

The ECPHORA



The Newsletter of the Calvert Marine Museum Fossil Club

Volume 24 • Number 1 March 2009

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Important Notice:
CMMFC Renewal Form Within. Please renew your club membership. Thank you.

Long-Term Service to the Fossil Club

For about the 27th straight year, **Tim Miller** and **Mike Ellwood** have set up both an exhibit case and a hands-on demonstration booth at the Montgomery County Gem, Lapidary, and Mineral Society's annual show (held at the Gaithersburg, MD Fairgrounds on March 21/22). Mike was a member of the society from the late 70s till about 1995. The CMMFC exhibit attracts about 2500 visitors to its booth each year, many of them are children and their parents (or scoutmasters), and learning about the natural bounty we have in Southern Maryland and particularly, where they can go to collect them is always a big hit. Mike sets up under both his name (since he is an ex-member of the Mineral Society) and the Museum's, and they hand out brochures for Calvert County, the Fossil Club, and the Museum.

Editor's Note: The Fossil Club is very grateful for their service and I extend my thanks to all club members who so generously donate their time to the success of this scientific endeavor.

Upcoming Lecture:

Saturday, May 30th, 2009
Calvert Marine Museum
Auditorium, 2:30.

Dr. Karen Roberts will speak on:
"The Evolving Ark: 60 Million Years of Life and Land in Australia"

This presentation will explore the epic voyage of Australia as it separated from Antarctica and began its long drift north towards Asia, carrying as passengers the most remarkable and unique animals in the world.



*Exhibits by **Mike Ellwood** and **Tim Miller** are perennial favorites of those who visit the Montgomery County Gem, Lapidary, and Mineral Society's annual show. Paleontologist Barbie keeps her eye on the megalodon teeth. ☀*



CALVERT MARINE MUSEUM

www.calvertmarinemuseum.com

Identification of a Fossil Crocodilian Femur

by: George F. Klein

Earlier this year, a friend, Fred Mazza (1), found a large, partial crocodilian femur in the Peace River, near Arcadia, Florida, shown in Figure 1.



Figure 1: Partial crocodilian femur.

The Peace River flows over the Miocene-Pliocene (approx. 15 million – 1.8 million years old) Bone Valley Member of the Peace River Formation

as well as Rancholabrean age Pleistocene formation(s), 300,000 – 10,000 years in age. The Peace River Formation contains the crocodile *Gavialosuchus* (also found at Calvert Cliffs) and all formations contain *Alligator* material, although most alligator fossils originate from the Pleistocene formations. The River washes fossils out of these formations and mixes them, so both crocodile and alligator material is found in the gravels on the river bottom.

Measurements on the specimen and comparison to fossil specimens in Museum and my collection will be used to confirm the femur's identity.



Figure 2: *Gavialosuchus* femur, Florida Museum of Natural History specimen number UF6230.



Figure 3: *Gavialosuchus* femur, Florida Museum of Natural History specimen number UF206801.

What is noticed first about this piece is its size. It is about 8.3 inches long and is the proximal part of the bone, i.e. that part of the femur that is closest to the body. The proximal end (wide end) of

the bone above is approximately 2.7 inches in width. It is tempting to assume the femur is from the Miocene crocodile rather than an alligator due to its size.

Comparison of Figure 1 to *Gavialosuchus* femurs, Figures 2 and 3, show some small differences. When placed on a table, the proximal end of the femur in Figure 1 appears flatter, whereas the *Gavialosuchus* femur arcs upward slightly.

Using two complete alligator femora in my collection, I was able to estimate the approximate size of the Figure 1 bone if complete. The ratio of the width of the proximal end to the overall length of the two alligator femora is 0.23. Therefore we can estimate the overall length of the partial femur by dividing the width of the proximal end by 0.23. The overall length is therefore approximately 12 inches. Hence, the bone shown in Figure 1 is about 2/3 complete.

Coincidentally, the ratio of the proximal end to the overall femur length is also approximately 0.23 for the *Gavialosuchus* femora pictured in Figures 2 and 3. Therefore, this measurement is of no use in identifying the femur.

