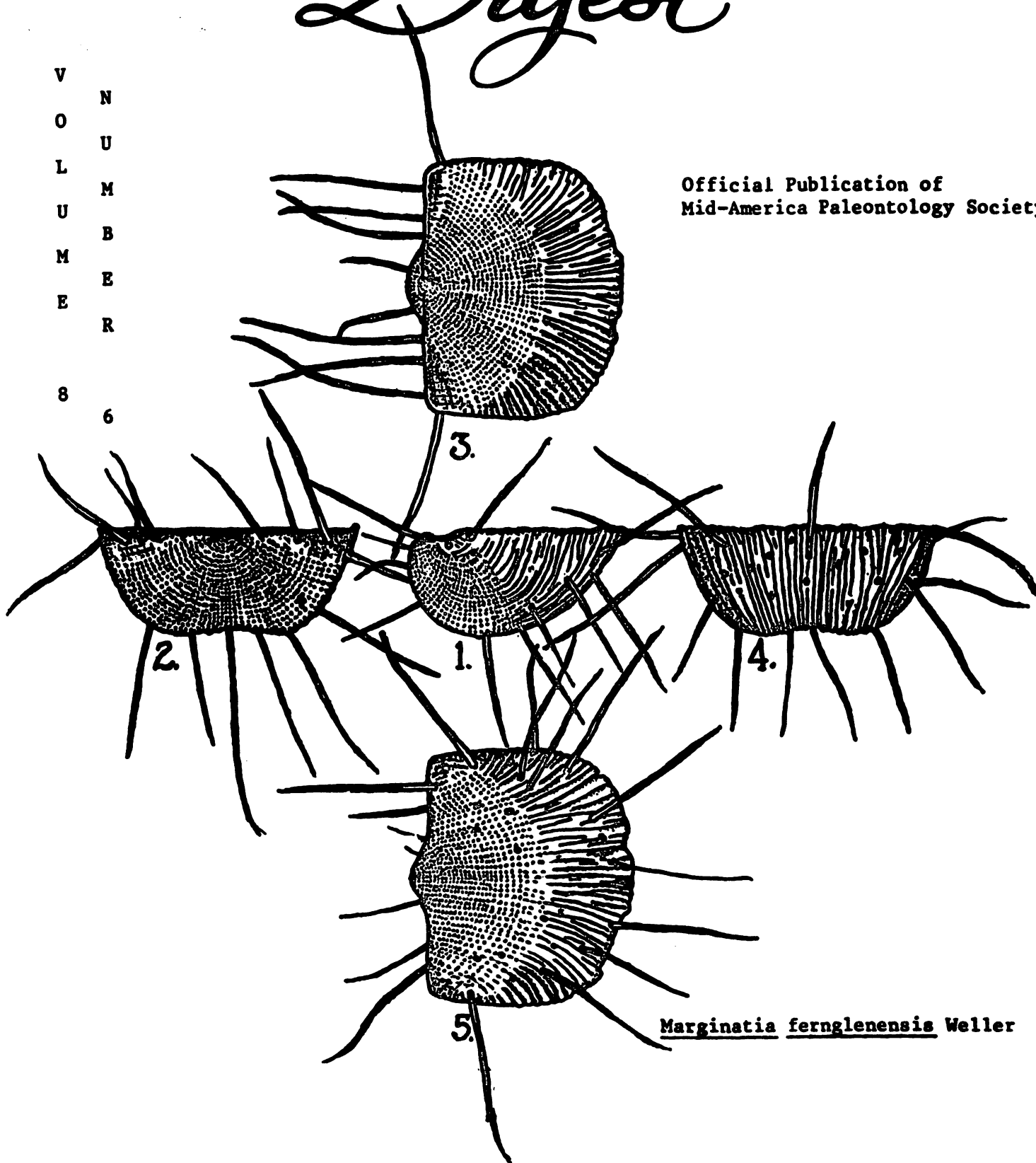


# M.A.P.S *Digest*

V  
O  
L  
U  
M  
E  
N  
U  
M  
B  
E  
R  
8  
6

Official Publication of  
Mid-America Paleontology Society



Marginatia fernglenensis Weller

Marginatia fernglenensis Weller, 1909 -- by Franklin Hadley, 839 Chapel Hill, E. Dr.  
Indianapolis, IN 46224

Productus Fernglenensis was described by S. Weller, 1909, and again in 1914. In 1960 Muir-Wood and Cooper named P. fernglenensis as type species for their new genus Marginatia.

It occurs in the rocks of the lower Mississippian period: Illinois and Missouri (Fern Glen Fm.), Indiana (Carwood Fm.), Missouri (Pierson Ls.), Kentucky (New Providence Sh.), Alabama (Fort Payne Chert), Ohio (Wooster Sh.), Alberta (Banff Fm.).

A specimen collected by me from the Carwood Fm. of the Borden series, near Brooklyn, Indiana, was identified by Dr. G. A. Cooper, Paleobiologist Emeritus N.M.N.H. Smithsonian Institution, Washington, DC. The specimen is 50% wider and 18% longer than the largest observed by Weller. Where Weller, 1914, stated spine bases were usually inconspicuous or absent, this specimen has abundant spine bases scattered all over the ventral valve. Muir-Wood & Cooper, 1960, in comparing Marginatia to Antiquatonia, states that it lacks a row of spines near the hinge. This specimen of Marginatia has spine bases near the hinge line.

While Muir-Wood and Cooper, 1960, do not use the term "fasciculate" in describing costae arrangement on the anterior slope of the ventral valve, Weller, 1914, does. It is this outstanding external characteristic that makes Marginatia immediately recognizable.

In spite of the difference in size and presence of spine bases absent in Weller's 1914 specimens, I have placed the specimen from the Carwood Fm. of Brooklyn, Indiana, in the species Marginatia fernglenensis. This is the same as named by Weller from the Fern Glen Fm. of Missouri which was then interpreted as being Kinderhookian in age. Muir-Wood and Cooper, 1960, stated the Fern Glen Fm. to be Osagian in age, the same time period as the deposits at Brooklyn, Indiana.

Specimens of other brachiopod species collected at the Brooklyn, Indiana site are remarkably well preserved displaying characters not previously reported. One example is the presence of microscopic prostrate anteriorly pointed spines of the Punctospirifer sp.

The five views of the Marginatia fernglenensis Weller are: 1) lateral, 2) posterior, 3) dorsal, 4) anterior and 5) ventral.

Art work -- Franklin Hadley -- The above and the cover have already appeared in the  
Indiana Society of Paleontology News Letter -- I got scooped.

#### BIBLIOGRAPHY

- Carter, J. L. "New Genera And Species of Early Mississippian Brachiopods From The Burlington Limestone". Journal of Paleontology, 1968, 42 (5), ppg 1140-1152, 4 plates.
- Carter, J. L. & R. C. Carter. "Bibliography And Index of North American Carboniferous Brachiopods (1898-1968)". Geological Society of America Memoir 128. 1970, p. 382.
- Moore, R. C. Treatise On Invertebrate Paleontology, Part H. 1965.
- Muir-Wood, H. M. & G. A. Cooper. "Morphology, Classification of Life Habits of The Productoidea (Brachiopods)". Geological Society of America, Memoir 81. 1970, pp. 1-447, pl. 135.
- Weller, S. Kinderhook Faunal Studies, 5. "The Fauna of The Fern Glen Fm". Geological Society of America. Bulletin V. 20. 1909, pp. 265-332, pl. 10-15.
- Weller, S. "The Mississippian Brachiopoda of The Mississippian Valley Basin:." Illinois State Geological Survey. Mon. 1, 1914, p. 508, 36 text-fig., p. 186, pl. 83.

## MARK YOUR CALENDAR

- 14 June -- BEDFORD SWAP -- Bedford Indiana  
 15 4-H Fairgrounds -- MAPS MEETING  
 16 Indiana Chapter -- Good Fossils
- 20 June -- EASTERN REGIONAL -- Charleston  
 to 23 West Virginia
- 18 July -- MIDWEST REGIONAL -- Sioux Falls  
 to 21 South Dakota
- 26 July -- CALIFORNIA REGIONAL --  
 to 28 Ventura, California
- 2 Aug -- NORTHWEST REGIONAL -- Burley  
 to 4 Idaho
- 31 Aug -- MAPS FIELD TRIP -- Humboldt, Iowa  
 1 Sept -- MAPS FIELD TRIP -- Rockford,  
 Illinois. See p.
- 13 Sept -- ROCKY MOUNTAIN REGIONAL -- Denver  
 to 15 Colorado
- 5 Oct -- ROCK & FOSSIL SWAP -- Izaak  
 Walton League Grounds, Linn  
 Junction Road, Cedar Rapids  
 Iowa  
 1:00 Board Meeting  
 2:00 MAPS Meeting
- 12 Oct -- MAPS FIELD TRIP -- P -- Palo,  
 Iowa -- Cystoids More in October  
Digest
- 18 Oct -- MUNICH SHOW -- Lv Chicago Oct 8  
 19, 20 Ar Stuttgart Oct. 9
- 1986 APRIL 11, 12, 13 -- EXPO VIII
- 27 July -- FOSSIL MINERAL SWAP -- Academy  
 SD -- I-90 to St 45 south.  
 10:00 a.m. New site, new mater-  
 ial. Think about it
- 25 Oct -- FOSSILMANIA III -- Oakdale Park  
 Glen Rose, Texas -- See back  
 page for information and reser-  
 vation blank.

(Ed. comment -- don't ask about the chrono-  
 logic order of this calendar. Just consider  
 it a challenge. Thanks.)

## BEDFORD SWAP

Biggest show yet. Old friends, new faces to  
 get to know. Gil presented the newest MAPS  
 Slide Show "Cephalopoda". If you want to pre-  
 sent this excellent slide show to your local  
 club and use the Study Guide to learn more,  
 contact Jim Konecny, 3036 Geronimo Rd.,  
 Prescott, AZ 86301.

If you've never seen or don't have among your  
 collection a trilobite about 24" x 10", they  
 do exist! In considerable numbers, I might  
 add. Dan Cooper, 5732 Lake Huron, Fairfield,  
 OH 45014, has one with your name on it, I  
 bet. They were the hit of the Bedford Swap.

The Indiana Chapter is in good hands. We'll  
 be hearing more from them.

## REGIONAL SHOWS

All the Regional Shows are included in the  
 calendar. If you're traveling this summer,  
 consider including one in your travel plans.  
 Take along your MAPS pin. It's pretty excit-  
 ing when you bend to examine a treasure from  
 ancient seas to feel a tap on your shoulder,  
 hear your name, and look up to see a familiar  
 face.

If you don't have a name tag send \$3 to Fred  
 Farrar, Rte 2, Box 295, Poplar Bluff, MO 63901.  
 You'll need it next year for EXPO VIII anyway  
 so get it early. They are most attractive.

## MAPS FIELD TRIP LABOR DAY WEEKEND

No field trips until Labor Day weekend. The  
 mid-west is hot and humid during the summer  
 months. But, Labor Day Weekend it's Humboldt,  
 Iowa on Saturday, August 31. Meet at 9:00 at  
 the HyVee Grocery Parking Lot in Humboldt.  
 Specialty of the day will be large gastropods  
 and microfossils.

Area motels in Humboldt: Beacon Motel, 515-  
 332-3545 -- 812 13th St. No.  
 Corner Inn Motel, 515-332-1672 -- Jct. 169 & 3.  
 Camping: Beeds Lake at Hampton is nice, but  
 about 50 miles east of Humboldt.

Saturday night after relaxing hour it's dinner-  
 scallops, anyone? Right, LaVeta?! Sunday,  
 September 1, we'll hunt in Rockford, Iowa.

If you're coming only Sunday, meet at Rockford Brick & Tile at 10:30.

If you will need more information about these field trips, contact: Jeff Nekola, 800 25th St, N.E., Cedar Rapids, IA 52402 -- Phone 319-363-9792.

MUNICH TRIP -- LUCKY!!

You can still make a reservation for a spot on this juncket, if you have been debating. Act fast, however, this is your last opportunity.

\$50 NOW reserves your space.  
\$570 cash balance due.

Leave Chicago October 8 -- Ar Stuttgart October 9. Collect Sollenhofen and 6 or 7 other quarries. Bus transportation to Munich October 18.

Munich Show October 18, 19, 20. Leave Munich for the states October 22. (Plenty of time to wrap your treasures.)

If you are interested, contact Gil Norris, 2623 34th Avenue Ct., Rock Island, IL 61201 Phone 309-786-6505. You need to do this immediately. Send the \$50 to reserve a special spot for you.

