



Fossil Beaked Whale Skull Donated to the Calvert Marine Museum

Features

- Beaked Whale Skull
- Geology Timeline

Inside

- Miocene Tapir Tooth
- *Gavialosuchus* Skulls
- Pathological Scallop
- *C. megalodon* serrations
- Pathological Dolphin Teeth
- Shark-bitten Sea Cow Rib

On July 4th, 2004, **James Wilbar** was beachcombing at low tide on Cedar Island and came upon the fossilized partial skull of a beaked whale, most similar to that of *Mesoplodon longirostris* (Cuvier 1823) (of the Family Ziphiidae), Figure 1. Cedar Island is one of the barrier islands on Virginia's Atlantic coast near Wachapreague.

Mesoplodon longirostris is an extinct beaked whale known from Miocene and Pliocene age sediments on both sides of the North Atlantic Ocean. It has also been found in the Pliocene of Australia (Whitmore et. al, 1986). It has not yet been determined what sediments this skull eroded from. Consequently, the geologic age of this fossil is unknown.

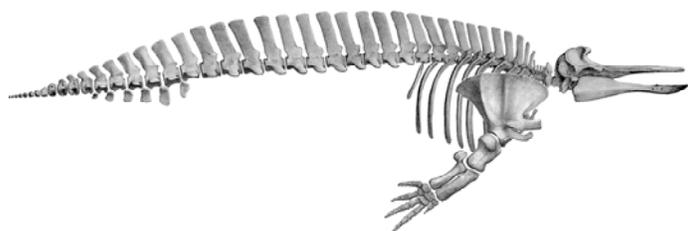


Figure 1. This fossilized partial skull of a beaked whale was found and donated to the Calvert Marine Museum by **James Wilbar** in memory of **Margie L. Wilbar**. It is tentatively assigned to the extinct beaked whale *Mesoplodon longirostris* (Cuvier 1823). The skull is shown in dorsal view with the front end of the skull pointing up. The bold arrow points to the ossified mesorostral "cartilage" indicating that this individual was male (in female beaked whales, the mesorostral cartilage does not ossify). The paired nostrils are also preserved behind (below) the mesorostral cartilage.

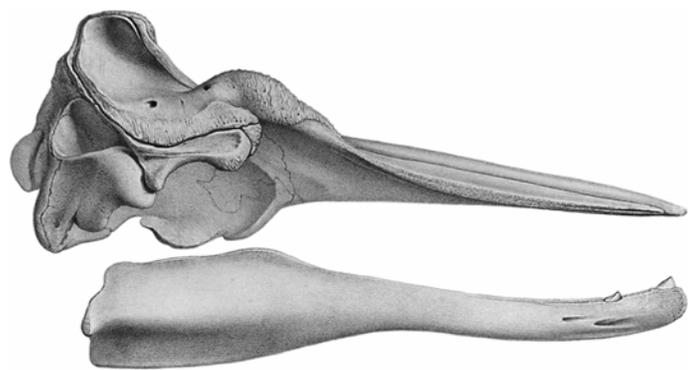


Until the discovery of this new skull, *M. longirostris* had only been known on the basis of the long narrow section of the skull comprising the snout (i.e., the rostrum). This more complete skull includes most of the bones over the eyes and those surrounding the blowhole (the nostrils). In fact, this new specimen appears to represent the most complete skull to date of this species of beaked whale.

Beaked whale fossils are rare (Godfrey and Fuller, 2005), presumably because, like their living descendants, they inhabited deep offshore marine habitats and rarely ventured close to shore. Much remains to be learned from this discovery and it will undoubtedly lead to a more detailed study.



Skeleton of a modern beaked whale, Mesoplodon. Modified from Van Beneden and Gervais (1880).



Skull of Arnoux's beaked whale, Berardius arnuxii. The lower jaw has been lowered so as not to obstruct any of the lateral anatomy of the upper portion of the skull. As in Mesoplodon longirostris, and most other living beaked whales, the rostrum is toothless. In Berardius arnuxii, each side of the lower jaw sports only two small teeth. Modified from Van Beneden and Gervais (1880).

References

Godfrey, S. J., and A. J. Fuller. 2005. Fossil Beaked Whales (Ziphiidae) from Calvert Cliffs. Bugeye Times: Quarterly Newsletter of the Calvert Marine Museum 30(2).

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Whitmore, F. C. Jr., G. V. Morejohn, and H. T. Mullins. 1986. Fossil beaked whales – *Mesoplodon longirostris* dredged from the ocean bottom. National Geographic Research 2(1):47-56.

Stephen Godfrey ☼

The Paleontological Resources Preservation Bill (H.R. 554)

There have been some concerns expressed regarding House Bill H.R. 554 and the impact it will have on fossil collecting. First and foremost, fossils have scientific and research value and should be valued as such. Any time a significant fossil is lost, stolen, or sold without study it is a great loss to the scientific community as well as the public at large. It is understood that **The Paleontological Resources Preservation Bill (H.R. 554)** was designed and introduced to protect as much as possible those fossils that are important for research and study that otherwise are stolen from federal lands. When read, the bill states that it covers only federal lands, not state, county, or private lands. As Calvert Cliffs does not fall under federal jurisdiction, this should not be a concern. It should also be known that it is already illegal (and has been) to collect vertebrate fossils from any federal land unless a permit has been acquired, there has been no change in that law. As for concerns regarding civil penalties, rewards, and forfeiture, this appears to be fairly routine in bills and is not construed as being over the top in any way.

