



The Rostrum

The Newsletter of the Maryland Geological Society

VOLUME 1/NUMBER 1

WINTER 1991-1992

INITIAL MEETING OF MGS AT MATOAKA

by Dick Grier

The first meeting of the Maryland Geological Society was held on Sunday, November 24th in the lodge at Matoaka Cottages, St. Leonard, Maryland, and was very successful, considering the small turnout. Most of the important issues were resolved.

The meeting was convened by President Dick Grier, Jr. at 1:10 pm with 15 members in attendance. Present were Dick Grier, Jr., Bob Grier, Dick Grier, Sr., Ken Boulrier, Russell Cox, Bob Farrar, Gerald & Carol O'Neil, Eric Beach, Dave Siegert, Ron Ison, Dennis Wright, Debbie Burdette, Jim Earman, and Steve Gladhill. Everyone present contributed \$5.00 toward the lodge rental.

The first item discussed was the purpose of the club and the innovative concept with which the membership had been attracted. It was emphasized that only the most ardent mineral and fossil collectors, the ones who will actively participate, had been solicited, and that professional, as well as amateur, collectors were being included.

The need for a statement of club intent as part of the general format of the newsletter was expressed by the President. A prepared statement was read, and unanimously accepted by the membership. The Rostrum front-page format, club letterhead, and club emblem were shown to the members and were accepted. The printing cost of said materials was underwritten by Dick Grier, Jr.

It was decided that the Rostrum should be published quarterly, at least for the present. We anticipate that the first issue will be published between December 15th, 1991 and January 15th, 1992. It will contain articles of interest to both mineral and fossil collectors.

The Maryland Geological Society is a society comprised of both amateur and professional mineral and fossil collectors. It is the intent of the MGS to emphasize the collecting, identification, study, and display aspects of the geological sciences. The Society is a non-profit organization. Correspondences for the MGS should be sent to Eric N. Beach, 1610 15th Street, Apt. 2, NW Washington, D.C. 20009 (1-202-387-1710). Material submitted for publication in the Rostrum should be mailed to either:

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Society officers were elected, with only a few posts remaining unoccupied. The membership unanimously voted in Dick Grier, Jr. as President and Editor of the Rostrum, Bob Grier as Vice-President and Field Trip Chairman, Dick Grier, Sr. as temporary Treasurer, Ron Ison as Contributing Editor, Dick Grier, Jr. as Meeting Site Selector, and Eric Beach as Corresponding Secretary. Three out of five members of the Board of Directors were selected and they are Eric Beach, Jim Earman, and Jerry O'Neil. Still needed are two Directors, a Program Chairman, a Membership Chairman, and a Hospitality Chairman. Hopefully, volunteers for these positions will step forward in the near future.

The Society will proceed with an open membership (no restrictions as to the maximum size of the group will be imposed). Additionally, the group will be open to children under 18 years of age under the family membership plan. Children will be included in Society activities, except where restricted (i.e. certain field trips). The Society has, as of this writing, 26 prospective members and 34 paid members. As the disparity between these two figures decreases, it will become feasible to publish a roster for the membership.

Club dues will remain \$5.00 per year for as long as possible. Fund-raising methods were discussed as a means of augmenting the Treasury.

Dick Grier, Jr. will attempt to secure a low-cost, permanent meeting site for the Society. It was decided that the Society should meet 4 times a year, and that the preferred meeting day is Sunday. Meeting dates have not yet been set, pending the outcome of the search for a meeting site. Updates on this will be forthcoming. The meeting site, when selected, will be in the vicinity of Baltimore, and will not ordinarily float.

Door prizes were donated by the Griers, Ron Ison, Jim Earman, and Steve Gladhill. The idea was popular with the members and it was decided to continue to do this, but to sell tickets to increase club revenues. We could then buy the door prizes. Auctions were also discussed as a means to generate funds. At auctions, the Society will receive 15% of the auction or sale price on all items (including dealer sales).

Field trips will be a major club activity. We will attempt to submit a complete itinerary in the Rostrum each season, complete with call-in dates, directions, etc. We will have a chance to go to the Texasgulf Quarry, Lee Creek twice this year. There will no field trips during the month of December.

Possibly in January or February, trips will be announced.

Programs for the meetings will be handled by Dick Grier, Jr. until someone volunteers to be chairman. Membership cards will be printed soon. The club will pay for these. Tee-shirts and hats may be ordered later in the year, at the expense of the individual. Gerald and Carol O'Neil volunteered to donate a 30-cup coffee brewer with coffee and fixings to the Society for use at the meetings. Sodas, doughnuts and firewood for the meeting were donated by the Griers.

SCUBA DIVING FOR TEETH

Prior to the meeting of the MGS at Matoaka on Sunday, Jim Earman, Steve Gladhill and Debbie Burdette went scuba diving and snorkeling for teeth in the cold waters out from the lodge. Diving in the range of 8-15 ft., they uncovered a treasure trove of larger teeth. Many 2"-5" Carcharodons were found, as well as a few large Isurus up to 2½". The teeth were washing out of submarine ledges, probably in the Calvert Formation. To quote Jim Earman, "We're killing 'em out there". Sounds very interesting.

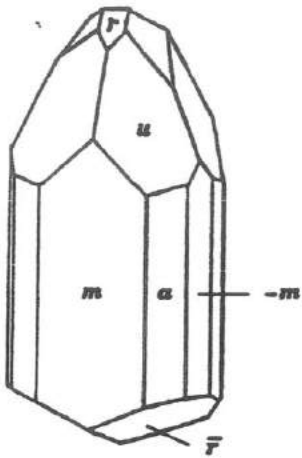
MOSASAUR

Ron Ison found a 1¼ in. mosasaur tooth at Green's Mill Run, Greenville, N.C. during November. The tooth is very nice looking and has sharp cutting edges. There is some debate as to what species or genus of the Mosasauridae is represented here. Ron Keil reports that Halisaurus, Platykarus, Tylosaurus and Mosasaurus (3 species: maximus, conodon, prognathodon) may be found in the Late Cretaceous Pee Dee and Black Creek sediments. Their teeth are quite similar. Congratulations Ron.

PLUM POINT

Eric Beach, Bob Grier and Dick Grier collected at Plum Point on Saturday, November 9th. It was chilly and windy, but the tide was fairly low. Despite the weather, only one big find was made. Eric spotted a 3½+ in. Carcharocles awash in the surf. It was virtually perfect, with a fine color and bourlette. Bob found a skate dermal ossicle in situ in what we believe was zone 10. Dick...well, Dick was in the vicinity.