This show is referred to as the Tuscon Show of Europe. 20,000 people attend this show. There are bound to be some goodies. Hope you can make it!

DON'T FORGET YOUR PASSPORT!

FOSSILMANIA III -- October 25, 26, 27

Look forward to meeting friends in Glen Rose, Texas. Usually someone is at EXPO and we gather to hear the plans and become swept up in the excitement. This year no one was at EXPO so information from the PALEO NEWSLETTER and the back page of this Digest will be our information source.

A high light of this show has always been the Texas BBQ. Last year they didn't think they would have it again--but not only is it back but a potato bust on Friday night as well, and a bonfire on Thursday night to welcome early arrivals and those setting-up.

Wish I could give first hand reports about this Swap, but the classroom calls so I've never been lucky enough to be able to attend. But those who have say it's terrific and gets better every year. For certain all those Texas people work hard all year to make FOS-SILMANIA a success.

So mark your calendars, get busy collecting this summer so you'll have plenty of swap material and head south to Texas October 25, 26, 27 for FOSSILMANIA III.

\* \* \*

NEW DIGEST COVER -- NEED YOUR HELP

Thanks, Franklin Hadley, Indianapolis, Indiana, for the summer cover. Franklin is a member of Indiana Society of Paleontology. The EXPO cover was thanks to Clarence Schuchman, Sacramento, California.

Every so often the cover needs to change. Get a new outlook, rejuvenate the spirit, all that good stuff. Our artist in residence, Bob Kenyon, is so busy it is difficult for him to find time to design a new sea floor. So, how about the membership at large.

What we need is a different fossil each month for the cover. There are enough of those, we ought to be safe until the next Ice Age. Inside the cover a paragraph or so telling about the fossil and/or the seas where it lived. The EXPO EDITION featured a type fossil found by Clarence Schuchman. Franklin sent a set of drawings and a longer description for this issue. You decide about that.

Will you help? We need 9 more covers for next year. I will have the one for the EXPO EDITION, so that leaves 8. What is your favorite fossil--fish, crab, coral, worm, echinoid? Next year is the "Year of the Trilobite" how about a trilobite?

Allow enough space to include the Digest masthead, a spot for the Volume and Number and the logo "A Love Of Fossils Brings Us Together". Include something about the fossil, where you found it, the seas, the collecting spot today--seashore, mountain top, quarry, road cut etc. Clarence found his up a ravine in Ishi country Where did you find yours, Franklin?

Teach us! It ought to be super great! Don't

Don't forget to give credit for the art work.  
 Let's try it for a year to see what happens.  
 Then we'll talk about it. If it gets dreary,  
 we'll go back to a sea floor or something.

Who will do the October Cover? You've never  
 let us down. I can hardly wait!

\* \* \*

\* \* \*

THREAD OF LIFE

The Smithsonian Looks at Evolution  
 Roger Lewin

\* \* \*

MINUTES OF SPECIAL MEETING

The special meeting of the members of the Mid-America Paleontology Society was held at the Union at Western Illinois University, Macomb, Illinois, on April 20 at 7:00 p.m., pursuant to a Resolution of the Board of Directors passed on March 30, 1985. Due notice of this special meeting was sent to all members April 8, 1985, as required by the Resolution of the Board of Directors.

Marvin Houg, President presided over the meeting and Margaret Wallace acted as Secretary. At least fifteen members of the Corporation were present so a quorum as defined by the Corporation's By-Laws was declared by the President.

The Amendments to the Restated Articles of Incorporation as adopted by the Board of Directors at thier meeting on March 30, 1985, were presented to the members present at the meeting and opened for disucssion. After discussion on the Amendments was closed and no changes, amendments or substitutions being offered a ballot was taken with the following results. Members voting to adopt the Amendments as submitted: 93. Members voting against adoption of Amendments as submitted: 0. Abstentations: 0. Other: 0.

More than two-thirds of all members being present having voted to adopt both proposed Amendments to the Restated Articles of Incorporation as submitted by the Board of Directors, both the Amendments to the Restated Articles of Incorporation were so adopted. On motion, the meeting was adjourned.

Respectfully submitted

Margaret Wallace, Secretary

\* \* \*

\* \* \*

\* \* \*

A D V E R T I S I N G   S E C T I O N

Ads \$3.50 per inch (6 lines). Send information and checks payable to MAPS to: Mrs. Gerry Norris, 2623 - 34th Avenue Ct., Rock Island, IL 61201 Phone 309-786-6505

AMMONITES FROM BAVARIA, WEST GERMANY, directly from clay pit to your fossil display. Perfect single specimens for sale or exchange.

genus & species: Pleuroceras spinatum  
 stratum: Lias delta (U.Pliensbach) 1.Jurassic  
 diameters: 30, 45, 60 mm for \$2, \$5, \$8  
 wanted for trade: U.S. Cretaceous Ammonites  
 dealers: ask for wholesale conditions!

DIETER HEINLEIN  
 Puschendorfer Str. 1  
 D 8501 Vietsbronn  
 WEST GERMANY

DISPLAY CASES for fossils, artifacts, slabs, cabs, coins, etc. Durable, low cost, high quality, satin-finish aluminum and glass.

4x4"	Price	\$4.95	Wt.	8 pz
6x6	(plus	5.55		14 oz
7x9	UPS	6.25		20 oz
8x12	cost)	6.95		30 oz
12x16		9.95		65 oz

Add UPS cost. Dealer inquiries invited.

SPECIAL INTRODUCTORY OFFER: Miocene Crocodile (Gavialosuchus americanus) osteoderm, tooth, and associated fish vertebra mounted in a lined REBOB GEM CASE with info sheet. Single set in 7x9 case \$14.60, double set in 8x12 case \$21.35. Shipping paid.

REBOB GEM CASES  
 P. O. Box 6167  
 Ocala, FL 32678  
 Phone 904-237-1909

## OKLAHOMA FOSSILS

Ordovician through Devonian trilobites and echinoderms, brachiopods, of specimen quality from Oklahoma. Carefully prepared with detailed stratigraphic information and locality specifications. Please send \$1.00 for our catalog. We have the quality and variety to meet your collection needs.

OKLAHOMA FOSSILS  
P. O. Box 780298  
Oklahoma City, OK 73178  
( ☎ ☎ ☎ )

## COMPUTER TECHNOLOGY -- BOONE!/BANE!

Keeping the mailing list up-to-date is a big job all by itself.

Recently a little computer mystique and all the files were lost. Out came the back-up disk but some information is not quite up-to-date yet.

Apologies to Dr. John W. Fox, Director of Anthropology, Baylor University, Waco Texas.

Dr. Fox will NOT trade. His nodule should read "Professor. Will NOT trade. Interested in arthropods and starfish. Collects starfish and pyritized ammonites from Texas."

This should have appeared this way in the new directory which was sent with the EXPO EDITION.

A personal apology to Jeff Aubry, P. O. Box 374 Crawfordsville, IN 47933. No computer mystique here--editor blooper! Somehow I missed him completely.

You are all extremely patient! Please keep writing. It will get straightened out!

( ☎ ☎ ☎ )

## AN OPEN LETTER TO MAPS -- NUMBER 1

The enclosed report deals with a fossiliferous incident that involved some of the MAPS members. I hope you will consider this for your Digest.

In early March I found it necessary to leave Tucson later in the month and go to Detroit, Mich. to help my father with some family matters. I at once realized that this was an excellent opportunity for me to do some fossil collecting in areas I may not get to for years since I would be driving back to Tucson. I consulted a number of books that gave directions to fossil collecting sites, made careful notes and routed

my return trip to pass through as many of these areas as possible. I next wrote to 7 MAPS members in the Detroit area asking about collecting sites that they knew of in Michigan. I received responses from each one of them before I left Arizona. I also called one member, Greg Hand, of the Dry Dredgers in Cincinnati, Ohio. He gave me specific direction to the Caesars Creek reservoir where I could collect Ordovician material. There is little Paleozoic fossiliferous rock in southern Arizona so such instructions were of great value to me.

When I arrived in Detroit I called those people I had written and talked with them at length. I found that the books were largely wrong about fossiliferous outcrops in the southern Michigan area. They all gave me suggestions as to where I might collect. One in particular, Thomas Witherspoon of Dearborn, gave me excellent directions to several areas and offered to accompany me to several of them. The first day of collecting I went to a site in Milan, Mich. and was extremely successful in obtaining a good sample of Devonian fauna. The second day Tom took me to Arkona and Thedford in Ontario, Canada. These two days tested my resolve in fossil collecting as it rained hard the first and snowed with 60 mph winds the second. From these two days I got a wide variety of fossils from the Devonian.

A few days later I started out on my return trip. Tom went with me to the Cincinatti Arch region and took me to several rich collecting grounds where I was able to get a good sampling from the Ordovician period. I went on alone from the Cincinnati area.

On the way back I stopped at two spots Tom had recommended to me. Both were rich in Mississippian fossils. One spot, in Indiana, was also recommended by Alan Goldstein of Louisville Kentucky, whom I called as I passed through there. Alan and I had an interesting talk. He was sure that he knew me from somewhere else. During the course of the telephone call we figured out that he had heard me speak at astronomy conventions in the Dayton, Ohio, area years before, and he had visited the observatory that I now work at.

I also stopped at all the locations I had uncovered in my research before the trip. In all cases no good or worthwhile fossils were found at these sites, and in many cases none at all. The books were either not specific enough in location or the places they delineated were no longer there. The only information

that was any good was that given to me by MAPS members.

This is what an organization like MAPS is all about, fossil lovers helping each other out. My trip would have been a fiasco had I only relied on the research I had done and had there been no MAPS. It was because of MAPS members that I returned with over 300 million years of fossils to add to my collection! I would like to thank Alan Goldstein, Greg Hand, Bob Gondek, Joe Koniecki, Jerald Mitchell, Richard Heimlich, Stephan Kopacz, Willis Kibler, Tony Raines, and most especially Thomas Witherspoon, without whom my plans would have been spoiled. Also I want to thank MAPS for being an organization through which amateur paleontologists like myself can communicate and help each other.

Sincerely

Richard E. Hill  
4632 E. 14th St.  
Tucson, AZ 85711

#### OPEN LETTER -- NUMBER 2

I am a doctoral candidate doing research on several aspects of Paleozoic arachnids, especially those from the Mazon Creek region. I have been using museum specimens for my projects, but I have been informed repeatedly that the members of MAPS represent an excellent scientific resource.

I would like to inform the members of MAPS of my research interests with the hope that they might agree to assist me with my work. In particular I need to know these items of information:

- 1)a) Which collectors have arachnid fossils in their collections?
  - b) How many specimens do they have?
  - c) Where were the specimens collected?
  - d) If possible, to what orders do the specimens belong?
- 2) Would any of these members be willing to loan their specimens to me, in care of the Museum of Paleontology, to study? I would gladly pay for all postage costs.
  - 3) Will the members allow me to make latex peels of their ironstone concretions? Because there is usually no organic material on this type of specimen, the fossil isn't damaged. I have used this technique on specimens from the Field Museum, Illinois State Museum, and the Smithsonian Institution, with excellent results.

Thank you very much for your assistance. Your organization is an asset to paleontologists.

Sincerely

Bret S. Beall  
The University of Michigan  
Museum of Paleontology  
Ann Arbor, Michigan 48109-1079

(Ed. comment. There is no question what these 2 letters are about. Fossil lovers helping fossil lovers. When the Founding Fathers were in the process of organizing this organization, this is exactly what they hoped would be the results of MAPS. Those of you who were at EXPO have had first hand opportunity with latex peels. Thank you Fred Collier, Smithsonian, for ridding those trepidations. One hears of greed when collecting, ripping up and destroying collecting sites, invasion of properties, but then there are letters like these and one knows there is much more good than destruction. Thank you Richard Hill, and good luck Bret Beall!)

( ☺ ☺ ☺ )

#### FROM THE MATRIX

Meet new member, author MARTIN REITER. Seen at EXPO VII this year with his new book THE PALOS VERDES PENINSULA, A Geologic Guide and More, Martin Reiter received his B.S. degree in geology from the University of Wisconsin and M.A. degree in geology from the University of Southern California. After employment as a paleontologist/stratigrapher with the Shell Oil Company for several years he began a twenty year teaching career with the Los Angeles Community College District and has recently been a lecturer in geology at California State University, Dominguez Hills. He is a Registered Geologist, State of California.

