

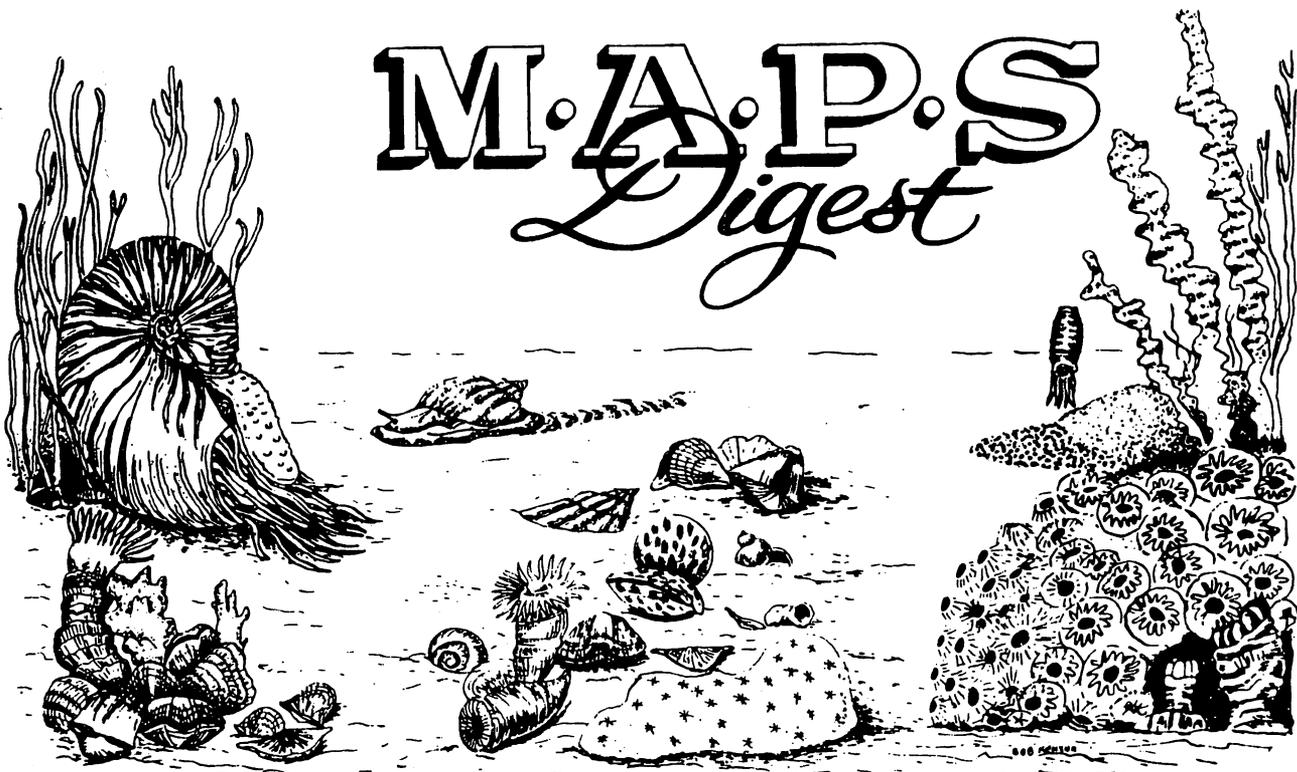
M.A.P.S Digest

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Official Publication of
Mid-America Paleontology Society

Expo Edition, 1983

FROM OUR PRESIDENT

Greetings and salutations. As many of you now know, and for you who don't, you now have a new president. My name is Doug Johnson and I will be taking over for Don Good. By the time this article is being read, Don will have had serious surgery. So we all wish Don a speedy recovery.

As I said, Hello and welcome to each of you. I live in Donnellson, Iowa, my wife's name is Sandy. I work at Fruehauf Corp., and have been interested in fossils for 10 years. Other interests include Indian artifacts, weight lifting, and motorcycles.

I want to wish everybody the best EXPO ever. I know from previous Expos there is always a new friend to be made, a new fossil to be added to the shelf, and usually by the end of EXPO you walk away with a little more knowledge than you had last year.

That's all for now--but remember, since Spring is here let's be careful when out in the field hunting and most of all, have FUN!

Doug Johnson

THE SHOW IS ABOUT TO BEGIN

MARK YOUR CALENDARS

- | | |
|---------|---|
| 15 Apr | -- EXPOSITION V -- Macomb, Illinois |
| 16 | Western Illinois University, Union |
| 17 | Building, Grand Ballroom. |
| 5 May | -- MAPS Meeting -- Augustana College |
| | Rock Island, Illinois |
| 10 June | -- Rocky Mountain Federation |
| 12 | Oklahoma City, OK |
| 17 June | -- California Federation |
| 19 | Santa Clara, CA |
| 8 July | -- Eastern Federation |
| 10 | Charleston, W. VA |
| 14 July | -- Midwest Federation |
| 17 | Kalamazoo, MI |
| 4 Aug | -- Northwest Federation |
| 7 | Spokane, WA |
| 5 Aug | -- MAPS Meeting -- Bedford Rock Swap |
| 6 | Bedford, Indiana |
| 7 | MAPS program, Saturday evening |
| 28 Oct | -- Austin Paleontology Show -- MAPS |
| 29 | "FOSSILMANIA" -- Pottsboro, Texas, |
| 30 | 8 mi. west of Denison, Texas. |
| 11 Nov | -- South Central Federation, Dallas, TX |



Me and my shadow
 Welcome YOU to EX-PO 5
 Me and my shadow
 Hope the fossils make your pulse beat high
 See Tri-lo-bites and ceph'lo-pods
 While crinoids dance
 To capture your glance
 So meet friends and fossils
 Here at EXPO ---- Have A Ball!!!

AND NOW ON WITH THE MAGIC

SECRETARY'S REPORT

The March 5 meeting of MAPS was held at Augustana College and called to order by President Doug Johnson.

Treasurer, Allyn Adams, reported a balance March 1 of \$3,023.97. The report was Approved.

Doug Johnson announced a program chairman for planning the fall meetings would be needed and that he would fill the position soon.

Gil Norris moved that Doug Johnson be appointed EXPO Chairman for 1984. The motion was seconded and carried.

President Johnson appointed Ray Fairbank to investigate cost and coverage of insurance for members 1) on field trips and 2) at shows.

Allyn Adams asked members to volunteer for helping at the desk at EXPO and to make signs for EXPO. Sign-up sheets are available. Members decided to ask Dick Johannesen to take MAPS materials and a display to MWF meeting at Battle Creek, MI.

Dick Johannesen invited members to examine some plant and leaf fossils that an Augustana student had been collecting at a site in the Quad-Cities. Several members brought newly cleaned and recently found fossils to share

Meeting was adjourned.

Respectfully submitted
 Peggy Wallace, Secretary

SEDIMENTARY NOTES

DR. CHARLES J. PETERSON, Columbia, MO--Do you know of anyone who would be interested in trading for some old Geological Survey folios?

DON GOOD, Aledo, IL--I am finding beautiful shiny black shark's teeth in a snow-white, crystalline calcite limestone. They are from the Burlington Formation of the lower Mississippian Period. The only sources I have found to identify them are Volumes VI and VII of the Illinois Geological Survey Report. The problem here is that A. Worthen authored these books in the 1870s. Does anyone know of a more up-dated source where I could check the current validity of these names? If so, I would appreciate hearing from you.

GLENN CROSSMAN, Riceville, IA--Don't know if you've received or seen this, but it's a form letter from Bureau of Land Management received just a few days ago--tho it's dated a month ago.

At least we got them to re-group and maybe think a little instead of just ramming it through. But the real problems lie ahead.

"BUREAU OF LAND MANAGEMENT FACT SHEET HOBBY MINERAL COLLECTING RULES TO BE REVISED The Interior Department's Bureau of Land Management will rewrite its proposed rules for collecting fossils, petrified wood and mineral materials used in hobby or craft pursuits, and give the public another opportunity to comment on the redraft.

Proposed regulations published in the Federal Register in August, 1982, drew almost 1,200 comments from scientists, hobby collectors and the general public. Many commentors appeared to have trouble in reading and interpreting the rules.

BLM director Robert F. Burford said these comments would be analyzed carefully and incorporated into the draft rules to the greatest extent possible. "Particular attention will be paid to the question of permits, quotas and sales," Burford said.

