

# M.A.P.S. Digest

Official Publication of  
Mid-America Paleontology Society

Volume 14 Number 3  
March, 1991

BROUZOAN *Hallopora*

TABULATE CORAL *Favosites*

RUGOSE CORAL *Hexagonaria*

CEPHALOPOD *Orthoceras*

CEPHALOPOD *Ovoceras*

TRILOBITE *Phacops*

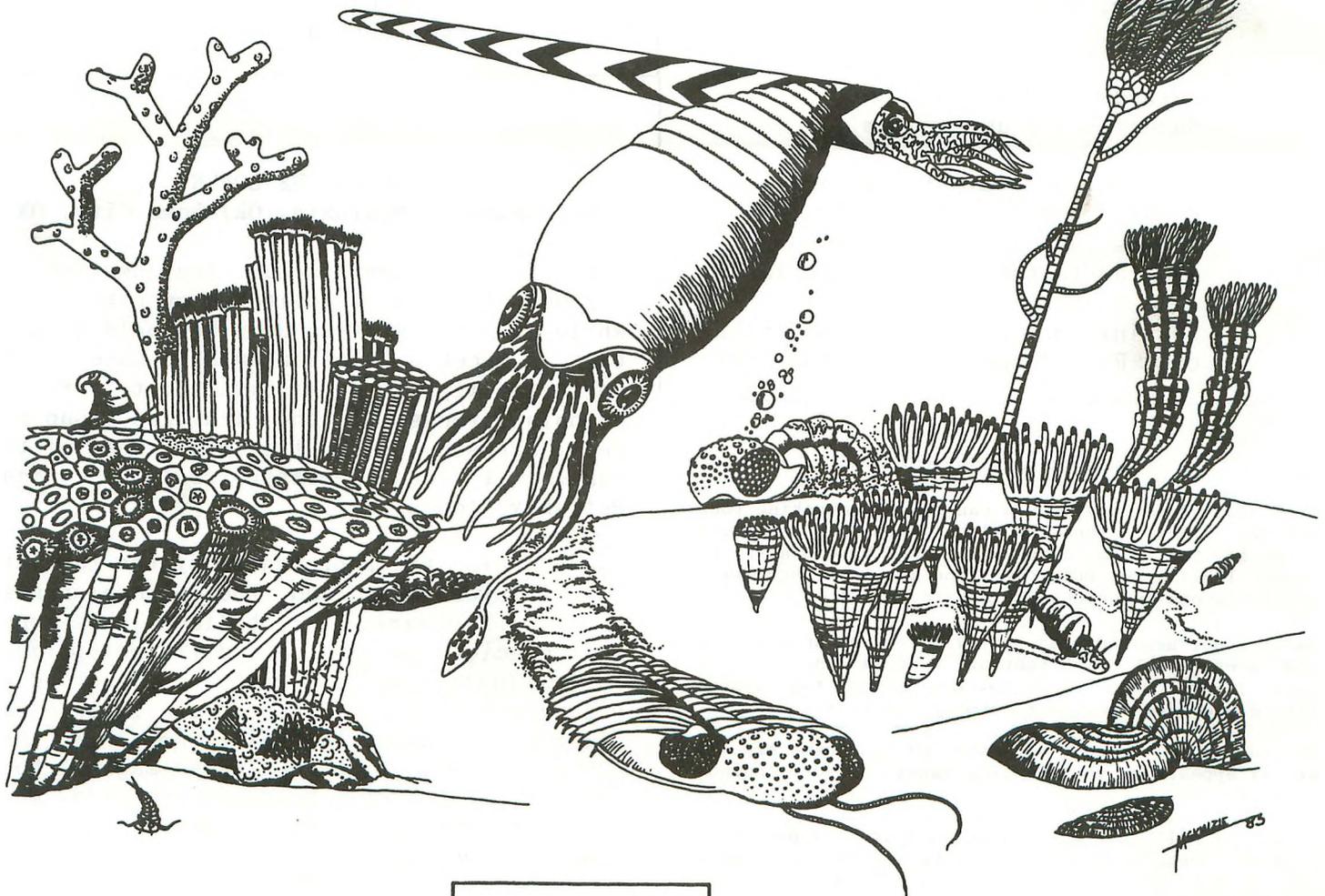
CRINOID *Taxocrinus*

RUGOSE CORAL *Amplexus*

RUGOSE CORAL *Streptelasma*

GASTROPOD *Harmotoma*

BRACHIOPOD  
*Leptaena*



DEVONIAN SEASCAPE

## MARK YOUR CALENDARS

2 MAR MAPS MEETING --Trowbridge Hall,  
University of Iowa, 123 N. Capital  
St., Iowa City, IA. The room  
number will be posted.