THE PALOS VERDES PENINSULA is a guidebook to the great variety of geologic features the Peninsula has to offer. This book is concerned with local geology and the significance of the entire region. Designed for geography and geology classes at the local schools it is also pertinent to the residents of the Peninsula and those visiting this fascinating area.

THE PALOS VERDES PENINSULA: A Geologic Guide and More, Martin Reiter, Kendall/Hunt publishing Company, Dubuque, Iowa Cost \$10.95

\* \* \*

On the facing page is a copy of a plate from LESQUEREUX COAL FLORA ATLAS (1879). Dan Chlipala, 220 S. Roselle Rd., Apt. 207, Schaumburg, IL 60194, is in the process of printing this unbelievable text. Cost \$19.95. Needed 100 orders to make the project feasible.

Seen at EXPO, this book would indeed make a beautiful addition to your own library and/or that of a friend. The plate shown cannot in any way do justice to the work of Lesquereux. Dan's reproductions are very much the same as the original line drawings.

A second project is a calendar for 1986 with plates from the text. It would take 6 years of calendars before all the text illustrations would be compiled. Dan uses a sepia toned heavy parchment (effect) paper. Cost \$5.95.

The atlas and/or calendar is a fine example of 19th century lithography. Many of the names of plants were later revised or placed in synonymy but Lesquereux is cited almost universally by later authors.

If you have collected Mazon Creek nodules you will recognize these beautiful drawings. Place all orders with Dan, address above.

\* \* \*

NATURAL HISTORY -- Vol. 93, No. 3, March, 1984 and Vol 93, No. 4, April, 1984 -- 2 beautiful articles on fossilization of flowers. (Mentioned in the February Digest, this editor made another blooper--There I said November Smithsonian.)

SCIENTIFIC AMERICAN -- July, 1985, issue has an article on Fossil Water.

UPPER PENNSYLVANIAN FLORAS OF NORTH AMERICA, William Durrah. Excellent Text, out of print. May still be in university bookstores. If anyone knows where, please contact the editor with pertinent information. Thank you.

"FRIENDS", Museum of Paleontology, The University of Michigan, Ann Arbor, Michigan 48104 for a list of publications.

NATURAL HISTORY, Vol 94, No 5, May, 1985. "Ancient Bristlecone Pine Forest, California" Some redwoods 2,200 years, western junipers

nearly 2,500 years, some sequoias more than 3,000 years, Bristlecone Pine Alpha 4,000; Methuselah 4,600 years, an even older one in Nevada 4,900 years. These unusual, magnificent trees are spectaculars to the environment of the West.

TIME, Vol 25, No 18, May 6, 1985. "Did Comets Kill The Dinosaurs". Every 26 million years or so some scientists think comet barrages hit the Earth and spew debris into the air. . .What sends comets earthward?"

Thanks to Jim Brubaker, Rock Island, Illinois.

\* \* \*

From J. A. MITCHELL, Wayne State University, School of Medicine, Gordon H. Scott Hall of Basic Medical Sciences, 540 East Canfield Avenue, Detroit, Michigan, 48201

Thought this monograph may be of interest to some MAPS members

EVOLUTION OF JAW MECHANISMS IN ORNITHOPOD DINOSAURS, David B. Weishampel, with 20 Figures, Springer-Verlag, Berlin, Heidelberg, New York, Tokyo, 1984.

\* \* \*

The Paleontological Society of the Geological Society of America has available through the University of Tennessee the Proceedings of a symposium convened by Robert A. Gastaldo and William F. Tanner entitled THE EVOLUTION-CREATION CONTROVERSY: PERSPECTIVES ON RELIGION, PHILOSOPHY, SCIENCE AND EDUCATION. This symposium was convened at the 1983 Southeastern Sectional meeting of the Geological Society of America in order to demonstrate to the public and the geological community the inaccuracies and fallacies in "creationist" science. Copies are nominally priced at \$6.50 and available from the following:

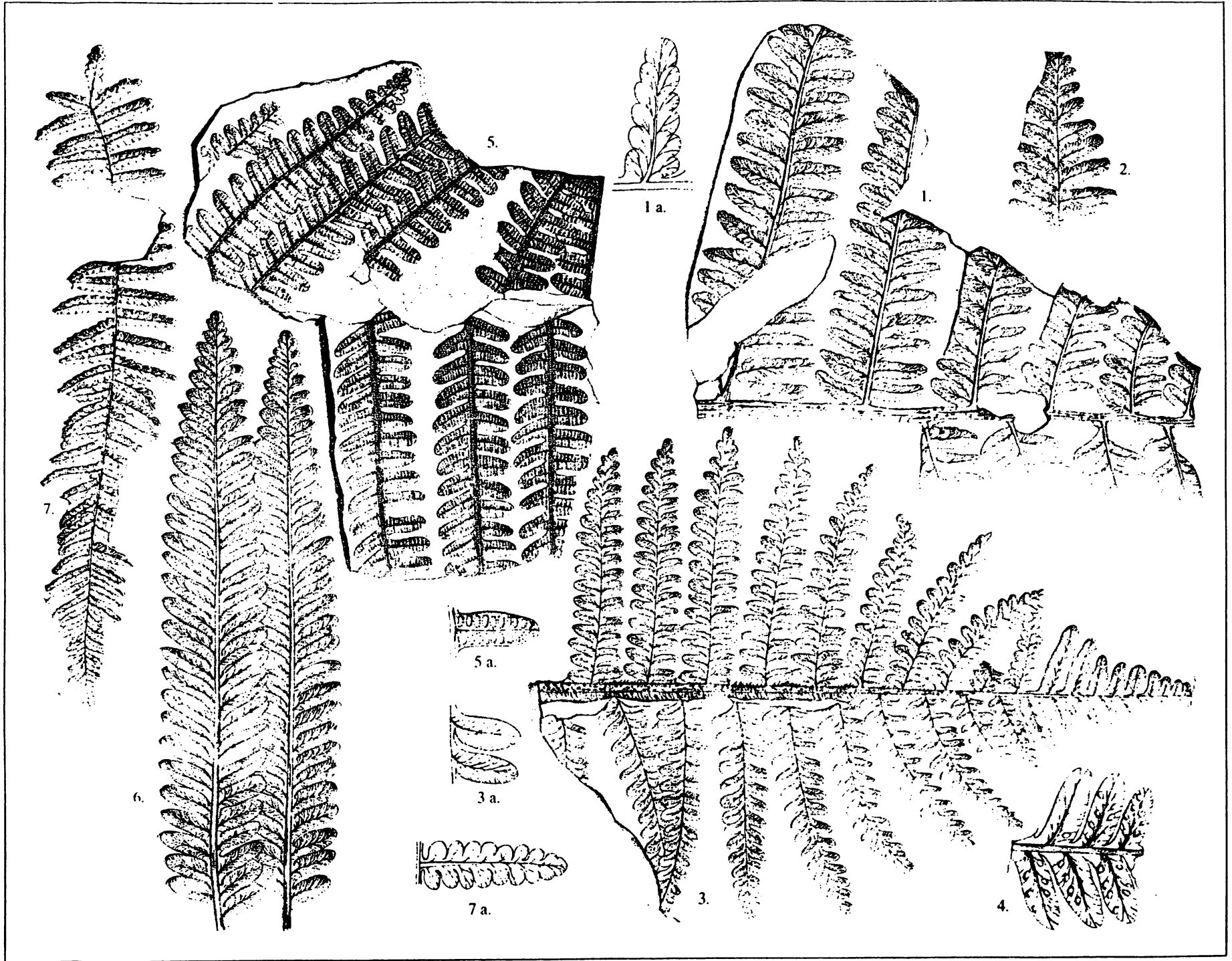
Publications Editor  
Dept. of Geological Sciences  
University of Tennessee  
Knoxville, TN 379960141

Thanks to ROBERT A. GASTALDO, Associate Professor, Auburn University, Auburn University, AL 36849-3501

\* \* \*

OHIO VALLEY PALEONTOLOGIST, a quarterly journal from the Falls of the Ohio Fossil Club, Alan Goldstein Editor. Alan guarantees 4 of these journals and after that he says he will do an analysis. Subscribe to yours for \$10. Write





PL. XLIII.

1 - 7 a. *Pecopteris vestita*, Sp. nov.

Alan Goldstein, 3430 Bryan Way, Louisville, KY 40220.

This journal has been set up as a regional "journal" that is, to publish articles related to the paleontology of the states in the Ohio Valley, including Kentucky, Indiana, Illinois, Ohio, and Pennsylvania. Other articles (non-regional) will be accepted.

\* \* \*

ANTHOLOGY, For Our 25th Anniversary, Bulletin of the Southern California Paleontology Society, June Maxwell, Editor, 3510 E. Hillhaven Dr., West Covina, CA 91791.

For your copy send \$11.00.

(Ed Comment--I have not sent my \$11 yet, but the publications from this exciting, impressive society that I have received are excellent additions for anyone's library.)

( ( ( ) ) )

#### SEDIMENTARY NOTES

CLARENCE AND ALICE SCHUCHMAN, Sacramento, California--A note to MAPS and EXPO Chairman Peggy Wallace. Greetings and congratulations on EXPO VII. It was 95° when we left Sacramento. Thought about packing our long-johns. Rozaline Johnson told us she nearly froze to death one year. Imagine our surprise!

One travels all that way because MAPS has things no one else has. . .major scholars contributing to your editions. . .

When a collapsing table sent my record Tro-paeum crashing to the floor I looked up from that small circle of fragments into a gathering silent circle of faces that told me MAPS has something else no one has. Thanks! (Ed comment--I first heard of this from someone at the show who was aghast because of the accident. I went immediately to Clarence who had begun the restoration process and who was as overcome with the agony on the faces of the surrounding group as they with the destruction of his precious fossil. A positive note: MAPS had an unplanned demonstration of fossil restoration. Good show!)

May EXPO VIII be even better! And I hope more and more large sections may be added devoted to research collections by amateurs that will invite interpretation and participation by the expert. MAPS leadership is superb.

ROZALINE JOHNSON, Napa, CA--Making plans with friend from Napa to be part of the Munich trip. Rozaline watches the weather map to see how friends are faring all over the country. A spunky lady, this one. She and husband Col. Bert spent time in Germany after WWII. She should be a valuable contributor to lore and fun on this trip.

PHILIP MARCUS, Wheaton, Maryland. I am interested in writing an article on the problem of closed-to-collector collecting sites and what to do about the problem. I think it would be very worthwhile and possibly controversial. (By all means, Phil, please tackle the problem. If your article is long we can break it up. Your expertise with the legal system should make this a fascinating article. )

Philip and Anna had a case of Mazon Creek fossils for their club's annual show.

New MAPS Members SAMUEL & BESS HAMERS, Somers, New York. I am a member of the N.Y. Paleontology Society which meets (monthly) at the American Museum of Natural History in NYC.

My husband and I do much traveling across country and enjoy fossil collecting as we go along. We'd be particularly interested in learning of accessible productive localities in almost any state, as we do lots of meandering.

We can share N.Y. fossils with interested parties. (Welcome, you'll get lots of ideas from the Membership Directory and meet very special people if you attend an EXPO.)

PAUL MEISSNER, Racine, Wisconsin. Enclosed are a couple of articles from the Racine Journal Times. Also, Paul sent a brochure on the Milwaukee Public Museum which has a new exhibit "The Third World". This geologic exhibit is of life-size dinosaurs in a Metasequoia Swamp.

If you are in or near Milwaukee consider a visit to the museum, located on the shore of Lake Michigan.

CHUCK STYLES, Ottawa, IL. If knurled handle on dental tool bothers your finger after long use try one or two wraps of masking tape on the knurled section, or use short pieces of heat shrink for more permanent fix.

ULRICH WEISS, Bethesda, Maryland. I was much interested in the list of coral species, which was completed in the April issue of the MAPS DIGEST. However, I notice that the author has

author has not mentioned anything about the State of West Virginia, which is just the one where I like to go hunting for Devonian invertebrates; the State is very, very rich in such stuff, and I did find corals. Could this omission be corrected some time. (Alan Goldstein, 3430 Bryan Way, Louisville, KY 40220, is the man you are looking for. Can you identify the corals?)

JOHN CATALANI, and LARRY JOHNSON, Clinton, Iowa (John is from Bolingbrook, IL)--Each one called checking about field trips for the summer. Some years ago we had a 4th of July field trip and an early August one, also. The heat and humidity were so intense it was actually dangerous for participants so MAPS has discontinued this practice.