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Another Tapir Tooth from the Maryland Miocene

By Pamela C. Platt

Recently, while walking on the beach at Scientists' Cliffs (2/9/07), I found an unusual tooth that looked like the molar of a land mammal. **David Bohaska** identified it as a tapir tooth (Figures. 1-3). Several of his colleagues at the Smithsonian concurred (letter dated 2/12/07), and suggested that the tooth may be either a lower 4th premolar or a 1st molar. In terms of size, it is between the smaller *Tapiravus* and the larger extant genus *Tapirus*.

Tapirs are rather primitive perissodactyls, which have evolved very little, unlike their horse or rhino relatives. They have a somewhat elongated proboscis and are quite short and stocky. They are forest dwelling animals that both browse and graze. Although all three groups first appeared in the Eocene, the horses and rhinos have evolved into much larger and more specialized animals (Savage & Long, 1989).



Figure 1. Fossil tapir tooth collected by **Pam Platt**. Scan by S. Godfrey.



Figure 2. Fossil tapir tooth collected by **Pam Platt**. Lower jaw bone fragments remain visible between the elongate roots of this tooth. Scan by S. Godfrey.

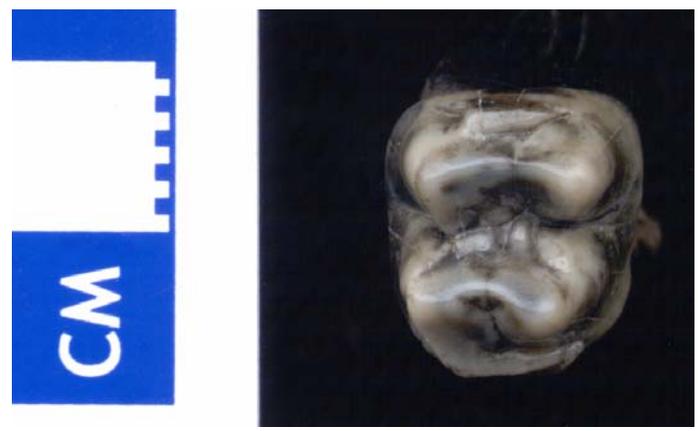


Figure 3. Fossil tapir tooth in an occlusal view, collected by **Pam Platt**. Scan by S. Godfrey.

Today four species of *Tapirus* survive: the Brazilian Tapir occurs in South America as a woodland animal; the Mountain Tapir occurs high in the Andes in mountain forests; Baird's Tapir occurs from Mexico throughout Central America, and south to west of the Andes; and the Malayan Tapir inhabits rainforest areas from Burma and Thailand to Malaya (Mackinnon, 1984).

Now extinct in North America, fossils of tapirs are very rare, although they occur over a large geographical area, and a broad geologic time, from

the Eocene to the Pleistocene. Fossil remains are often isolated teeth or bones. Tapir fossils have been found in the White River Formation of Nebraska and South Dakota, in several localities in Florida, and in other East Coast localities like New Jersey, the Gray Site in Tennessee (Bohaska, pers. comm.), at Lee Creek in North Carolina, and in the Miocene of Maryland.



Figure 4. This is an occlusal (chewing surface) view of a fossilized upper second tapir premolar tooth (*Tapirus veroensis*). The original was collected as float by **Debbie Rosser** at Flag Ponds. Apparently, *T. veroensis* is a Pleistocene tapir. Notice that the ridges formed by the cusps resemble the Greek letter pi (π). This scan is of a cast of National Museum of Natural History 244777. Scan by S. Godfrey.

The Smithsonian has several tapir teeth from the Miocene of Maryland. In 1949, an upper jaw fragment containing two teeth was found at Chesapeake Beach (Gazin & Collins, 1950). This specimen was thought to be *Tapiravus validus*, similar to an earlier specimen reported in the Miocene Marl of Cumberland County, New Jersey (Marsh, 1871). Another specimen (as yet unpublished) of a lower jawbone fragment with two teeth was also found at Chesapeake Beach. There is a large single tooth from Flag Ponds, and in 1989, CMMFC member **Betty Cridlin** collected an upper 2nd molar at the Chesapeake Ranch Estates (Bohaska, 1989). This somewhat larger tooth may represent the genus *Tapirus*. No genus has yet been suggested for the new tooth. All of these specimens have been found as float. These teeth probably span all three formations of the Maryland Miocene,

judging from the localities where they have been found.

One interesting aspect of the new specimen is that it has bone fragments attached to its roots. Keep you eyes open, all of you Beach Walkers, and look for the rest of the jaw!

Acknowledgements

The author wishes to thank **David J. Bohaska, Dr. Robert Emry, Dr. Clayton E. Ray, and Fred Grady** of the Department of Paleobiology, National Museum of Natural History (the Smithsonian Institution) for identifying the tooth. I also wish to thank David for making several of the references available to me and for reading the manuscript.

References

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- Savage, R. J. G. & M. R. Long. 1986. Mammal Evolution-An Illustrated Guide. Facts on File Publications, New York, N.Y. 259 pp.



Rare "Prehistoric" Goblin Shark Caught in Japan

<http://news.nationalgeographic.com/news/2007/02/070209-goblin-shark.html>

Submitted by **Bruce Hargreaves** ☀

Fossil *Gavialosuchus* Skulls

By: George F. Klein

Readers will probably recall my article in the June 2005 issue of *The Ecphora* (Vol. 20(2)) about a crocodile jaw section found along the Cliffs. In the article I mentioned the largest intact *Gavialosuchus* skull found was 4'-4" in overall length, shown in Figure 1. I presented estimates of the body length and weight on the crocodile belonging to this skull.



Figure 1: Bone Clones® *Gavialosuchus* Skull.