1:00 Board & General Meeting  
combined.

2:00 Program: The Delta  
Amphibian Site, by Brian Witzke  
of the Iowa Geological Survey.  
*Delta, IA, is the site of a  
rare tetrapod find. Several  
MAPS members took part in a  
field trip to the site last  
fall.*

13 APR TAMPA BAY FOSSIL CLUB 4th Annual  
14 Fossil Fair, Ft. Homer Hesterly  
Armory, 504 N. Howard Ave., Tampa,  
FL.

Saturday: 9 am to 7 pm  
Sunday: 9 am to 5 pm

Auction, displays featuring  
fossils, etc., dealers,  
demonstrations, raffle, slide  
program featuring Frank Garcia.

For information on being a dealer  
call Rudi Johnson at 813-839-2291.

19 APR 1991 MAPS National Fossil Expo-  
20 sition XIII--Lagerstatten  
21

The theme for EXPO XIII is  
Lagerstatten, which means very  
special locations of fossils  
world-wide.

Fri., Apr. 20: 10am - 6pm

(Dr. Desmond Collins, Royal  
Ontario Museum, will give the  
keynote address at 7:45 on  
"The Burgess Shale Fossil  
Fauna--The Type Lagerstatten")

Sat., Apr. 21: 8am - 5pm

(Business meeting and auction  
following)

Sun., Apr. 22: 8am - 3pm

(Seminar by Dr. Merrill  
Foster: 9 - ?)

### ABOUT THE COVER

by: Mark G. McKinzie, Oklahoma City, OK

This illustration is an amalgamation of various fossils I collected over the years while I was growing up. We would always take a week's vacation on Burt Lake in the northern tip of the Michigan "mit." Middle Devonian rocks of the Traverse group are well exposed along the shoreline of the lake. I can remember collecting many Petoskey stones.

The corals are represented by the tabulate coral *Favosittes*, and the colonial rugose coral *Hexagonaria*. I believe this genus and species is now called *Prismatophyllum pericarinata* and is what is preserved as Petoskey stones. Other corals include the solitary rugose corals *Amplexus* and *Streptelasma*. I have always imagined horn corals being very brightly colored, much like modern-day sea anemones found in today's tropical waters.

A *Platyceras* gastropod grazes for algae on top of the *Hexagonaria* colony while a high-spired *Hormotoma* meanders among the horn  
(continued on next page)

\*\*\* 91/03 DUES ARE DUE \*\*\*

Are your dues due? You can tell by checking your mailing label. The top line gives the expiration date in the form of year followed by month--91/03 means 1991/March. 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 on your *Digest*. We carry overdues for two months before dropping them from our mailing list.

Please include your **due date** and your **name exactly as it appears on your mailing label** (or just include a label).

Dues are \$15 per U.S./Canadian household per year. Overseas members may choose the \$15 fee to receive the *Digest* by surface mail or a \$25 fee to receive it by air mail. Library/Institution fee is \$25.

Make checks payable to MAPS and mail to:  
Sharon Sonnleitner, Treas.  
4800 Sunset Dr. SW  
Cedar Rapids, IA 52404

## EXPO XIII--LAGERSTATTEN

This is the last *Digest* before EXPO. The next issue will be the EXPO issue, which comes out at EXPO and will be mailed from there to all members not in attendance. The next regular issue of the *Digest* will go out around the first of June.

The last I heard from Doug DeRosear, who is handling table reservations, there were very few reservations for displays, so if you have specimens from any special fossil locations or any other specimens that you would like to share with the EXPO participants, please let Doug know how much table space you will need. Displays are a very important part of EXPO.

It is really just a short time to EXPO now, and we hope many of you will be able to make the show this year to make new friends and visit with old ones, as well as to enlarge and upgrade your collections or perhaps just add to your wish-list.

## CAN YOU HELP?

MAPS member Erich A. von Fange, 517 S. Occidental, Tecumseh, MI 49286, is writing material on dinosaurs for children and is compiling a list of states where dinosaur fossils and prints have been found. If **YOU** can add to his list, please contact him and, if possible, give the source of your information. Your help will be much appreciated.