On a return trip, the following weekend however, Dick found a Squalodon incisor and a 2½ in. Isurus desori.



Tourmaline

by Dick Grier

The tourmaline group of minerals is comprised of the following based on cation distribution in the bulk formula $XYZB_3Si_6O_{27}(O,OH)_3(OH,F)$: buergerite, chromdravite, dravite, elbaite, ferridravite, uvite, schorl and liddicoatite. Cations may substitute in the hexagonal lattice as outlined in the chart on the following page.

It is these differences in cationic couples and trace element chemistry that are responsible for the wide array of colors displayed by tourmaline crystals: red, pink, green, colorless, blue, blue-green, brown and black. Many tourmaline crystals are zoned and are bi- or tri-colored, reflecting fluctuating physicochemical conditions during crystal growth.

Tourmaline occurs not only as single crystals, but as fibrous masses or in parallel, divergent or radial groups. The crystals are hexagonal, often displaying prismatic, rhombohedral and pinacoidal faces; they are hemimorphic, giving rise to pyroelectric and piezoelectric effects.

Tourmaline is most commonly found in granite pegmatite dikes, where it occurs in association with beryl, morganite, spessartine, columbite-tantalite, cassiterite, smoky quartz, spodumene, topaz, lepidolite, cleavelandite, apatite, and others. It can, however, also be found in chlorite schists (schorl, such as at Northeast Materials Quarry, Cecil Co., Md.), in muscovite schists and contact marbles and quartzites (as in northern Baltimore Co.), and in ore veins. Hard rock mining techniques are usually required to extricate tourmaline crystals.

Notable tourmaline occurrences worldwide include Pala, San Diego Co., California; Elba, Italy; Newry, Maine; Gilgit, Pakistan; Ural Mts., USSR; Nepal; Minas Gerais, Brazil; and the Malagasy Republic.

Ref. Min. Rec., vol. 16, no. 5, Sept.-Oct. 1985, Tourmaline Issue, pp.339-352.

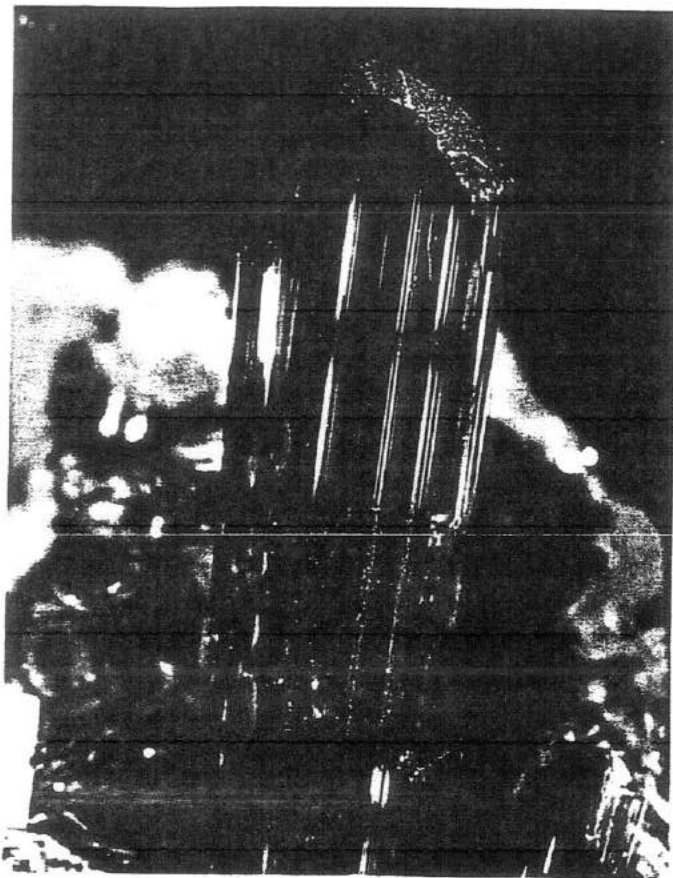


Figure 13. Green elbaite crystal 5 cm tall from Minas Gerais, Brazil. Werner Lieber photo.

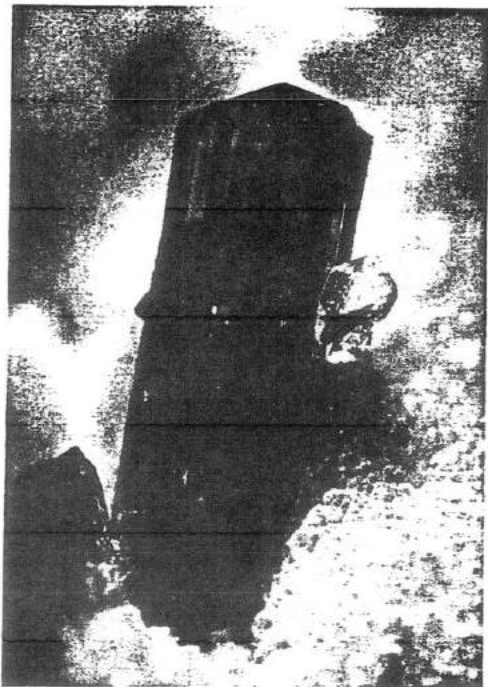


Figure 14. Brown dravite crystal 4 mm tall in a vug in dolomite from the Lengensch quarry, Binntal, Switzerland. Eric Offermann photo.

	X	Y	Z	
Buergerite	Na	Fe ⁺³	Al ₆	B ₃ Si ₆ O ₂₇ O ₃ F
Chromdravite	Na	Mg ₃	Cr, Fe ⁺³	B ₃ Si ₆ O ₂₇ (O, OH) ₃ (OH, F)
Dravite	Na	Mg ₃	Al ₆	B ₃ Si ₆ O ₂₇ (O, OH) ₃ (OH, F)
Elbaite	Na	(Al, Li) ₃	Al ₆	B ₃ Si ₆ O ₂₇ (O, OH) ₃ (OH, F)
Ferridravite	Na	Mg ₃	Fe ⁺³	B ₃ Si ₆ O ₂₇ (O, OH) ₃ (OH, F)
Liddicoatite	Ca	(Li, Al) ₃	Al ₆	B ₃ Si ₆ O ₂₇ (O, OH) ₃ (OH, F)
Schorl	Na	Fe ⁺²	Al ₆	B ₃ Si ₆ O ₂₇ (O, OH) ₃ (OH, F)
Uvite	Ca	Mg ₃	Al ₃ Mg	B ₃ Si ₆ O ₂₇ (O, OH) ₃ (OH, F)