Once redrafted, the proposed rules will be analyzed for environmental and economic impacts and republished as proposed rules with another public review and comment period. The process is expected to take about a year. In the meanwhile, regulations that were in effect prior to the August, 1982, proposal will remain in effect.

These regulations include a prohibition against collecting vertebrate fossils except for scientific purposes the need for an Antiquities Act permit for scientific collecting; a limit of 25 pounds plus one piece per day for petrified wood; and a limitation on the collection of other hobby materials to reasonable quantities."

(Ed. Comment--Many thanks to all of you who joined in in an effort to effect a change in BLM collecting rules as proposed. A special thanks to Judy Owyang and Glenn Crossman whose efforts brought this act to our attention. Obviously our work is not yet finished. Your work has paid off. Good Job!)

JIM & SYLVIA KONECNY, Prescott, AZ--Just thought we would share our experience with you concerning the book dealers who specialize in geologic and paleontologic literature. First we wrote to Raymond C. Pfeifer in Houston, Texas. Our letter came back stamped "NOT AT THIS ADDRESS". Our friend Fred Labahn had the same experience. We then wrote to Lulian J. Nadonly, Kensington, Connecticut. We still haven't heard from her--three months. Then we wrote to Albert C. Clegg, Eaton Rapids, Michigan. We received an immediate reply, sent him a check for the literature, and bingo, in a few days we had the material. We certainly recommend this gentleman to anyone interested in paleontologic literature.

HARRELL STRIMPLE, Iowa City, IA--In response to inquiry by L. R. Sinclair in March, 1983, MAPS Digest.

The rules of grammar and pronunciation are no different in paleontology than in any other field. The trouble is that people are inclined to pronounce words the way they think they

should be pronounced or the way they have heard someone else pronounce them. Words like brachiopod or trilobite are in any dictionary but a surprising number of people do not even own a good dictionary and even fewer utilize one to any appreciable degree. When one considers that our school system produces vast numbers of functionally illiterate graduates it is hardly any surprise to discover a lack of understanding among the general population of more scholastic matters.

You (and most others) will have even more trouble with terminology, for example, you use "brachial" in your examples. To you this probably connotes the foreleg of an animal but in crinoid terminology it is specifically applicable to the individual ossicle of an arm (plural "brachials" for all ossicles, excluding pinnules). Terminology evolves but one must start somewhere in order to communicate which is the reason we recommend Moore, Lalicker and Fischer (see note in March, 1983 DIGEST) for learning basic terms.

This is not intended as just criticism of others, I am not immune to forgetting, breaking, or bending the rules

The formation and origin of scientific words is covered in a book by Roland Wilbur Brown, Composition of Scientific Words, which has been reprinted by Smithsonian Institution Press, P.O. Box 1579 Washington, DC 20013. When ordering show code 15BN 286-2 and include check for \$17.50 payable to the Smithsonian Institution Press.

CLARENCE M. SCHUCHMAN, Sacramento, CA--Veterinarian Luke Sinclair (Mar. MAPS) in his troubled search for "standard" Paleo pronunciations sounded a note that "rings 'round the halls". Welcome to the club Luke!

About 16 years ago when I happened onto my first ammonite someone counseled - "the names are strictly from the Latin". Armed with this misinformation and some undergraduate courses I once took from a prominent Latin authority, I proceeded to the halls of the Earth Sciences building in Berkeley enquiring whether I had found a Lytoceras batesi. My Latin in no way seemed adequate to Lytoceras so I don't remember what I came up with for that, but I do remember proudly Latinizing the batesi -bah - TAY-see dutifully stepping the vowels back a notch a=ah, e=a, i=e.

In the silence that followed I was aware of a polite exchange of glances that covered convulsive internal guffaws. Subsequently I was informed that this was an historic fossil brought in from

SEDIMENTARY NOTES, Cont'd.

the gold fields by an early legislator whose name was Bates and spelled bates + i pronounced Bates - eye. Not even Church Latin would account for this procedure. My Latin rules were down the drain.

Similarly I was informed that Lytoceras, which I had probably pronounced lit - o - SERRAS, is always done Lie - TOSS - er - us. The genus suffix when spelled oceras is OSS-er-us never o-SERR-us and when spelled iceras it is ISS-er-us. Now there occasionally is found the spelling aceras which looks for all the world as though someone had intended uh-SERR-us. The only other alternative is AHSS-er-us for, at least in English, ASS-er-us would be a bit uncomfortable.

The alternative spelling yceras for iceras also leaves one wondering sometimes. For example is Pachyceras really Pack-ISS-er-us? (I have always been a purist about it) but since my first encounter with "batesi" you may rest assured that I have hung on every word the professionals utter and I must report that in some cases like this I have witnessed them lapsing into i-SERR-us which, as you can imagine, is a salve to my "batesi sensitivities".

"Latinizing" suffers similar transformations throughout paleo taxonomy--this coupled with the fact that, contrary to my first instructor's advice, a good share of it is "Greekized" and then "Americanized". I do not find the professionals at all immune from confusion except in the most trampled of the arenas of paleo where standardization has pretty well set in.

One of my favorite examples is the ammonite genus Patagiosites. Any professional would come up with suffix pronunciation EYE-teez which is standard Greekize everywhere. But, you might be surprised by what they do with the rest of it. In my state it depends on how far south (and hence hear to Patagonia?) you are how you pronounce it. The "southerners" insist it's Pa-TAJ-ee-o-SIGH-teez but from the "northerner" or unsuspecting newcomer you will get something similar to Pata-GEO-SITE-eez.

Another example of difficulties in "paleo-pronounce" would be such a simple thing as

the familiar suffix idae as, for example, the ammonite family Desmoceratidae. There seems a trend to Anglize this to Desmocerati-DAY. In Latin ae=long i. I can't keep from pronouncing it Desmocerati-DYE.

One intriguing ammonite genus Cicatrites which I hope some day to find in California (so far no luck) also leaves me wondering. I have not heard it pronounced but suspect Sick-a-TRY-teez will turn up. Just for the heck of it, I would like to make it Kick-i-TRY-teez. After all, ancient translations show Cicero was pronounced KICK-ay-row.

Numbers of professionals have told me that when they go on tour they listen carefully to the pronunciation in vogue in the particular professional community in which they find themselves and go along with their usage. When in Rome do as the Romans. As an amateur, I recently piloted a visiting scholar through an area I consider to be my own particular bailiwick. Imagine my surprise to find him extending just this courtesy. I can only hope that I did not lead him too far astray, or beyond that provide him with too much internal amusement.

Anyway it is comforting to learn that not everything is cut and dried--even in science. Courage Luke.

RICHARD MCCOY, St. Joseph, MI--...I have a fossil of great interest to share with MAPS. It is a "fossil" human skull. It was found without the lower jaw. I have...put a modern jaw with it to show perspective...Here is some additional information on the skull which has become quite well known as "Florida Man".

The skull was discovered (not in situ) in a phosphate pit near Brewster, S.W. Polk County, Florida in the summer of 1965. The phosphate pit belonged to the American Agriculture Co. which is located immediately North of Brewster at Ft. Pierce, Florida. It is logical to surmise that the skull came from near the top of the pit where sediments were found of the Pleistocene Age. The specimen is definitely different and it's possible ancient age, it's locality far from any other ancient skulls, and the fact that it is fossilized places it in a most unique category. Could this be North America's oldest human skull?

HARRELL STRIMPLE, Iowa City, IA--A recent letter from MAPS member, JOHN RIVERS, disclosed that in Rochester, New York the amateur fossil collectors enjoy the cooperation of Dr. Carlton Brett, a professor at the University of Rochester, and Dr. George McIntosh, a curator at the Rochester

Museum of Science. Both of these young professionals are very competent paleontologists and investigators of crinoids who are producing excellent research studies. It is good to know they are willing to take time from their busy schedules to help our amateur friends. Their mentor, Dr. Robert Kesling, Museum of Paleontology, The University of Michigan, Ann Arbor, has been very active with amateur collectors in that area and was part of the organization Friends of the University of Michigan Museum of Paleontology. I have heard that Dr. Kesling has recently retired from the University but one hopes not from paleontology.

One of the most spectacular examples of cooperation between amateurs and professionals is the monograph, Strata and Megafossils of the Middle Devonian Silica Formation, University Michigan Papers on Paleontology No. 8, 1975, 408 pp., 41 pls. Some 26 "Friends" were involved who contributed time, specimens, work and publication costs. Black and white illustrations are superb and profuse drawings are helpful. Just about anything you ever wanted to know about the Silica Formation and its fauna is included, like paleoecology, stratigraphy, pyritization, the phyla, interpretation of the record, etc. It is useful for amateur, student and professional alike.

