L. Stinchcomb

The "ammonite" in the upper right of Gil Norris's ammonite exhibit, *Hercoglossa* sp., is not an ammonite. It is an aberrant nautiloid. *Hercoglossa* is an "index" fossil for the Paleocene and occurs locally in abundance in the Paleocene Midway "Limestone." Some nautiloids possess slightly sutured chambers; one of these is *Hercoglossa.* The species illustrated is probably *H. ulrichi*, named after E. O. Ulrich (1881-1944), a noted American paleontologist-stratigrapher. *H. ulrichi* can occur locally in abundance in some of the counties which border the Alabama River in Alabama. It might be noted that ammonites do not go into the Cenozoic Era. They are one of the fatalities of the Mesozoic extinction event at the K-T (Cretaceous-Tertiary) boundary. The nautiloids, like *Hercoglossa*, do continue into the Cenozoic and are present today (Nautilus).

PROCEEDINGS OF THE BOARD October 11, 2003

EXPO: Gil Norris will block rooms at the Union, to be held until March 1.

Marc Behrendt's floor plan was reviewed and discussion about table limit and cost of tables followed. Gil made a motion to:

Sell the first 2 tables for $15 each.
Any tables over 2 will sell for $30 each.
Limit the tables to 10 per membership.

Karl Stuekerjuergen seconded and the motion carried.

Displays will be welcome.

We will ask dealers to let us know *with their* registration if they are leaving before the close of the show on Saturday at 5:00 so the floor can be arranged in such a way that it does not have big holes in it from people leaving early.

SLATE OF OFFICERS: The following slate was set for elections at the next meeting:

President:	Karl Stuekerjuergen
1st Vice President:	Dale Stout
2nd Vice President:	Gil Norris
Secretary:	Doug DeRosear
Treasurer:	Sharon Sonnleitner
Editor	Andie Carter
Director to 2006	Allyn Adams

Continuing on the Board are:

Immediate Past Pres.:	Marv Houg
Director to 2004:	Blane Phillips
Director to 2005:	Alberta Cray

DAVID JONES GRANT: Following the meeting, Julie Golden, retiring curator of the University of Iowa Repository, reported on the progress she and new curator Tiffany Adrain have made on the fossil identification project they are developing for the David Jones grant.

POTTER FARM FORMATION
FOSSIL COLLECTION LOCATION
BAGLEY ROAD
ALPENA, MICHIGAN

By Joe Kchodl, Midland, Michigan

Periodically I'll be reviewing some fossil collecting localities that I've had the pleasure of digging in. Most are pretty easy to dig, accessible and very productive for different types of fossils. If you're in the neighborhood and can drop in, they are a pretty good way to spend a productive fossil collecting day. I'll provide contact information if such contact is required along with directions to the sites.

Some sites are in danger of being lost forever. As civilization encroaches on these locations, the rush to excavate becomes almost a quest. Many locations have already been lost and more are being lost yearly.

Amateur or professional – take the time to visit your local fossil sites often. It is a wonderful way to spend some time outdoors, spend time with your family doing a fun activity and who knows, you may discover something new and exciting. Remember, many of the spectacular finds that have been made throughout history, have been made by amateurs. This is by no means an explanation as to the stratigraphy of the formation. Merely, it is only a brief review of the formation as a collecting location.

Digging, rather picking, through the sediments in the ditch at Bagley Road

During the Devonian Period, about 350 million years ago, the area of Northern Michigan was a shallow salt-water tropical sea. The sea was teaming with life. However the landmasses were not as we know them today. There was a great deal of volcanic activity. Mostly primitive plants and mosses sparsely populated the land. The limestone bedrock of this area was formed by billions of creatures that grew lived, died and fell to the sea floor. Huge coral and Bryozoan colonies, the reef builders, grew on the shallow sea floor. Millions of years of such deposition created the hard limestone that is being quarried today in the Lafarge, Paxton and other quarries and serves as the bedrock for that area. Interspaced between the layers of limestone there may also be found deposits of a light gray shale and clay. These bands of clay can be very fossil rich. Sporadic periods of silting and turbidity caused occasional local mass extinction events as slurries of mud, sand, dirt and ash washed into the shallow seas. These events formed the shale and clay found today. The fossils within these sediments are very well preserved and can be easily removed or even found completely free of matrix. Brittle fossils such as crinoids and trilobites did not withstand the millions of years as they either disarticulated prior to fossilization during the depositional event or were broken apart in the intervening years as they were exposed.

About 2 million years ago, during the Pleistocene, glaciers formed in

the far north of what is now Canada. These continental glaciers began their slow, methodical sweep southward and scraped the surface sediments down to what we see today. Actually three major periods of severe glaciations occurred that formed what we now see as northern Lower Michigan.

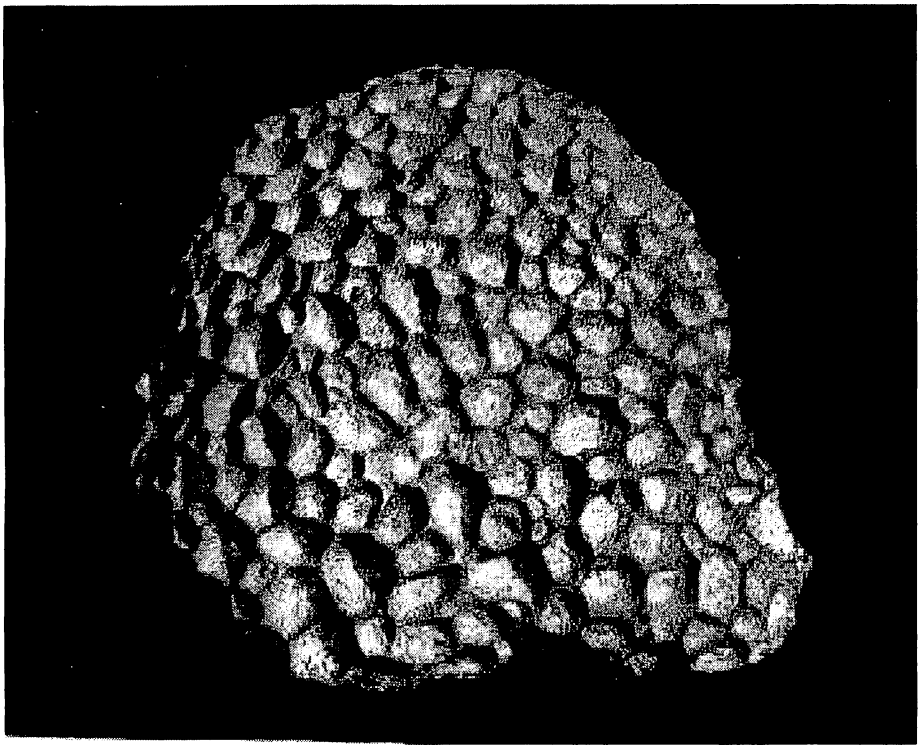
The Potter Farm formation is part of the Traverse Group, a group of Limestone's laid down during the Devonian Period. The formation is sandwiched between Norway Point Formation (below) and Thunder Bay Limestone (above).