During the compilation of data for *The Tourmaline Group*, 788 of nearly 1000 analyses recorded in the literature were entered into a computer file for study. Partial analyses, obviously poor analyses, and analyses of apparently "oddball" (e.g., probably contaminated) tourmalines were not included. Each of the 788 analyses was converted to number of ions (i.e., subscripts in the formula) on the basis of 31 anions. After that conversion, several more analyses were deleted so far as inclusion on certain data plots; the basis for deletion was the character of the output and considerations of certain aspects of structural analyses and/or of known analytical pit-

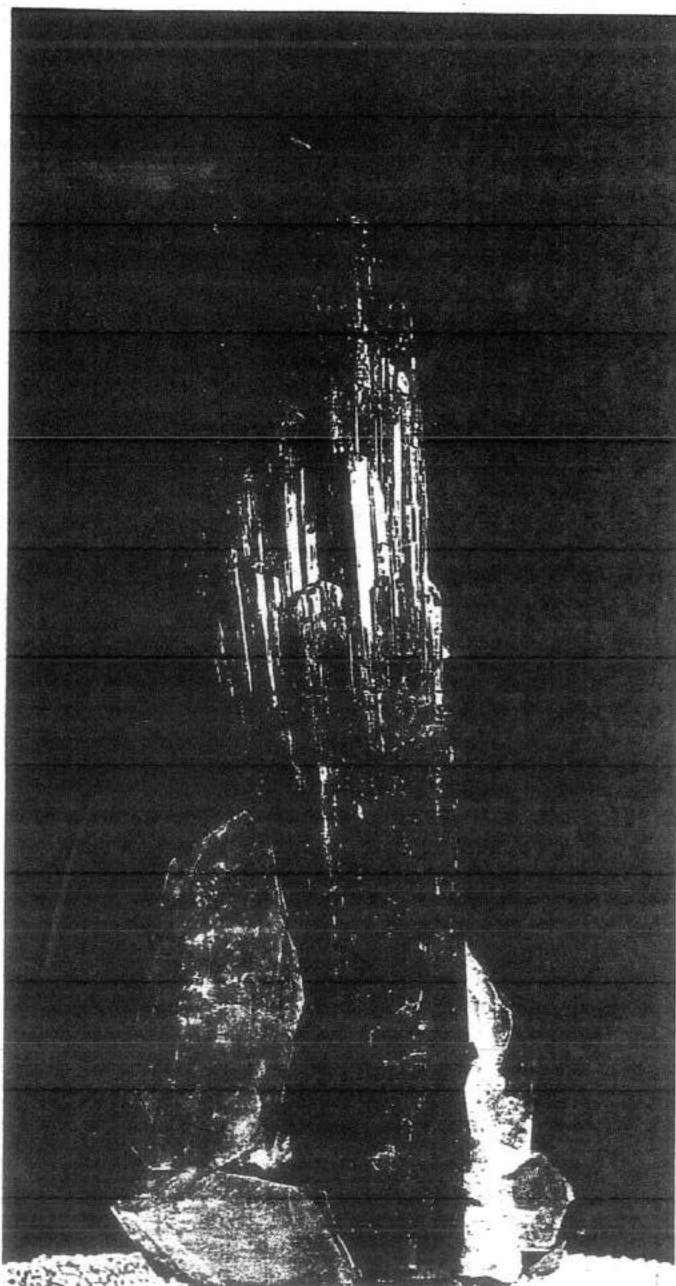
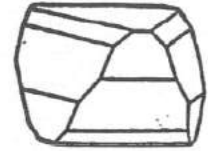


Figure 15. "The Rocket," at 109 cm (43 inches) the largest fine crystal of tourmaline known; from the Jonas mine, Itatiaia, Brazil. Photo courtesy of Carlos Barbosa.



FINDS BY OUR MEMBERS



by Dick Grier

Since I have not yet had time to get any feedback from our members, I will write about the recent finds of my brother Bob and myself. Hopefully, in the next issue, mention can be made of the finds of others in the club.

While on the October 5th trip of the Myrtle Beach Fossil Club to Lee Creek, Bob was lucky enough to find a 2½ in. *Parotodus benedeni* in the new area, near where I had set my bucket. It was a beautiful, white tooth, and in good condition. He jokingly said "tell my brother to get his checkbook ready."

On October 12th, Bob and I attended the Atlantic Coast Gem & Mineral Exhibition in Pikesville, Maryland. There we purchased a thumbnail-sized Chinese cinnabar specimen (red xls.), a 2x2 in. Moroccan vanadinite specimen (orange-red xls.), a Moroccan trilobite (*Dicalymene ouzregui*) from the Devonian period, and a 2-¾ in. *Otodus obliquus* from the Paleocene-Eocene of Morocco.

Both Bob and I attended the October 19th field trip to Lee Creek (Rita's group). I found a few pristine makos, but my brother found a 3½ in. incisor with root from *Squalodon tiedemani*, again near where I was sitting. I can truthfully say that I have been in the vicinity of a lot of great teeth. On Friday the 18th of October, we went screening at Green's Mill Run, Greenville, North Carolina and Bob found a 1-5/8 in. mosasaur tooth (Black Creek Fm., Late Cretaceous).

On the weekend of October 26th, I attended the South Penn Rock Swap at Arendtsville, Pennsylvania. I purchased a Massachusetts datolite, a Peruvian pyrite and a green Pakistani elbaite tourmaline in cleavelandite matrix. I also swapped a few specimens.

At Aurora on November 2nd, I found a 2-5/16 in. *Carcharocles angustidens* in Pungo River sediments (Middle Miocene). My dad found his biggest tooth to date, a 2 in. *Isurus hastalis*. He also found a 2 in. *Pterorhynchus conradi* (a murex), which is rare.

And finally, on Sunday, November 3rd, Bob and Craig Stillwaugh went to Liverpool Point, Charles Co. Here Bob found a nice *Paraorthacodus clarkii* (horn shark, formerly *Synechodus*, Aquia Fm., Late Paleocene) and a teleost tooth which we believe to be *Cybium proosti*.

We invite the membership to keep us informed of unusual or interesting finds or purchases. If you would give us a call, or if you see us on a field trip, let us know what you've found, and we will be able to include it in a future edition of this column. It is hoped that exposition of this sort will stimulate collecting activities among the members.

Editor

IDENTIFYING NOTORHYNCHUS, HEXANCHUS, AND HEPTRANCHIAS

by Dick Grier

On quite a few field trips to Lee Creek, I have heard people ask about how to tell the difference between the lateral teeth of Notorhynchus, Hexanchus, and Heptranchias (since all three are found there, according to Case, 1967). To be honest, until recently, I did not know. Then I ordered a copy of the Handbook of Paleoichthyology, by Capetta (\$250.00) and behold, there was enlightenment. For those of you who have been unable or unwilling to afford this book, I present the following synopsis.