The cross section of the proximal end of the Figure 1 femur compared to an alligator femur shows similarity, Figure 4.



Figure 4: Proximal end of the unidentified Femur, left, compared to a smaller alligator Femur.

Due to the differences between the unidentified femur and the *Gavialosuchus* femora, and the similarity of its proximal end to known alligator femora, I believe that the partial bone above is from *Alligator*. It is a very large femur for an

alligator and data presented by Farlow et al (2) can be utilized to approximate the animal's overall length.

Farlow and co-workers studied the dimensions of the bones of alligators and other modern crocodilians for the purpose of using this data to estimate of the size of extinct crocodilians. They compared the dimensions of their bones to body dimensions and developed correlations between them.

They present a correlation between overall femur length and total body length for alligators. The correlation is shown in Figure 5 and is expressed mathematically as Equation (1):

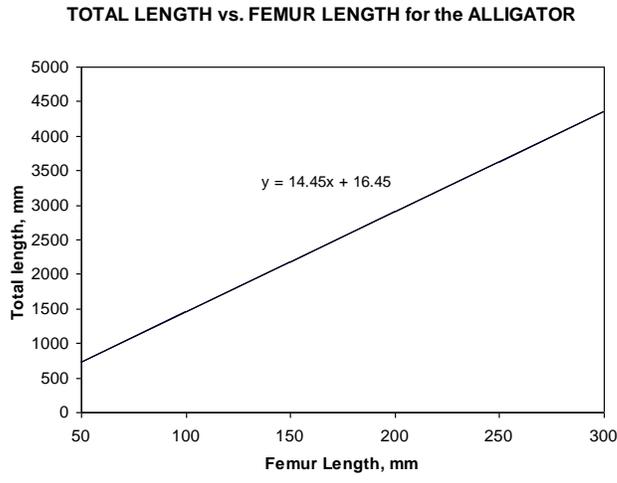
$$(1) TL = 14.45xFL + 16.45$$

Where TL is overall body length (TL = Total Length) and FL is femur length, both measured in millimeters. Converted to TL in feet and FL in inches gives the following:

$$(2) TL = 1.204xFL + 0.054$$

Substitution into Equation (2) with a femur length of 12 inches yields an overall length for the alligator of 14.5 feet. A very big gator indeed!

Figure 5



Acknowledgement

Thanks to Dr. Richard Hulbert of the Florida Museum of Natural History for permission to photograph the *Gavialosuchus* femora in the Museum's collection.

References

- (1) www.paleodiscoveries.net
- (2) Farlow, J. O., G. R. Hurlburt, R. M. Elsey, A. R. C. Britton, and W. Langston Jr.. 2005. Femoral dimensions and body size of *Alligator mississippiensis*: estimating the size of extinct mesoeucrocodylians. *Journal of Vertebrate Paleontology* 25:354–369.



In Honor of Fossil Club Member Ruth Showalter

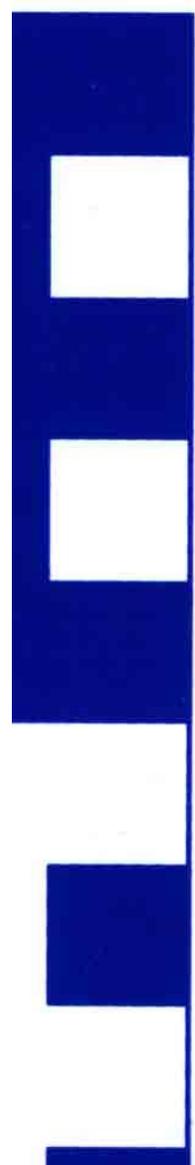
Ruth Showalter died on Friday, March 27, 2009. Ruth had been a volunteer at the museum since it's beginnings and continued to volunteer here faithfully twice a week until she was taken to the hospital a couple of weeks ago. She will be missed by all of the staff and volunteers.