The Potter Farm formation has not been studied in the manner other formations have been. There is not much published data on this outcropping although several people have been studying the locations, removing fossils and beginning the long process of documentation. Rominger first saw several exposures and described the formation found on the hillsides of the Thunder Bay River in 1876. Rominger and Grabau (in 1902) studied the formation at Stony Point. In 1927, Ver Wiebe accomplished additional work documenting the formation. *In 1935* Warthin and Cooper named the formation after the F. N. Potter Farm west of Alpena.

Further erosion over the last 15,000 years, since the last Ice Age, has exposed several areas where the Potter Farm formation is exposed for collection. Outcroppings of the Traverse Group, the group in which the Potter farm lies in, were exposed thanks to the glacial activity in the past.

One specific part of the Potter Farm Formation described by Warthin and Cooper (1943) is a thin 2 to 3 foot layer of gray shale found sandwiched between two limestone layers. This is the specific part of the formation exposed at Bagley Road. There is some discussion as to whether this layer actually belongs to the Potter Farm Formation or the Thunder Bay Limestone.

There are other outcroppings of the Potter Farm however I have not personally visited them. If you can find a copy of ***Devonian Strata of Alpena and Presque Isle Counties, Michigan*** George M. Ehlers and Robert V. Kesling 1970, make every attempt to obtain it. It is a wonderful publication listing many sites in the area along with stratigraphical data as well as types of fossils that may be found there.



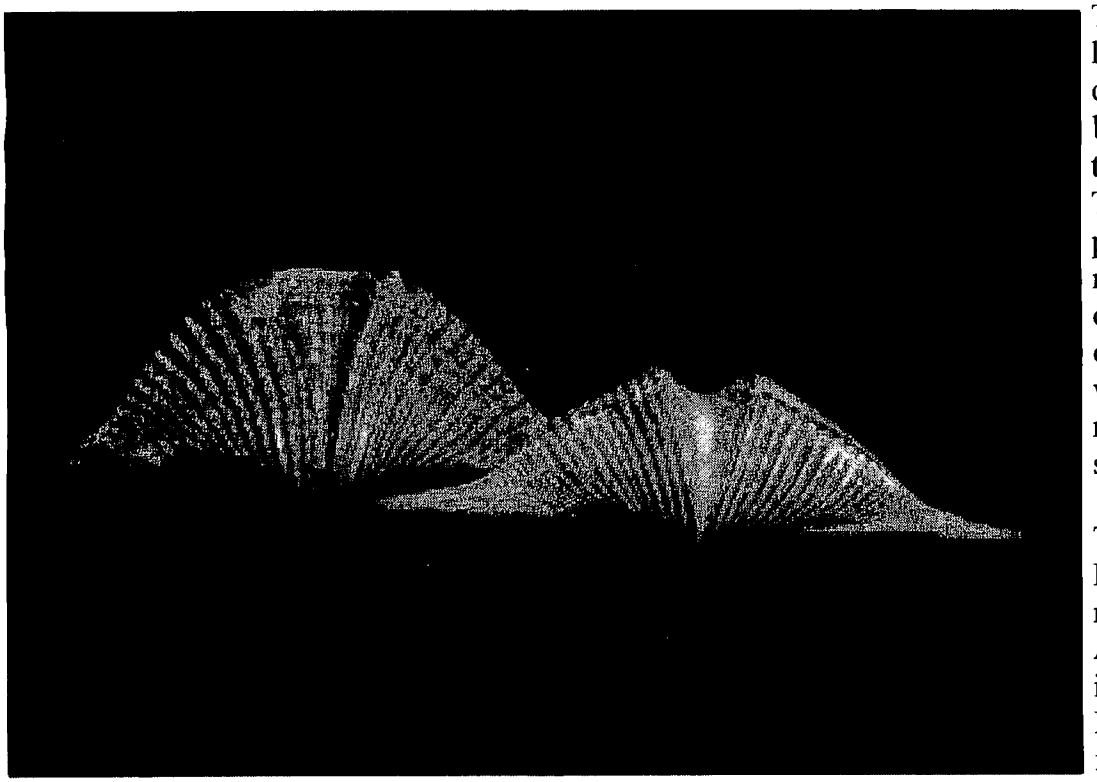
Exceptional coral head from the Potter Farm Formation – as found.