Notorhynchus Ayres 1885: In each lateral tooth of the lower jaw, there is a regular decrease in the size of the accessory conules, starting from the acrocone which is not much bigger than the first accessory cone. There are from 4 to 7 accessory conules. In the upper jaw, there are from 1 to 4 accessory conules that decrease very rapidly in size toward the rear.



Hexanchus Rafinesque 1810A: In the lateral teeth of the lower jaw, there are up to 12 accessory cones of gradually decreasing size. The principal cone is either slightly larger or much larger than the first accessory cone. In the upper jaw, there is a prominent acrocone followed by from 1 to 4 accessory conules:



Heptranchias Rafinesque 1810: In each lateral tooth of the lower jaw, there are from 4 to 7 accessory cones, first increasing in size toward the rear, then decreasing. In each lateral tooth of the upper jaw, there are from 1 to 3 low accessory conules that are bent distally (toward the rear).

As you can imagine, it is not as easy to differentiate between the three sharks based on teeth from the upper jaw, as it is on the teeth from the lower jaw. This means that in some cases, particularly that of the most anterior teeth, it is not possible to differentiate using these criteria.

Ref. Capetta, H., Handbook of Paleoichthyology: Mesozoic and Cenozoic Elasmobranchii, vol. 3B, Gustav Fischer Verlag, N.Y., (1987), pp. 46-49.

Case, G., Pictorial Guide to Fossils, Van Nostrand Reinhold, N.Y., (1967), p. 261.

CMM LEE CREEK TRIP

by Dick Grier

Beautiful weather and temperatures in the low 80's highlighted the Calvert Marine Museum trip to Lee Creek on November 30th. Eighteen MGS members and hopefuls attended: Bob and Dick Grier, Joe Bernstein, Dennis Wright, Eric Thompsen, Melissa Manwaring, George Fonger, Steve Brady, Pat & Melanie Gotsis, Ron Ison, Steve Gladhill, Russ Channell, Tom Parks, Debbie Burdette, Dave Siegert, Frank & Becky Hyne and Lloyd & Arlene Gleason.

Since it was the twelfth week of the collecting season, the quarry was quite picked over. There were, however, some nice finds made by our members.

Melissa Manwaring found a beautiful black, $3\frac{1}{2}$ in. *Carcharocles angustidens* (Pungo River formation) in perfect condition. Ron Ison came away with a 2 in. *Parotodus benedeni* from the Yorktown formation. George Fonger dug out an entire fish skull in matrix. Dick Grier found a 4 in. reworked Pungo River *Carcharocles*. Steve Gladhill and Russ Channell unearthed another trove of small *Carcharocles* and *Isurus*. Becky Hyne found a beautiful $4\frac{1}{2}$ in. *Carcharocles* on Thanksgiving Day. Joe Bernstein cornered the market on fish jaws with teeth (5 or 6). Debbie Burdette found the largest drumfish tooth that I have ever seen, and Dennis Wright uncovered a $2\frac{1}{4}$ in. *Carcharocles*. As usual, Steve Brady had an array of larger teeth, but I did not get to see them.

On Friday, November 29th, and again on Sunday, December 1st, our members invaded Green's Mill Run in Greenville, N.C. Ron Ison, Bob and Dick Grier, George Fonger, Eric Thompsen, Melissa Manwaring, Debbie Burdette, Steve Gladhill and Russ Channell screened at various times.

Ron Ison found a fine *Enchodus ferox* (salmonid fish/Cret.) jaw fragment with 3 teeth and a $2\frac{1}{2}$ in. *Carcharodon carcharias* (Pliocene). Bob Grier came up with 2 small mosasaur teeth (*M. conodon* Marsh), 2 *Anomeodus phaseolus* teeth, a sawfish rostral tooth (*Ischyrrhiza mira* Leidy), and 2 nice *Squalicorax kaupi* (crowshark). Everyone received their share of the ubiquitous *Belemnitella americana* (Cret. belemnite), and a good time was had by all.

George Fonger, Lloyd & Arlene Gleason and several others made the long journey to the Giant Cement Quarry at Harleyville, South Carolina on Sunday, December 1st. We hope that they had good luck.

GEORGE POWELL

We regret that member George Powell was unable to join us for the CMM trip to Lee Creek. We understand that George has been "under the weather" recently with cardiovascular difficulties. We hope for his speedy return to health and his normal collecting activities. NORMAL= a 6 in. tooth every other week.

LIST OF MINERAL MAGAZINES AND PERIODICALS

- Rocks & Minerals, bi-mon. publ., \$28.00/yr., Call 1-800-365-9753, very good.
- Mineralogical Record, bi-mon. publ., \$33.00/yr., Call 1-602-297-6709, semi-technical, excellent.
- Lapis Mineralien Magazin (in German), mo. publ., DM 80.40/yr, very good. Order from Christian Weise Verlag, Oberanger 6, D-8000 Munchen 2, West Germany.
- U.K. Journal of Mines and Minerals, 3 issues/yr., \$30.00 airmail from U.K., Call 1-414-362-3674, good.
- Rivista Mineralogica Italiana (in Italian), quarterly publ., \$32.00/yr. ppd, Order from Renato and Adriana Pagano, P.O. Box 37, 1-20092 Cinisello Balsamo, Milan, Italy; English abstracts, good.

MINERAL BOOKS

- Glossary of Mineral Species, 1991, Fleischer & Mandarino, \$15.00 +\$1.00; Order from Circ. Mgr. Min. Rec., P.O. Box 35565, Tucson, Arizona 85740; 262 pp., excellent. Annual updates to glossary published in Min. Rec.
- Handbook of Mineralogy, Anthony, Bideaux, et.al., vol.1, (1987), \$82.50 + \$5.00 prepaid; Send to Mineral Data Publishing, P.O. Box 37072, Tucson, Ariz. 85740, 586 pp., similar to vol. 1 of Dana's System of Mineralogy.
- Gem and Crystal Treasures, Bancroft, (1984), \$65.00 ppd. Order from Circ. Mgr. Min. Rec. , P.O. Box 35565, Tucson, Arizona 85740, 488 pp.
- Mineral Museums of Europe, Burchard and Bode, (1986), \$52.00 ppd., Order as above.
- Minerals of New York State, Jensen, \$14.50 ppd. hardcover, Order from Rocks & Minerals, 5341 Thrasher Dr., Cincinnati, Ohio 45247.