Calvert County and Scientists' Cliffs lost one of their most beloved residents with the death of Ruth Showalter. Ruth died of complications from a stroke and a fall suffered several weeks ago. A long-time resident of Gate C in Scientists' Cliffs, she was 94.

Along with her husband, Joe Showalter, Ruth was one of the first full-time residents of Scientists' Cliffs. Her influence on generations of Calvert County children and teachers has been profound – she taught in the public schools here since 1946, and served also as an assistant principal and as a principal in the county school system. At the same time, and increasingly since her retirement, Ruth also managed to pursue an extraordinary career in public service. She volunteered *more than 8,000 hours each* at the Calvert Marine Museum and the Calvert Memorial Hospital; and was very active in the League of Women Voters, as a member of several library boards, and as a volunteer at the local homeless shelter and the One-Room Schoolhouse. Ruth also served as president of the local chapter of Delta Kappa Gamma, a national honor society for women in education.

Information courtesy of Sherry Reid and the Scientists Cliffs Community.

Most Bite Marks on a Dolphin Snout?



Jeff Sparks found a partial eurhinodelphinid skull in Virginia, which he generously donated to the Calvert Marine Museum. It is now catalogued as CMM-V-4045. A predator/scavenger with tiny teeth chewed the front end of this dolphin's very slender rostrum (only one bone of the snout is shown). The predator did so with zeal because there are more tooth markings on this bone than on any I've seen from Calvert Cliffs. One gets the impression that the predator chewed along the bone like it was corn on the cob. Scan by S. Godfrey. ☼

Replica Rhino Tooth

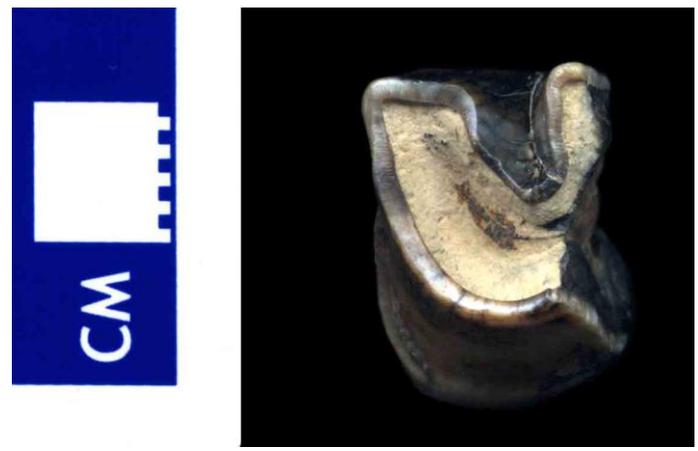


The Miocene rhino tooth (probably from a "Pot-bellied" rhino; *Teleocerus* cf. *T. hicksi*) that was featured in the December 2008 issue of *The Ecphora* was donated by the finder, **Ray Bacorn**, to the Calvert Marine Museum (CMM-V-3993). Because of the rarity of this find, painted replicas were made and given to Ray. You should be able to figure out which is which. Scan by S. Godfrey.

To learn more about Miocene rhinos that were here see the Gray Fossil Museum site at: <http://www.grayfossilmuseum.com>



Partial Rhino Tooth



Steve Grossman found this Miocene partial rhino tooth as float along Calvert Cliffs, Maryland. They're out there; just exceedingly rare. Scan by S. Godfrey. ☀

Mako comes too Close for Comfort



John Nance (CMM Paleontology Collections Manager) now sports this marvelous mako tattoo on his lower leg. The artistry is remarkable for a tattoo so small. I wonder if this tattoo would protect him from a shark attack. Let's find out...

Photo by S. Godfrey. ☀



CENTER FOR PALEONTOLOGY 2009

LOCATION: Mill Creek Middle School, Calvert Marine Museum

Entering grades: 7 – 9

Program Dates: Monday, June 22 – Thursday, July 2
Hours of Operation: 8:30 am-3:00 pm
Tuition: \$125.00 for a nine-day non-residential program



Calvert County is known nation-wide as one of the best places to find fossil shark teeth, whale bones, and the shells of ancient snails and clams. Throughout these nine days, you will work with professional paleontologists from the Calvert Marine Museum to uncover the mysteries of these ancient animals and the environments in which they lived.