STATES WHERE DINOSAUR BONES AND PRINTS have been found: AK, AZ, CA, CO, CT, KS, NJ, NM, OK, TX, UT, WY (12)

DINOSAUR BONES ONLY have been found: AL, DE, ID, MD, MO, MT, NE, NC, ND, SD (10)

DINOSAUR PRINTS ONLY have been found: AR, MA, PA, VA (4)

TOTAL: 26 states.

## MEMBERSHIP CARDS

Because the membership year has been changed from a calendar year to a year from the date of a member's joining, we have decided to discontinue the issuance of membership cards. It was very time-consuming and confusing at EXPO last year to try to match membership cards with the month of membership expiration. Several options were explored, and after much discussion of issuing undated membership cards, we decided to just drop them. It was suggested that the address label on your *Digest* should be sufficient proof of your membership--if you need such proof. Also, the label on this month's issue can be cut out on the line to serve as a membership card. (Overseas and Canadian members can cut and paste your address labels or simply write in the information from your address label.)

(continued from **Cover** on page 1)

corals feeding on organic detrius in the lime mud. Other mollusks include the nautiloids *Orthoceras* and *Ovoceras*. I illustrate *Orthoceras* (which is actually a "form" genus in that it represents a whole group of straight-shelled nautiloids) with the classic herring-bone pattern of alternating light and dark bands on its test. I show *Ovoceras* with the suckered tentacles, much like a modern-day squid. This is probably inaccurate, but one never knows since an impression of the soft-body parts has not yet been discovered for this genus.

Finally, I show three specimens of the common Devonian trilobite *Phacops rana*--two adults and one larval form hiding beneath a coral colony. The *Phacops* in the background is beginning to bury itself in the mud, in response to some environmental stress. In the Hamilton group of New York, *Phacops* have been recovered in a burrowed position with their thorax-pygidium perpendicular to bedding, and the cephalon exposed above the surface.

## HOW PTEROSAURS REALLY LOOKED

by David Peters

1208 Dubois Ct., St. Louis, MO 63122-5518

It seems that every "dinosaur novel" of the past century, including the recent *Jurassic Park*, has included pterosaurs (once called pterodactyls), those "devilishly reptilian monstrosities" with "huge leathery wings". Remarkably, an accurate picture of how pterosaurs really looked has only recently come to light.

It was once thought that pterosaurs hung like bats by their toes from branches or cliffs, that they walked on all fours when on flat ground, and that their wing membranes extended all the way to their ankles. In fact some artists of the time went so far as to give pterosaurs large bat-like ears! All pterosaurs retained three sharp-clawed fingers that must have been used for climbing or clinging, they reasoned.

A contrasting model emerged in the 1980s when scientists and artists began giving pterosaurs a bird-like look. They have extended the wing membranes of pterosaurs to the tail and have pictured them flying with their knees tucked in to their chest. Is either reconstruction correct?

### Pterosaurs and their closest relatives

Let's take a look at the fossil evidence. Pterosaurs were closely related to the earliest dinosaurs. Both first appeared during the Middle to Late Triassic. Dinosaurs have (not *had*, since *birds are dinosaurs*) an S-shaped neck, a short stiff back, fully erect hind limbs, and they walk with their ankles off the ground. So did pterosaurs. Because of their similarities, especially a "simple hinge" ankle joint, pterosaurs and dinosaurs are lumped together in a group known as the Ornithodeira (bird ankles.) Dinosaurs are dinosaurs because they alone have a perforated hole for a thigh socket (the acetabulum). Pterosaurs, like humans and most other tetrapods, did not. They retained a primitive cup for a thigh socket.