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T H E P R O F E S S I O N A L ' S C O R N E R

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Dr. N. Gary Lane
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Bloomington, IN 47405

ILLUSTRATING FOSSILS -- No. 3

Most of us are limited to the photographic equipment that we have available, but here I am going to describe what I think is the ideal situation. The fewer times that an image on a negative has to pass through a lens the better print you will obtain. This means that using an enlarger inevitably results in some loss of detail and sharpness. Ideally, the image on a negative should be large enough so that the print can be made with a contact printer. This in turn means that you can't get such negatives with a 35 mm camera. The ideal set-up is a 4x5 sheet film camera with a bellows and a long focal length lens. Here at Indiana University we use a Leitz Aristophot bellows camera with a 150 mm lens. The long lens admits lots of light so that exposures can be kept under 1 second and also provides considerable depth of focus so that all parts of a convex fossil are in focus. Shorter focal length lenses generally admit less light and have a narrower depth of field. They can provide increased magnification if that is wanted. The main idea is to have the image on the negative at exactly the same size that you want to publish the picture.

Generally you will want the image at some even magnification scale: X1, X2, X3, etc., not at X1.31 or some other uneven number. The smallest acceptable pictures for publication are about the size of a nickel. Ideally all prints should be somewhat bigger than that. If the specimen is more than about 2 inches in maximum dimension then you may want to make the image smaller than the original: X0.5 or X0.75. The exposure and development of the film should result in an image that is neither too dense or too light. Our experienced photographer says that you should be able to read ordinary newspaper print through the image on the negative.

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T H E P R O F E S S I O N A L ' S C O R N E R

-- Continued

H. L. Strimple
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Section 10

A FACTUAL ACCOUNT OF THE IDENTIFICATION PROCESS

A frequent inquiry made by almost everyone is "How do you determine whether a form is new or not?" I recall the question was put to me by Dennis Burdick when he was a graduate student here at Iowa several years ago. My response was "When it looks different." which, of course, is an oversimplification of a very complex problem. At the time Grahme Philip was spending a sabbatical from Australia with us and had a desk in a corner of the old Repository in Calvin Hall. Burdick allowed he would find out from a "real" scientist, and I followed along behind to see whether I

THE PROFESSIONAL'S CORNER, Continued

might pick up some pearls of wisdom myself. Dennis carefully put the question to Grahme, who quite seriously pondered it and replied "Well now a lot depends on how I feel when I get up in the morning." Naturally, neither of us are really casual about such matters but there are times when exhaustive research has failed to conclusively yield a clear cut conclusion and yet it is virtually certain the form does not conform to any previously known so a decision may be made to propose a new name. A great deal depends on the morphological features the investigator considers to be significant or of most importance. Often an investigator with many years of experience will be influenced by quite different criteria than one lacking the advantage (or disadvantage) of familiarity with the problems involved. So it is that young investigators often have a built in disdain for work that has gone on before their time and may even express it in their work and attitude. Certainly any investigator worth his/her salt will examine every detail with a critical eye but they need to take considerable care and consider the options before rejecting prior work. I can think of at least two studies in recent years which, in my opinion, have created confused situations which will require more effort to straighten out than it took to produce the problems.

As I outlined at the onset of this series, it is my intention to present current activity, reasoning behind the activities, etc. in the belief that more familiarity with the overall program will be beneficial to you. What I write now is something taking place, right now.

A graduate student in Freiburg, Germany, has been working on rock strata on the Island of Crete, Greece, for his Ph.D. project (dissertation). He found a stratum of rock exposed which contained Permian fossils, including a diagnostic ammonoid. Another parallel stratum close by contained a small crinoid fauna which he assumed to be late Upper Carboniferous (Pennsylvanian) or Permian. He attempted to identify the crinoids apparently by reference to the Treatise and then sent them to me for further evaluation. Five genera are apparently involved: Zenocrinus, Protencrinus, Taidocrinus, Metacromyocrinus and Moundocrinus. Three of these are North American genera of about Moscovian age (Atokan or Middle Pennsylvanian), one is cosmopolitan (Protencrinus) of the same age, and only Taidocrinus is both cosmopolitan and ranges into the Permian.

So there is now a link between our genera (and strata) and Greece. I have previously made a slight link between northwest Spain and North America. In any event, there is quite a time gap between Permian and Moscovian.

The problem continues because the crinoids will be reported as a joint study. As an example of how I actually work toward identification, I have selected the single nearly complete dorsal cup which is thought to belong to Moundocrinus. When I first looked at it I noted a shallow cup, lack of a basal invagination, a single broad anal plate, wide but short articular facets on the radials; a mental checking process in which for one reason or another various genera are considered and rejected. After a day or so of thinking about it off and on, checking the most likely forms, etc., I decided that it was most like Moundocrinus and in some aspects like M. coalensis from the Atoka Formation of southern Oklahoma. I have prepared drawings of the holotype of M. coalensis as well as the specimen from Crete with the aid of a camera lucida (a mirror device whereby your right eye can see your pencil while you view the specimen with the binocular microscope). You are, therefore, able to compare the two species (figure 6) and see the features which are alike and those which are not. Unfortunately, the stem area is lost in the holotype of M. coalensis and the proximal columnal in the Crete specimen is damaged although it appears to be round. M. osagensis the type species of the genus has a pentagonal shaped proximal columnal and is a somewhat taller cup with more erect sides. M. coalensis actually has a peculiar anal plate which, in a basal view of the cup, does not reach the perimeter, there is a shallow basal concavity (atypical of the genus) with slightly downflared infrabasals, basals are moderately large, and proximal tips of radials approach but do not reach the basal plane (hypothetical line under the lowermost points of the cup). As previously noted the anal plate of the Crete specimen is wide and it is confluent with the somewhat protruded CD interray. In that regard it is comparable to a form described as Oklahomacrinus canyonensis from the Canyon Fiord Formation (Middle Pennsylvanian) of southern Ellesmere Island, Arctic Canada. However, the latter species has smaller basals (except for the CD basal), a broad basal invagination, and the proximal ends of radials form the basal plane of the cup. It is atypical of Oklahomacrinus but is also different to Moundocrinus, although it may be related to both genera. Actually, none of the three species considered here conform to all stated diagnostic characteristics