FOSSIL BOOKS

- Solnhofen: A Study in Mesozoic Paleontology, Barthel et.al., \$62.00 ppd., Nevada Mineral and Book Co., 765 N. Nellis Blvd., #8479, Dept. R, Las Vegas, Nevada 89110, 1-702-453-5718, VISA/MASTERCARD accepted.
- Fossils of the World, Turek, \$23.00 ppd., Oxcart Minerals, 48148 Conley Rd., Vida, Oregon 97488, 1-503-896-3201.
- On Methuselah's Trail: Living Fossils & the Great Extinctions, Peter Douglas Ward, W.H. Freeman & Co., \$18.95, 212 pp., illustrated.

INVERSAND MARL PIT

On Sunday, November 23rd, Dr. William Gallagher of the New Jersey State Museum led a field trip of 30 people for the DVPS to the Inversand Marl Pit at Sewell, New Jersey. Bob and Dick Grier attended from the MGS. We screened in the Late Cretaceous Navesink and the Late Paleocene Hornerstown Formations. We found chelonid neural plates, crocodile scutes, fish vertebrae, shell casts and a few broken teeth. Two theropod bones were found by a DVPS member, but were donated to the State Museum. Screening for fossils in the quarry was difficult (treacherous mud conditions), and the best finds were made on the spoil piles where the fossils have been concentrated.

UPCOMING SHOWS

- Mar. 7,8 Claymont, Delaware, 29th Annual Earth Science Gem & Mineral Show; Delaware Min. Soc., Brandywine Terrace, 3416 Phila. Pike. Info. Donna Brown 1-215-255-5365.
- Mar. 14,15 Clifton, N.J., 4th Annual "Crystal Gazers" Gem & Mineral Show, Clifton Min. & Lap. Soc. Info. Ed Murphy 1-908-477-8897.
- Apr. 3,4,5 Raleigh, N.C., 16th Annual Capital Area Gem Festival. Info. Earl Hines 1-919-847-5038.
- Mar. 17,18 Gaithersburg, Md., Montgomery Co. Fairgrounds, Gaithersburg, Maryland.
- Mar. 7,8 Philadelphia, Pa., DVPS Fossil Fair, Philadelphia Academy of Sciences, 19th & Parkway, Phila., Pennsylvania.

BOARD OF DIRECTORS

Debbie Burdette has volunteered to be the fourth member of the Board of Directors. Thanks Debbie. One more volunteer is needed so that we will have five members. Prospective directors will be sought at our January 1992 meeting.

THEME FOR JANUARY MEETING

The themes for the January MGS meeting are as follows: for the mineral collectors-- tourmaline, and for the fossil collectors -- shark teeth of the various periods. Please bring these types of items for display, along with any other fossils or minerals that you wish for "show and Tell".

PROGRAM FOR JANUARY MEETING

Dick Grier, Jr. will speak at our January meeting on "Minerals and Fossils". There will be an accompanying slide program. Please try to attend.

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ARTICLES FOR THE ROSTRUM

Your editors would like to take this opportunity to invite the membership to submit articles concerning subjects which are of interest to them. Particularly needed, are technical articles and research-level articles (not necessarily your own research). All articles submitted which are deemed appropriate for the Rostrum will eventually be published. Submit articles to either Ron Ison or Dick Grier, Jr. at the addresses shown on the cover page of the bulletin.

TREASURERS

Dick Grier, Sr., our current Treasurer, has recently opened a bank account for the MGS at the First National Bank of Maryland. At our January meeting, Russell Cox will be assuming the duties of Treasurer for the 1992 year.

FOUNDATIONS OF ARITHMETIC

BY J. A. LINDON

One day when Mugg the Missing Link was prowling through the woods,
In search of wives and mammoth-meat and other useful goods,
Whom should he see, on pushing out from deep arboreal shade,
But Ogg the Paleolithic Man, cross-legged in a glade.

This Ogg had made a neat array of pebbles on the ground,
In number they were twenty-one, the most that could be found,
And Ogg, with one red-hairy hand pressed to his bony brow,
Was staring at these pebbles like a ruminating cow.



Thought Mugg—for he was Primitive—I should be very dull
To lose this opportunity of busting in his skull;
My club weighs half a hundredweight, he doesn't wear a hat—
(And here he wondered.) Yes, but what the Devil is he at?

For Ogg was touching pebbles and then prodding at his digits,
Until the weirdness of it all afflicted Mugg with fits:
"Invented any goodish wheels just recently?" he hollered,
And doubled up in merriment, his face raw-beefy coloured.

Ogg looked at him in pity, then he drummed upon his chest,
His reddish eyes aflame with all a mathematician's zest:
"I've done a Think!" he bellowed. "Monkey Mugg, I've done a
Think!

And I would write it down, but no one's yet invented ink."

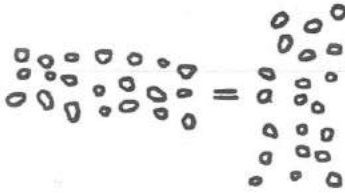
Mugg moved a little closer, and his eyes and mouth were round,
And stared in trepidation at those pebbles on the ground.

Ogg pointed with a nailed red-hairy sausage at the rows
And said, "Three people's hand-plus-two is hands-plus-feet-plus-
nose."



"And this is hand-plus-two of people's three-for-each-by-name,
So three times hand-plus-two and hand-plus-two times three's the
same!"

Mugg scratched his matted hairy head, not knowing what to say.
Said Ogg, "It's all made clear by this rectangular array."

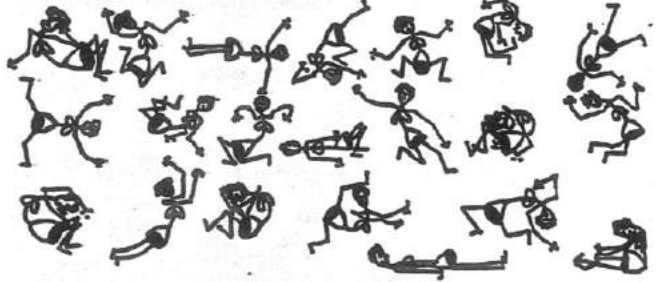


"Three rows of hand-plus-two and hand-plus-two short rows of
three
Are just the same according to which way you look, you see!
In brief, a triple heptad is the same as seven trebles,
And may quite possibly be true of other things than pebbles."

Mugg viewed it from all angles, then he gave a raucous belch
And trod on a Batrachion that perished with a squelch.
He growled, "I do not understand these arithmetic quirks,
But maybe we should try it to discover if it works."