JUNE MAXWELL, Editor, Southern California Paleo Society, West Covina, CA--reports in the most recent bulletin that fossils can be Xeroxed to add a dimension for your file records. The other half of this Lillybeck household, who incidentally does much reducing and copying for the Digest, took some of my fossils--flat ones, thick ones, matrix every description--for a "doubting Thomas" test. It works! June's right. They appear smaller in the Xerox copy but when you lay the fossil on the reproduction it fits. (if you don't subscribe to June's Bulletin you miss a lot of fossil news and lots of information about Los Angeles area fossil collecting. Good job, June!)

SOUTHERN CALIFORNIA PALEO SOCIETY, Los Angeles is celebrating a 25th anniversary this year.

DRY DREDGERS, Cincinnati, Ohio, is celebrating 43 years. WOW! Founded by Dr. Kenneth Caster, Prof Emeritus of Geology, University of Cincinnati.

Congratulations to both of these very active societies. Keep up your good work and all your activities.

FOSSILS FOR FUN, Sacramento, CA, how old are you?

T. M. MALONEYS, Willows, California, are about to take another trip to Alaska. Hilda, how about an article for the Digest? Tell us what a drive to Alaska entails and something about those vertebrates which keep luring you back.

KONECNYS, Prescott, Arizona are up to their eyeballs in rodeo. These ex-Chicagoites

went West all the way when they went West. It's fun to listen to them. They get as excited about rodeo as fossils, well, almost.

LLOYD GUNTHER, Brigham City, Utah, continues his fossil hunting with professors from several universities. This time to new territory for even Lloyd. He says a late frost destroyed some of his fruit. Haven't heard from him since the 4" Utah snow quenched the forest fire.

LAVETA HODGES, Mission, Kansas, would be interested to hear from you to see how you make use of the Paleo Societies listed in the Membership Directory. If you have suggestions, she's listening!

DENNIS KINGERY, Rock Springs, Wyoming, is gathering fossils for dealers from Germany. He added some help to his very Western fossil shop, but really they both just love hunting skulls and vertebrates so they just both go. No word from BARI SINES or JANE LUNDEEN the other two of the triumvirate. They discover breathtaking leaves and insects.

MAPS HEADQUARTER PEOPLE are all cocooned in their own world after a busy year and very successful EXPO VII. All except Alyn Adams, that is, who says chasing tax legalities isn't all it's cracked up to be--or is that, it's everything you've ever heard and then some.

A.R. HUTCHINSON, HUTCH, of Dinny's Doin's fame, Sacramento, California had an experience with the US mail. Took 3 weeks to get a letter to Illinois and back to CA. The frustration gets pretty intense sometimes. Don't know where the holdup is but it happens often anymore.

BOB COOPER, BC, Peoria, Illinois, just called. He's a walking encyclopedia, marine, biologic, evolution, that is. If ever you can, make arrangements with him to visit his museum. You will be glad you did! He's just been watching "The Smithsonian World--Time and Light". Don't miss it if you can help.

Did you know Haliotis, abalones, meaning ear of sea, are living gastropods?

SLINKY LINKY says to find loads of gorgeous treasures this summer. Plan to bring them with you to EXPO VIII in the spring. Be careful not to get over heated with summer suns. Safe and successful hunting to each of you.

Did you ever look over your collection and wonder how different it might have been if there

there had never been a MAPS?

Did you ever close your eyes and think of all the friends you have come to know and love because of MAPS?

Causes one to smile!!

( ( ( ) ) )

( ( ( ) ) )

( ( ( ) ) )

#### THE BURLINGTON FORMATION

Doug DeRosear  
Box 125  
Donnellson, Iowa 52625

The Burlington Formation is part of the Osage Series, being lower middle Mississippian in age. The type section is at Burlington, Des Moines County, Iowa.

In Illinois and Missouri, It is underlain by the Fern Glen Formation of Elsey Formation, also Osagean in age. In southeastern Iowa, it is underlain by the Hampton Formation of Kinderhook age. In central Iowa, it is underlain by the Gilmore City Limestone. The Burlington Formation is overlain by the Keokuk Formation.

The Burlington Formation is composed of limestone (dolomitized in some places) and chert. The limestones consist mainly of disarticulated crinoid skeletons which were spread evenly over the sea floor. There is little evidence of wave or current action and of bar accumulation. The exact nature and origin of the chert is not fully understood. The even and continuous chert beds that are seen in many exposures would seem to indicate a primary origin. However, the fossils found in the chert have been diagenetically silicified.

Many different types of fossils are found in the Burlington Formation including remains of corals, brachiopods, gastropods, bryozoa, trilobites, and fish. However, the Burlington Formation is most famous for its profusion of crinoids and blastoids. There are literally hundreds of species of crinoids and blastoids found in the Burlington Formation. In fact, in many places, the Burlington Formation is a veritable coquina of crinoid remains--stems, plates, spines, etc. Most of the crinoid specimens which collectors seek are calyxes. However, an occasional complete crown may also be found.

In 1907, Rowley separated the Burlington Formation in Pike County, Missouri, into 5 different horizons. The basal division (Abatocrinus calvini zone) is rust brown and is 5-8 feet thick. This stone weathers very soft and is not usually quarried.

Above this horizon is a series of white and brown layers of limestone and chert (Uperecrinus longirostris zone). This division

Simple pinhole eye of the chambered nautilus, is one of more than 30 different patterns of sight organs evolved by various branches of the animal kingdom. Nautilus's open-pit eye lacks a lens, yet has served its kind well for 500 million years.

#### THREAD OF LIFE

The Smithsonian Looks at Evolution  
Roger Lewin

is 15-20 feet thick and contains the common blastoid Cryptoblastus melo and the distinctive blastoid Orophocrinus stelliformis.

The third division is the "White Ledge" (Cactocrinus expansus zone). This bed is 10-14 feet thick, without seams, and with very little or no chert. This is the layer that furnishes the best rock for commercial quarrying ventures. There are many brachiopods but few crinoids in this layer.

Above the "White Ledge" is the "Blue Layer" (Coral horizon). This layer is approximately 4 feet thick and is the top of the Lower Burlington. This layer also contains many brachiopods and some corals but few crinoids and blastoids.

Rowley mentioned that the Upper Burlington is made up of thin bands of brown and yellow limestone and chert. However, it is so inconsistent in character, Rowley found it impossible to separate into divisions.

In 1937, Lowell Laudon divided the northward extension of the Burlington Formation in Iowa into three faunal zones. In 1947, Stanley Harris, Jr. divided the Burlington Formation into three lithologic units, which also correspond well with Laudon's faunal zones.

The lowermost member is the Dolbee Creek (Laudon's Cactocrinus zone) and is 9.1 feet thick at the type section. The dominant lithology is very dense, coarsely crystalline, crinoidal limestone, with scattered chert nodules and perhaps some dolomitization. The

large brachiopod, Spirifer grimesi, is abundant.

The middle member is the Haight Creek (Laudon's Physetocrinus zone) and is 39 feet thick at the type section. The Haight Creek exhibits a dominance of dolomite over limestone and contains numerous chert layers. In surface exposures, it is commonly reduced to steep talus-covered slopes as the dolomite tends to disintegrate and the chert layers are highly fractured. At the base of the Haight Creek is a zone of interlaminated glauconite and dolomite from 0.5 to 2.0+ feet in thickness. This zone is an important marker bed. The top of the Haight Creek is marked by a grayish-orange, finely crystalline dolomite.

The topmost member is the Cedar Fork (Laudon's Dizygocrinus and Pentremites zone) and is 18 feet thick at the type section. It is primarily a coarsely crystalline, crinoidal limestone. Scattered glauconite is present throughout. In the upper portion of the member are nodules and layers of white chert. Fish teeth are particularly abundant in a zone at the top of the Cedar Fork.

There are few places in the world which can compare with the Burlington Formation in terms of diversity of crinoid species. I have been hunting this formation for over 10 years and it seems like I find something different to add to my collection every time I go collecting. Most of the better specimens in my collection have come from the many quarries along the Mississippi River in Iowa, Illinois, and Missouri. I have also found some nice specimens from the Burlington in central and southwestern Missouri. Roadcuts and stream exposures may also yield very nice specimens.

There are a few places in the Burlington Formation of Iowa where it is possible to pry up strata and actually "break rock" in hopes of retrieving nice calyxes which may separate from the surrounding matrix. However, this is usually not the case in most exposures, especially in the quarries. In these places, most of the collecting entails close examination of the weathered surfaces of the large limestone blocks or walls of the quarry.

Nevertheless, finding a specimen and taking it home are two different things. Although sometimes the matrix is soft and crumbly, this is usually the exception. Most of the matrix is a very hard limestone. Extraction of the

crinoid or blastoid specimen from a large block of hard limestone can be an extremely disappointing endeavor. It can easily take one or two hours to extract the specimen with a hammer and chisel. However, there may be complications. Many of the blastoids and crinoids are hollow or sometimes filled with calcite. Repeated jarring of the specimen by pounding with a hammer on a chisel has the tendency to dislodge plates of the specimen being extracted and/or cleave the calcitic specimen into many pieces.

In my early days of collecting the Burlington Formation, I figured I could achieve a 20%-30% ratio of extraction success with a hammer and chisel. When I think of some of the beautiful specimens I have broken, I feel pretty sad. It got to the point where I left many nice specimens untouched because I figured there was no chance of extracting them without damage. Today, I employ the gasoline powered carbide saw to extract the specimens. In the past few years my ratio of extraction success has climbed to approximately 95%. Many specimens which I left untouched in the past are now in my specimen cabinet thanks to the carbide saw.

Although some species of crinoids and blastoids occur in both the Lower Burlington and Upper Burlington, most species occur only within definite zones. A good example is my favorite blastoid, Orophocrinus stelliformis. This beautiful blastoid is limited to the Cryptoblastus melo horizon. While it occurs very sparingly through 7 or 8 feet of limestone, it is rarely found outside of the 12"-14" zone that yields Cryptoblastus melo abundantly. Therefore, when collecting this zone, it pays to look very closely for Orophocrinus.

Some of the chert yields very interesting specimens. The crinoids and blastoids are preserved as internal casts. They are quite different looking due to the means of preservation and may show features, especially of internal structures or vascular canals, which do not show on the specimens preserved in the limestone. I have even found entire crowns preserved in the chert.

Identification is a big problem with the specimens preserved in the chert and extraction from the chert can be frustrating. The carbide saw does not work very well on the chert specimens. Looking for specimens by breaking chert with a sledge can become quite wearisome. Gloves, long sleeved garments,

and eye protection are a must as the chert fragments are quite sharp and ten to fly in all directions. It is not fun to collect chert specimens in the hot summer months.

It is no secret that the Burlington fauna needs to be extensively restudied. Most of the scientific work was done around the beginning of the twentieth century. The late Harrell Strimple once told me that I could work on the Burlington fauna every day of the rest of my life and probably never complete it. It seems as if many professionals shy away from the Burlington Fauna because of the large diversity of specimens and because it takes so long to clean and prepare the specimens for study.

I would like to thank everyone who encouraged me to write this article. I would like to thank Herb Davison for redrawing selected pictures of representative crinoids and blastoids from Index Fossils of North America. Most of all, I would like to thank the people who have expressed an interest in my Burlington material and who have encouraged me to keep collecting this material. Perhaps as time progresses, I can keep you up-to-date as to how much I have learned that I don't know about the Burlington echinoderms. I would be very happy to correspond with other people who have an interest in this diverse fauna.