To get to this northern Lower Peninsula fossil location travel north on Route I – 75 until you reach Standish, Michigan. Exit at Standish Route 23 north. Continue along Route 23 north through the wonderful towns of Au Gres, Tawas, and Oscoda. Continue on Route 23 into Alpena. As you pass near Thunder Bay you will see outcroppings of Thunder Bay limestone. Partridge Point, another collecting location, mainly for corals, is on the shore of Lake Huron. Continue along 23 north into town. You will come to the intersection of Ripley Boulevard. Turn left onto Ripley Boulevard. Continue north on Ripley to West Washington Street that is also M – 32. Turn left on West Washington, M – 32. Follow the road as it

winds around Lake Besser. You'll pass Evergreen Cemetery and at the next intersection, Bagley Road, turn right. You'll notice a Wal-Mart in the area, a small shopping center, a water tower and many other business developments there. (I am afraid that this location may be on the endangered locations list as the area is rapidly developing. Drive just a short way north on Bagley Road and you'll see the County Highway department on the left side of the road and a State Park picnic area on the right just before the bridge over the river. You will also see a dirt road, Burkholder Drive on the north side of the highway department. Pull into the picnic area, park and you are there. Cross back over Bagley Road on foot to the intersection of Bagley and Burkholder. Make sure you have a bucket or some receptacle for fossils, enter the ditch, look down and start picking up thousands of fossilized treasures.

The brachiopods are beautifully preserved. On many occasions I have found "brachiopods on the half shell" These are halves of the brachiopods. They are so well preserved that in some cases the other half of the shell is right next to it. I have found exceptional mucrospirifers, coral heads, bryozoan colonies in that location. In some spots in the ditch you can see entire coral heads several feet in diameter. One can only begin to imagine what happened here over 350 million years ago.

There are many other sites nearby, the 4 Mile Dam site is also fairly rich. If you travel over the river on Bagley turn left on Long Rapids Road and follow that a short distance, you'll see outcroppings of 4 Mile Dam Formation and Norway Point formation.



2 of the species of Mucrospirifer found at the Bagley Road site. Notice the exceptional preservation. No cleaning or matrix removal necessary.

The fossils are not very large many are fragments of crinoids, corals and bryozoans, also literally thousands of brachiopods. The fossils are beautifully preserved and need no matrix removal. Get down on the ground and look close. You'll be amazed at what you'll see. The sheer number of fossils found is staggering.

The Norway Point Formation is also especially rich in fossils. North of Alpena, along the lakeshore is an abandoned quarry. Rockport Quarry is also a fairly rich site. In short, in the entire area around Alpena up to Rodgers City, along the lakeshore and inland, there are exposures of Devonian sediments just waiting to be explored.

Listed below are fossils found in the Potter Farm Formation. This has been excerpted from ***Devonian Strata of Alpena and Presque Isle Counties, Michigan***, Michigan Basin Geological Society, Guide Book for Field Trips, George M. Ehlers and Robert V. Kesling 1970 p 96.

Cylindrophyllum hindshawi Ehlers & White
Cylindrophyllum panicum (Winchell)
Cystiphylloides cf. aggregatum (Billings)
Cystiphylloides (?) amalgamatum Stumm
Cystiphylloides petoskeyense Stumm
Cystiphylloides potterense Stumm
Disphyllum compactum Ehlers & Stumm
Hallia vesiculata Sloss
Heliophyllum halli potterense Stumm & Tyler
Heliophyllum rotatorium Stumm & Tyler
Heliophyllum tenuiseptatum tentaculum Stumm & Tyler
Heterophrentis curviseptata Stumm
Spongophyllum alpenense Ehlers & Stumm
Sterolasma petoskeyense Sloss
Synaptophyllum crassiseptum Ehlers & Stumm
Tortophyllum magnum Stumm
Alveolites subramosus Riminger
Dolatocrinus grabaui Kirk
Aulocystis alpenensis Watkins
Aulocystis parva Watkins
Favosites romingeri patella Swann
Favosites romingeri romingeri Swann
Favosites romingeri romingeri pisum Swann
Pachyphragma erectum Rominger
Chonetes ensicosta Imbrie
Cranaena aff. amygdaloidea Cooper & Cloud
Pentamerella papilla Imbrie
Pentamerella petoskeyensis (Imlay)
Strophodonta crassa Imbrie
Strophodonta elongata Imbrie
Strophodonta potterensis Imbrie
Pleurotomaria alpenensis Ehlers & Hussey
Codaster alatus Reimann
Lipsanocystis oblatus Stumm

Additional species listed as being found in the Potter Farm Formation from Appendix 4, p 113, SPECIES OF *MACROFOSSILS* RECORDED FROM THE TRAVERSE GROUP (column PF -Potter Farm) of the above noted publication.

TETRACORALLA
Aulacophyllum hemicrassatum Sloss
Tabulophyllum traversense (Winchell)
Bethanyphyllum geniculatum Rominger
Tortophyllum cysticum (Winchell)

TABULATA
Alveolites subramosus Rominger
Emmonsia alpenensis Stumm & Tyler
Favosites alpenensis tenimuralis Swann
Favosites placentus Rominger
Tracypora lineata Stumm & Hunt
Tracypora proboscidialis (Rominger)
Aulocystis cooperi (Watkins)
Favosites alpenensis alpenensis (Winchell)
Favosites mammillatus Stumm & Tyler
Tracypora alternans Stumm & Hunt
Tracypora ornata Stumm & Hunt

BRACHIOPODA - ARTICULATA
Cranaena aff. amygdaloidea Cooper & Cloud
Mucrospirifer latus (Grabau)
Spinulicosta mutocosta Imbrie
Mucrospirifer attenuatus (Grabau)
Mucrospirifer profundus (Grabau)
Truncalosia gibbosa Imbrie

CRUSTRACEA - TRILOBITA
Crassiproetus alpenensis Stumm
Phacops iowensis Delo

MULLUSCA - GASTROPODA
Pleurotomaria alpenensis Ehlers & Hussey

Since the writing of the field trip guide in 1970 by Ehlers and Kesling, I am sure many other species have been discovered there. I have noted several additional species I have found, not noted in the above referenced publication. Brachiopods Atrypa, Athyris, and Crytina. I have also sifted the sediments with a sieve and found at least three-dozen perfectly clean and preserved tentaculites some smaller than a pencil lead along with some other interesting finds. An acquaintance of mine has also discovered several other species including a fossil fish armor plate.