So home they went to get their wives and drag them by the hair,
For Mugg had feet-plus-hand-plus-four, while Ogg had just a pair;
But what with all their screeching and their running every way,
At first they would not form a neat rectangular array.

So Ogg he then positioned each by holding of her down
While Mugg with mighty club in hand, just dined in her crown;
And when they had them all in place, like pebbles, they could see
That three times hand-plus-two in wives was hand-plus-two times
three!

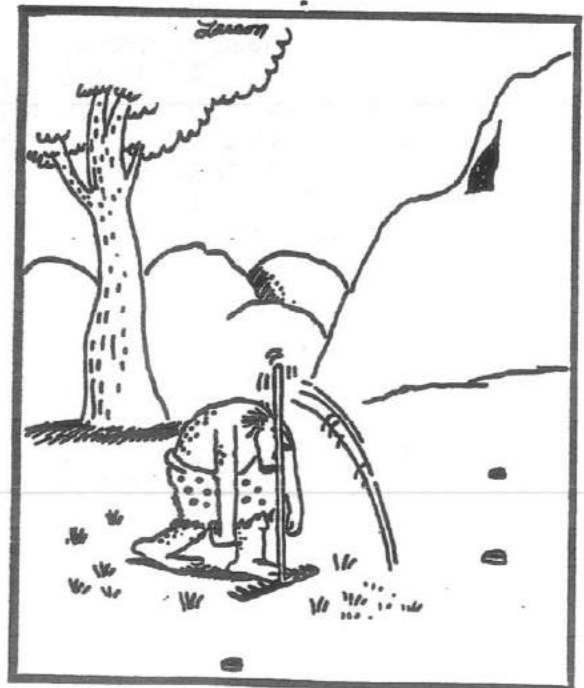


Then Ogg he roared in high delight, cartwheeling to and fro
(Carts had not been invented, but he did it, just to show!);
And Mugg he grinned a shaggy grin and slapped a hairy thigh
And said, "It's true, as sure as Pterodactyls learned to fly!"

And then they feasted on their wives in unuxorious zest,
Except for one whose skull was rather thicker than the rest,
And she was sent to dig a pit and bury every bone,
While Mugg and Ogg went off to find a flat unsullied stone.

Then Ogg he sharpened up a flint and scratched upon the rock:
First Arithmetic Theorem—by Ogg the son of Mok.
He drew his little diagrams, and proved, with QED,
That Three times hand-plus-two of x is hand-plus-two times three.

But Mugg the Missing Link grew bored, and left him there alone,
Still scratching with his silly flint upon his silly stone;
And belching, plunged back in the woods on feet toes simple five,
In search of wives and mammoth-meat, particularly wives!



The discovery of tools

Greenbelter Finds Dinosaur Femur, Largest Maryland Fossil Discovery

by Mary Lou Williamson

Tramping through a local sand and gravel pit not 10 miles from home with his two children on Sunday afternoon, May 19, Arnold "Butch" Norden, of Lakewood, made the biggest dinosaur discovery in Maryland during this century. An ecologist by profession, Norden finds Greenbelt "a fascinating area to live in."

He was walking on a level area, looking down where a bulldozer had scraped the day before. Norden told the News Review, when he saw the outline of a huge bone—six feet long. One end had been crushed under the dozer's tread and a section had been scraped. "I've seen lots of fossilized bones," said Norden. "The inner structure can be like honeycomb. Rocks don't look organic."

He studied his find, dug a bit around the edges, found the other end of the bone, and decided he was "absolutely positive" that his discovery was worth a call to the Smithsonian. Experts there have identified the bone, a femur (upper bone of the hind leg) of *Astrodon*, the largest dinosaur, 60 to 80 feet (or more) in length, to roam Maryland 110 million years ago. (See drawing.)

Norden marked the bone site late Sunday. Monday morning a call to the property owner brought assurance that "we'll avoid it." In fact they shut down. The call to the Smithsonian produced a three-man team by 11 a.m. to unearth and retrieve the 400-lb. fossil. Layers of burlap soaked in plaster were draped along the top and sides of the bone to keep it from breaking apart during the move. The process took all day. The team returned Tuesday to dig under the huge bone and surrounding clay, roll it over and secure the other side in plaster, supported by a wooden frame. Now weighing 600 lbs., the bone was carried by truck to the Smithsonian.

On Thursday Norden received a call from Dr. Nick Hotton, curator of paleobiology. The find, he said, was significant enough for the Smithsonian to hold a press conference the next day. Norden said each of the local TV news channels aired the story that evening, the Washington Post and Baltimore Sun

ran weekend stories and the Discovery Channel, which did an extensive interview, will air its piece in a week or so.

Norden, a very private man, has not welcomed all the personal attention. Phone calls interrupt him at work. Friends he and his family haven't heard from in years are calling. He found himself the subject of a children's sermon at church the following week. Nevertheless, Norden is pleased by the publicity. "All of a sudden people are becoming aware that there were dinosaurs in this area," he said. "They are really excited."

Clean-Up

The bone is now in the Smithsonian's "prep lab." The encasing plaster and grey clay have been carefully removed. The clay makes the clean-up job easy, said Curator Hotton. But it also means the fossil will be more fragile than if it had been preserved in rock. Next the bone will be soaked in liquid plastic that will polymerize as it dries and thus hold the fossil together.

The Smithsonian, Hotton explained, has the best collection of Maryland dinosaurs. The importance of Norden's addition is that it is the "most complete single adult bone of anything we've got" in that collection, he said. Scientists want to know what the adults were like. Norden's bone, like the others, will be available for scientists to study.

See DINOSAUR, page 4

Fossil Hunter Butch Norden

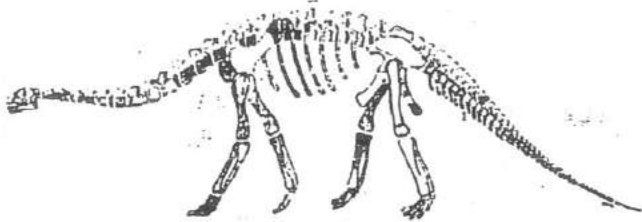
by Mary Lou Williamson

If finding a dinosaur is every kid's dream, Arnold "Butch" Norden is that rare adult who at age 45 is still looking. A native of Baltimore and product of its schools, Norden by the age of 12 had begun a life-long interest in collecting fossils and dinosaurs. Butch, as he is still known by family and friends, had seen the great halls of the Museum of Natural History in New York with its "incredible collection of dinosaurs." The easily found fossils at Calvert Cliffs fed his early interest in collecting. At Towson State University he studied biology, receiving an M.S. degree in Aquatic Ecology. Today he loves best the field work of his Annapolis-based job — looking for adverse environmental impacts on projects that require use of land owned by the Maryland Department of Natural Resources.