I have recently learned that there was an error in the skull measurements. A cast of the skull is sold by Bone Clones® Inc. (www.boneclones.com) and is actually about 4'-1" in overall length. However in estimating the body length of a crocodile, the overall skull length is not used. What is used is the length from the tip of the snout (or premaxillary) to the back of the condyle (see Figure 2), which in this case is 3'-5".

Using the corrected measurement, the actual body length of this crocodile is estimated at 24'-3" with a weight of approximately 2 US tons.

While at the Tucson Fossil, Gem and Mineral Show in February, I saw a *Gavialosuchus* skull for sale that has an even longer snout to condyle dimension than the skull pictured in Figure 1. This skull measured 3'-7" from the tip to the condyle. This skull is pictured in Figure 3 below.

The Bone Clones® skull was cast from a specimen found in a Florida phosphate mine by noted fossil hunter Frank Garcia in 1990. The skull sold at auction in 2004 for a hammer price of \$18,800. The skull shown in Figure 3 is also for sale for the princely sum of \$35,000!

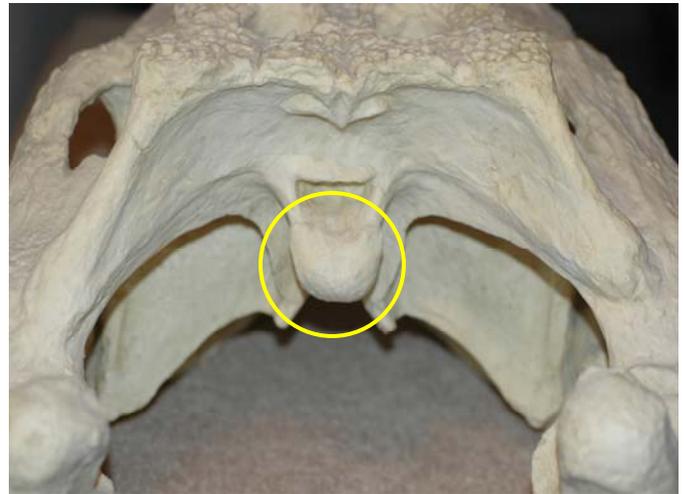


Figure 2: Rear of *Gavialosuchus* skull. The condyle is the rounded bone projecting in the center of the picture. Photo by G. Klein.



Figure 3: New World Record Holder? Photo by G. Klein.



Fossil Turtle Newsletter Website...

Here is a website for those of you who enjoy fossil turtles...

http://www.peabody.yale.edu/collections/vp/vp_fossilturtle.html

Submitted by **Stephen Godfrey** ☀

Short Calendar of Events... A Geology and Paleontology Timeline

By Dr. Peter Vogt

13.7 +/- 0.2 billion years ago (Ga = Giga-annum)

Age of Universe = Big Bang

(13,700,000,000 years ago)

ca 13.5-8.5 Ga (uncertain) Formation of Milky Way Galaxy

4.54 +/- .02 billion years ago (Ga) Age of earth and solar system; oldest Moon rocks and most meteorites (4,540,000,000 years ago)

4.404 Ga oldest known Earth material (besides meteorites): zircon crystal from Australia

3.8 Ga oldest evidence for life on earth

3.8-3.5 Ga oldest known rocks in North America (Superior Province of Michigan and Minnesota; Issua province, Greenland)

2.01 Ga first free oxygen and ozone in Earth's atmosphere

ca. 0.9 Ga Grenville orogeny, ocean closing, continental collision, age of rocks exposed in Blue Ridge, age of Baltimore gneiss; oldest structures paralleling later Appalachian and still later modern Atlantic ocean rifting.

0.9 Ga oldest evidence for metazoan life

ca. 0.6-0.52 Ga rifting opens Iapetus Ocean, vanished precursor to present Atlantic

0.542 Ga = 542 +/- 1.0 Ma (Mega-annum) Cambrian period begins; hard-shelled organisms first appear in large numbers

510 Ma—oldest known fish fossils

ca. 480-440 Ma Taconic orogeny (mountain building episode) creates structures still present in Appalachians, complex plate motions and continental collisions

ca. 410-360 Ma Acadian orogeny in Appalachian region

375 Ma oldest known amphibian fossils

ca. 340-260 Ma Alleghenian orogeny in Appalachian region, which remains above sea level from this time on (except for present Coastal Plain sediment wedge).

251 +/- 0.7 Ma Boundary between the Permian and Triassic periods, greatest mass extinction in history

of earth life (up to 90% of marine life), attributed variously to asteroid impact(s) and/or major flood basalt episode in Siberia, most recently to Hydrogen Sulfide emissions into atmosphere, triggered by volcanism and warming

230 Ma oldest known dinosaur fossils

230 Ma Rifting and scattered volcanism begins along eastern US margin, creating Great Basin/East African type landscape, prelude to opening of North Atlantic; Taylorsville Basin formed, remains underlie Southern Maryland and were once considered as a petroleum prospect. About 10-20 miles wide, this buried basin runs from the Rte 301 Potomac River bridge northeast under Bryantown, Hughesville, Dunkirk and perhaps beyond West River and Annapolis.

200 Ma widespread intrusions and some volcanism along eastern North America, part of CAMP event (Central Atlantic Magmatic Province)

200 Ma oldest known mammal fossils

175-185 Ma Final separation of North America from Africa; modern Atlantic Ocean begins to form. Location of present Solomons only 150 miles from present Cape Blanc, Mauritania (West Africa).

169 +/- 8 Ma age of diabase dike (intruded dark crystalline rock) recovered from Lexington Park drillhole to basement; probably part of the "rift-stage" igneous activity. Newer dating of similar rocks in Eastern North America suggests actual age approximately 200 Ma

160 Ma oldest known bird fossils

145.5 +/- 4.0 Ma boundary between the Jurassic and Cretaceous periods of geologic time

130 Ma oldest angiosperm (flowering plant) fossils

130-120 Ma Waste Gate Formation—oldest sediments overlying basement in Lexington Park borehole; brackish porewater.