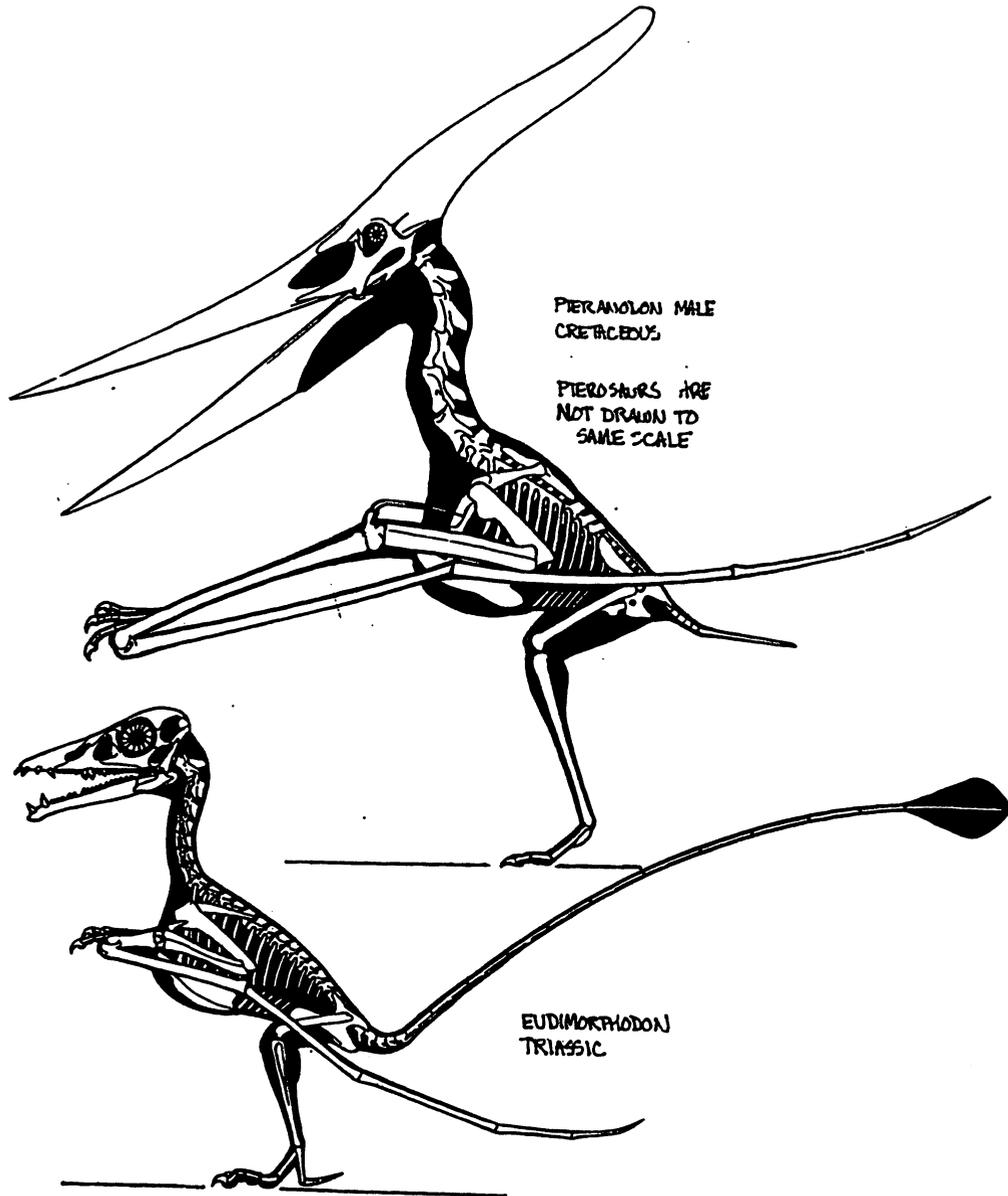
The common ancestor of both pterosaurs and dinosaurs was a hollow-boned, non-flying, five-fingered, bipedal, ornithosuchian archosaur probably no more than 16 inches long. Early pterosaurs continued to resemble little dinosaurs (if one disregards the wing finger). They walked completely upright, although their knees probably bowed out as much as did those of *Allosaurus* and *T-rex*. Initially pterosaurs were speedy runners that probably took to the air only after a long running take-off. Later pterosaurs, such as *Pteranodon*, seem to have had wings capable of flight after only one leap and a flap.

### What makes a pterosaur special?

Wings, of course. Pterosaurs had a unique pteroid bone which framed a wing membrane in front of each elbow. The rest of each elastic wing was framed by an enlarged fourth finger. No known pterosaurs have a fifth finger. The fourth finger of many living lizards and other primitive reptiles is also the longest and usually contains the same number of joints.