He's an active member of the Maryland Natural History Society in Baltimore and credits that organization with maintaining his strong interest in fossil collecting. Norden has found fossils in every county in the state, particularly in Western Maryland, where he finds trilobites and other marine invertebrates and 300 million year-old plant fossils. Norden laughs and says, "I spend a lot of time breaking rocks."

Not content to spend only his weekdays in the field, Norden pursues his interests in Maryland's natural history also on weekends, often with his family.

When he moved to Greenbelt 6 years ago, Norden began reading
See FOSSIL, page 4, col. 4



ASTRODON, the largest plant eating Sauropod known from the eastern United States, roamed Maryland during the Lower Cretaceous period, 110 million years ago. No intact dinosaur has been found in Maryland. Only the bones which have been shaded, above, have been found and no two bones were discovered together.

—Maryland Geological Survey

Dinosaur Bone Discovered

(Continued from page 1)

The bone would disintegrate if kept in someone's basement, Norden said. The original specimen of *Astrodon*, a tooth found over 100 years ago, he pointed out, is still safely preserved in Yale University's Peabody Museum.

"Scientists need more and better bones all the time," Norden explained, "so they can really begin to understand what the dinosaurs looked like and what they did."

Under Greenbelt

Norden is excited that he is diving over a formation, the Potomac Group of Early Cretaceous age, that contains dinosaur fossils. In this area bones were found in old "bog-iron" mines. Tunnels made for the Baltimore & Annapolis Railroad, between Beltsville and Jessup, also brought a flurry of finds in the 1880s. "At that time museums started scooping up all the specimens," Norden said. A fragment of a femur, just the tip, "was found recently in Baltimore County. Other pieces came from Muirkirk and the vicinity of the Beltsville Agricultural Research Center. The early discoveries resulted from men who moved earth using picks and shovels, said Norden. The site of his "find" is loaded with rock, particularly ironstone, which looks something like bone. Next, he said, you've got to pick the right layer—generally a grey clay containing jet black lignitized wood. "It's very distinctive, it looks like charcoal. That's where you zero in." Bones are typically long and brown. They should have predictable protrusions, Norden explained.

Today the places to look are now excavations for buildings or highways and working quarries. Norden is keeping a watchful eye on a Greenbelt Metro Station

site.) The old sites, Norden said, have grown over with weeds and trees or are under parking lots.

Astrodon?

The plant-eating *Astrodon*, a sauropod, has a long neck, small head and long tail and was the largest dinosaur of Eastern North America. Or is it? Scientists really don't know. Fewer than half the bones of his hypothetical skeleton (see drawing) have been found and almost all except Norden's were from much smaller creatures thought to be juveniles, some as small as 10 to 15 feet in length. No two bones have been found in the same place. Only a partial skull has been found, Norden says the skeleton, as drawn, could be inaccurate. The bones that we have could even represent two or three or more related but different species.

Juveniles are the most common finds in Maryland, but are rare everywhere else. Why? Norden says scientists don't know. Bones from this period are rare also.

Astrodon or "Star Tooth" was named by a dentist in 1859 because the inner structure of the teeth that had been found were star-shaped. It is the most common dinosaur here.

The huge sauropod lived during the Lower Cretaceous period when this area was covered by coniferous forests and meandering rivers. Fossils seem to be found in what may have been logjams of bone, logs and stumps and other plant remains in a

river's oxbow, which Norden explains as a swampy loop left behind when the river cut a new course.

Other area dinosaurs have left even fewer remains. One is identified by a single tooth, another by a few toe bones. Many bone fragments found here have not even been identified.

Other Fossils

Fossils of crocodiles, turtles, some fish, plants and early flowering plants, which were beginning to make their appearance in the Lower Cretaceous period, can also be found locally. Cycads—ancient plants with trunks like huge pineapples and leaves like fern fronds—have been found throughout this area, including Greenbelt Park and along Paint Branch in College Park. Most Cycad fossils have also been found by amateurs, said Norden.

Renewed Interest

Interest and fossil finds waned for almost a century. But new discoveries and new theories during the past 10 to 15 years have greatly expanded our knowledge of and interest in dinosaurs, Norden said. Both larger and smaller specimens have been found, flying dinosaurs twice as big as we thought could fly, mass graveyards out West containing 10,000 dinosaurs, nesting grounds with fossilized eggs, new and changing theories on why dinosaurs became extinct. There is a real revolution going on in what we know about dinosaurs, said Norden. Scientists are re-writing the text books.

Very young children are often wildly excited about dinosaurs. Norden can picture that interest utilized by elementary schools to teach beginning science.

FOSSIL HUNTER for p 1

ing original papers about the dinosaur finds of the 1880's and The Maryland Dinosaurs, a book by local collector Peter Kranz. Norden is pinpointing locations where today's searchers should look. Because field work in the East takes a lot of time and dinosaur finds are rare, professionals can't afford to spend time in pursuit of the local type-like *Astrodon*, he said. "That's why the amateur is so important and can make a significant contribution to science."

The actual looking, he said, is not just a lark. Sunday's adventure required "a long walk with no shade. It was hot as blazes." You spend a lot of time as close to the ground as possible, he said, your knees get cut-up on the rocks. The flies bite. Only those really interested keep going. Norden is certified as a fossil hunter by the Smithsonian. Commercial operations do not open their gates for the merely curious.

That Sunday, May 19, was Norden's first day out looking for dinosaurs. Now, he adds, "the gamble is—clearly there was an adult dinosaur, maybe 80 feet long, scattered over some area. When is one going to come to light again?"