You will work with the scientists to learn proper collecting techniques as well as how to preserve your specimens. Documentation of your findings will be done with Global Positioning Systems, Geographic Information Systems, drawings and digital photography. This information will be used to help others learn about these amazing animals from the past.

For more information contact:

Tom Harten
CHESPAX, (410)535-2960
Hartent@calvertnet.k12.md.us



In early February, application materials may be downloaded directly from:
www.marylandpublicschools.org/summercenters



2009 Membership Application/Renewal – Calvert Marine Museum Fossil Club

Name(s)

Address

City, State, Zip

Phone(s) (Include Area Code)

E-Mail Address

If you would like to receive the club's newsletter via email check here:

Select **ONE** type of membership
(Enclose a check or money order for the
indicated amount.)

Individual (New) \$10.00
Individual (Renewal) \$10.00

If known, please indicate the expiration date of your CMM membership. ____/____/____

If you are not a current member of the CMM, please complete a *CMM Society* membership application and send under separate cover. Your CMMFC membership will not be effective until receipt of *CMM Society* membership dues is confirmed and your signature is attached at the bottom of the form accepting the conditions of the CMMFC Liability Statement.

Children of CMMFC members who are dependent minors and living at home may accompany parents on any trip **EXCEPT for PCS-Lee Creek** or where otherwise noted. Memberships are effective from January through December of the year (or portion of the year) of the date of application. For example, persons joining in August will need to renew their membership 5 months later in January. Membership in the CMMFC and CMM do not expire concurrently, but if the CMM membership expires before the expiration date of the CMMFC the club membership shall be considered forfeit. All dues must be current for both the CMM & CMMFC for a person to attend any CMMFC trip.

CMMFC Liability Statement

The Undersigned hereby acknowledges his/her understanding that fossil collecting is an inherently physically demanding and dangerous activity, which can result in serious bodily injury or death, and/or property damage and hereby confirms his/her voluntary assumption of the risk of such injury, death, or damage.

The Undersigned, in return for the privilege of attending field trips related to the collection of and/or study of fossils, or any other event or activity conducted or hosted by the Calvert Marine Museum (CMM) or the Calvert Marine Museum Fossil Club, hereinafter collectively and individually referred to as "CMMFC Events", hereby releases the CMMFC, CMMFC Board members and officers, CMMFC Event leaders or organizers and hosts, landowners and mine or quarry operators from any and all liability claims resulting from injury to or death of the undersigned or his/her minor children or damage to his/her property resulting from any cause whatsoever related to participation in CMMFC Events.

The Undersigned agrees to comply with any and all CMMFC By-Laws and CMMFC Code of Ethics, and further by any rules and restrictions that may be communicated to the undersigned by the CMMFC Event leader and/or landowner and mine or quarry operator and acknowledges that failure to comply will result in immediate expulsion from the premises and/or expulsion from the Club.

The Undersigned acknowledges that this release covers all CMMFC Events and will remain in effect at all times unless or until it is revoked by written notice to the current President of the CMMFC and receipt of such revocation is acknowledged.

The Undersigned further attests to his/her intent to be legally bound by affixing his /her signature to this release.

Name	Signature	Date
<hr/>		

Name	Signature	Date
<hr/>		

Mail To:

Calvert Marine Museum Fossil Club, P.O. BOX 97, Solomons, MD 20688

Upcoming Events

Editor's Note: The Club is currently without a Spring Field Trip Co-ordinator. Consequently, field trips will be made known to club members via email as they are organized.