\* \* \*

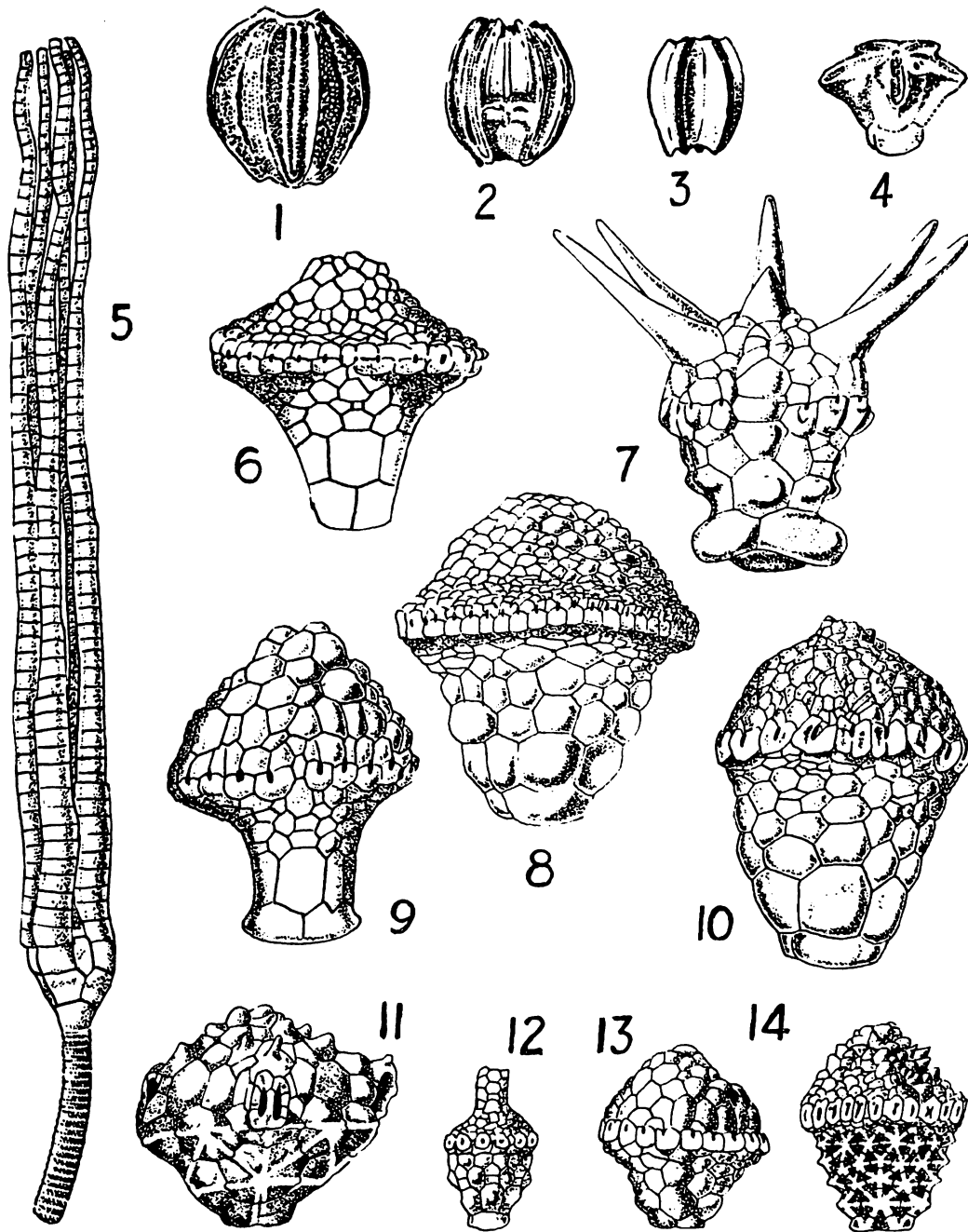
#### REFERENCES

- Bassler, R. S. & Moody, M., 1943, Bibliographic and Faunal Index of Paleozoic Pelmatozoan Echinoderms: Geol. Soc. America, Spec. Paper, v. 45, 734p.
- Cline, L. M., 1936, Blastoids of the Osage Group, Mississippian: Part I. The Genus Schizoblastus: Jour. Paleontology, v. 10, no. 4, pp. 260-281.
- Cline, L. M., 1937, Blastoids of the Osage Group, Mississippian: Part II. The Genus Cryptoblastus: Jour. Paleontology, v. 11, no. 8, pp. 634-649.
- Harris, S. E., Jr. & Parker, M., 1964, Stratigraphy of the Osage Series in Southeastern Iowa: Iowa Geological Survey, p. 1-46.
- Lane, N. Gary, 1963, Two New Mississippian Camerate (Batocrinidae) Crinoid Genera: Jour. Paleontology, v. 15, no. 1, pp. 691-702.
- Laudon, L. R., 1937, Stratigraphy of Northern Extension of Burlington Limestone in Missouri and Iowa: Am. Assoc. Petroleum Geologists Bull., v. 21, pp. 1158-1167.
- Rowley, R. R., 1908, 1909, The Geology of Pike County: Missouri Bur. Geology & Mines, ser. 2, v. 8, 122p.
- Shimer, H. W. & Shrock, R. R., 1944, Index Fossils of North America: The Massachusetts Institute of Technology, pp. 133-209.
- Thompson, T. L. & Anderson, K., 1976, The Mississippian System: MO. Dept. of Nat. Resources, Geological Survey, Supplement 1 to v. 40- The Stratigraphic Succession in Mo., 90p.
- Wachsmuth, C., & Springer, F., 1897, North American Crinoidea Camerata: Harvard College Mus. Comp. Zool., Mem., v. 21, 22, pp. 1-897, pls. 1-83.

\* \* \* \* \*

#### KEY TO PLATE

- |  |                          |
|--|--------------------------|
| 1) <u>Cryptoblastus melo calcaratus</u> (Cline)      | Lower Burlington         |
| 2) <u>Schizoblastus sayi bellulus</u> (Cline)        | Lower & Upper Burlington |
| 3) <u>Globoblastus norwoodi</u> (Owen & Shumard)     | Upper Burlington         |
| 4) <u>Orophocrinus stelliformis</u> (Owen & Shumard) | Lower Burlington         |
| 5) <u>Synbathocrinus dentatus</u> (Owen & Shumard)   | Upper Burlington         |
| 6) <u>Eutrochocrinus christyi</u> (Shumard)          | Upper Burlington         |
| 7) <u>Dorycrinus missouriensis</u> (Shumard)         | Upper Burlington         |



- |     |   |                  |
|-----|---|------------------|
| 8)  | <i>Teleiocrinus umbrosus</i> (Hall)       | Upper Burlington |
| 9)  | <i>Uperocrinus pyramidalis</i> (Shumard)  | Upper Burlington |
| 10) | <i>Cactocrinus glans</i> (Hall)           | Upper Burlington |
| 11) | <i>Steganocrinus pentagonus</i> (Hall)    | Lower Burlington |
| 12) | <i>Macrocrinus konincki</i> (Shumard)     | Upper Burlington |
| 13) | <i>Abatocrinus aequalis</i> (Hall)        | Lower Burlington |
| 14) | <i>Cactocrinus multibrachiatus</i> (Hall) | Lower Burlington |

The discussion which follows is not intended to be a comprehensive treatment of fossil cleaning by mechanical procedures. Rather it is an attempt to share with others the observations I have made during experimentation with a vibrating electric engraving tool.

There are several engraving tools on the market; however I have used the Model 74 Heavy Duty Electric Engraver (Figure 1) manufactured by Acme Burgess, Inc. located at Rt. 83, Grayslake, Illinois 60030. This Vibro-Graver cost me \$31 in 1983. It can be equipped with a replaceable point of steel, tungsten carbide, or diamond. This point is driven at 7200 strokes per minute. The length of stroke (depth of penetration) is continuously variable by an adjusting knob calibrated from 1 (long stroke) through 8 (short stroke). For work on fossil materials I find the tungsten carbide point very effective, long lasting, and relatively inexpensive (\$3.19 in 1984).



Figure 1 Heavy Duty Electric Engraver (Acme Burgess)

### General

A fossil embedded in a matrix --- typically limestone, shale, or perhaps an iron compound --- is usually discovered when some smaller part of the fossil has become exposed by weathering or by quarry operations. The remainder of the fossil is hidden by encasement within the matrix material. In order to identify and to study the fossil a collector usually wishes to remove as much of the matrix as possible.

There is always a zone of demarkation or discontinuity between the fossil and the matrix (Figure 2a). Hopefully the zone of discontinuity is also a zone of weakness such that, with careful treatment the shaded sections 1 and 2 in Figure 2b can be removed to expose a larger portion of the fossil.

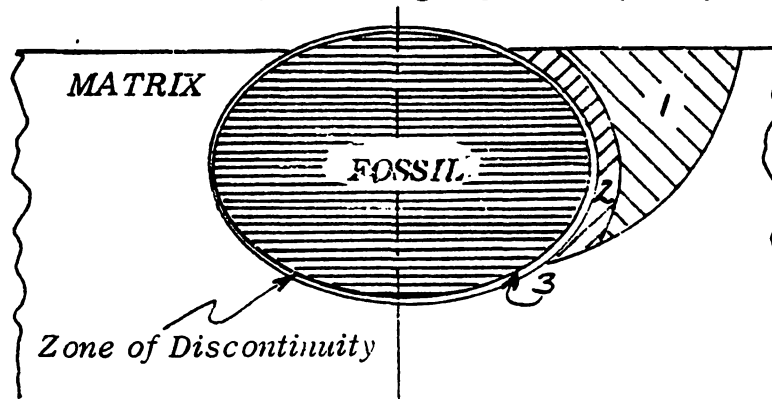


Figure 2a

Figure 2b

The Fossil and Its Matrix



The zone of discontinuity is not always a zone of weakness. The fossil may involve replacement by silica, and the matrix may also be a silica compound. The bond between the two could be very strong. The treatments I shall discuss are concerned primarily with the release of fossils which are embedded in limestones and shales.

The Electric Engraver (Vibro-Graver)

The Vibro-Graver has two basic actions which should be understood before one attempts to use the tool on a valuable fossil. These functions determine the results which can be expected. They are

1. Penetration of the surface by the sharp anvil point, and
2. Lateral displacement of matrix material by the wedge effect produced by the conical surface of the point.

The Model 74 Graver point has a shank which is roughly  $\frac{3}{32}$ " in diameter (0.094"), and this has been sharpened to a conical apex of about  $65^\circ$ . For the sake of discussion let us assume this sharp point to be 0.003" in diameter. Moreover, let us assume that the Graver delivers a 1/2 ounce blow to the anvil point. Figure 3a shows the pressures in pounds per square inch which are at work as the 0.003" point strikes a fresh surface. In our example this pressure is 4420 psi. Figure 3b shows the average pressure when the Graver point has penetrated to the full 0.094" diameter of the shank. This is only 4.6 psi.

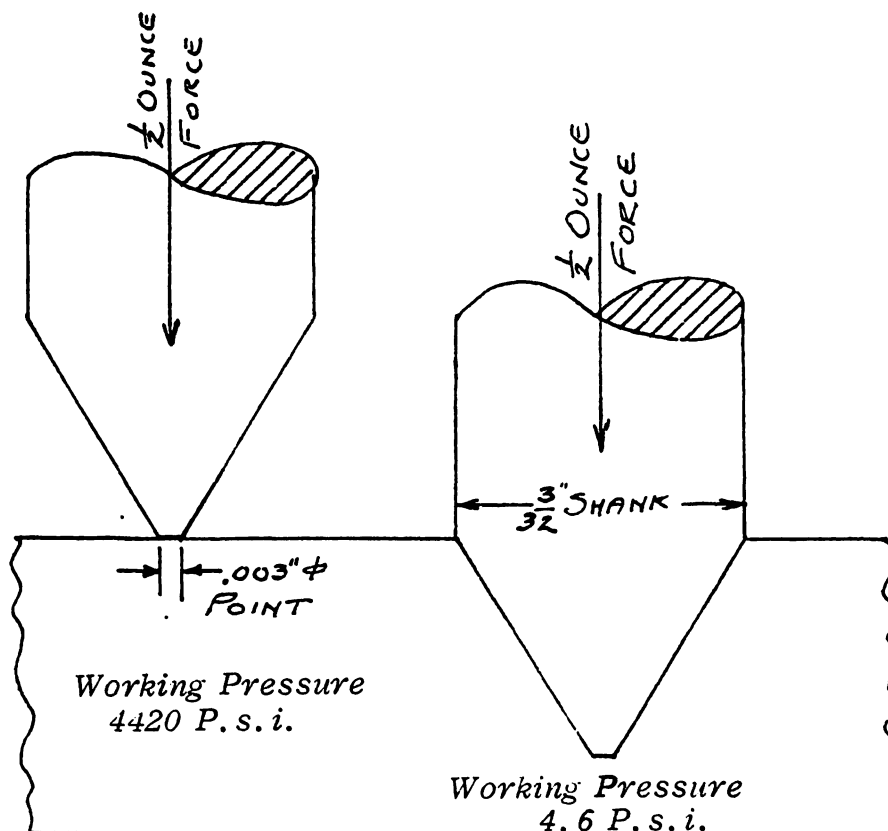


Figure 3a

Figure 3b

The graph in Figure 4 shows the very rapid decrease in working pressure as the anvil point penetrates the surface. The initial pressure of 4420 P. s. i. drops to 200 at 10% penetration, to only 12 P. s. i. at 50%, and remains at 5 P. s. i. over the last 50%.