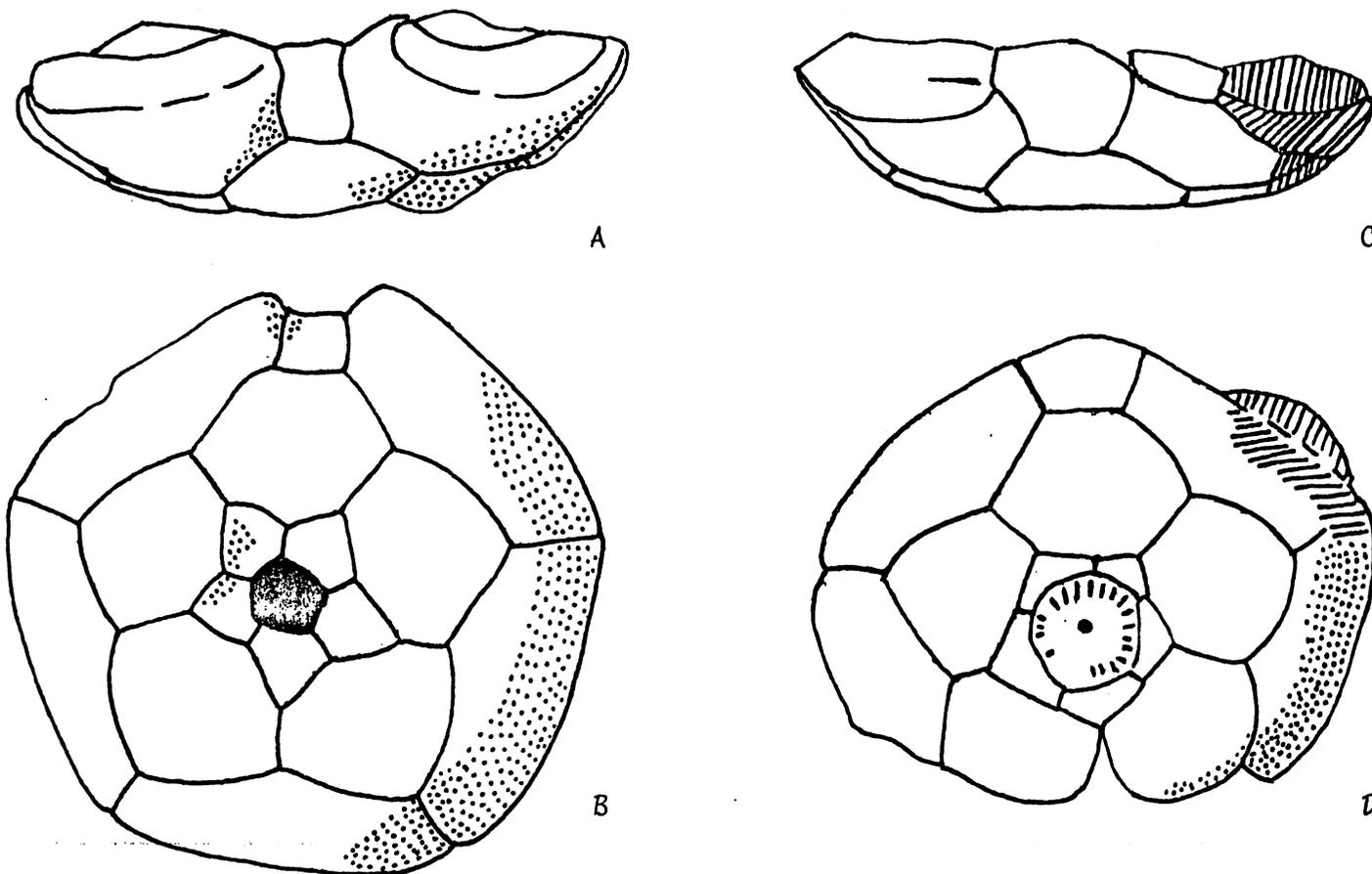


Figure 6. Sketches made with aid of a camera lucida: A, B, Holotype cup of *Moundocrinus coalensis* from Coal County, Oklahoma, viewed from posterior side and base; C, D, cup of *Aesiocrinus* sp. from the Island of Crete, Greece, viewed from posterior side and base, enlarged X6.

of *Moundocrinus* or of *Oklahomacrinus*.

By this time I have screened all of the pertinent works by Wanner on the fabulous Permian crinoids of the Island of Timor, Indonesia, Lane & Webster's studies of Pennsylvanian-Permian crinoids of the far western United States, Trautchohl, Yakavlev, Arendt studies of Pennsylvanian and Permian crinoids of Russia. But nothing seems really comparable. However, even as I write this two alternatives come to mind which are *Polusocrinus* and *Aesiocrinus*.

Polusocrinus is very close to *Moundocrinus* but differs in commonly having a taller cup and the single anal plate is faceted for the reception of two tube plates as opposed to one facet in the latter. The plates are commonly smooth (not tumid) in both genera. On the other hand, *Aesiocrinus* has a low cup, commonly has tumid cup plates, and a broad single anal plate in the cup which is faceted for reception of two tube plates. Both of these genera have proximal columnals with a pentagonal outline.

The specimen from Crete is closer to *Aesiocrinus* than to anything considered so far; however, the stem of the former appears to be round and the radial articular facets quite different from those of the latter. *Aesiocrinus* commonly has subhorizontal articular facets which are longer than those of any other genus discussed here. So the moment of truth is at hand, the specimen from Crete does not clearly belong to any presently known species or genus, although better preserved specimens might rectify the situation. In the meanwhile, it is not like other species, therefore, it will be described as a discrete species. Assignment will be made to *Aesiocrinus* but with reservation.

When I started writing this section I intended to assign the specimen from Crete to *Moundocrinus* although I had not started preparation of the manuscript. As I attempted to explain the rationale, my dissatisfaction increased, and I eventually adopted another option even though it is not fully satisfactory. The same thing might have happened when I prepared the

discussion of the new species in the formal study. A final manuscript is often quite different from the first draft. There will be some who might think this account is contrived, but I do not need to "dream up" situations or experiences.

* * * * *

CARPOIDS

Lloyd F. Gunther
Brigham City, UT

Carpoids are primitive echinoderms belonging to the Subphylum Homalozoa. The name "carpoid" is derived from an earlier class (now obsolete) Carpoidea. They differ from most other echinoderms by the absence of radial symmetry. Several new forms of this somewhat enigmatic fossil have recently been discovered. At present their recognized diversity is such as to divide them into four classes: Stylophora, Homostealea, Homoiostealea, and Ctenocystoidea.

The Stylophora have been considered by some authors not to be echinoderms but rather primitive Chordates with similarities to the echinoderms. The name Calcichordata was proposed as the Subphylum within the Phylum Chordata. Other authors reject this theory and consider the many difficulties with this view to be too great to classify them other than true echinoderms.

The Stylophora body is composed of a theca and an armlike appendage called an aulacophore. It has no tail like appendage (stele) as in the Homostealea and Homoiostealea.

The Homostealea has a body composed of a theca and a tail like appendage called a stele. It has no arm like appendage (aulacophore) as in the Stylophora.

The Homoiostealea has a body composed of both a tail like appendage (stele) and an arm like appendage (aulacophore). The stele is also differentiated into three distinct regions.

The Ctenocystoidea has an ovoid theca with a double-layered marginal frame. The mouth and anus are at opposite body poles. There are no aulacophore, stele, or arm appendages present and this is the only group that completely lacks appendages. Only one member of this class is presently known, that being *Ctenocystis utahensis* Robison & Sprinkle from the Middle Cambrian of northern Utah and southern Idaho.

Carpoids are thought by some workers to be somewhat close to the hypothetical ancestor

of the echinoderms. They range from the Cambrian to Devonian. Much remains to be known about this group of most interesting and intriguing fossils. Important information on echinoderm evolution will likely come forth from new studies and new collections as new discovery sites are made.



One of the carpoids of the class Homoiostealea from the Middle Cambrian Marjum Formation in the House Range of west central Utah.

Carpoids have a special interest to the Gunthers (Lloyd, Metta and Val) as we have had the opportunity to collect many of these primitive echinoderms in the numerous Middle Cambrian outcrops of Utah. Just this past summer we had the good fortune to collect specimens for Dr. Richard A. Robison. Dr. Robison is currently the editor of TREATISE ON INVERTEBRATE PALEONTOLOGY and a professor at THE UNIVERSITY OF KANSAS. The principle specimens we were to collect were a rare solutan carpoid at a new discovery site in the House Range, Millard County, Utah. Dr. Robison secured funding from the Smithsonian to assist with this project.

In May, 1982, Dr. Robison and my son Val were searching for a zone in the Middle Cambrian-Marjum Formation where some new trilobites and rare sponges were known to be present. They did not find what they were looking for. Instead, they found something even more interesting and exciting. They discovered some disarticulated specimens of a carpodid belonging to the class Homoiostelea. This was believed to be the first time that a member of this class had been found in rocks this old. The oldest previously known specimens of this class were reported from near the U. Cambrian-Ordovician boundary in Nevada (see Ubahgs, J. Paleo., Vol. 37, pp 1133-1142). Also there was a fairly recent discovery of two new genera from two Late Cambrian sites in Alabama reported by Bell and Sprinkle. (See Abstract published in GSA Abst. with Progr., 12 (7): 385).

In September, 1982, my wife, Metta, and I began a systematic search in hopes of finding these carpodids in place. After several days of fruitless quarrying and becoming somewhat discouraged, we suddenly hit upon a productive carpodid bearing layer. It was a great feeling of exhilaration! Not only had we found them present but in great abundance as well. Many were completely articulated. Some were large, well over 50 mm in length. Further digging resulted in finding other carpodid bearing layers in both limestone and shale.

By the time Dr. Robison and Val joined us about a week later, we had already collected several hundred specimens. Also associated with the carpodids were trilobites, hyolithids, large phyllocarids, a sponge, worms, algae, trace fossils and even an edrioasteroid. Needless to say we had a most delightful time collecting and finding far more than any of us had anticipated.

These carpodids have since been shipped to Dr. Georges Ubahgs at the University of Liege in Belgium for study and description. Dr. Ubahgs is a world authority on primitive echinoderms. Dr. Robison will be studying some of the other new material and contribute to the study of the carpodids. The specimens will later be deposited with the Smithsonian-National Museum of Natural History.