May 30, 2009, Saturday. CMMFC Meeting at 1:00 pm. Free public lecture will follow at 2:30 in the Auditorium. **Dr. Karen Roberts** (from Australia; currently at the Smithsonian) will speak on **"The evolving ark: 60 million years of life and land in Australia"**

Lecture Summary:

Australia has always been a land of extremes. In the last 60 million years it has gone from being polar to tropical; from being covered in lush rainforest to swathed in baking deserts. This presentation will explore the epic voyage of Australia as it separates from Antarctica and begins its long drift north towards Asia, carrying as passengers the most remarkable and unique animals in the world. In doing so, we will see the vast changes wrought on the animals and landscapes of Australia by an unpredictable environment, and what this fascinating history of the world's oldest continent can tell us about the present and future of life on Earth.

July 11, 2009. Saturday. SharkFest at the Calvert Marine Museum. Volunteers are needed to help with the Paleo Department and our Fossil Club exhibits. Please contact Stephen Godfrey at Godfresj@co.cal.md.us or by calling 410-326-2042 ext 28.

September 12, 2009, Saturday. CMMFC Meeting at 1:00 pm in the Auditorium. Free public lecture will follow at 2:30 also in the Auditorium.

October 10-11, 2009. Saturday and Sunday. 10:00 am – 5:00 pm. Patuxent River Appreciation Days at CMM. Please contact

Club website: <http://www.calvertmarinemuseum.com/cmmfc/index.html>

Stephen Godfrey at Godfresj@co.cal.md.us or by calling 410-326-2042 ext 28, if you will be able to lend assistance for the event or wish to display some of your collection on one or both days.

December 5, 2009. Saturday. CMMFC Meeting and Holiday Pot-Luck Lunch Party at 12:30. Come one, come all and bring your fossils, a hot or cold dish, drink, or dessert to share. Free public lecture will follow at 2:30 in the Auditorium.

Editor's Note: The following field trips are hosted by the Virginia Museum of Natural History.

The Virginia Museum of Natural History invites CMMFC members to participate in a genuine dinosaur excavation in Wyoming this summer. There will be four, 1-week sessions beginning in June and ending in July.

For details, costs, dates and itinerary, check out http://web.mac.com/dooleyclan/Wyoming_excavation/_VMNH_2009_Wyoming_excavation.html

CMMFC Treasurer Grenda Dennis (below left) participated in one of last summer's digs. Contact her at gdennis1@md.metrocast.net for answers to specific questions.



Other Virginia Museum of Natural History fossil trips include:

April 17-19: Alabama Boat Trip (Limit 10)
VMNH Members, \$300; Non-Members, \$350

Club email: CMMFossilclub@hotmail.com

Boat the Alabama and Tombigbee Rivers and collect fossils from the Paleocene, lower and middle Eocene formations exposed in those areas. The fossils, mostly shells, but some vertebrates, sand dollars, etc. are beautifully preserved and very abundant. These exposures set the standard for the rest of the Gulf and Atlantic Coast and have been explored back into the 1830s by Conrad, Harris, etc. Our base motel is the Best Western in Monroeville. We collect April 17, 18 and 19 starting at 9 a.m. from the motel.

May 2-3: Kentucky

*VMNH Members, \$100; Non-Members, \$125
Children under 12, \$50; Non-Members, \$62.50*

We meet at Natural Bridge, Virginia, on April 30. We tour Natural Bridge in the morning of Friday, May 1, and then follow I-64 through Virginia, West Virginia, and Kentucky, to Maysville making stops along the way. On May 2 and until 12:00 p.m. May 3 we collect the spectacular Ordovician (475 mya) outcrops in the area of Maysville. Specimens include individual specimens and whole slabs of brachiopods, bryozoans, corals, pelecypods, etc. Trilobites, though not abundant, are found on every trip. We start from the motel each day at 8:00 a.m.

May 9-10: Stratford Hall/Westmoreland

*VMNH Members, \$67.50; Non-Members, \$75
Children under 12, \$40.50; Non-Members \$45
Stratford Hall \$5/ea grounds fee which can be applied to dining at the Stratford Hall Dining Room or Gift Shop
9 a.m.-3 p.m.*

Take a trip along the spectacular cliffs of the Potomac River, in an area rich in paleontology, ecology, and history. The 140-foot high cliffs expose sediment ranging for 3.5 million to 14 million years old, and have produced fossils of whales, seals, crocodiles, sharks, and numerous seashells. Take time to explore the scenic beauty at Westmoreland State Park and the historic structures and museum at Stratford Hall. Accommodations and park fees not included. There is a campground at Westmoreland State Park, and hotels are available in Montross and Colonial Beach. Bring your own lunch, a trowel, plastic gags, and a bucket. Dress to wade and get dirty. Access is moderate, with some walking required, and getting wet is likely. No restrooms.