120-115 Ma age of Patuxent Formation; lower and upper parts are aquifers, middle section is a confining unit

115-105 Ma age of Arundel Formation (dinosaur fossils in outcrop areas north of Southern MD); confining unit.

105-98 Ma age of Patapsco Formation, very early angiosperm (flowering plant) fossils in formation outcrop areas; time of maximum landward advance of shallow seas since formation of Atlantic Ocean. Upper and lower parts of Patapsco Formation are aquifers, middle section is a confining unit.

98-85 Ma no sediments of this age preserved under Southern Maryland

85-83 Ma age of Magothy Formation—non-marine sandy sediments, important aquifer in northwest of Southern MD, but confining unit towards the southeast

83-68 Ma no sediments of this age preserved in Southern Maryland

68-65 Ma Severn Formation; outcrops in Prince George County rich in ammonites; youngest sediments from the age of dinosaurs. Confining unit.

65.5 +/- 0.3 Ma Boundary between the Cretaceous and Paleogene periods of geologic time, second-greatest mass extinction (including dinosaurs), attributed to asteroid impacts (65,000,000 years ago) on present Yucatan coast and possibly elsewhere.

65-62 Ma age of Brightseat Formation; confining unit

57-56 Ma age of Aquia Formation (greensand), important Southern MD aquifer; early mining of glauconite, a source of potassium, as fertilizer

56-54 Ma age of Marlboro Clay, confining units

55.5 Ma ca 0.1-0.2 **Ma** long “hothouse” climate interval (Paleocene-Eocene Thermal Maximum, PETM) attributed to seafloor methane hydrate dissociation, perhaps caused by submarine igneous activity. Peak warming lasts just 10-20 thousand years; warmest climate (so far!) of post-Cretaceous times. Tropical climates extend north to Wyoming, sub-tropical climates with crocodiles north of the Arctic Circle. Deep-sea water temperatures rise by 8 to 10° C; extinction of many deep-dwelling fauna. Surface temperatures rise by 5° C in tropics and 10° C near poles, most rapid temperature change in last 65 million years. Mammals greatly expand their range and diversity.

54-49 Ma age of Nanjemoy Formation, upper and southeastern portions aquifer, other parts confining units

49-41 Ma age of Piney Point Formation, shallowest usable aquifer in Southern Maryland.

40-22 Ma no sediments in this age interval preserved under Southern MD

35.7-36.0 Ma Chesapeake comet or asteroid impact leaves crater under mouth of present Chesapeake, ground-zero at Cape Charles, tsunami deposits found in sediment cores.

23.03 Ma beginning of Miocene Epoch of geologic time.

22-10 Ma Chesapeake Group sediments deposited (Calvert, Choptank and St. Marys Formation). Confining unit.

21-20 Ma Fairhaven Diatomaceous Earth member (Shattuck Zone 3a) of Calvert Formation deposited, exposed in Fairhaven Cliffs, Anne Arundel County and elsewhere. Earliest US diatomite mines near Dunkirk (1883) and Lyons Creek wharf (until 1930s), material used for filtering and in dynamite production. Ocean productivity and silica availability high, resulting in widespread diatom blooms. Possible widespread distant volcanism added lots of silica to oceans.

19-20 Ma approximate age of oldest sediment (lower Calvert Formation) at base of cliffs just south of Chesapeake Beach

15 Ma average age of Shattuck Zone 12 (Parkers Creek Bone Bed), Calvert Formation, Calvert Cliffs

14 Ma average age of Shattuck Zone 14 (Kenwood Beach Shell Bed), upper Calvert Formation, Calvert Cliffs

13.9 Ma final transition of earth climate into an “icehouse” state—rapid permanent expansion of East Antarctic Ice Sheet. Corresponding sea level drop might explain the upward shallowing from Calvert Formation sea to Choptank formation sea, especially Calvert-Choptank unconformity

13 Ma average age of Shattuck Zone 17 shell bed, Choptank Formation, Calvert Cliffs

12-12.5 Ma average age of Shattuck Zone 19 shell bed, Choptank Formation, Calvert Cliffs

10 Ma approximate age of youngest marine sediments (St. Marys Formation) near top of southern Calvert Cliffs; sea withdraws from Southern Maryland, only to reappear locally much later in the form of Interglacial estuaries developed in deep glacial-age valleys (like modern Chesapeake, and tidal Patuxent and Potomac)

10-2.75 Ma? Upland Deposits (shallow aquifers, source of water from dug wells until modern times, now considered untrustworthy in terms of pollution from septic tanks etc). Deposited by rivers-perhaps including the Potomac before it turned south-and smaller streams

7 Ma approximate last common ancestor of humans and chimpanzees

6 Ma Tectonic events isolate Mediterranean Sea from Atlantic, causing sea to dry out (a super-Death Valley) for at most 450,000 years, causing the

“Messinian Salinity Crisis”, until refilled by rivers and North Atlantic.

5.32 Ma end of Miocene epoch of geologic time

2.75 Ma first extensive Cenozoic northern hemisphere glaciation—evidence from iceberg dropstones in ocean-floor sediments. Modern Southern Maryland topography (ravines and valleys) probably begins to develop, caused by sea level drop, as water is stored in ice sheets.