Good luck hunting this location. It is very fossil rich and a treasure trove of wonderfully preserved fossils. It is a great location to take the family to as well as for new fossil collectors. The collecting is easy and lots of fun.

SOME WEIRD ECHINODERMS OF THE CINCINNATIAN

Compiled by Colin D. Sumrall

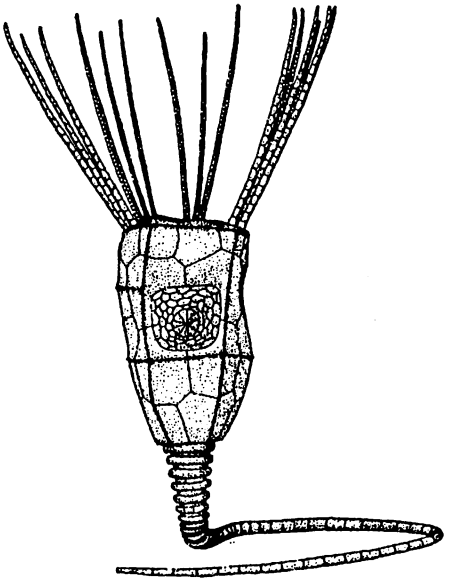
A publication of the Dry Dredgers, An Association of Amateur Geologists and Fossil Collectors
(Printed with Permission)

Echinoderms are one of the most diverse groups of marine animals that today includes starfish and sea urchins. Most members of the phylum have five-part symmertry, although there is some variation. Echinoderms had a flowering of diversity in the Early Ordovician, and worldwide there are more than 21 classes known. In the local Cincinnatian, however, there is a surprisingly low diversity with only seven classes present, including crinoids, edrioasteroids, starfish, brittle stars, Glyptocystitid Rhombiferans, stylophorans, and cyclocystoids. Crinoids and edrioasteroids are familiar to most local fossil collectors and are relatively common fossils in this area. Although rare, starfish and brittle stars are common in the oceans today. Glyptocystitid rhombiferans, stylophorans, and cyclocystoids, however, are very rare fossils locally, and a sharp eye should be kept out looking for them.

All echinoderms have a skeleton composed of a large number of elements called plates, and each plate is a single crystal of the mineral calcite. When the animal dies, these plates tend to fall apart, leaving a pile of debris. Generally, if one finds a whole echinoderm, it must have been preserved by being buried alive. The body is typically called a theca, and the animals feed with "arms" called ambulacra.

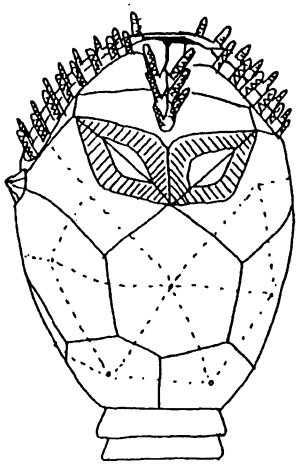
Glyptocystitid Rhombiferans

Glyptocystitid rhombiferans, commonly called cystoids, are common fossils locally in the Cincinnatian. They are characterized by a body, or theca, that has 19-20 plates, long thin feeding appendages called brachioles arising from the ambulacra, and a short flexible stem. Typically only the theca is found as the brachioles and stem quickly fall off after death of the animal.



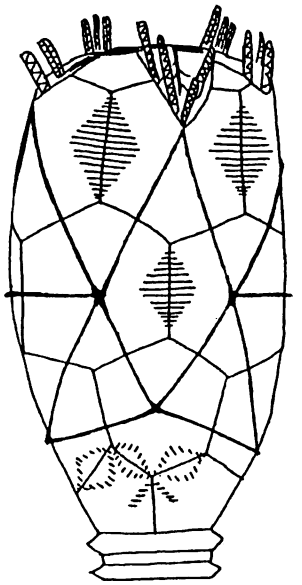
World-wide, this is a very important group of echinoderms, but in Cincinnati there are only two species each known from only a few rock beds.

Lepadocystis moorei



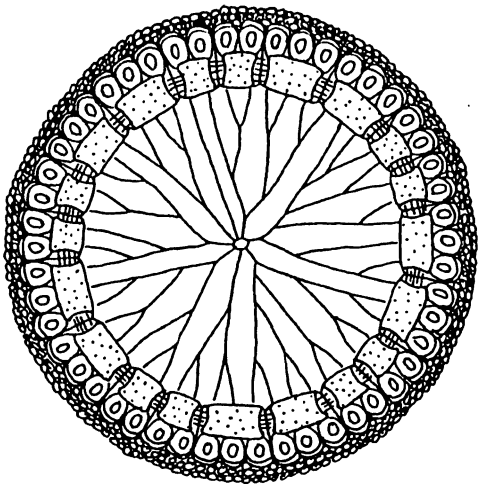
This glyptocystitid is known from several hundred specimens found mainly in the Upper Whitewater Formation and Elkhorn Formation. It is a small gyptocystitid characterized by very weak ridges on the thecal plates, five diamond-shaped series of holes called "pore rhombs", and long ambulacra that extend onto the theca.

"*Cheirocystis fultonensis*"



Although not yet formally described, this glyptocystitid has been known form many years. It is characterized by a large number of diamond-shaped series of holes called "pore rhombs" and plates with large ridges. This species is known only from a few beds in the Point Pleasant Formation and Lower Kope Formation.

Cyclocystoids

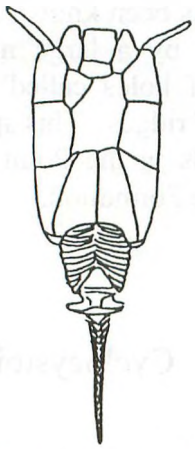


Zygocycloides magnus

Cyclocystoids are one of the rarest of Cincinnati's echinoderms. They are characterized by a ring of heavy plates that have small bumps around the outside and a middle portion that has radial lines. Unfortunately, they are small (about the size of a penny) and delicate. Typically all one finds preserved is the ring of plates.