June 27: Lower James Boat Trip (Limit 16)

VMNH Members, \$90; Non-Members, \$100

We meet at the Jamestown Yacht Club at 8:30 a.m., June 27, and boat the James River on the Surry County side for about 15 miles. We will collect from massive outcrops of marine formations containing millions of shells, barnacles, corals, bone, teeth, etc. of Miocene and Pliocene Age. We stay at the Hampton Inn-Chester.

June 28: Lieutenant Run

*VMNH Members, \$22.50; Non-Members, \$25
Children under 12, \$18; Non-Members, \$20*

We meet at the Hampton Inn (Chester) at 8:30 a.m. on June 28 and drive to Petersburg and Lieutenant Run. We will

collect from Miocene and Pliocene beds (7-3.5 mya). The fossils, mostly shells, but some bone and teeth, are excellently preserved, extremely prolific, and exhibit several hundred species many of which named from that locality. We will collect until noon.

July 11: Pamunkey River Boat Trip (Limit 16)

VMNH Members, \$103.50; Non-Members, \$115

We are staying at Westmoreland State Park July 10. We leave the park at 8:00 a.m., caravan to the Pamunkey (about 1 hour) and boat the river until 4:30 p.m. We will collect from the Nanjemoy (L. Eocene—50 my), Piney Point (M. Eocene—45 my), Old Church (U. Oligocene—25 my), Calvert (18-14 my), and Eastover (8-7 my) Formations. We will collect shells, bone, teeth, etc. We return to Westmoreland State Park and on Sunday (July 12) we will explore the shoreline at Stratford Hall by boat or by foot. We leave Stratford Hall at 1:30 p.m.

July 12: Stratford Hall/Westmoreland

*VMNH Members, \$31.50; Non-Members, \$35
Children under 12, \$22.50; Non-Members, \$25
Stratford Hall \$5/ea grounds fee which can be applied to dining at the Stratford Hall Dining Room or Gift Shop
9 a.m.-3 p.m.*

Take a trip along the spectacular cliffs of the Potomac River, in an area rich in paleontology, ecology, and history. The 140-foot high cliffs expose sediment ranging for 3.5 million to 14 million years old, and have produced fossils of whales, seals, crocodiles, sharks, and numerous seashells. Take time to explore the scenic beauty at Westmoreland State Park and the historic structures and museum at Stratford Hall. Accommodations and park fees not included. There is a campground at Westmoreland State Park, and hotels are available in Montross and Colonial Beach. Bring your own lunch, a trowel, plastic gags, and a bucket. Dress to wade and get dirty. Access is moderate, with some walking required, and getting wet is likely. No restrooms.

Aug 14-15: Westmoreland/Upper Potomac Boat Trip (Limit 16)

VMNH Members, \$90; Non-Members, \$100

We are staying at Westmoreland State Park August 14. We leave the park at 8:00 a.m. on August 15, caravan to the Upper Potomac and boat the river until 4:30 p.m. We will collect from the Aquia (60 my) and Nanjemoy (L. Eocene—50 my) Formations. We will collect shells, bone, teeth, etc. We return to Westmoreland State Park at 5:00 p.m.

August 16: Stratford Hall

*VMNH Members, \$31.50; Non-Members, \$35
Children under 12, \$22.50; Non-Members, \$25
Stratford Hall \$5/ea grounds fee which can be applied to dining at the Stratford Hall Restaurant or Gift Shop*

We meet the park at 8:00 a.m., convoy to Stratford Hall, and boat the Stratford Hall Cliffs until 2:00 p.m. We will collect shells, bone, teeth, etc. from the Calvert, Choptank, St. Marys, and Eastover Formations.