It was a thrilling experience for us to collect this material and hopefully the information resulting from this discovery will provide a little more knowledge of these strange early life forms—the carpodids.

THE ODDITIES AND ECCENTRICITIES IN LIFE STYLE OF CRINOIDS

Amel Priest
Peru, IA

One time when we were at a rock show with a case of crinoids on display, I happened to be standing near when a couple of ladies walked past and I heard one of them remark, "ummm, crinoids, when you've seen one you've seen 'em all." The lady's problem was that she looked but really didn't see. But before we judge the lady too harshly, how many times have we looked and didn't see either. I rather suspect we have all been guilty at one time or another of failing to see a great masterpiece and thereby missed much of the pleasure which could have been ours had we looked with seeing eyes, so that we could understand and appreciate the scene or object before us. According to Webster one of the definitions of see is to "perceive mentally."

Anyway let us look at some of the oddities in the lives of these ancient sea creatures, as they attempted to cope with the problems of their day, and see if we can understand some of the reasons why they grew as they did.

I have always been interested in spines of crinoids and why they grew them. Obviously there were predators back in those days who would like nothing better than to crunch a mouthful of tasty crinoid. To offset and deter this practice the crinoids developed spines that were stiff and very sharp, altho sometimes very minute. Had an experience with a friend that well illustrates this point. We were in Texas looking for agate, and as it happened directly in front of where we parked the car was a clump of twiggy, pencil sized joint cactus, with red seed pods up and down the stem, real pretty, and this lady from Iowa didn't do a thing but walk over there and start to break off some for a winter bouquet. She looked but didn't see the minute hair like spines that ran up and down the entire stem. Yes, she had a hot hand for several days. I've often wondered if crinoid spines had any poison secretions such as do present day marine life with their spines. Anyway crinoids grew spines from the dorsal cup to the very tips of the arms and on the anal sac or anal tube, depending on the species.

I have a crinoid from the Devonian of New York that has spines coming from the center of some of the plates that make up the dorsal cup. There is a good picture of it, plate 72, Shrock and Shimmer, INDEX FOSSILS OF NORTH AMERICA, Acanthocrinus spinosus. Another crinoid from the Devonian period is Arthrocantha and they have slender spines from the cup plates, seldom preserved, also there are spines from the arms.

There are a number of crinoids that have spines on the first primibrach. Endelocrinus, Plaxocrinus, Stenopecrinus etc. Sometimes various species have spines on secondary brachials and on up the arms as they divide. Stelarocrinus has this type of spines even tho it doesn't have spines from the first brachial.

Eretmocrinus has spines well up toward the tip of the arms, where the arms tend to flatten out like a ribbon, then on the edges the spines appear like sawteeth, makes one wonder if they could have used these teeth to help if they become tangles up in sea weed or other types of marine life with which they mingled.

Many camerate crinoids had spines on the tegman, probably most prominent are the Dorycrinus, with large spines protruding out between the arms. Peterotocrinus also has spines sticking out beyond the arms, but they are blade like, with a sharp edge.

All crinoids have a digestive system, and the body part that encloses the gut is called the tegman or anal sac, and sometimes this part extends even up beyond the arms and is then referred to as the anal tube. I have an Anobasicrinus that has the anal sac partly exposed and it is covered with short erect spines. Cactocrinus also has many spines covering the tegman. In Uperocrinus we find the anal tube extending away beyond the arms and slightly below and up to arm length there are spines extending out at right angles, so beware. Probably the most spectacular are the umbrella type, with the spines on top of the anal sac. Most of these are more or less flat, with small pentagonal plates in the center, with long sharp spines around the outside, pointing out at right angles to the arms. I have a specimen where the spine itself is over 1½" and the center plates over 1", with spines on opposite sides better than 1½", that gives a diameter of better than four inches. A formidable mouthful for any fish to think of eating.

Spines are not the only means of crinoids defending themselves. There is a tricky little guy (Camptocrinus) which has a flatish stem that curves around like a capital C with the crown doubled back inside the curve and therefore completely enclosed by the stem or column which has numerous cirri, and they sort of camouflage the body parts as the cirri mingle with the arms. Pretty sneaky.

Sometimes one species mimics another form of marine life, such as the netted crinoid, Crotalocrinites, the arms of which are very much like the fronds of a Bryozoan. The netting, which is actually numerous arms all joined together till it looks like a fish net. Strimple, when he saw it remarked, "really a strange creature." I do not think a complete crown has ever been found here in the US, parts perhaps, anyway the one I have came from Gotland, Sweden, and is of Silurian age. Other than the very odd arms, it has the same characteristics as other types of crinoids. Just speculation and curiosity makes one wonder if they snuggled up to a colony of bryozoan in order to sort of hide their identity.

Still another crinoid with odd characteristics is Halysiocrinus, where the column comes down parallel with the arms and supports the cup or crown from one side. The cup is not bowl or cone shaped as are most crinoids. This species is sometimes called the nodding crinoid, but I have wondered if instead of being erect and nodding, if it didn't really sit on the bottom where it could perhaps merge or hide among some of its neighbors should it be threatened.

Another strange crinoid is Eucatillocrinus, it does have a bowl or cone shaped cup, but not symmetrical radial or basal plates as do most other crinoids, and the arms are more like the brachioles of a blastoid, just straight and unbranched similar to a paint brush.

Eucalyptocrinites is a unique crinoid family and a couple of things set them apart from other families. They have a root system like an oak tree, and therefore are stationary for their lifespan. There are other crinoids that do have roots, but not as extensive. The other difference is that they have compartments in the tegman for the arms to fold back into and rest and be protected. Since the skeletal parts are very thick and heavy it would have taken some pretty hard chewing for a predator to get much eating out of one of these babies, and some of them became quite large as well, as crinoids go.

Another crinoid is the one called Camarocrinus or Scyphocrinus. It has an oval sac or bulb it used

AS A FLOAT. This bulb had compartments and I suppose it had the ability to remove the liquid from these compartments and replace it with some form of gas for motivations of some sort. If this wasn't so, why would it have such a complex arrangement? There also was a nice crown, with large ornate cup and long arms which was connected to the float by a column or stem, just as other crinoids have. How mobile they were I have no idea, but I have talked with scuba divers who have seen some of the swimmers in our present day seas and they say they are fast and agile. Of course these recent species have no stem or float.

Gilbertocrinus is another oddball which has large appendages from the summit of the tegman. Most would think these are arms but they are not real arms. There is some speculation as to the use, the most popular being that they used these to aid in circulation of the sea water, increasing their ability to harvest algae from the water. They do have real arms but they are small and frail and probably not of much use. The real arms are very seldom preserved.

Cyathocrinites, as pictured on MAPS, has several different species. The one called C. Multibrachiatus, from Indiana probably has the most arms, and the species' name is a scientific way of saying, many arms.

Several years ago Harrell Strimple and myself went down to Sloan Valley, KY on a collecting trip. One of the things we hoped to find was a five armed crinoid, Pentarmi-crinus. He mentioned there were four specimens then known in existence, so way before daylight I was in Iowa City, and before we were in Sloan Valley, even tho we went right past Crawfordsville, Indiana, and I screamed and hollered. He was driving and never even eased up on the footfeed a bit. Anyway, before dark I found a slab with a crown on it and when I showed it to him he said that's one of 'em. Thrill? Yes, Sir. There are other species that have only five arms.

One of my favorite specimens is from England, Pentacrinus. I counted the arms in one ray as near as I could, around fifty. Multiply this by five and you have two hundred fifty arms. The arms have pinnules besides so I imagine if one could have

glanced down on a mature specimen in real life it would have resembled a crinoid with an Afro hairdo. Anyway there is quite a contrast between this one and the one from Kentucky with only five arms.

Speaking of arms reminds me of the first time we displayed at a rock show. It was at Davenport, Iowa, and as I didn't know anyone, I slipped off from the show and went out to Buffalo to do some looking around. Almost fainted when right in the middle of a great block of limestone was a flexible crinoid crown. The long flexible arms made several complete loops right at the tips of the arms. This was very solid rock, but I got out the old chisel and hammer, some job, but I stayed at it till it came loose. Still one of my favorites. And when I walked into the show with this crinoid some other people almost fainted.

Another crinoid with curious arms is the stick crinoid, Clathocrinus. The brachials are long and slim and they zig zag back and forth, and a complete crown is a curious jumble of little stick like segments, really is an oddball.