0.6-0.7 Ma (600-700 **ka** = **kilo-annum**) Climate oscillation periods change from about 40ka to 100ka, large-amplitude glacial-interglacial climate swings begin; up to 150-175ft deep paleochannels cut during glacial stages by Susquehanna and tributaries; wide Chesapeake Bays with rapid shoreline erosion during interglacials).

140-130 ka penultimate glaciation—buried Susquehanna River paleochannel clearly mapped below present Chesapeake Bay east of Calvert County

130-120 ka last Interglacial—sea levels about 20ft higher than today, likely age of flat terraces/choice farmlands bordering Potomac and Patuxent estuaries and around Chesapeake Beach and North Beach. Cypress swamp remains from about 20ft below Mayflower Hotel and National Geographic buildings, DC.

100 ka approximate age first modern humans appear in Africa (*Homo sapiens*)

18-25 ka (25,000 to 18,000 years ago) extreme of last glaciation, Canadian ice sheet advances into New Jersey and Pennsylvania. Susquehanna river, flowing in its channel (up to ca. 175 ft below the modern Chesapeake sea level) east of Calvert County, enters Atlantic at edge of modern continental shelf, 50 miles east of Norfolk.

15,000-17,000 BP (**years before 1950**) reasonably good evidence humans (Pre-Paleo-Indians) already present in eastern North America: Meadowcroft rock shelter, West Virginia; Cactus Hill/ Nottoway River, Virginia.

14,700 BP—rapid warming (most within one human lifetime!). Canadian ice sheet retreats from Valley Heads terminal moraine in upstate New York, ending glacial melt water flow into Susquehanna.

13,450 BP—earliest widely accepted time of first Clovis (Paleo-Indian) culture in North America. Clovis settlements more widespread to 12,900, final ca. 11,200 years ago.

13,000-12,800 BP—Younger Dryas “mini-ice age” begins, attributed to glacial melt water shutting off Northern Atlantic thermohaline circulation (old Gulf Stream water becomes too fresh to sink in Norwegian Sea)

12,500 BP—57 species of mammals, including mammoths and mastodons, giant sloths, cave bears, and saber-toothed tigers become extinct within a period of no more than 1000 years centered on this time. Advanced Paleo-Indian hunting technology may have been a major cause.

11,400-11,700 BP—rapid warming (within one human lifetime, most perhaps within 10-40 years!) marks the onset of present warm climate. Rapid sea level rise begins as ice sheets melt.

10,000 BP—Atlantic tidewaters backing up Susquehanna River valley pass Virginia Capes (Cape Charles and Cape Henry)

10,000 BP—beginning of Archaic Indian culture in eastern North America

9,000 BP—tidewater first reaches lower Patuxent and Potomac River valleys and Susquehanna River channel east of Calvert County

6,000-7000 BP—sea level rise rate slows, modern wide Chesapeake estuary begins to take shape

1023-1020 years ago in 2006 (983-986 AD = CE) Erik the Red discovers and settles Greenland.

1006-991 years ago in 2006 (1000-1015 AD = CE) Leif Eriksson’s Vinland voyages to North America, short-lived settlement in Newfoundland

514 years ago in 2006 (1492 AD = 1492 CE; “Common Era”) Voyages of Columbus trigger permanent European colonization of Americas

372 years ago in 2006 (1634 AD = 1634 CE) Maryland colony founded by Lord Baltimore

0.0000...years ago-- you are reading this timeline with great interest. ☀

Editor’s Note: **Dr. Peter Vogt** is a retired geophysicist who is currently working (with a geophysics colleague, **Prof Tanya Atwater**) on computer-animating several key geological processes that have shaped the Chesapeake Bay and Susquehanna watershed region. These animations will form part of the revamped paleontology gallery here at the Calvert Marine Museum. Funding for these animations and the gallery upgrade is from The National Park Service, Chesapeake Gateways Grant.

Wavy Enamel...



The serrations at the base of this *C. megalodon* tooth zigzag conspicuously. Notice also that the enamel is creased on the inside of the fold where the line of serrations changes direction. This unusual feature could either be a sign of old age or it could represent a developmental abnormality (i.e., a pathology, see **Ward in Renz, 2002**, p. 123). **Pam Platt** found the tooth (split lengthwise...) along Calvert Cliffs. Scan by S. Godfrey.

Renz, M. 2002. *Megalodon: Hunting the Hunter*. PalePress, Lehigh Acres, Florida. 159 pp.

Stephen Godfrey ☀

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

Fused Fossil Dolphin Teeth



These two fossil dolphin teeth are fused throughout most of their length. Even the bases of the adjacent enamel crowns are also fused. Notice that the roots of these teeth flare (they become spatulate), a condition most often seen in pontoporiid dolphins. **Dougie Douglass** found this pathological specimen along Calvert Cliffs near the Willows. Scan by S. Godfrey.

Stephen Godfrey ☀

Shark-Bitten Sea Cow Rib



This short section of a fossilized sea cow rib (*Metaxytherium* sp.) shows convincing evidence that it was bitten by *C. megalodon*. Visible at higher magnification within the bite-mark are a series of regularly spaced "impacts," which I presume mark where individual serrations struck this dense bone. **Dougie Douglass** also found this specimen near the Willows. Scan by S. Godfrey.

Stephen Godfrey ☀

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Giant Ammonite in China



*On a recent trip to China, a research team photographed this 7-meter-tall statue of a coiled cephalopod in the city of Golmud. Golmud is a transportation hub for the Tibetan Highway and the Qinghai-Tibet Railway. The team didn't know the story behind this statue located in a new pedestrian mall, but were impressed by the cephalopod's elevation from fossil to municipal artwork. Photograph is by **James Cobb**. Read more by going to:*

http://www.geotimes.org/current/feature_railroad.html

Don't Wash Those Fossils...