It is immediately apparent that the Graver is most effective when its point is used to penetrate the matrix only a short distance and is then moved to a new point of attack. The tool should not be used to pound in the same spot in the matrix to any significant depth.

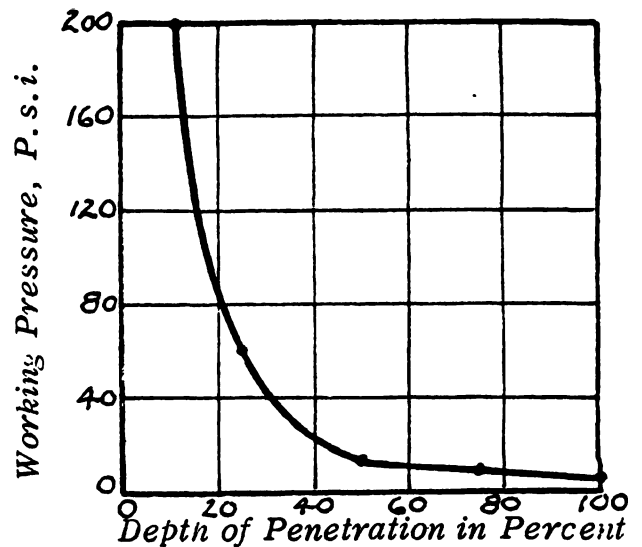


Figure 4

Let us next examine the direction of the forces which are operative beneath the point of the Vibro-Graver. When the tool is held perpendicular to the surface (Figure 5a) and the point is driven into the matrix, a compressive force is generated which acts at  $90^\circ$  to the surface of the conical point --- at right angles to the lines OX and OY in Figure 5a. If these forces acting along lines OX and OY are combined, they may be represented by the single vector F. Vector F can be divided into a shear component,  $F_s$ , and a compressive component,  $F_c$ . The component  $F_s$  produces a shear stress along the line OP while the component  $F_c$  produces a compression stress in the matrix below the line OP. The matrix rock is very strong in compression and the force  $F_c$  probably has little or no destructive effect upon it. At this angle of attack even the shear stresses along the lines OP occur well below the surface where they are relatively ineffective.

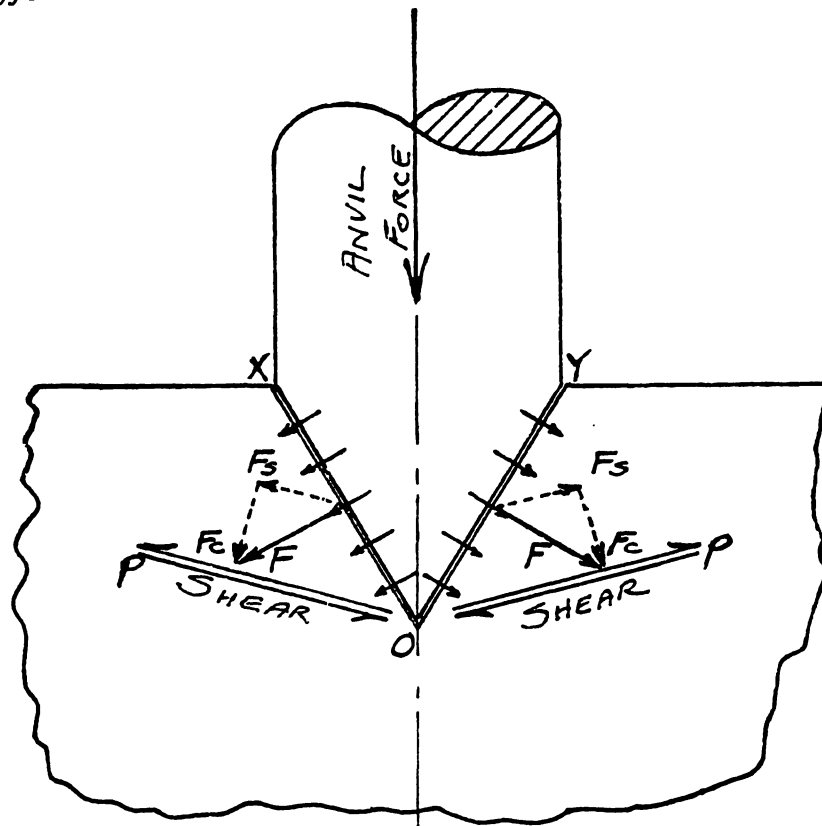


Figure 5a Attack on Matrix at  $90^\circ$

If we now incline the tool at a  $45^\circ$  angle to the matrix surface, Figure 5b, and look particularly at the triangular section OAB it is seen that a shear stress is created along the surface OA. Moreover the force component  $F_s$ , acting parallel to surface OA, produces a bending (tension) stress along surface OA as this force tends to rotate the triangular section OBA about its apex at A. Matrix rock is relatively weak in tension. For these reasons the shaded triangular section OBA is torn loose along the line OA, and a small chip is thereby removed --- the object of the operation.

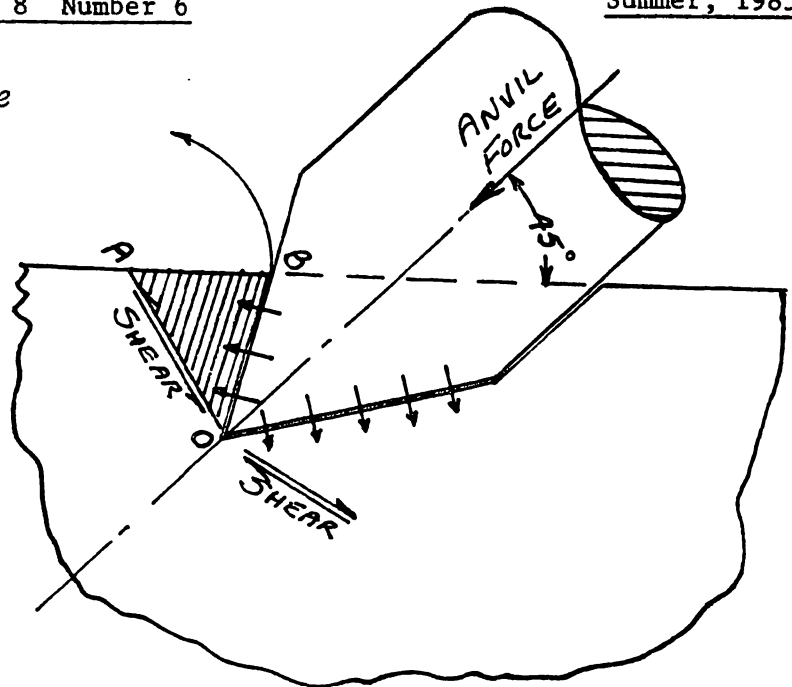


Figure 5b Attack on Matrix at  $45^\circ$

In Figure 6 below we can now apply these principles to the fossil and its matrix. By holding the Vibro-Graver at an angle (say  $45^\circ$ ) to the surface of the matrix and pointing it toward the exposed fossil it is possible to penetrate the matrix and create compressive forces perpendicular to the surface of the conical point of the Graver. These, in turn, result in a shear stress which is roughly parallel to the fossil/matrix discontinuity surface. If the chip, represented by the black area in Figure 6, is kept small, there is also a significant rotational effect on this chip which causes tension stresses along its base. These shear and tension stresses cause the matrix chip (black area) to break away at the surface of the fossil --- if all goes well!

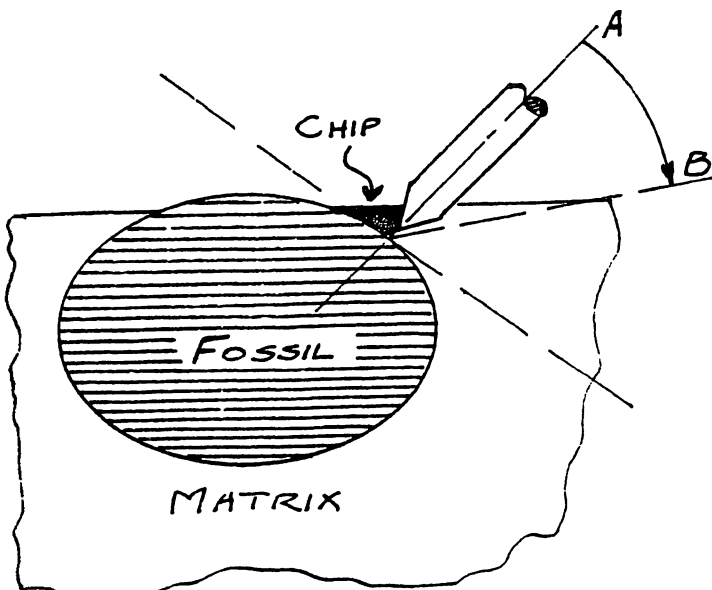


Figure 6

The name of the game then is to incline the Graver point toward the exposed fossil at an angle to the matrix surface such that a small (say  $1/16''$  to  $1/8''$ ) flake or chip is broken away without allowing the point to penetrate the fossil surface. In this process the tool could be started in position A at  $45^\circ$  to the matrix and then moved to position B as the fossil/matrix interface is approached. At this point the tool could be inclined at  $45^\circ$  to a line tangent to the discontinuity surface.

### Graver Impact Force

*The force of the blow delivered by the Graver anvil point to the matrix is a function of the mass (weight) of the vibrating anvil and the rate at which the anvil is caused to decelerate when it strikes the matrix. This impact force is given by the familiar law of physics which states*

$$\text{Force} = \text{Mass (Weight)} \times \text{Rate of Deceleration}$$

*Should you jump from an aeroplane and fortunately land in a haystack, the force on your body could be tolerable since your deceleration through the hay is not rapid. On the other hand if you land on completely immovable concrete, your deceleration is essentially infinite and the force on your body is also infinite. Under these conditions you will promptly be on your way to the Pearly Gates.*

*The force from the anvil point is generated by the sudden stopping of the anvil point against the matrix --- not by any hand pressure on the tool. Hand pressure will only restrain the free vibration of the anvil at 7200 strokes per minute and this will reduce the impact effectiveness. Never attempt to hasten the action of the Graver by applying hand pressure on the point through the tool itself.*

*Some control over the impact force can be exercised through the manner in which the fossil/matrix specimen is held. The more rigidly a specimen is held the greater the anvil deceleration rate will be, and the more effective the chipping action will be.*

*If you hold a small specimen in your hand, there will be considerable give in response to the vibrating point of the Graver, and there will be a smaller and less effective chipping force. Conversely, a larger and heavier specimen, say 5 or 10 pounds, will behave more like the immovable object, deceleration will be more rapid, and the anvil point will strike a stronger, more effective blow. For these reasons I have found it desirable to bond smaller specimens to a larger stone or brick. For this purpose I use "Duct Seal" --- a mastic which is used by electricians in certain kinds of duct and conduit sealing operations. This is available at professional electrical supply houses.*

*A word of caution! If you place a small specimen on a completely immovable surface, such as a concrete floor, the forces due to the extremely rapid deceleration may become strong enough to do damage to the surface of the fossil.*

### Specific Vibro-Graver Functions

*With the above basics in mind the fossil collector is now ready to go to work. There are four ways in which the Graver can be used.*

1. *Excavating*
2. *Breaking adhesive bonds at fossil/matrix boundary*
3. *Chipping*
4. *Shaving*

Excavating is perhaps a crude term for the removal of the matrix included in shaded section 1 in Figure 2b on Page 1. In excavating a substantial trough is cut at a safe distance from the fossil. The Graver is set for a longer stroke, say 1, 2, or 3. The matrix is attacked at a 45° angle to the matrix surface, and the tool is moved first in one direction, then in another, such that chips are broken away continuously. In this manner substantial quantities of matrix can be excavated around the fossil. Do not pound steadily in one spot or in one direction only; the tool will quickly become ineffective as it buries itself into the matrix. Keep the tool moving.

Breaking adhesive bonds at the fossil/matrix zone of discontinuity is not a major use of the Graver. It is simply an attempt, when most of the matrix has been rough chipped away by excavating, to allow the Graver point to tap/rap the surface at right angles to the thin layer of matrix still clinging to the fossil. It is hoped that this action will break some of the bonds holding the matrix to the fossil, thereby permitting a clean fracture in the final chipping operation.

Chipping removes the matrix shown by shaded section 2 in Figure 2b leaving the fossil surface exposed. The Graver use is illustrated in Figure 6. By inclining the Graver at 45° to the surface and directing it toward the fossil exposure, and attacking relatively small areas, it is possible to break small chips and flakes of matrix away from the fossil at the discontinuity surface.