I can't leave this story without mentioning stems and probably Platycrinites have the most spectacular columns of any family. One of Strimple's former students got a job in Montana and on the road out he stopped in and he wanted a slab of Cactocrinus pretty bad so I told him if he found some crinoids out there to send me one. Sure enough one day here came a package from this young man. Platycrinites bosemanensis uncleaned. Just a few arms showing, not very impressive, but it cleaned up with a perfect flower like crown and the added benefit of about eight inches of twisting perfect stem, truly a beautiful specimen. There are other kinds of stems, various kinds of ornamentation on the cups and arms, all interesting and different. This story just hit the high spots.

Did someone say you see one you've seen 'em all? Better have another look.

WHERE TO SEE FOSSIL BONES

READERS DIGEST
vis MWF Newsletter

Visitors have easy access to four sites at which they can study the early animals. The Dinosaur National Monument near Vernal, Utah, offers an exceptional display of dinosaur-fossil bones still imbedded in rock. Big Bone Lick State Park, Kentucky, not far from Cincinnati, is the site of the first excavation of ancient animals

WHERE TO SEE FOSSIL BONES, Continued

in this country. The Rancho La Brea Tar Pits, in the center of Los Angeles, are world-famous as a vast mausoleum encasing the skeletons of thousands of animals now vanished. And Agate Fossil Beds National Monument, in western Nebraska, contains skeletons of many such animals.

Four great museums display mounted skeletons of the mammoth, mastodon, sloth and other extinct mammals: in New York City, the American Museum of Natural History; in Washington, the Smithsonian Institution; in Lincoln, the University of Nebraska State Museum; and in Denver, the Museum of Natural History.

ULTRASAUROS LEG STRETCHES 26 FEET --

Three years ago when BRIGHAM YOUNG UNIVERSITY paleontologist Jim Jensen unearthed the largest dinosaur shoulder blade ever found, he got curious about what the rest of the creature would look like.

Now he knows, at least in part. Using a few calculations and all the available scientific information about dinosaurs in the same family group, the Brachiosaurus, Jensen has pieced together a fiber glass replica of the creature's right front leg.

From toenail to scapula the leg stretches to 26 feet--and hangs from a crane inside a high-ceilinged workshop called The Ossuary where part of Jensen's bone collection is housed. The leg, which has the same bones as those in a human arm, includes a nine-foot humerus which Jensen enlarged from a Brachiosaurus to match the scapula he had discovered; a five-foot foreleg; and five toes with claws.

Dinosaurs, like today's elephants, rhinos, giraffes, and horses had front legs which were not connected to their bodies by means of a bony socket. Unlike those of humans, their legs are attached only by muscle and ligaments.

The task of piecing the leg bone together was fascinating but not too complicated for Jensen. "If a person takes a car part to a good mechanic, the mechanic can tell what the part is, how it functions, what car it belongs to, and probably the year and speci-

fical model," he said.

"Likewise, when we find a bone in a dinosaur quarry, we have a good idea of what the remainder of the skeleton looked like, even though it may be a completely new dinosaur."

Jensen calls this enormous creature "Ultrasaurus" and if he were to piece it together it would stand about 60 feet tall from tail tip to snout and be able to peer into a six-story building. Since Jensen found a four-and-one-half-foot neck vertebrae in addition to the nine-foot shoulder blade, he estimates that the neck was at least 40 feet long.

BYU TODAY MARCH 1983
Lloyd Gunther

OLDEST SOUTH AMERICAN MAMMAL FOSSIL FOUND

Washington (AP) The oldest fossils of land mammals ever found in South America have been unearthed in south-west Bolivia by a U.S.-French scientific team.

The fossils, believed to be between 70 million and 75 million years old, were discovered on a hillside in a remote region this past fall, said the National Geographic Society, which funded the expedition.

The seven fossils represent three species of mammals that were all marsupials, or animals that carry their developing young in a pouch. The species, which have not yet been named, were identified as marsupials on the basis of their dental characteristics.

The fossils include a nearly complete upper and lower jaw with teeth from an animal the size of a rat, a partial lower jaw without teeth from a creature the size of a mouse, and a partial upper molar from an animal the size of a cat.

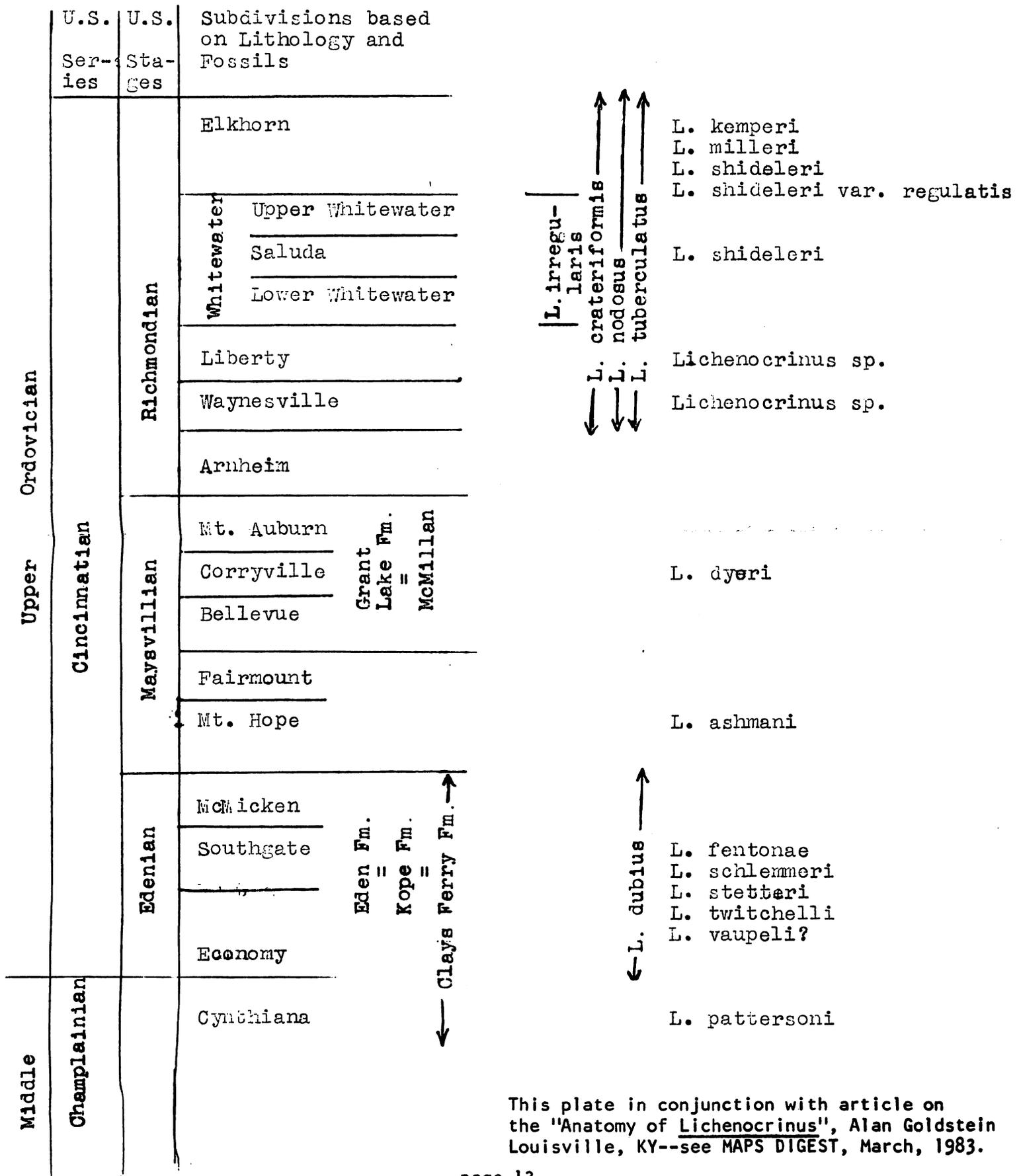
Until now, the oldest confirmed fossil record of mammalian development in South America consisted of specimen 60 million years old.

ROCK SPRINGS (WYO.) DAILY ROCKET-MINER
January, 1983
Dennis Kingery

When we try to pick out anything by itself, we find it hitched to everything else in the universe.

--John Muir

Stratigraphic Column for Lichenocrinus Distribution



This plate in conjunction with article on the "Anatomy of Lichenocrinus", Alan Goldstein Louisville, KY--see MAPS DIGEST, March, 1983.