Here is an interesting story in *Nature* about why you shouldn't always wash your fossil finds.

<http://www.nature.com/news/2007/070108/full/070108-2.html>

Submitted by **Bruce Hargreaves** ☀

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

Fossils Stolen from the Smithsonian Institution...

Thank you for your interest in helping us pursue the recent loss of fossils from our exhibit gallery. As you now know, this past November 9 specimens were stolen from 5 separate exhibit cases in our Hall of Fossil Mammals. The matter is still under active investigation on a variety of fronts, and we appreciate the notes of support and offers of help we have received.

Many of you have requested images of the specimens, and we've now put together a webpage showing as many as we can (8 of 9). This page may be accessed at:

http://www.nmnh.si.edu/paleo/stolen_specimens/

Matthew Carrano

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An Irritated Chesapeecten



*The lower left quadrant of this Chesapeecten valve displays a pathology, the result of an irritating foreign object disturbing the normal processes of shell formation. Collected by **Christa Conant** north of Driftwood Beach, Chesapeake Ranch Estates. Scan by S. Godfrey. ☀*

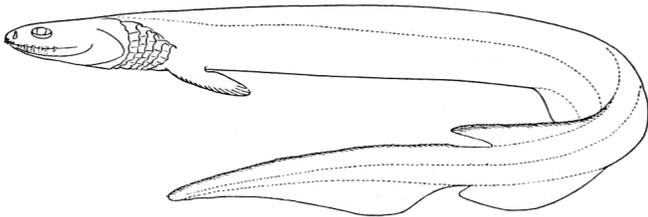
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Japanese Marine Park Captures Rare Shark on Film

Marine park staff caught a 5-foot long female frilled shark in January. These sharks are another example of a "living fossil" because their anatomy has changed little since prehistoric times. Unfortunately, the shark died shortly after it was captured.



A rare frilled shark, Chlamydoselachus anguineus, swims in a tank in Numazu, Japan. Awashima Marine Park / Handout via Getty Images.



Body outline of a frilled shark. From:

http://upload.wikimedia.org/wikipedia/commons/a/a4/Frilled_shark.png

Read more at:

<http://www.msnbc.msn.com/id/16785254/from/ET/>

Submitted by **Doug Alves Jr.** ☀

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

Gem - Mineral - Fossil And Jewelry Show

Sponsored by

**The Bergen County Mineralogy &
Paleontology Society and
The New Jersey Paleontological
Society**

Saturday, June 2, 2007

10:00AM to 5:00 PM

Rain Date - Sunday June 3

At the

Bergen County Courthouse Parking Lot

River & Court Streets

Hackensack, New Jersey

Free admission to the Public

Directions: The Courthouse can be reached from Exit 66 of Rt. 80, right onto Kennedy and then left onto River St., the show is on the left, opposite PepBoys or go north from the Rt. 46 traffic circle in Little Ferry onto River St.

From Rt. 4, take Hackensack Ave. south onto River St., the show will be on your right.

For info call Tom at 631-499-7504 - tomcagg@aol.com or Howie at 201-265-2236 - fossilh@aol.com ☀

Girl out Shooting Nature Photos finds Mother Lode of Fossils in Florida

(And they even give the street address!!!)

http://www.sptimes.com/2007/02/17/Tampabay/Out_for_photos_girl_shtml

Submitted by **Bruce Hargreaves** ☀

Club email: CMMFossilclub@hotmail.com

CALVERT MARINE MUSEUM FOSSIL CLUB MINUTES

From the January 20, 2007, Meeting.

The winter meeting of the CMM Fossil Club was held Saturday, January 20, 2007, in the Exhibition Building at the Calvert Marine Museum.

President **Bruce Hargreaves** called the meeting to order at 1:32 p.m. Bruce asked if any member had additions or corrections to the minutes of the last meeting. No one responded. He asked about any old business. No one responded.

The Membership report was given by **Bob Platt** (Pam is off on a cruise to the Antarctica). We have 23 paid for 2007, but 53 not yet paid! We have 18 Life Members and *The Ecphora* is sent to 6 other clubs and 5 museums. Remember, you must be a paid member to get *The Ecphora* or to go on trips. You must first join the museum (\$35.00) and the club (\$10.00). If you give more than \$35.00 to the Museum – that is a tax credit (charity).

If you are a trip leader – you can get credit of \$.40/mile (tax credit), but you must keep accurate records of exact times and miles and cost of gas.

Grenda Dennis gave the treasurer's report. We have \$4,505.95!

There was a discussion about what to use some of this money for – caps, t-shirts, and mugs were suggested – with the club logo on them. Bruce said he wants what is selected to be functional and be sellable to members and others. They would be sold at CMM in Aurora.

Kathy Young said Lee Creek plans to be open this spring. So our club must contact that company and ask for slots and days. She plans to have trips to Plum Point, Purse Park, and Scientists Cliffs.

Bruce reminded us that our club needs volunteers for the Aurora Fossil Festival. If you help set up and stay with our display, you get a free trip into the mine on Sunday morning!

Stephen Godfrey announced that **Jean Hooper** retired. He also spoke on the upgrades that will occur in the Paleontology Galleries in the Museum. **Alton Dooley** is planning another trip to Peru to look for fossil whales. If you would like to go – contact him at VMNH.

In February, **Yasemin Tulu**, will join the Department of Paleontology at the Museum as an Assistant Curator. She is working towards her PhD in paleontology.

Bruce thanked Stephen for all his work planning the Fossil Club's 25th anniversary celebration and symposium and for being the Editor of *The Ecphora*.