#### Dampening

At this point I would like to outline a procedure which I have found to be very effective in the final stages of fossil cleaning with the Vibro-Graver. Limestone dust is gray/white and the chipped matrix surface quickly becomes the same color making it most difficult to differentiate between fossil and matrix. Under such conditions it is very easy to miss the matrix and damage the fossil.

In these final stages of cleaning matrix from the surface of the fossil I find it extremely helpful to apply to the working surface a film of water (plus a small amount of detergent) with a soft brush. The liquid quickly penetrates the matrix and has four significant effects.

1. The matrix may be softened somewhat.
2. The bond between the fossil and the matrix at the zone of discontinuity may be reduced.
3. More importantly the visual appearance of the surface is altered. Water makes the surface uniform in color and texture, eliminating the dusty white appearance which the surface has developed during working. And even more importantly the fossil surface and the matrix typically take on different shades or colors. This makes it possible to differentiate with ease and required precision between fossil and matrix. Matrix can be attacked without harm to fossil.
4. Water makes the layer of matrix less opaque and it often is possible to see the fossil through the remaining layer of matrix --- at least in outline. Recall how the early settlers coated brown paper with oil to render it translucent enough to be used for window coverings.

*After applying a film of water I blot the surface with a paper towel to remove the excess liquid. The remainder is quickly absorbed into the matrix leaving the surface damp and dull. At this point it is easy to attack the matrix with precision since the line of demarkation between fossil and matrix is clearly defined. The dampening procedure, followed by chipping or shaving with the Vibro-Graver, can be repeated as many times as necessary to remove all traces of the matrix.*

*Do not attempt to use the Graver with a glossy film of free water on the surface of the matrix. This will produce a viscous layer of mud which will cushion the blow by the anvil point, reducing the rate of deceleration and the impact force of the point. This slows the action. Work with a damp surface.*

### Shaving

*The electric engraving tool is designed to penetrate a metal surface by the process of metal upsetting. The metal is physically displaced away from the penetrating point to produce a tiny crater surrounded by a tiny circular mound of metal. Since metal is plastic and can flow, this displacement does not result in actual loss of metal. However, limestone is inelastic, brittle, and friable. Penetration of a surface of limestone matrix will actually destroy the bonds between particles at the surface. This will result in dust which can be washed away with water.*

*In the shaving process the dampened surface of the thin coating of matrix bound to the fossil can be worn away by holding the Graver at right angles to the surface and moving it back and forth over the surface with a light pressure and a short stroke setting of 3, 4, or higher. This action will loosen a very thin layer of matrix. Wash this debris away with water. Continue until the fossil is uncovered satisfactorily. In this manner the fossil can be approached slowly and without danger. You will notice that the water renders the matrix somewhat translucent and you will be able to see the fossil in outline below the dampened matrix.*

### Cleaning Fine Detail

*It is not desirable to attempt to clean fine details such as grooves and folds completely with the Graver since the force at the point may be too strong, and the shoulder of the point may contact the sides of the groove before matrix at the bottom of the groove can be removed. In Figure 7 below the shaded material at the top of the grooves might be removed safely with the Graver. However the black area at the bottom of the grooves should be removed with a stainless steel dental tool which has been ground to a very sharp needle point. Again it is very helpful to wet this surface with water and blot the excess before using the dental tool for final cleaning of such fine detail.*

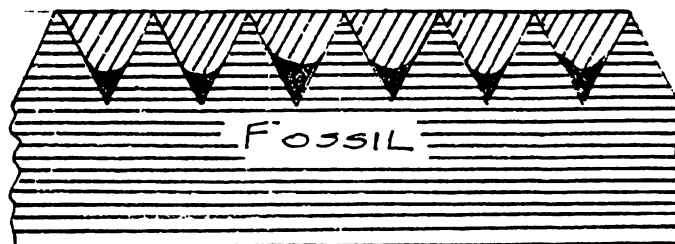


Figure 7

In Conclusion

*The manufacturer states in his operating instructions for the Vibro-Graver as an electric engraving tool*

*"Don't press down on the Engraver while it is in operation. When working on glass, ceramics, and wood, hold the point perpendicular to the material to prevent chipping and splintering."*

*These instructions are consistent with our discussions. Since for matrix removal from a fossil, we wish to produce chipping and splintering, we should*

- a. Hold the point perpendicular to the surface when we wish to loosen bonds at the fossil/matrix interface or shave the matrix surface.*
- b. Hold the point at an angle when we want to remove matrix by chipping, flaking, or splintering.*

*I have used the above procedures to uncover large specimens of fossil fish from the Green River Formations in Wyoming and Utah. Interestingly these fossils were deposited in a matrix comprising a series of distinctly different layers --- volcanic ash, limestone, sandstone, iron compounds, etc. There was a zone of discontinuity between each layer --- an ideal application for the Graver. I have also used the Graver to uncover fine trilobite specimens from the Mid-Cambrian discovered by Lloyd Gunther. These were locked in very hard shale from the House Range in Utah. In some of these specimens the zone of discontinuity was almost non-existent. The entire operation was done by shaving --- not chipping.*

*I hope I have given you an incentive to experiment on your own with an electric engraving tool and the dampening procedure I find beneficial. I would welcome comments and suggestions. Happy fossil hunting and cleaning!*

*John R. Curtis (Ray)  
165 Broadview Road  
Springfield, Pennsylvania 19064*

( ( ( ) ) )

( ( ( ) ) )

( ( ( ) ) )

SMITHSONIAN, July, 1985 Trees Are Living Archives. "Concentric Clues From Growth Rings Unlock the Past" Fascinating article. Question for you wood experts. If one examines a piece of petrified wood one can often observe what appears to be growth rings. When that same piece of wood is polished one would expect to see the growth rings accentuated. In fact the growth rings, or what appeared to be growth rings disappeared. Who will clarify this mystery?

( ( ( ) ) )

October MAPS DIGEST look forward to an article by B. Clay Cartmell on Hunting Fossil Shark Teeth in Florida. Also an article to include a line drawing of a spectacular find Mazon Creek Pit 11 by Dan Chlipala. Your Digest will be mailed in late September

## DIGGING FOR FOSSIL FACTS

Hopkins Medical News

V 8 No 6, Fall 1984

Thanks Carlos Bazan, San Antonio, Texas

A Johns Hopkins investigator has strengthened the theory that evolutionary changes in animals occur gradually, not abruptly.

Kenneth D. Rose, Ph.D., Assistant professor of cell biology and anatomy, and Thomas M. Brown, Ph.D., of the U.S. Geological Survey, studied modifications in dental morphology of more than 600 fossils of the omomyid primates--an extinct family of small, tree-dwelling primates common in North America approximately 50 million years ago.

The fossils which covered a million-year period revealed small and gradual changes. Specifically the jaw shortened, the front tooth enlarged, and certain other front teeth became smaller and moved closer together.

The pace and mode of evolutionary change is one of the most controversial issues in evolutionary biology. Much of the debate centers around two opposing theories; gradualism versus punctuated equilibria. Gradualism, as the name suggests, says evolutionary changes which often lead to the development of new species occur gradually over a long period of time. Punctuated equilibria, on the other hand, proposes that the changes occur more abruptly and relatively quickly, "punctuating" longer periods when species experienced no change.

Eager for new facts in the debate, Drs. Rose and Brown traveled to the fossil-rich Bighorn Basin in Wyoming, which is one of the richest areas of fossil vertebrates in the world. From its badland exposures comes the largest and most diverse collection of omomyid primate remains.

Unlike most fossil sites, the Bighorn Basin contains a richly fossiliferous, continuous sequence of strata, spanning millions of years, that contains an exceptionally complete fossil record of many evolving species. Other ancient sites typically have large gaps in their time-line of fossil evidence. The gaps, Dr. Rose explains, give rise to several other interpretations of how evolution occurs. For example, proponents of punctuated equilibria believe the gaps are not gaps at all, but evidence that evolutionary change occurs abruptly. Gradualism, however, supports the notion that time has

swept away the opportunity for a perfect reconstruction of all fossil evidence, except

in rare areas such as the Bighorn Basin.

"For the fossils we looked at, the evidence is clear that their evolution is gradual," says Dr. Rose. There are no long periods of time during which nothing changed, he adds. "I'm not saying that all evolution is gradual," . . . "but gradualism seems to be much more common than the proponents of punctuated equilibria claim."

. . . This research appeared in the May 17, 1984 issue of NATURE. It was funded by the National Geographic Society, The American Philosophical Society and the National Science Foundation

--Ariane Fenton

BONES MAY BE OLDEST DINOSAUR'S--Berkeley Calif. The bones of a clumsy prehistoric creature that lumbered through swamplands in northeastern Ariz. 225 million years ago may be from the world's oldest dinosaur skeleton, researchers say.

The skeletal remains discovered in Arizona's Painted Desert are believed to be those of an early ancestor of the brontosaurus family, the largest animals that ever roamed Earth.

Scientists at the Univ. of Calif. at Berkeley announced the discovery and estimated the skeleton is three or four million years older than the oldest known dinosaur skeleton. . .

The animal, about the height of a German shepherd, is believed to have weighed about 200 pounds and had a long neck and tail characteristic of the brontosaurus. It was rather clumsy, and walked around on all fours while munching on plants.

The site of the find, Arizona's Painted Desert is a part of Petrified Forest National Park about 200 miles northeast of Phoenix. Bob Long, leader of the team of paleo. researchers, made the find last summer less than two miles from the Petrified Forest park headquarters.

Long, who has spent 20 years sifting through Arizona's fossil rich parklands, said that although the area is primarily desert today, it was once full of streams and swampy lowlands. "The dawn of the dinosaurs was a totally alien world," Long said. "There were no flowers, no birds, no mammals, no butterflies, no colors--only green and brown."

Michael Greenwald, curator of the Berkeley Museum of Paleo., one of the largest in the world devoted to the discipline, said, "It's the oldest dinosaur in the world, no doubt about it."

RACINE JOURNAL TIMES, May 16, 1985

Thanks , Paul Meissner, Racine, Wisconsin

SEE YOU IN SEPTEMBER! Love you!

Slinky Linky and Maddy



## PLEASE UP-DATE THE FOLLOWING IN YOUR MEMBERSHIP DIRECTORY

JEAN-GUY PELLERIN, 6855 #12 35th Ave. Rosemont, Montreal, Quebec, CANADA HIT 3A8 - 514-729-8460

JOHN BADURA (NOT Mr. & Mrs. John Badura) 4218 California, St., Omaha, NE 08131

ROBERT BILLMAN, 9603 Whistler Ct., Overland, MO 63114

ANN BURLEIGH, Denver CO 80221 -- Please remove the words "will trade" from nodule.

CHRIS COZART, 1633 Jasper, Wheaton, IL 60187 -- 312-462-9778

GARY EICHHORN, East Lakeshore, Bigfork, MT 59911 -- 406-837-4432

RANDY & LINDA FAERBER, 7854 Darnell, Lenexa, KS 66216 -- 913-268-6786

JOHN FAGAN (after Aug. 1) Rice High School, 74 W 124th St, New York NY 10027

JOHN W. FOX, Baylor University, Waco, TX 76798 Professor. Will NOT trade. Interested in Arthropods and starfish. Collects starfish and pyritized ammonites from Texas.

I would appreciate this entry being amended inasmuch as the institution where I am employed has rules against such activity.

STUART GRIEVE, 266 N. Railroad, Laramie, WY 82070

R. D. HAMELL, Mr. NOT Dr, Monroe Community College, Rochester, NY 14623-5780

ROBERT HOWELL, Rte 2, Box 98, Roachdale, IN 46172 -- 317-522-1516

AL & JACKIE JANESKY & FAMILY, New Milford, CT 06776

GLEN J. KUBAN, 1127 Manitoulin Pike, Brunswick, OH 44212 -- 216-273-6371

Director of software applications company. Interested in all fossils but especially dinosaur tracks. Have studied tracks near Glen Rose, Texas, extensively. Would like to meet others interested in tracks and other trace fossils.