CREATIONISM THREATENS MORE THAN JUST BIOLOGY

By Gwinn Owens

THE BALTIMORE EVENING SUN December, 1982

The battle of evolution versus the Biblical creation as described in Genesis has been fought in letters to editors to no great advantage.

the creationists show not the slightest understanding of the nature of science, and the evolutionists cannot penetrate or understand the religious faith of the creationists.

There would, however, be no public issue, were it not for pressure from some zealots to have Creationism taught as "science." The reason for raising the issue once more is based on the observation that the front line in the battle to defend the purity of science has been manned almost entirely by biology teachers.

But why only biology teachers? Just as big a stake in the campaign to avoid confusing faith with empirical science should be held by physicists, astronomers, chemists, geologists, archeologists, anthropologists, psychologists and physicians.

For there is a key issue: If a literal interpretation of Biblical creation is a fact, the edifice, not just of biology, but of all science, collapses. And with it go the underlying principles that have made possible everything from television to the miracles of modern medicine.

The issue, it must be said at the start, does not involve belief or non-belief in God. There is nothing in science that precludes the existence of a Supreme Being, even as the Creator of the universe--and many scientists believe exactly that. There is everything in science, however, that precludes the creation of the universe in six days 5,743 years ago, with the earth and man and every creature and feature as part of the original, simultaneous project.

The simplest example comes not from biology, but from astronomy, which now has become inseparable from physics. Light travels 186,000 miles a second. Astronomical distances are so immense that they are frequently measured in light years, which is to say the distance light travels in a year. Modern telescopes

probe so far into the heavens so as to make visible distant galaxies that are millions of light years away.

This means that as we see distant clusters of stars, we are seeing them not as they are, but as they were perhaps 10,000,000 years ago. If the universe were created only 5,743 years ago what we are seeing through the telescope is either some kind of illusion, or else light travels a lot faster than 186,000 miles a second.

this means that astronomy and physics, as we now understand them, would have to be some kind of theological joke. Thus would disappear the cornerstones of modern physics--Einstein's special and general theories of relativity and the underlying principles of particle physics, all of which involve calculations relating to the speed of light.

Another example: Chemists, biologists, geologists, archeologists and anthropologists, not to mention physicists, are aware of the phenomenon known as radioactive decay. The best known practical use of radioactive decay is the observation of the isotope carbon 14.

Almost all living creatures and plants absorb carbon 14. When they die, the carbon 14 begins to decay and turn into nitrogen. Every 5,730 years, half of the original amount has decayed. Hence if a geologist or archeologist or anthropologist finds the remains of a once-living organism, the relatively simple process of carbon dating enables the scientist to know with considerable accuracy when the organism's life ended. The geologist or archeologist is thus provided with vital information.

Needless to say, carbon dating has identified organic materials thousands of years old. This standard tool in so many sciences would become a blind alley if the creation as described in Genesis were taken literally.

And the decay process on which it is based is one of the bedrocks of both physics and chemistry.

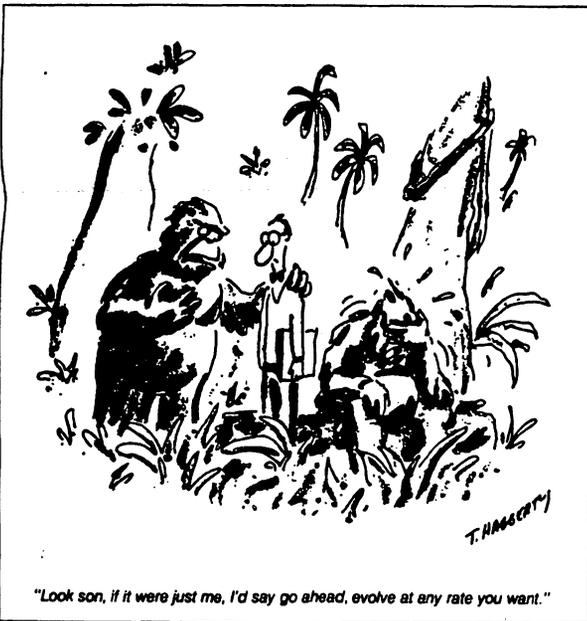
For a government or a school board to want to have the Bible taught as part of religious study in public schools may not be constitutional, but it is not unreasonable. But to demand that a tenet of faith of one religious tradition (Judeo-Christian) be taught as verifiable fact in science classes is an entirely different matter.

Perhaps the best way to assess the issue is to

ask whether it could be taught as a scientific theory in a classroom of Hindus or Buddhists--or atheists. The chances are the scientists in China or India or the Soviet Union are learning the theory of evolution (and the various sudden-mutation theories that have modified it) just as Americans are. The chances are they are learning the theories of relativity, just as Americans are. But are they learning--or would they accept--the Fundamentalist Christian belief that the universe was created in six days? As science, certainly not.

The issue is not one just for biologists. to try to make science out of dogma is an assault on the tradition of free enquiry. It is form of, to use Jefferson's phrase, "tyranny over the mind of man."

--Jim & Sylvia Konecny
Prescott, AZ



"Look son, if it were just me, I'd say go ahead, evolve at any rate you want."

104 OMNI

ARCHAEOLOGY AND SOCIETY, by Grahame Clark--

Though my primary interest is fossils, I recently finished reading ARCHAEOLGY AND SOCIETY by Grahame Clark (Barnes & Noble University Paperbacks) and highly recommend it to all earth science enthusiasts. Though at times it seems dated (it was written in 1939, revised in 1957) such as when the author mentions development of the aqualung and Cousteau's free-diving techniques which make possible the use of submarine archaeology as a field of purposeful research as well "as of lucky finds", much has not changed over the years.

Archaeological evidence is rather life circumstantial evidence in a court of law, and he stresses the importance of other sciences. Stratigraphy and fossil remains (from mammoths to molluscs) date finds, especially those of the Ice Ages.

On pollen analysis--by planting crops, "reduce the contribution of forest trees and correspondingly magnify that of grasses and herbs so markedly that the near presence of prehistoric farmers can be detected...even though no archaeological material whatever is available." And to learn about trade--"a simple measure of the succinic content of amber enables them to distinguish between Baltic or North Sea and Mediterranean amber".

One must also take into account human disturbances of the layers, such as material thrown out of tombs, burials inserted in a lower level, hoards, etc. Saying the archaeologist is "somewhat in the position of a paleontologist trying to reconstruct the life of an intricate organism from a few surviving fossils", he tells of the need to study modern day primitive cultures as well as governments, societies, economic life, environmental changes, and so one, to interpret finds.

The author is English, and some terms need explanation, such as "excavation of coprolites for manure has also yielded its archaeological harvest". A footnote explains that "by origin, the word coprolite signified petrified dung, presumably of enormous reptiles, but the term came to include phosphatized casts of vertebrate remains in general".

This little book is an interesting blend of earth sciences, and the sketches and photos are fascinating, ranging from mammoths to safety pins!

--Diane Dare
Evansville, IN

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Cash reward to any one furnishing to me information leading to a purchase of any of thses items. Respond to: RICHARD MCCOY, 1119 Michigan Avenue St. Joseph, MI 49085

SCIENTISTS TAKE DEEP INTEREST IN ILLINOIS PROJECT--Circuit Writer David Fryxell--21 February 83
TELEGRAPH HERALD,ubuque, IA

Lena, IL--The yard-high pipe sticking out of Dale Wernicke's farm in northern Stephenson County, IL, is a time machine boring 1.47 billion years into the earth's past.

It looks like a piece of misplaced plumbing. Take the cap off, it looks like a three-inchwide hole in the ground. Drop a stone in the hole and it would fall 5,270 feet, just 10 feet shy of a mile. That makes it the deepest hole cored out of granite in the United States. A utility company drilled it, but scientists seized it as a geologic Rosetta Stone.

"anything we found was in a way a surprise, because we didn't have hands-on experience at that depth," says Bezalel C. Haimson, a professor in the metallurgical engineering department at the University of Wisconsin-Madison, who headed the Illinois Deep Hole Project. The farm with the hole is between Lena and Winslow, IL, about 50 miles east of Dubuque. . .

Southwest of Wernicke's farm, in Carroll County near Savanna, IL, rock rods from his land and from similar drill sites fill a shed on the grounds of a future Commonwealth-Edison nuclear power plant. A billion years of history, neatly boxed, are stacked eight feet high and 40 feet long in what one geologist calls "a chicken coop."