Sept. 11-12: Stratford Hall/Westmoreland Boat Trip (Limit 16)

VMNH Members, \$75; Non-Members, \$85

Stratford Hall \$5/ea grounds fee which can be applied to dining at the Stratford Hall Dining Room or Gift Shop

8:00-4:00 p.m. on September 12

Take a trip along the spectacular cliffs of the Potomac River, in an area rich in paleontology, ecology, and history. The 140-foot high cliffs expose sediment ranging for 3.5 million to 14 million years old, and have produced fossils of whales, seals, crocodiles, sharks, and numerous seashells. Take time to explore the scenic beauty at Westmoreland State Park and the historic structures and museum at Stratford Hall. Accommodations and park fees not included. There is a campground at Westmoreland State Park, and hotels are available in Montross and Colonial Beach. Bring your own lunch, a trowel, plastic gags, and a bucket. Dress to wade and get dirty. Access is moderate, with some walking required, and getting wet is likely. No restrooms.

Sept. 13: Stratford Hall/Westmoreland

VMNH Members, \$31.50; Non-Members, \$35

Children under 12, \$22.50; Non-Members, \$25

Stratford Hall \$5/ea grounds fee which can be applied to dining at the Stratford Hall Dining Room or Gift Shop

9 a.m.-3 p.m.

We meet the park at 8:00 a.m., convoy to Stratford Hall, and boat the Stratford Hall Cliffs until 2:00 p.m. We will collect shells, bone, teeth, etc. from the Calvert, Choptank, St. Marys, and Eastover Formations.

October 3: Calvert County Cliffs and Bay Boat Trip (Limit 16) (depending on weather conditions)

VMNH Members, \$90; Non-Members, \$100

We will be staying at the Holiday Inn Express in Prince Frederick. On October 3 (Saturday), we will launch boats at Chesapeake Beach at 9:00 a.m. and collect the beaches and cliffs of the famous Calvert Cliffs for about 15 miles. We will collect the Calvert (17 my) and Choptank (12 my) Formations for shells, bone, teeth, etc. We return to Chesapeake Beach at 4:30 p.m. In case of windy weather we will move to the Patuxent River.

October 10: Lower James Boat Trip (Limit 16)

VMNH Members, \$90; Non-Members, \$100

We meet at the Jamestown Yacht Club at 8:30 a.m., and boat the James River on the Surry County side for about 15 miles. We will collect from massive outcrops of marine formations containing millions of shells, barnacles, corals, bone, teeth, etc. of Miocene and Pliocene Age. We stay at the Hampton Inn-Chester.

October 11: Lieutenant Run

VMNH Members, \$22.50; Non-Members, \$25

Children under 12, \$18; Non-Members, \$20

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extremely prolific, and exhibit several hundred species many of which named from that locality. We will collect until noon.



Very Rare Dolphin Found



Although this hand-held fossil does not look like much, enough of it was preserved to know that it is part of an extinct dolphin's skull. The two swollen knobby bones by Gale's thumb are the paired nasal bones of a kentriodontid dolphin known as Lophocetus calvertensis. The species was first described and named in 1842 by Harlan on the basis of a single more complete skull held in the collections of the National Museum of Natural History, the Smithsonian Institution. The partial skull roof shown here (i.e., the vertex of the skull) was found by Al Berling along Calvert Cliffs a few years ago. Let's hope that it doesn't take another 165 years before the next specimen attributed to this exceedingly rare species is found. This find just highlights how rare some fossils are. Whole species are often represented by only a single incomplete skull.



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Solomons, MD 20688

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The Ecphora is published four times a year and is the official newsletter of the Calvert Marine Museum Fossil Club. All opinions expressed in the newsletter are strictly those of the authors and do not reflect the views of the club or the museum as a whole. **Copyright** on items or articles published in *The Ecphora* is held by originating authors and may only be reproduced with the written permission of the editor or of the author(s) of any article contained within.

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