Although there are more than five species of cyclocystoids in the Cincinnatian, the most common is *Zygocycloides magnus* characterized by having a ring of 20 plates that alternate two big, two small.

Styloporans



Enoploura popei

Stylophorans are one of the rarer echinoderms in the Cincinnatian. Unlike most other echinoderms, they have one ambulacrum instead of five. Stylophorans are characterized by a feeding/locomotory appendage called an "aulacophore" and a somewhat flattened body. Opposite the aulacophore are two antenna-like appendages of unknown function. Although rare, two species are known from the local Cincinnatian: *Enoploura balanoides* and *Enoploura popei*, and locally isolated plates can be extremely abundant.

AMERICAN LION FOUND AT HOT SPRINGS MAMMOTH SITE

Summary of: "Mammoth-site scientists unearth ancient lion bone" by Dan Daly
In Rapid City Journal, Rapid City, SD. 8/23/03

A bone found this past summer at the Mammoth Site in Hot Springs, South Dakota, shows the state was home to the American lion. *Panthera leo* was a giant cousin of the African lion. Although the animal is known to have ranged from Alaska to Peru, the big humerus is the first lion bone found in South Dakota.

Now extinct for over 10,000 years, the American lion was the second-largest carnivore of its time. Males averaged 500 pounds. Only the short-faced bear, also found at the site, was larger.

Paleontologist Larry Agenbroad, who has headed Mammoth Site research since the first bones were uncovered in 1974, first thought the unusual bone belonged to a bear. When he could not make the connection with the giant short-faced bear, he asked for a lion sample from the La Brea Tar Pits. Half an hour after the sample arrived, he had matched it to the Mammoth Site bone.

The bone is thought to belong to a male lion. While only the upper front leg bone has been found so far, Agenbroad believes the rest of the lion is buried nearby. He expects to recover the whole animal.

The Mammoth Site dates back more than 26,000 years. At that time it was a warm-water sink hole that trapped perhaps as many as 100 mammoths. The lion probably was drawn to the sink hole to scavenge on the carcasses.

Evidence suggests American lions traveled and hunted in groups, so it is possible bones from other lions may also be unearthed in Hot Springs.

Lion bones have been found in 40 other locations in North America, including Wyoming, Idaho, Colorado and Nebraska.

The Mammoth Site is open to tourists, who can watch as scientists dig. Only 40 percent of the site has been excavated, so there may be many more exciting discoveries in the future.

MESOZOIC PLANTS

By Stan Balducci, Mechanicsville, Virginia
Previously published in Fossil News

Plants, especially non-flowering ones, evolved rapidly during the Mesozoic Era. Some have survived with little change until the present, although many others were overtaken by the flowering plants which appeared toward the end of the era. Ginkgos first appeared 150 million years ago and became common in the Mesozoic era. They are gymnosperms and produce seeds without a protective covering. One species, *Ginkgo biloba*, survives as a "living fossil" today.

Certain characteristics enabled early plants to invade and become established on land. Internal vessels called vascular tissue circulated nutrients and water to all parts of the plant. An outer layer of waxy cuticle was developed to prevent drying out. The stomata located on the undersurface of leaves open and close to allow a plant to breathe. Roots provide anchorage and nutrient uptake. Finally, spores and seeds ensure the continuation of the species.

Four groups of plants dominated Triassic and Jurassic landscapes. The dominant understory plants were ferns, which included a variety of foliage types. A middle story of plants was quite diverse, including tree ferns, seed ferns, cycads, and cycadeoids. Cycads have a stem or trunk that commonly looks like a large pineapple and is composed of the coalesced bases of large leaves. The leaves break off as the plant grows, leaving a cluster of sturdy bases surrounding the stem. The leaves are large and palm-like, growing in a cluster at the tip of the stem.

Foliage of cycads and cycadeoids is abundant in Mesozoic strata. Because they are among the commonest compression-impression fossils found, the Mesozoic is also known as the "age of cycadophytes" (as well as the "age of reptiles☺.

The extinct order Cycadeoidales is a mysterious group of Mesozoic gymnospermsthat disappeared from the fossil record during the Cretaceous. Like the cycads many cycadeoids have trunklike stems that are unbranched or sparsely branched and clothed in spirally arranged persisten leaf bases. The fronds borne by plants of both orders are highly similar in appearance.

The upper story of Triassic forest was formed by a variety of conifers. These had distinctive patterns of cells in the wood that permit us to ally them with primitive living conifers called araucarians. The Norfolk Island pine is an example that is commonly grown as an indoor houseplant.

Although the fossil record of conifers and taxads is difficult to interpret, it is clear that they reach their maximum diversification during the Mesozoic.

The ginkgos also made up Mesozoic landscapes. These gymnosperms are small to large and are slow-growing trees. Each individual is either male or female, bearing small reproductive structures of one sex or the other. The leaves are quite distinctive, having a fan shape with parallel veins and the outer margin split or entire. Ginkgos were very common during the Mesozoic all over the world.

The major evolutionary innovation of plant communities during the late Mesozoic was the appearance and rapid radiation of the flowering plants, the angiosperms. By the beginning of the late Cretaceous period, angiosperms were abundant on a worldwide bases. The evolution of petals or distinctive smells and nectar to attract insects can be viewed as part of the selective process that led to the evolution of more complex flowers. The advent of flowering plants during the Cretaceous led directly to the tremendous increase in abundance and variety of living insects. Many species of flies, beetles, bees, wasps, and butterflies have life cycles that are controlled by and dependent on specific kinds of flowering plants.

By the late Cretaceous period agiosperms had become the most diverse and floristically dominant group as evidenced by the composition of numerous

macrofossils and pollen floras.

The following lists some of the common plant genera of the Mesozoic era:

Equisetites – These small horsetails had ribbed stems, with spores present in terminal cones. Individual leaves were jointed, linear, or grasslike, with up to 30 per whorl. Scale leaves clothed the base of the leaf. The plant spread by underground stems and tubers. Equisetites lived in wetland conditions. Its tubers are often found in fossil soils. Typical height 20".