The geologist, W. R. Van Schmus of the University of Kansas in Lawrence, helped unlock the secrets of the rock pulled out of the Illinois Deep Hole. "There are many reasons to drill down there," he says. "The problem is to find out who's doing it and to get them to provide samples for scientific study. It's a valuable resource that's often thrown out at the drilling site."

He moans, "Some of it ends up as bookends on executives; desks."

Rock from the Deep Hole escaped bookend use at Commonwealth Edison's Chicago offices because Haimson chanced to hear about it from a consulting firm overseeing the drilling. The utility company was planning to plug the hole for good when Haimson called.

Com Ed began drilling on the Wernicke farm in April, 1979, to test the granite's suitability for a mammoth engineering scheme.

An underground storage "battery" for electrical power.

During the day when power is most in demand, water would drop down a 5,000-foot shaft to a turbine in a cavern whacked out of solid granite. The falling water would generate electricity just as it does at a hydroelectric dam. At night, cheap off-peak power would be used to pump the water back up the shaft for the next day.

Tests showed the granite was solid enough to serve as a reservoir. But by then consumer demand for power had slackened. Says Marvin Cooper, an engineer at Com Ed, "The need was deferred into the future. It probably won't happen before the next century."

Meanwhile, Haimson was rounding up support from the scientific community and a grant from the National Science Foundation. "the fact that you could get together 40 or 50 scientists for this research shows the tremendous interest in this area," he says. . .

Com Ed even gave Haimson 25 days on the drilling rig, which he estimates was worth about \$25,000. The total project--three holes of which the 5,270-footer is the deepest--ran to \$750,000.

"It was incredible opportunity," Haimson enthuses. "Nobody will grant you three-quarters of a million dollars for science."

Drilling a mile into the earth demands a bit ringed by diamond "teeth." The hollow drill bit cuts a circular core as it descends. Cooper says, "You can go about 20 feet at a time before you have to pull the core out. It gets to be quite a job when you're drilling about a mile. You have to bring it up section by section and take apart the pipe as you bring it up," Work went on 24 hours a day for 18 months.

Once the drill penetrated the 30-foot "overburden" that's all most of us see when digging basements and ditches, it hit the residue of ancient oceans. From 500 million to 250 million years ago, a landlocked sea lapped, off and on, from Colorado to Ohio.

The comings and goings of the water left calling cards in the rock, layers as thin as 45 feet or as thick as 860 feet. Geologists named the layers after noteworthy outcrops of each kind of sandstone or limestone, some as familiar as Galena, Platteville or Prairie du Chien.

Like a knife slicing an enormous layer cake, the Deep Hole drill struck and brought up vanilla-colored Glenwood-St. Peter, creamy Potosi, lemony Franconia, orange Mount Simon rock--11 types in all. Each represented millions of years. At 2,170 feet the drill passed the billion-year mark and bit into granite laid down during the Pre-cambrian--when the only life on earth was amoebae and bacteria.

"We had no idea what to expect," Haimson says. "What size granules, stress conditions, forces acting on the rock, permeability, the extent of fractures, density." Or the age of the rock: "This may not impress you, but it was about 300 million years younger than other granite on the continent." So geologists believe the granite underlying northwestern Illinois may have been squirted up, molten hot, by a collision on a continental scale

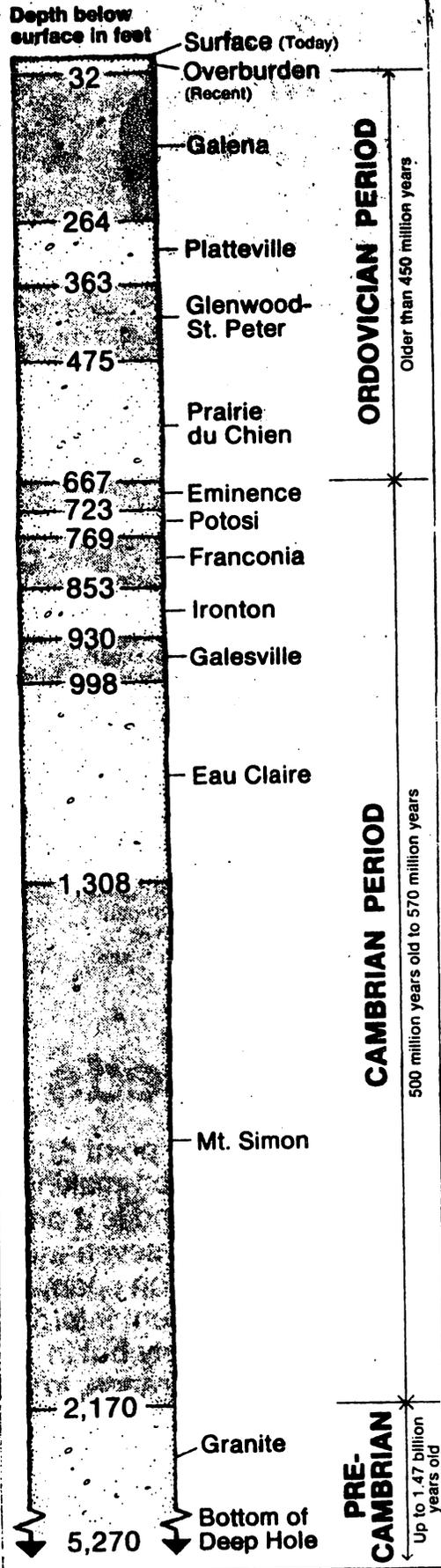
But the subterranean temperature today is a tepid 120 ° dashing hopes that the area might be ripe for geothermal energy.

Van Schus does believe the earth's "basement" could hide mineral resources, though it may be 50 years before we can exploit them. Of course, oil developers have drilled as deep as six miles--but not through solid granite and not with continuous core samples.

The Illinois Deep Hole stops 3,000 feet into the granite, which Van Schus says continues for another 2½ miles. Among the uses of the Illinois core samples, some of which continue to circulate among scientists around the country, is to help map just what does lie under the land from the Rockies to the Appalachians.

Rock formations from Illinois Deep Hole project

Source: W. R. Van Schus



Geologists theorize that under the granite is a 24-mile-thick swatch of volcanic rock called amphibolite. Below that bottom boundary of the earth's crust is a 60-to 120-mile molten sea on which the continents sail.

Stress marks in the Deep Hole samples confirm that the Wernicke farm is moving northeast. But Wernicke needn't worry that he'll soon be plowing in downtown Milwaukee. The continents drift in geologic time, where a million years is like an eyeblink.

From the semi-solid layer to the earth's core is another 1,700 miles, far beyond any imaginable "journey to the center of the earth."

Whether geologists can explore even a few thousand feet deeper depends on luck and corporate generosity like the Deep Hole Project. It's difficult, Van Schus says, to sell people on a hole in the ground.

"We're working with fortuitous samples. In a sense it's a sort of treasure hunt," he says. "The deeper the hole, the bigger the treasure."

Peggy Wallace
Dubuque, IA

Scientists have discovered contrasts of coiling directions of microscopic shells of planktonic foraminifera (Globorotelia truncatulinodes) from deep-sea Pleistocene sediments of the North Atlantic. Right hand coiling (clockwise) occurs in waters warmer than 8 to 10°C, whereas left-hand coiling characterizes cooler temperatures.

EVOLUTION OF THE EARTH
Robert H. Dott, Jr.
Robert L. Batten

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.

MAPS is affiliated with the Midwest Federation of Mineralogical and Geological Societies, and with the American Federation of Mineralogical Societies. Membership in MAPS is open to anyone, anywhere who is sincerely interested in fossils and the aims of the Society.

Family membership \$7.00; individual membership \$7.00; junior membership \$5.00 (between ages 8 and 16).

MAPS meetings are held on the 1st Saturday of each month (2nd Saturday if inclement weather) October through May at 2p.m. in the Science Building, Augustana College, Rock Island, Illinois.

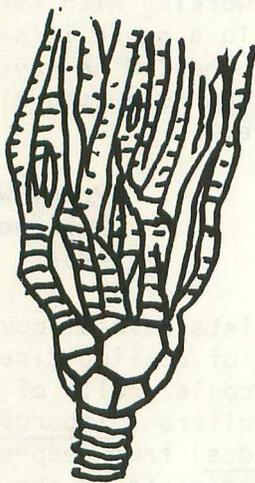
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CYATHOCRINITES

MID-AMERICA PALEONTOLOGY SOCIETY

Madelynn M. Lillybeck
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