### How did pterosaurs develop wings?

Pterosaurs probably became flyers in much the same way that some dinosaurs became flyers. They were tiny, speedy bipeds in a land of large, fast quadrupeds. So far as we know, there were no predators in the trees, so trees gave refuge from danger on the ground. Some trees had no branches, but conifers did, and many were, as they are today, arranged ideally for an animal that could hop from branch to branch. In this way pterosaurs could escape their enemies. Each hop would have been accompanied by a flutter of the arms, initially just to keep balanced on the branch. If any hopper had some sort of arm membrane to catch the air, then not only would balance be enhanced, but each hop would also have that much more explosive power at take-off. Once in the trees, a glide to another tree or to the ground would have been facilitated by a wing

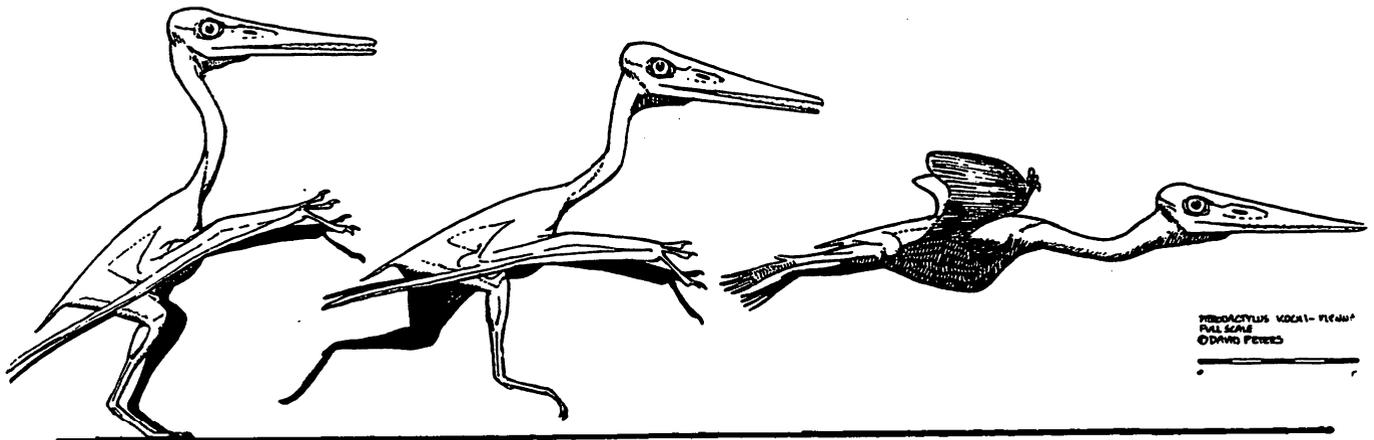


PTERANODON MALE  
CRETACEOUS

PTEROSAURS ARE  
NOT DRAWN TO  
SAME SCALE

EUDIMORPHODON  
TRIASSIC

© DAVID PETERS 1990



PTERODACTYLUS VOGELI - PLEISTOCENE  
FULL SCALE  
© DAVID PETERS

membrane. Early pterosaurs had only about half the wingspread of later ones. Their currently unknown ancestors must have had even shorter wingspreads.

#### What shape were pterosaur wings?

A recent fossil find from the Soviet Union, *Sordes* (the famous "Hairy Devil") seems to show wing membranes attached to the feet, confirming the bat-like reconstruction. However, there is room to doubt the preservation of the wing membrane as described. Other finds, chiefly of *Rhamphorhynchus*, clearly show a narrow gull-like wing, but in each case, the attachment to the body has not been clear. The best pterosaur wing preservation has recently come to light in a *Pterodactylus* find. This well-preserved fossil shows that indeed the wings were narrow and gull-like and that the wing membrane remained quite narrow until just behind the elbow. From there on in the wing membranes broadened and attached midway down the leading edge of each thigh. In this way neither the legs nor the wings interfered with one another either during running or flight, despite being connected.

When the wings were retracted, the elastic wing membranes shrank to almost nothing. There was never any danger of tripping over sagging wrinkled wing membranes while pterosaurs walked about. Pterosaurs held their retracted wing fingers like skiers hold their ski poles, folded back against their elbows, pointing toward the rear.

#### References:

Bennett, S. C. 1990. A pterodactyloid pterosaur pelvis from the Santana Formation of Brazil: implications for terrestrial locomotion. *Journal of Vertebrate Paleontology* 10(1). 80-85

Padian, K. and D. J. Chure. 1989. The age of Dinosaurs, the 12th Annual Short Course of The Paleontological Society. 159-161

Wellenhofer, P. 1987 Die Flughaut von *Pterodactylus* (Reptilia, Pterosauria) am Beispiel des Wiener Exemplares von *Pterodactylus kochi* (Wagner). *Ann. Naturhist. Mus. Wien* 88. 149-162