Osmunda – This is a fern with a short stem, large ordinary fronds, and specialized spore-bearing fronds. It is probable that fossil plants of this genus were to be found near water, often in warm, temperate wetland areas. Typical height 6 ½'. All ferns require a moderately damp habitat for reproduction.

Pachypteris – A common constituent of many Jurassic flora, Pachypteris had small fronds with a lobed appearance. It was one of the last of the pteridosperms and became extinct during the Cretaceous period. Pachypteris grew in salt marshes. Typical height 6 ½'.

Williamsonia – This plant resembled a small tree with diamond-patterned bark and palmlike leaves. Its most interesting aspect was its star-shaped flowers. Williamsonia grew in tropical tree-fern forests. Typical height 10'.

Pityostrobus – The form genus represents the cones of various pinelike trees common in the Jurassic and Cretaceous periods. The cones were about three times longer than broad. Seeds were attached to the bract bases and fell out of the cone when mature. Pityostrobus grew in sub-tropical forests. Typical height 65'.

Sequoia – This genus includes very large trees. Small, very globular cones are a feature of these plants. The cones do not often disintegrate, even as fossil, but open to let the seeds fall out. Redwoods once formed extensive forests in sub-tropical regions of the world. Typical height 230'.

Araucaria – The leaves are small and toothlike. The cones are large and very spiny. Seeds are present at the base of the bracts. This genus grew in subtropical mountain forests. Typical height 100'

Araliopsoides – This genus is characterized by large leaves. Araliopsoides grew in ward, temperate to sub-tropical deciduous forests. Typical height 33'.

This Mesozoic flora was the vegetation eaten by dinosaurs, other reptiles, and mammal herbivores during this era.

ASHFALL FOSSIL BEDS STATE PARK NEAR ROYAL, NEBRASKA

By Donald Phillips

From NYPS Newsletter 5/03, Donald Phillips, Ed.

Located in the rolling prairie of northeaster Nebraska, this fine little park contains everything *this author looks* for in a fossil site-specific exhibit – a useful visitor center, good stratigraphic exposures with explanation, and, of course, an *in situ* fossil exhibit. After the site was discovered in 1971, it was made a state park in 1986 and opened to the public in 1991.

Between 10 to 12 million years ago (depending on dating techniques), ashfalls from volcanic eruptions to the west (probably in Idaho) suffocated many animals surrounding a water hole; the same ash also burying and preserving them for later fossilization.

You begin your tour in the small visitor center where an exhibit explains how the site was formed and techniques used for dating the site. There is an exhibit describing the site's stratigraphy – most of the fossils are found in the Ash Hollow Formation, Cap rock Member. The waterhole is found in a sandstone layer overlain by the ash layer in which are entombed the fossils.

The visitor center contains a number of articulated skeletons, including *Procaine/us* (a small camel), *Pseudohipparion* (early horse) and, the star of the show, the short- legged rhinoceros *Teleoceros.* The large number of rhino specimens has allowed scientists to deduce many details of their lives. The rhino specimens include two populations – larger specimens with longer tusks and smaller, small tusked ones. One important specimen (on display in the quarry) has a pelvis containing an unborn rhino – this specimen allows paleontologists to conclude the smaller specimens are females. Alfred Meade has concluded that puncture marks on the larger male skulls were probably the result of male combat, possibly over females. Generally, these rhinos seem more similar in possible life-styles to the modem social hippopotamus rather than that of living solitary rhinos! *[For more information on this, see* The Rhino that Thought It was a Hippo, *in the November, 2001* Newsletter, *available free from the Editor.]*

The visitor center also contains an exhibit on horse evolution, and a discussion of the horses found in the formations – *Pseudohipparion, Neohipparioft, Corhohipparioft, Protohippus* and *Pliohippus.* There is also a small fossil prep area to view. Outside the center is a small "fossil dig" for kids and a display of small (but marvelous) fossils - rodents, rabbit, garter snake and seeds/plants.

A small trail leads to the covered quarry site. On the way, you'll pass an *in situ* cross section of the area's stratigraphy and signs describing the area's geologic relationships and history of the finds. The quarry itself though small, is exquisite. The ash burial has produced beautifully preserved fossils, most completely articulated. Many skeletons have been prepped *in situ,* propped-up on pedestals of ash. One rhino died while laying-down on its belly. As well as the pelvis mentioned above, there are specimens of carnivore coprolites (fossilized feces), and a specimen of the little sabre-toothed deer, *Longirostomeryx.*

Main Strengths of Exhibit: Most of the specimens on display in the visitor center area are original, as are, obviously, all those at the quarry. The specimens are beautifully preserved, and the quarry death assemblage is a must see.

Comments: Generally a fine little site. Unfortunately, it's not located on major tourist routes and is therefore a bit out-of-the-way. However, there are many western history and Native American history and cultural sites in the state, as well as the beautiful sand hills of north central and western Nebraska, and the geologic and pioneer historical sites of Chimney Rock and Scott's Bluff in western Nebraska. A lover of the prairie and its history will be at home here.

Other Exhibits/Trails: There are a number of relatively short trails in the park. Since the park contains an increasingly rare example of original prairie ecosystem, there is a keyed nature trail. There are also fine views of the prairie all the way to the horizon - few trees interfere.

Further Information: The site is located about 6 miles north of Royal on route 20. For information, call 402-893-2000.

Their website is *www.museum.unl.edu/ashfall*

THOSE CRAZY EDENTATES

By Patrick McGirk

From Tampa Bay Fossil Chronicles Tom Lofland, Ed. 12/02

Can you imagine a more bizarre collection of animals than the Edentates? That's the group of living animals that includes the sloths, the armadillos, and the South American anteaters. Each is individually peculiar. As a group, it is initially difficult to see how they might form a family.