Heather, age 10, and John, age 7, are pretty good naturalists, their father said. While he was working on his dinosaur bone, their explorations turned up insects, three different kinds of snakes and, in a pool of water masses of tadpoles changing into "spring peepers" (little brown frogs that sing high notes) and toads. The children's mother

LEE CREEK MINE
November 30th, 1991

Left to right:

Dennis Wright, Clyde Swindell, Bob Grier, Dave Siegert, Ron Ison, George Fonger



Russ Channell, Steve Gladhill, Steve Brady, George Fonger



Melissa Manwaring, Eric Thompsen, Ron Ison, Bob Grier, Debbie Burdette, Russ Channell, Dennis Wright



MATOAKA BEACH
November 24th, 1991

Bob Grier, Eric Beach,
Jerry O'Neil, Jim Earman,
Carol O'Neil



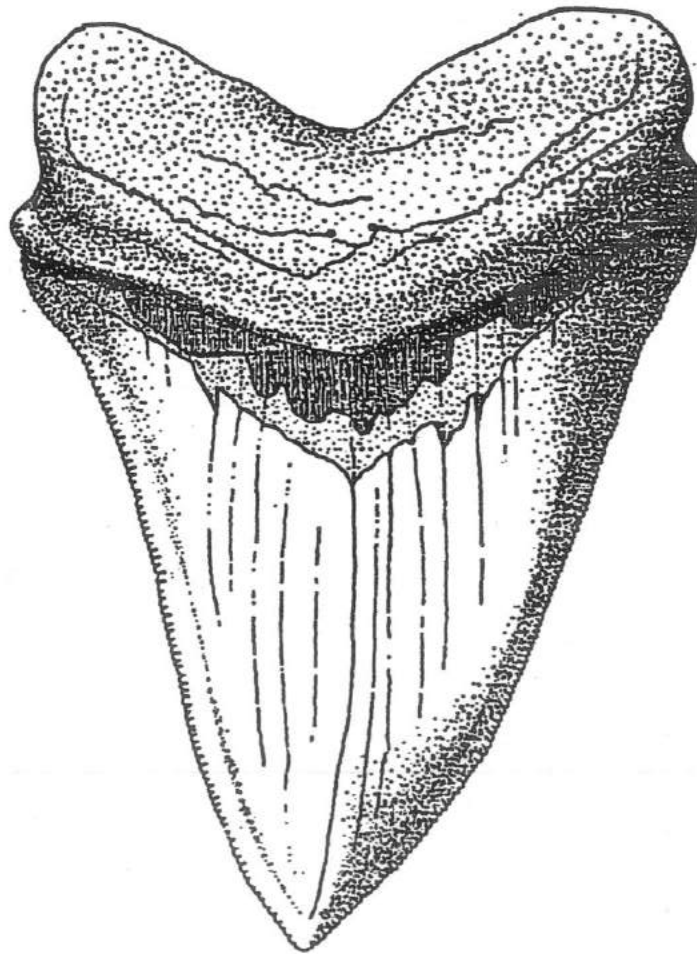
Jerry & Carol O'Neil



Dick Grier, Sr., Ken
Boulier, Russell Cox



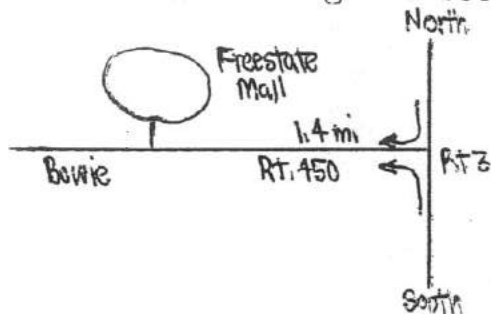
Sunday, February 23, 1992 MUSEUM OF NATURAL HISTORY, Wash., D.C.
on Constitution Avenue. Hall of Gems & Minerals and Hall of
Fossils. No limitations. This is not a trip behind the scenes
into the Paleobiology Lab. I am, however, working on this
for a later date this year. Meet behind the Museum at Uncle
Beasley (triceratops) in the mall at 10:00 am. Admission is
free. Call-in date: Sunday, February 16, 1992 at 9:00 am
to Bob Grier, Phone: 1-410-285-5554.



The officers of the Maryland Geological Society wish you
and your family a Merry Christmas and a Happy Holiday Season.
Above all we wish you good collecting in the upcoming year.

PERMANENT MEETING SITE

A more or less permanent site for the MGS meetings has been procured. With the approval of the Board of Directors, the meeting site will be in the Community Room of the Freestate Mall, Bowie, 1.4 mi. west of Md. Rt. 3 on MD. Rt. 450. There will be 6 bi-monthly meetings per year. The proposed meeting dates for 1992, the last 4 of which are still tentative, are: January 19th, March 15th, May 17th, July 19th, September 20th, and November 15th. Meetings will all be held on Sundays from 1-4 pm. Only the January and March meetings have been confirmed thus far. There is no charge for the use of the room for a non-profit organization. This should be a great boon to our Treasury. You must go inside



of the mall to be able to see the Community Room; it cannot be seen from outside. Tables, chairs, lighting, and heat will be provided. A group liability waiver will be signed by the club President in January. The centralized location should be to everyone's advantage. Hope to see you in January.

FIELD TRIP DATES

Saturday, January 25, 1992 LIVERPOOL POINT/PURCE STATE PARK.

Meet at 9:30 am at the shopping center at the NW corner of the intersection of Rt. 301 and Rt. 6. Limit: 20 members, with no age requirements. Call-in date: Sunday, January 5, 1992, after 9:00 am to Bob Grier, Field Trip Chairman; Phone: 1-410-285-5554. Beach collecting at its finest. Aquia Formation, Paspotansa member Late Paleocene, 55-60 mya. Recommend chest or hip waders or boots. We may need to car pool to the site. If it rains, bring raingear; if it snows, the trip may be cancelled. Fossils commonly found include:

Shark Teeth:	<i>Paleocarcharodon orientalis</i>
	<i>Otodus obliquus</i>
	<i>Striatolamia macrota</i>
	<i>Odontaspis winkleri</i>
	<i>Carcharias hopei</i>
	<i>Ginglymostoma</i> sp.
Skate:	<i>Myliobatis dixonii</i>
Crocodile:	<i>Thecachampsia antiqua</i>
Turtle:	<i>Asperidites virginiana</i>
Gastropod:	<i>Turritella mortoni</i>
Pelecypod:	<i>Ostrea compressirostra</i>



MARYLAND GEOLOGICAL SOCIETY

BALTIMORE, MARYLAND

FOUNDED 1991

JAN 1992-JAN 1993

MEMBERSHIP APPLICATION

Name _____ Date _____

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Phone _____

Interests _____

ANNUAL DUES: Single \$5.00/yr.
Family \$8.00/yr.

Please enclose check or money order with application, payable to:

Dick Grier, Jr.

Mail application and dues to: MARYLAND GEOLOGICAL SOCIETY
c/o Dick Grier, Jr., President
8052 Kavanagh Road
Baltimore, Maryland 21222

Phone: 1-410-285-5554

The Society will publish a periodic news bulletin.
Field trips to various mineral and fossil localities will be conducted.
Dues are being assessed in order to defray the expenses associated with
a news bulletin and other printed material.

WELCOME TO THE SOCIETY