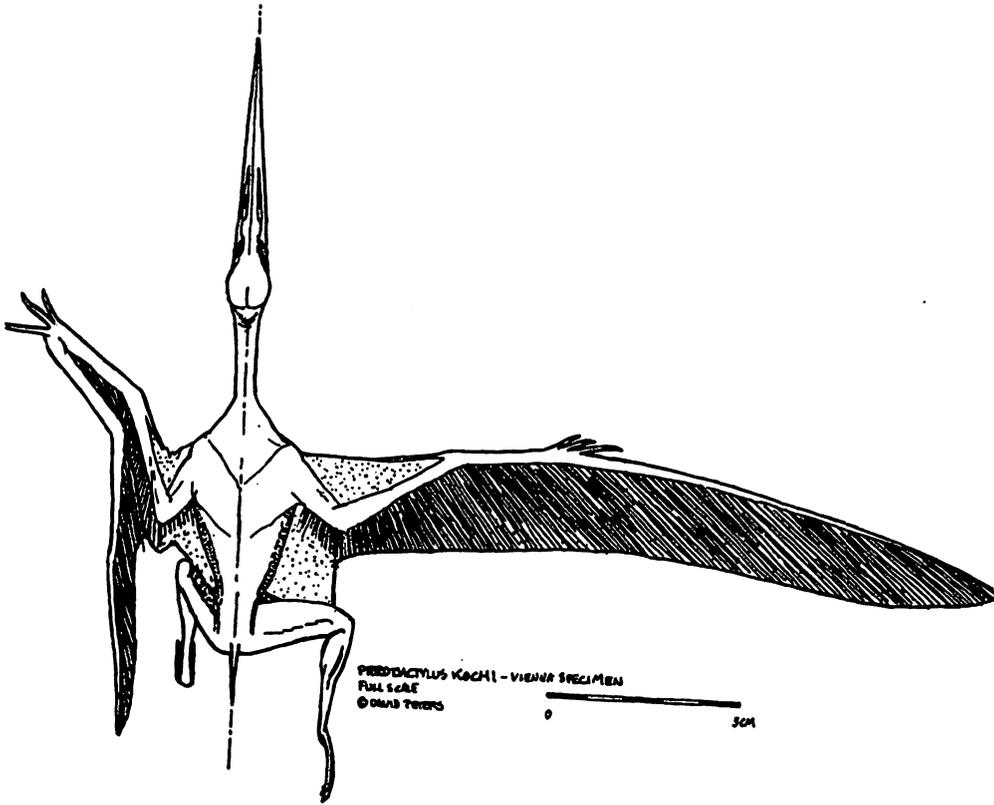
The airfoil shape of each wing, as well as its trailing edge, was maintained by dozens of parallel fibers within the membranes, which acted like stiffeners. Some hang gliders use removeable aluminum tubing in their wings for the same reason.

Since the wings and legs of pterosaurs did not differ either in form or apparent function among all the pterosaurs, it is reasonable to assume that the wing pattern shown by *Pterodactylus* was maintained throughout the order.

#### How did pterosaurs hold their legs while flying?

Scientists now believe that pterosaurs held their knees out to the sides, in line with their wings, while flying. In essence, they raised their undercarriage up and out, like ME-109s and Spitfires did during World War II. A recent uncrushed pterosaur pelvis from Brazil confirms this view. The streamlined thighs of pterosaurs probably were moved during flight either to shift the animal's center of balance or to affect the airstream. We can imagine that pterosaurs were quite agile in the air. As the legs were dropped in preparation for a landing, the wing membrane between the thighs and elbows probably acted as an airbrake and flaps.

In conclusion, pterosaurs walked like birds do and flew like bats do. Pterosaurs would have dropped down to all fours only to rest or to cover their eggs.