The Teeth

Let's start with the name "Edentate." It literally means "toothless" and I guess when one looks at the anteaters, that pretty well applies. Sloths have teeth, but they are missing canines, incisors, and premolars, leaving only the molars or "cheek teeth." One species in the family, though, is not only not toothless, but it holds the record for the most teeth of any mammal. That animal is the giant, extant armadillo, and it has between 80-100 teeth.[1] The teeth in this animal are small, though vestigial, and relatively useless. Any teeth produced by this family of animals are interesting because the teeth have no enamel. Though this design makes for softer, easily worn teeth, it allows for continuous growth of the tooth throughout the animal's life. Many of the teeth are so simple they look like pegs.[e]

Classification Corrected

It's interesting to note that the Edentate family used to include a number of other species from the old world. People saw that aardvarks, African anteaters, and pangolins were all quite toothless and so they were thrown into the group, but no more. These old world animals may share some characteristics with the true Edentates, but they are unrelated. Instead, this is an example of "convergent evolution" where nature came up with a similar design in order to solve a common problem, in two unrelated groups.[3]

Other Defining Characteristics

Besides the teeth (or lack thereof), the Edentates also have a couple of other characteristics that define the group. Most mammals have one pair of joints that join the lumbar (lower back) vertebrae. Edentates have an additional two pairs of articulating points in these vertebrae, and it is for this reason that they are sometimes called Xenarthras (which is a word that describes these joints).[4] The extra articulations help in strengthening the lower back for effective digging.[5] The Edentates are also unusual in that their facial bones are a little more simple than in most other mammal families.[6]

Metabolism

For me, the most interesting difference between the living Edentates and other mammals is that they are, in general, quite primitive. The monotreme group (which includes the platypus and the spiny anteater of Australia), is perhaps the most primitive and earliest lineage to break off, but the Edentates are a close second among the mammal lineages. "These animals lack many of the traits that other placental mammals share; they don't have a cervix, for example, and their metabolism, while higher than a platypus', is still slower than other placentals."[7] The sloth, not surprisingly, has a slow metabolism, but it also has a relative lack of muscle. Lack of muscle, again, saves energy because muscle is metabolically quite active. Having a slow metabolism and having smaller muscles helps the sloth sustain itself on food (leaves) that has such low energy content. How slow is the sloth? The sloth can take up to a month to digest the poor quality food that it consumes, but that food is enough if you hang from a branch barely moving. "Sloths have metabolic rates that are only 40-45% of the expected for their body weights."[8]

Anteaters also have slower metabolisms allowing them to subsist on their diet of ...(you guessed it) ants. Armadillos are a little more active because they have a more varied diet.

It is interesting that in all of these living Edentates, their metabolism is such that they can't quite keep their body temperatures at a constant. Rather, their temperature varies somewhat with the ambient temperature. "Sloths, (for example) have a variable temperature, fluctuating between 70 degrees and 91 degrees."[9] It is this inability to maintain a constant temperature that limits the armadillo to the Southern portions of the U.S.

The Fossil Record

The Edentates, as a family, all started out in South America back when it was an island continent, unattached to North America by the Central American isthmus. In the Miocene the sloths, at least, were able to island hop a bit and enter the Caribbean as well as North America. Once the Central American isthmus joined North and South America about 2.5 million years ago, there was actually quite an exchange of animals, both north-bound and southbound.[10] As a generalization, with the exception of the Edentates, many of the northbound animals were out-competed by the animals already living in North America, and many of the South American animals were out-competed by the southbound animals. The Edentates that did well in North America include some of my favorite fossils: the giant armadillo, the glyptodonts, and several species of ground sloths. The eremotherium has the distinction of being the largest land animal ever to occupy North America.[11]

Extinct Edentates and Humans

As I did my research about the extinct Edentates, I was surprised to learn that some of them survived into historic times. The ground sloths are mentioned in legends of two South American tribes, the Tehuelche and the Araucan, both of Patagonia.[12] It is thought that the "carapace" of the glyptodont, with all of its connected scutes, was used to cover burial sites or even small dwellings.[13] However, now these giants are gone and we are lucky enough to find their fossilized remains.

Successful Edentates

The extant cousins that survive actually do quite well for themselves. Though a slow metabolism might be seen as a disadvantage, it is this ability that allows them to live on poor quality food. In so doing, they exploit an ecologic niche that others can't. How well do they flourish? It is estimated that in some parts of South America, sloths make up 25% of the mammalian biomass.[14]

The next time you run into a little armadillo, I hope it will remind you of its extinct and massive cousins, the giant armadillo and the glyptodont. Also, the next time you find a peg-like tooth of a ground sloth, I hope you will recall the many smaller sloths living today in South America.

Footnotes

1. *Macdonald, Dr. David (editor), The Encyclopedia of Mammals, (New York, NY: Facts on File Inc. 19840, P. 780.*
2. *Grzimek, Grzimek's Encyclopedia of Mammals-Volume 2, (NY,NY: McGraw-Hill Publishing Co. 1990) p.612.*
3. *Grzimek.*
4. *Grzimek, p.577.*
5. *Macdonald, p.770.*
6. *Macdonald, p.770.*
7. *Zimmer, Carl, Evolution: The Triumph of an Idea, (WGBH Educational Foundation and Clear Blue Sky Productions, 2001), p.158.*
8. *Macdonald, p.778.*
9. *Grzimek, p.597.*
10. *Zimmer, p.166.*
11. *Brown, Robin, Florida's Fossils, (Sarasota, FL: Pineapple Press, 1988), p.160*
12. *Macdonald, p.770.*
13. *Macdonald, p.780.*
14. *Grzimek, p.597.*

FANTASTIC FOSSIL FOR SCIENCE?

By Gregory Brown
gbrown@unlinfo.unl.edu, University of Nebraska State Museum – Division of Vertebrate Paleontology
http://www.museum.unl.edu/research/vertpaleo/vertpaleo.html
from AFMS Newsletter, 12/97; via *Paleo Newsletter*: Jean Wallace, Ed. 3/03

That new fossil that you just found looks to be an important, fantastic new fossil that will advance the art of paleontology. So you hustle it to the experts. Their enthusiasm is mild. On the other hand, upon spying a small bone fragment you thought little of, their eyes bulge like saucers. What's going on?