Dave Bohaska reported on the Smithsonian. Several small fossils were stolen, so be on the lookout (report included herein) for them. If you think you see some fossils that you suspect may be stolen, please call the FBI or the Smithsonian. The Lee Creek Book IV has not been published. However, to purchase an advance copy, contact **Dr. Lauck Ward** at VMNH, 1001 Douglass Ave., Martinsville, VA, 24112. It will be on marine and land mammals, and lists all publications about Lee Creek. There was a discussion about the club ordering 20 copies of Volume IV @ \$50.00 each. Then members can get them at this price.

Dave can arrange a behind the scenes tour at the Smithsonian (limit of 15 people). The Club could arrange a field trip accordingly.

The National Science Foundation in VA will have a special fossil show and lecture on January 24 at 1:30 p.m.

Bruce asked about New Business:

He announced for all to think about – if they would like to be a club officer or field trip leader, and if so – tell us at the next meeting.

Bob Platt, Grenda Dennis, and Judy McKay volunteered to be members of the nominating committee.

Bruce said the up-to-date membership list should be used to drop non-members from the club.

Stephen announced that the next meeting will be April 21 and he hopes to get a lecture about continental drift and the origin of the Chesapeake Bay and ice ages to follow the meeting. (Editor's Note: this speaker is not available, Stephen will speak in her place on fossils from Australia).

Several people brought recently found excellent fossils to display and for our show-and-tell.

Most stayed for a tour and talk by Stephen about the new changes to the Paleo displays.

Minutes submitted by **Flo Streaun** ☀

UPCOMING FIELD TRIPS AND EVENTS

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- Please remember to call (or e-mail if indicated) **on the dates and times specified only**, for yourself and family members, or for another club member.
 - Current memberships in both the fossil club and the Calvert Marine Museum are needed to go on the trips.
 - Information on directions, lodging, meeting times and meeting places will be provided at the call-in, or via e-mail.
 - Some of the trips have limits on the numbers of participants; if you sign up for a trip but later find that you will be unable to attend, please let the trip leader know as soon as possible. That way, members who may be on a waiting list will have a chance to go on the trip.
-

April 14, 2007. Saturday. Purse State Park (Nanjemoy Liverpool Point). A Late Paleocene site on the Potomac River in Charles County, MD. Well known for abundant crocodile, ray, *Otodus* sp., and *Striatolamia* sp. teeth, and the gastropod *Turritella* sp. Rare *Paraorthacodus* sp. and *Palaecarcharodon* sp. teeth have turned up with persistence. Access to the site requires a moderate hike through the woods, and sometimes rather strenuous hiking and climbing over trees along the waters edge. Collecting is by beach combing along the riverbanks and screening. Call in to Kathy at either 410-549-4701 or 301-622-0840 on Wednesday evening, April 11, 5:00-7:00.

April 21, 2007. Saturday. CMMFC meeting at 1:00, to be followed by a free public lecture at 2:30. CMM's Curator of Paleontology, **Stephen Godfrey**, will speak on **Oligocene/Miocene Marine Mammals and Cretaceous Tetrapods of Australia's Coastal Victoria.**

April 27, 2007: Friday. Martin Marietta Rocky Point Quarry, New Hanover Co., NC. Castle Hayne Formation (Eocene). The most common

fossils at this site are echinoids, including the sea urchins (e.g., *Echinolampas appendiculata*, *Eurhodia rugosa*) and sand dollars. Crab claws, nautiloids, sharks teeth (*Carcharocles auriculatis*) and rarely archaeocete whale material (*Zygorhiza kochii*) have also been found here. We will need to bring our own hardhats and wear sturdy boots. This site often requires walking over difficult terrain, including steep hills and muddy areas. The travel time from the Washington, DC area is approximately 8 hours. Call-in to Kathy at either 410-549-4701 or 301-622-0840 on Wednesday evening, April 18, 5:00-7:00.

April 28, 2007: Saturday. PCS Phosphate Mine in Aurora, NC. Yorktown Formation and Pungo River Formation. A diversity of Miocene and Pliocene vertebrate and invertebrate material with abundant shark, whale, porpoise, turtle, fish, and mollusk specimens can be found. The giant and highly prized *Carcharocles megalodon* shark teeth, and relatively rare bramble shark (*Echinorhinus blakei*), whale shark (*Rhincodon* sp.), and false mako (*Parotodus benedeni*) teeth, and seal, walrus, *Squalodon*, and sea cow material have turned up on rare occasions. Hard hats, ankle-covering steel-toe boots, sleeved shirts, long pants, and photo ID are required. Limit 10. Call-in to Kathy at either 410-549-4701 or 301-622-0840 on Wednesday evening, April 18, 5:00-7:00.

May 5, 2007: Saturday. Scientists Cliffs. Calvert Formation (Miocene) site on the Chesapeake Bay. Invertebrate (*Anadara*, *Mercenaria*, *Nuculana*, *Ecphora*, crab claws) and vertebrate material including *C. megalodon* teeth, and crocodile teeth have been found here. In past trips, several specimens of the Miocene brachiopod, *Discinisca lugubris* were found. Also, the sea urchin *Echinocardium* and some complete sand dollars have turned up. The small fossil museum in Chestnut Cabin may be opened for the club; the highlight is a slab of *Echinocardium* specimens. Distance from the Calvert Marine Museum is approximately 20 miles. Limit 20. Call-in to Kathy at either 410-549-4701 or 301-622-0840 on Wednesday evening, May 2, 5:00-7:00.

Memorial Day Weekend, May 25-27, 2007. Aurora Fossil Festival. Aurora, NC. The town teams up with the nearby PCS Phosphate Mine, Aurora Fossil Museum and numerous local, state and national museums and clubs to offer a three-day celebration of fossil collecting. Highlights include a fossil auction, paleo-displays, vendors and a bus tour of the mine.