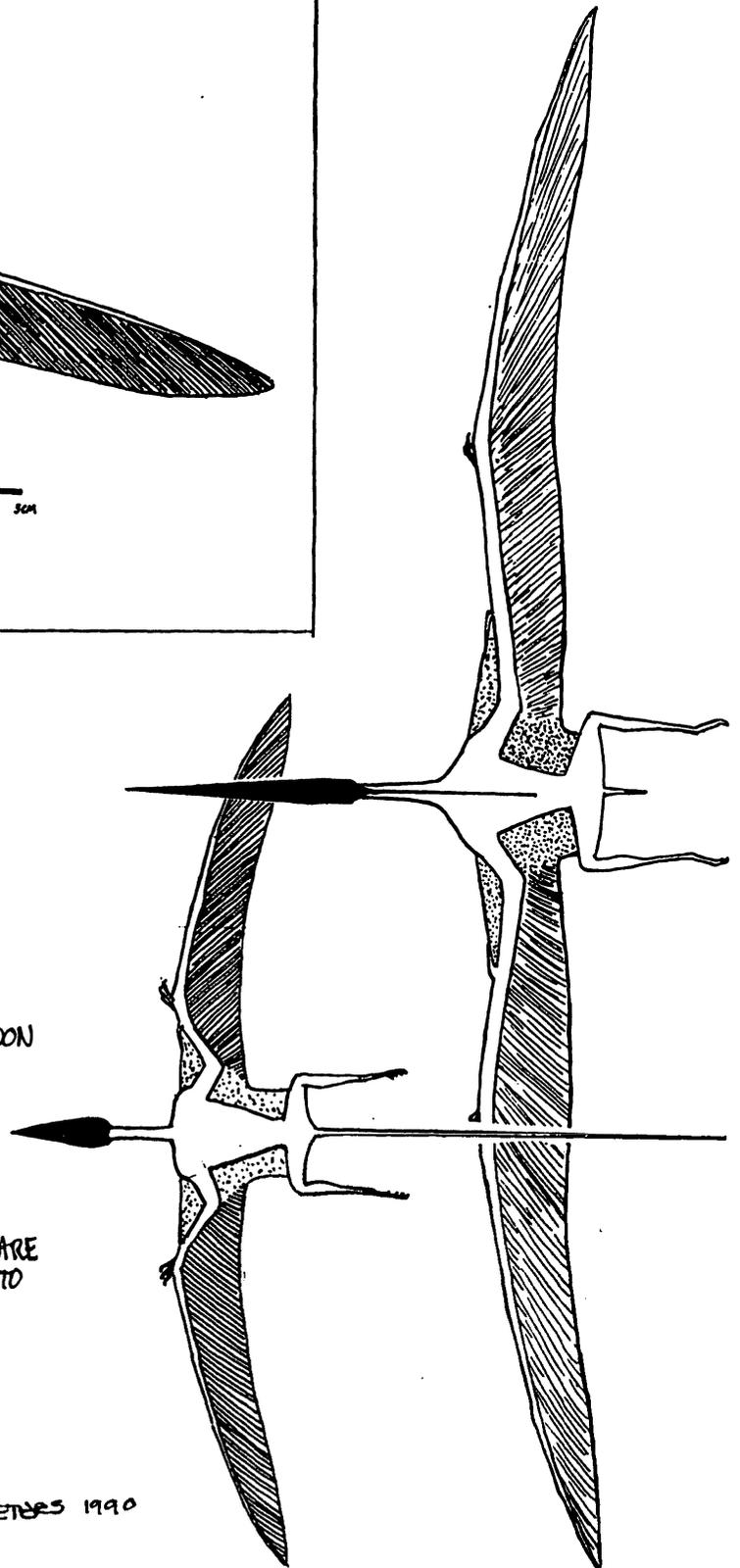
PTERODACTYLUS KOCHI - VIENNA SPECIMEN  
 Full size  
 © DAVID PETERS



PTERANODON  
 CRETACEOUS

EUDIMORPHODON  
 TRIASSIC

PTEROSAURS ARE  
 NOT DRAWN TO  
 SAME SCALE



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Ads are \$5.00 per inch (6 lines x 1 column--43 spaces). Send information and checks payable to MAPS to: Mrs. Gerry Norris, 2623 34th Avenue Ct., Rock Island, IL 61201. Phone: (309) 786-6505. This space is a \$5.00 size.

To extend currently running ads, please send request and remittance to **Editor** by the 15th of the month. We do not bill. Ads do not run in the EXPO issue (April). Ads up to 8 lines by 54 spaces can be printed in smaller type to fit a 1" space.

We trade **FOSSILS** and **REBOB GEM CASES** for good antique bottles and food jars for our collection. Call or write or see us at MAPS EXPO. Harry Miller, P.O. Box 6167, Ocala, FL 32678, 904-237-1909.