To many amateurs and hobbyists, "importance" is judged on only two criteria: 1) Is it new to science? 2) Is it unusually complete or well preserved? These are "9-pin, dot matrix" questions! Paleontology is now looking at 1200+ dpi resolution questions!

The science of paleontology...determining past environments, climates, faunal composition, behavior, etc., etc.,...depends on far more detailed information now. The basic questions (what kinds of animals were here; what did they look like?) have generally been answered. We're now addressing far more complex questions. Thus the importance of "collecting information."

You can find an electronic version of a detailed article I wrote on this subject (specifically for amateur paleontologists) on our museum's web page at: http://www.museum.unl. Edu/research/ vertpaleo/musnote2.html. "Preserving Vertebrate Fossils: Notes from the Laboratory" can be repinted or downloaded from the site. Though specific about vertebrates, the general principles apply to all fossils.

What's really important? For anyone (amateur or professional) to determine a species-level identification of a critter (with any degree of confidence) is nearly impossible unless they specialize in that group. Genus- or family- level IDs are much more realistic. Geologic provenience is likewise difficult to establish precisely without a great deal of expertise. For instance, my field notes from years (many!) ago record strat data like this: "Aquia Formation, zone 2." Was it?

According to my then-current knowledge...and some very, very old literature...it was. Now, I doubt it very much. What is *really important is to* record common-sense observations that would allow you (or someone else) to return to the location and relocate the very spot the fossil came from. For detailed research on museum collections, professionals will always try to return to the original locality and look at the sedimentology and stratigraphy themselves, even if the original data was collected by a well-respected colleague.

The "name" of the critter and the "name" of the formation are far less important to record in your field notes than some good old-fashioned basic observations about the fossil's occurrence. Without data, a beautiful fossil may be scientifically worthless. With data, a seeming scrap may be a scientific treasure. If something is worth picking up, it is always worth documenting.

PLEASE ADD THE FOLLOWING NEW OR REJOINING MEMBERS TO YOUR DIRECTORY:

Brian Bowles
5917 Sandhurst Lane #126
Dallas TX 75206
214-740-1975
bowlesbi@aol.com

Mathematics Teacher. Will not trade. Interested in learning more about fossil collection and preparation.

Oliver Goldsmith Jr.
9532 Frederick Rd.
Ellicott City MD 21042
410-465-4862

Interested in all fossils. Major interest petrified wood/pinecones. Would like to share info on collecting sites. Member of Calvert Marine Museum. Would like to broaden contacts.

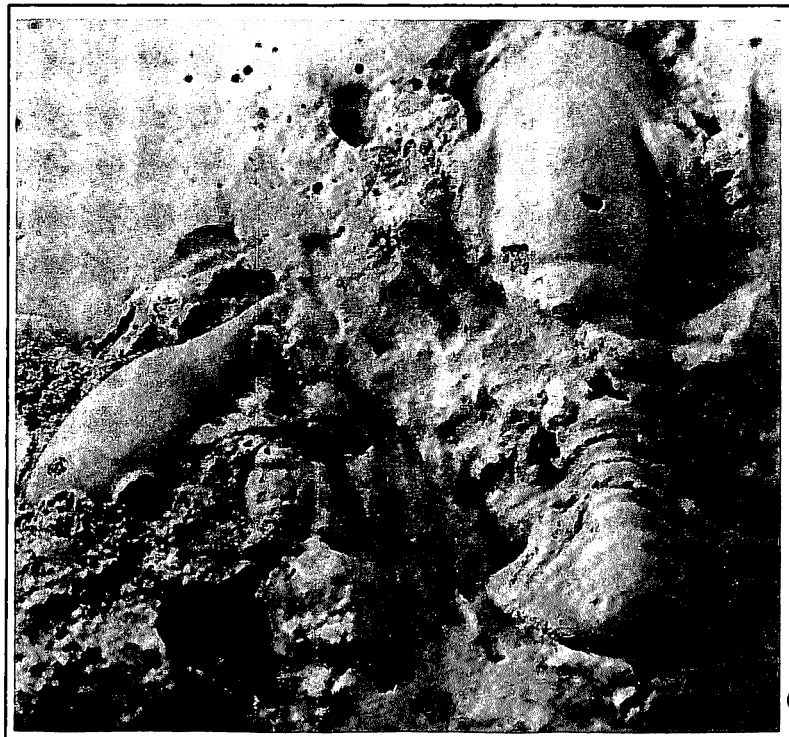
PLEASE NOTE THE FOLLOWING CHANGES OF ADDRESS OR CORRECTIONS:

Dennis W. Haas
104 East Wisconsin Street
Trenton IL 62293-
618-224-9458
DennisDWH2001@aol.com

Carpenter. Not much to trade (03). Major interest trilobites. Wants to learn and collect.

Earl Hoffman
3197 Woodland Rd.
Los Alamos NM 87544
505-662-7823

Physicist. Will trade. Major interest currently conularids. Has for trade Penn. Marine Invertebrates from NM. Wants to expand his interaction with amateur collectors.



Trilobite
Plethopeltis sp.
With separated free cheek
Eminence Formation
Upper Cambrian
Potosi mini-lagerstatten

(Sent by Bruce Stinchcomb)

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.

Membership fee: $20.00 per household covers one year's issues of DIGESTS. For new members and those who renew more than 3 issues past their due date, the year begins with the first available issue. Institution or Library fee is $25.00. Overseas fee is $20.00 with Surface Mailing of DIGESTS OR $30.00 with Air Mailing of DIGESTS. (Payments other than those stated will be pro rated over the 9 yearly issues.)

MAPS meetings are held on the 2nd Saturday of October, November, January, and February and at EXPO in March or 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.

The MAPS official publication, MAPS DIGEST, is published 9 months of the year—October through April, May/June, and July/August/September. View MAPS web page at http://midamericapaleo.tripod.com/

Dated Material – Meeting Notice

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