TED MILLER, 116 West Lake Drive, Weatherford, TX 76086 -- 817-599-6090

JERRY NAVONE, 1804 So 65th St, West Allis, WI -- 414-321-9798

MRS. KEITH PALMER, Orem, UT

LULU & TOTO OLIVERA, 1370 Bryan Ave., Salt Lake City, UT 84105

D.J. & SARA C. PARSONS, Rapid City, SD 57701 -- 605-348-0937

SHARON POWELL/KATHLEEN MORNER, River Forest, IL 60305 -- 312-366-7198

W. LLOYDE ROSE, 772 Wayah Rd, Franklin, NC 28734

JACK & KATHY SHIRLEY, 6292 Castle Hill Dr, Middletown, OH 45044 -- 513-777-7793

RICK ZARWELL, Fairfield, IA 52556-1307

## PLEASE ADD THESE NAMES TO YOUR MEMBERSHIP

UNIVERSITY OF ALABAMA  
Dept. of Museum  
P.O. Box 5897  
University, AL 35486

JEFF AUBRY  
P.O. Box 374  
Crawfordsville, IN 47933

STEVE BRYSON  
5100 W. Henrietta Rd.  
Rochester, NY 14692-9012  
716-359-2502

DOUG CORLEY  
1727 Parkway Acres  
Maryland Heights, MO 63043  
314-434-3070

JAMES A. ENGMAN  
2002 - 37 St.  
Rock Island, IL 61201  
309-786-1809

DR. ROBERT FENDRICH  
220 1/2 North 18th St.  
Quincy, IL ?  
217-224-4518

MR. & MRS. BURNELL E. FRANKE  
901 E. Johnson  
Madison, WI 53703  
608-251-2601

HARRIS E. FERGUSON  
Rt. 5, Box 302  
Portland, IN 37148  
615-325-9781

JEFFREY J. GREEN  
P.O. Box 780298  
Oklahoma City, OK 73178  
405-840-2573

DONALD HEATH  
69 Westernview Circle  
East Longmeadow, MA 01028

DALE H. HOCEVAR  
781 E. 236 St.  
Euclid, OH 44123

Director of Geology--Ward's Natural Science. Will NOT trade. Wants to keep up-to-date on collecting news and new finds.

Controller. Will trade. Has Missouri fossils for trade. Is interested in fossils.

Sanitarian. Will trade. Has next to nothing to trade now. Has a general interest in fossils/biology.

College Professor (psychology). Will trade. Major interest ammonites. Has Cretaceous ammonites for trade.

Will trade. Major interest paleobotany Has fossil ginkgo leaves--Paleocene. Generally not complete. Collect, buy and sell fossils.

School Principal. Will trade. Major interest cystoids crinoids, sponges. Has sponges, corals, brachiopods for trade.

Environmental Technician. Will trade. Major interest trilobites, crinoids, cystoids, paracrinooids, edrioasteroids. Has Ordovician through Devonian Oklahoma material, Crawfordsville crinoids, Cincinnati and Waldron. Wants to further my collection and share the fossils from my area of the country with other individuals with like interests, and to learn more about fossils.

Will possibly trade. Major interest trilobites and crinoids.

MAYSIE HUGHES  
Route #1, Box 137  
Elvins, MO 63639

MIKE MANNING  
1150 Scott St.  
Troy, OH 45373

Will trade. Major interest all types of fossils. Has Cambrian trilobites and various Ordovician fossils for trade. I would like to acquire various fossils for re-sale as well as meet other people and collect and talk fossils.

MIKE KOLODZYK  
1011 S. 63rd St.  
West Allis, WI 53214  
414-453-3904

Biology teacher. No indication about trading. Major interest Pit 11 Mazon Creek. Wants to be a member of MAPS because of a love of fossils. (Welcome, Mike, you came to the right place!!)

ROBERT J & FAY MCCOY  
1729 W. Schaaf Rd.  
Cleveland, OH 44109  
216-749-7384

Retired. Vol. Cleveland Museum of Natural History. Just starting.

SCOTT C. MCKENZIE  
630 Clifton Dr.  
Erie, PA 16505  
814-838-3269

Training coordinator. Fossil collecting 15 years. Will trade. Major interest horseshoe crabs, shrimp, conularids, meteorites, sponges, rudists, crabs, insects. Has for trade large variety of invertebrate fossils and meteorites, Titusvillia type sponge fossils, etc. Wants to trade quality specimens.

ELSIE MOREY  
200 Wagner Rd.  
Morgantown, WV 26505

DANIEL MOSHER  
1337 S.W. Jennings  
Bartlesville, OK 74003  
-336-9553

Self employed. No indication about trading. Major interest Mississippian echinoderms. Wants to learn more about what is being published in other time periods other than Mississippian.

RICHARD LEE NEWBERN  
1045 Old Monrovia Rd.  
Huntsville, AL 35806

Professor of Biology, Indiana University. Will trade. Major interest echinoderms, Cretaceous fossils in general. Has Indiana Paleozoic and ammonites. Wants contacts and information on MAPS activities.

RUDOLF A. RAFF  
909 S. Highland  
Bloomington, IN 47401  
812-334-2105

Anesthetist. Will trade Major interest trilobites.

DEAN RASMUSSEN  
930 Westwood  
Rexburg, ID 83440  
208-356-0126

MARTIN REITER  
30467 Ganado Dr.  
Rancho Palos Verdes, CA 90274  
213-377-8546

Prof. of Geology. No indication about trading. Major interest trilobites. General interest in fossils.

JOHN & EARLENE SCHOOLER  
406 Colonial Ct.  
Lee's Summit, MO 64063  
816-373-9126

Engineer. Will trade. Joining MAPS for knowledge of fossils.

DR. CHARLES W. SHABICA  
Northeastern Illinois University  
Chicago, IL 60625  
312-583-4050

Professor Paleontology. Will trade. Major interest Mazon Creek fossil Atlas. Has Mazon Creek fossils for trade. Joining MAPS because it is a first class operation.

CARL SLAUGHTER  
3503 Oak Ave.  
Brookfield, IL 60513  
312-485-3284

Occupation education. Will trade. Major interest general but primarily Mazon Creek flora and fauna. Has Pennsylvanian floras for trade. Wants to gain more knowledge about fossils.

DONALD G. SMARJESSE  
23628 Stonehenge  
Novi, MI 48050  
313-476-3386

Maintenance Supervisor. Will trade. Major interest trilobites, crinoids, brachiopods, corals. Has the above for trade. Wants to join MAPS because of the people. Wants to associate with people with same interest.

GEORGE L. H. STONE  
110 W. Lake Dr  
Springfield, IL 62703  
217-529-0080

University Foundation President. Will trade. Major interest trilobites. Has trilobites for trade.

DAVID L. WINDSOR  
412 McCreary Ct.  
Cincinnati, OH 45231  
513-772-8053

Analytical chemist. Will trade.

DONALD G. WYMAN  
132 Forest St.  
Winchester, MA 01890  
617-729-0868

Fossil & Mineral Dealer. Will trade. Major interest pyritized fossils of Alden, NY and Waldron Indiana, and Aesthetically attractive fossils of all types. Has crinoids, trilobites, fossil fish, pyritized fossils for trade. Wants to make acquisitions of fine fossils by trade or purchase.

PETER MUIR MACDONALD  
12 Orngangs Terrace, Counton Mains  
Edinburgh, SCOTLAND EH13 9BY

Lawyer. Collecting 11 years. Will trade. Major Interest L. Palaeozoic, shelly faunas (Sorry, that is what it looks like, but I do not understand. Is it right? also ammonites and vertebrates. Has ammonites, corals, sponges, brachiopods, shrimps, some trilobites, graptolites, some Devonian fish, gastropods. Member of Paleontological Association of Great Britain and Glasgow and Rodinburgh Geological Societies. Wants to broaden knowledge of paleontology and to correspond with like people abroad.

F O S S I L M A N I A III

FOSSILMANIA III will be held at Oakdale Park, Glen Rose, Texas on October 25, 26 and 27, 1985. Only fossil and fossil related items.

HOURS: Friday October 25th 1:00 p.m. to 6:00 p.m.  
 Saturday October 26th 9:00 a.m. to 6:00 p.m.  
 Sunday October 27th 9:00 a.m. to 3:00 p.m.

LODGING: Trailer Sites \$10.00/night (full hook-up)  
 Tent Sites 7.50/night  
 Cottages 25.75/night (1 double bed /linens furnished)  
 31.00/night (2 double beds/linens furnished)  
 36.25/night (3 double beds/no linens, w/kitchen facilities)

\*All cabins are air conditioned and heated. There is a 2-day minimum requirement on all cabins. A list of motels and RV sites are listed below for your information.

MEALS: Some light meals will be available. There will be a potato bust on Friday night at 6:30 p.m. and a real Texas BBQ on Saturday night at 6:30 p.m.

EXHIBITS: Let us know if you intend to bring an exhibit. Tables will be provided free. Let us know dimensions of table space needed and any electrical requirements.

TABLES: Tables will be assigned on a first come, first served basis. The cost is \$8.00 for a 6-foot table for the entire weekend. Reduced cost basis for partial days will be available if tables are not already reserved.

FIELD TRIPS: We will have information on field trips in the local area, but no field trips will be sponsored during the show.

AUCTION: We would like a donation of one nice fossil specimen for the live auction to be held Saturday night after the BBQ. Please provide full data on the fossil and the name of the donor.

RESERVATIONS: Everyone should make advance reservations as soon as possible, but no later than September 30, 1985. All cabins not reserved by September 30th must be released back to Oakdale Park. Please separate the registration form below and send to F.O. Crane, 1603 Twilight Ridge, Austin, Texas 78746. Make checks payable to the "Austin Paleontological Society". For additional information or questions, you may also call (after 5:30 p.m.) (512)327-4005.

MOTELS/RV SITES: Glen Rose Motor Inn, Hiway 67 (817)897-2940 From \$36.00  
 Glen Rose Motel, Hiway 67 (817)897-2635 From \$35.00  
 Dinosaur Valley State Park - from Texas 67, FM 201 E 4 mi.; Park Rd. 59  
 E 1 mi. Entrance - \$2.00; Wheeled Camper Sites - \$4.00; Primitive  
 camping - \$3.00 Box 396, Glen Rose, Texas 76043 (817)897-4588.

SECURITY WILL BE PROVIDED --- BUT WE CANNOT BE RESPONSIBLE FOR LOST OR STOLEN ITEMS.

NAME \_\_\_\_\_ PHONE ( ) \_\_\_\_\_

ADDRESS \_\_\_\_\_ CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

\*\*\*COTTAGES: 1 Double Bed @ \$25.75/night, linens furnished \_\_\_\_\_  
 2 Double Beds @ \$31.00/night, linens furnished \_\_\_\_\_  
 3 Double Beds @ \$36.25/night, no linens, w/kitchen \_\_\_\_\_

\*\*\*When making reservations for cottage accommodations, please indicate which nights.

CAMPSITES: Trailer Sites @ \$10.00/night \_\_\_\_\_  
 Tent Site @ \$ 7.50/night \_\_\_\_\_

TEXAS BBQ: \$8.00 per person \_\_\_\_\_

POTATO BUST: \$4.00 per person \_\_\_\_\_

COMBINATION BBQ/POTATO BUST: \$11.00 per person (Save \$1.00) \_\_\_\_\_

TABLES: 30" x 72" @ \$8.00 \_\_\_\_\_

TOTAL ENCLOSED \_\_\_\_\_

EXHIBITS: Do you plan on exhibiting? YES \_\_\_\_\_ NO \_\_\_\_\_

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: January 1 through December 31 is \$7.00 per household.

MAPS meetings are held on the 1st Saturday of each month (2nd Saturday if inclement weather). September, October, May, June, and July meetings are scheduled field trips. The August meeting is in conjunction with the Bedford, Indiana, Swap sponsored by the Indiana Society of Paleontology, the Indiana Chapter of MAPS. November through April meetings are scheduled for 2 p.m. in the Science Building, Augustana College, Rock Island, Illinois. MAPS Annual International Fossil Exposition is held in the Spring, and a second show in the Fall, Fossilmania, is sponsored by Austin Paleontological Society, a MAPS Affiliate.

MAPS official publication, MAPS DIGEST, is published 9 months of the year--October through June.

President: Marvin Houg, 3330 44th St. N.E., Cedar Rapids, IA 52402  
1st Vice President: Karl Stuekerjuergen, Rt. 1, West Point, IA 52656  
2nd Vice President: Jeff Nekola, 800 25th St. N.E., Cedar Rapids, IA 52402  
Secretary: Peggy Wallace, 290 So. Grandview, Dubuque, IA 52001  
Treasurer: Allyn Adams, 612 W. 51st Street, Davenport, IA 52806



## CYATHOCRINITES

FIRST CLASS MAIL

MID-AMERICA PALEONTOLOGY SOCIETY

Mrs. Madelynn M. Lillybeck  
MAPS DIGEST Editor  
1039 - 33rd St. Ct.  
Moline, IL 61265

Dated Material - Meeting Notice