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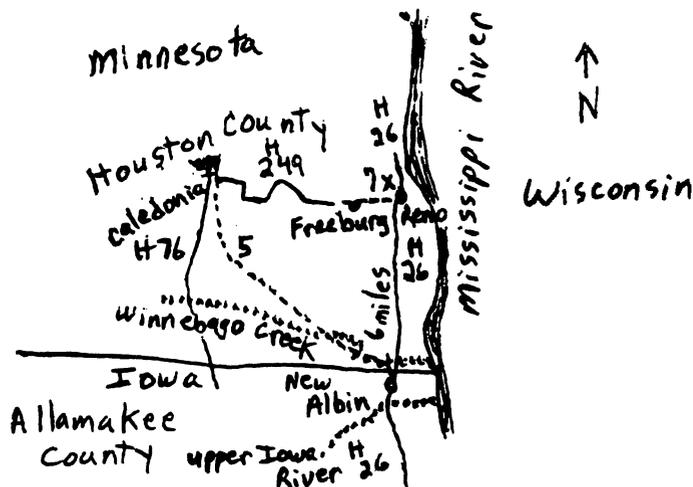
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**CAMBRIAN EXPOSURE AT RENO, MINNESOTA**

By Robert Wolf, Midwest Rockhound Services, 3521 10th Ave North, Fort Dodge, IA 50501

This site is a high bluff along the west side of Highway 26 at Reno, Minnesota (Houston County). This is in the southeast part of the state, about five miles north of the Iowa border. The section has not been measured, but there is a large exposure of sandstone that varies in color from brown, to red, to green and is quite colorful. The green color is from the mineral glauconite. Fossils can be found here, but like in many Cambrian exposures, they are not very abundant and many are fragmented. Burrows are numerous, which is also typical of Cambrian faunas. Trilobite fragments are present at certain levels, but due to the steep face, collecting is generally restricted to the talus in the ditch. I have heard of other collectors finding an abundance of trilobites here, but this has not been my experience. I have also found a few small inarticulate brachiopods, and in the spring of 1988 I found a Cambrian graptolite here. The unit exposed is part of the Franconia Formation (Tunnel City Group, Saint Croixan Series). The Franconia is equivalent to the Reno Member of the Lone Rock Formation in Iowa and Wisconsin.



## Please ADD the Following NEW OR REJOINING MEMBERS to Your Directory:

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P.O. Box 5007  
Terre Haute, IN 47805  
812-877-4512

Manager of training & development (SONY). Will not trade. Member Indiana Soc. of Paleo. Wants to learn about fossil collection sites, trips, etc.

Sally Labadie  
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Elementary teacher of gifted and talented. Will trade. Has for trade calamites, coral, brachiopods. Wants to know collecting sites in the Mid-West and PA. Also wants to meet others and expand knowledge of fossils.

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Electron Microscopist. Will trade. Major interest microfossils. Has had a longtime interest in fossils.

Steven Wagner  
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APO, NY 90378

Computer operator--USAF. Will trade. Major interest Paleozoic invertebrates--species collector wishing to acquire the best possible specimens. Has for trade high quality brachs & mollusks, mostly Penn. & Perm--occasional trilobites & crinoids. Wants to get in touch with other collectors.

This Is To Certify That  
The Person(s) Named On The Reverse Side  
IS A MEMBER OF  
**Mid-America Paleontology Society**  
AND IS ENTITLED TO ITS PRIVILEGES  
AND BENEFITS

*Sharon Sonnenleitner*  
TREASURER

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.

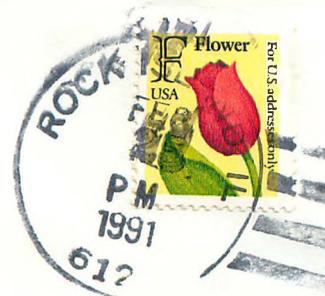
Membership in MAPS is open to anyone, anywhere who is sincerely interested in fossils and the aims of the Society.

Membership fee: One year from month of payment is \$15.00 per household. Institution or Library fee is \$25.00. Overseas fee is \$15.00 with Surface Mailing of DIGESTS OR \$25.00 with Air Mailing of DIGESTS. (Payments other than those stated will be pro-rated.)

MAPS meetings are held on the 1st Saturday of each month (2nd Saturday if inclement weather). October & May meetings are scheduled field trips. The June meeting is in conjunction with the Bloomington, IN, Gem, Mineral, Fossil Show & Swap. A picnic is held the fourth weekend in July. November through April (except February) meetings are scheduled for 1 p.m. in the Science Building, Augustana College, Rock Island, Illinois. The February meeting is held at Monmouth College, Monmouth, Illinois. One annual International Fossil Exposition is held in the Spring.

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

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Dated Material - Meeting Notice