July 14, 2007. Saturday. SharkFest at the Calvert Marine Museum. Volunteers are needed to help with the Paleo Department and our Fossil Club exhibits. Call Stephen @ 410 326-2042 ext. 28, or e-mail Stephen at godfresj@co.cal.md.us.

September 22, 2007. Saturday. CMMFC meeting at 1:00, to be followed by a free public lecture at 2:30.

October 6-7, 2007. Saturday and Sunday. 10:00 am – 5:00 pm. Patuxent River Appreciation Days at CMM. Please contact 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 1, 2007. Saturday. CMMFC meeting and holiday party at 12:00 noon.

Field Camps: Dr. David Parris, of the New Jersey State Museum, has announced two field expeditions, to the Rocky Mountains and South Dakota in the summer of 2007. The field course announcements are included below.

VMNH Paleontology Field Trips. Field trips are conducted by the Virginia Museum of Natural History throughout the year. For more information or to make a reservation, please contact bdooley@vmnh.net, or the VMNH website at <http://www.vmnh.net/index.cfm>.

Happy hunting! Kathy Young ☀

Field Course In South Dakota (New Jersey State Museum)

As in past years, I (**David C. Parris**) will again join with South Dakota School of Mines and Technology in a two-week summer field course in 2007. A brief description is given below. Also, in past years, I will try to arrange for shared transportation to South Dakota for those who are interested. The two-week course may be taken for two undergraduate college credits. Graduate credit is also available. There is a higher fee and some additional work is required for graduate credit.

The course will consist of collecting and documenting fossils such as mosasaurs, plesiosaurs, turtles, fish, and ammonites in marine sediments of Cretaceous age. Biostratigraphy of the shales will be emphasized. This year we will continue to search for fossils in Pierre Shale on the Crow Creek Indian Reservation along the South Dakota “Great Lakes”, with the generous permission of the Crow Creek tribe.

Good physical condition is requisite.

Course costs and requirements: \$500.00 registration (\$400 for college students, verified by identification card), including fees, handouts and supplies.

Instructors: David C. Parris, Curator of Natural History, New Jersey State Museum; James E. Martin, Curator, Museum of Geology, South Dakota School of Mines and Technology.

Application forms available from:

David C. Parris, Curator of Natural History
New Jersey State Museum
P.O. Box 530
Trenton, N.J. 08625-0530
(609) 292-6330
Fax: (609) 599-4098
E-mail: david.parris@sos.state.nj.us
Geology 371: Field Paleontology
Dates: August 6-17, 2007

Dinosaurs in the Rocky Mountains!

(A field expedition with the New Jersey State Museum)

Since 2001 the New Jersey State Museum has returned to a field area in Montana and Wyoming, which was the site of many famed expeditions of Princeton University. This year, survey and excavation work will continue by permit of the U.S. Department of the Interior, Bureau of Land Management. The New Jersey State Museum will be joined by the South Dakota School of Mines and Technology in offering a field course for interested adults, with college credit available.

The two weeks will consist of finding, collecting, and documenting fossils such as dinosaurs, crocodiles, turtles, fish, and mammals in continental rocks of Cretaceous age. Biostratigraphy of the rocks will be included and there will probably be some discoveries of fossil ammonites in associated rocks of marine origin. Collecting will be on behalf of the New Jersey State Museum by federal permits of the Bureau of Land Management, U.S. Department of the Interior.

The expedition is a serious museum project and is more than a field trip. Activities include both leisurely and strenuous tasks and participants should be adults (18 or older) in good physical condition. We plan to stay at the Yellowstone-Bighorn Research Association field station in Red Lodge, Montana. Fees will cover Lodging and meals; the station is a comfortable facility with typical collegiate field camp food and cabins (pets may not be brought). Course costs: \$1,400 for registration, which includes tuition fees, handouts, lodging and meals.

David C. Parris, Curator of Natural History
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Fax: (609) 599-4098
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Geology 371: Field Paleontology
Dates: July 23-August 3, 2007

Paleontology Summer Center for Middle School Students

Do you love to uncover mysteries? Do you see the world differently than your friends – or would you like to? Paleontology is a way of seeing in “deep time,” learning to read the past from clues left behind millions of years ago, before humans existed. During this two-week camp, students will experience this specialized and fascinating field of study first hand. Working with professional paleontologists and exhibit designers from the Calvert Marine Museum, students will visit field sites along the Chesapeake to collect fossil samples, and then learn how to categorize, identify, catalog, and record their sampling. This information will then be used to recreate the paleo environments that existed here during the Miocene Epoch. Their findings will be published in *The Ecphora*.

The Summer Center is part of the Maryland Gifted and Talented program, presented in partnership with Calvert County public schools and the Calvert Marine Museum. The Paleontology Summer Center will take place June 18 – 29, weekdays from 8:30 – 3:00 pm and will be based at Mill Creek Middle School. The cost is \$100. For more information about the program, contact Tom Harten (410) 535-2960, or email Hartent@calvertnet.k12.md.us.

Application materials may be downloaded directly from:

www.marylandpublicschools.org/summercenters

Albertaceratops nesmoi

Albertaceratops nesmoi, is a new species of horned dinosaur named after the Province of Alberta, Canada where it was found by **Cecil Nesmo**, a rancher near Manyberries, Alberta. Read more at:

http://www.cmnh.org/site/AboutUs_PressRoom_Mar2007NewHornedDino.aspx

Submitted by **Yasemin Tulu** ☀

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The editor would like to acknowledge **Paul Murdoch**'s ongoing contribution towards the production of *The Ecphora*.

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