

The “Wow Factor” at Matoaka

by Dave Lines

Throughout both days on Saturday and Sunday, January 14 and 15, 2023, the wind blew strongly from the northwest. Infact, there was a Gale Warning from the National Weather Service for our area. Anticipating extra low tides, I sent out a Short Notice Trip Announcement email to all members of our club (Southern Maryland Rock and Mineral Club) saying it was a good time to hunt fossils along our region’s tidal water shores.



On Sunday afternoon, I headed to Matoaka (pronounced “Mat – toe - ock-ka”) Cabins near the town of Saint Leonard in Calvert County because it offers access to a long stretch of Chesapeake Bay beach that has yielded many fossils in past trips.

Arriving about the time of the “predicted” low tide at 2 pm, I paid my \$10 day use fee at their office and headed down the path to the beach. A few minutes before, I had been surprised by the 10 or so vehicles parked in the designated “day use parking area” because I had never seen more than 3 there. When I reached the beach, I was shocked at the “horde” of folks already there searching for shark’s teeth and more.

People were everywhere along the entire beach as far as I could see --- both north and south.

Remembering the Maryland law that allows public access below the mean high tide mark along all its tidal beaches, I headed south because it looked less crowded. Results, after a half hour of looking: --- I did not find anything worth taking home.

So, I headed back north. By 3 pm, the crowd on Matoaka Beach had thinned and I began a slow walk along the water’s edge looking for sharks’ teeth. The conditions were less than ideal because the water was very turbid and the waves seemed to be growing larger with the wind shifting to more from a northerly direction. Also, the tide had started to rise. I spotted several small teeth in the surf and was able to pick up 2 by literally stepping on each tooth with my boot and holding them down until the wave wash subsided long enough to pick up my foot and grab the tooth.



It was hit or miss all the way for about a quarter of a mile until I reached the area where the cliffs had been actively eroded by the Bay. Beginning at that point, there were at least 200 yards of large and small cliff falls with the beach covered in several places with fossil shells, chunks of blue marl and some rocks. Of course, there were people tracks everywhere, so it was a real challenge to find something remaining that had not been crushed or stepped on. Yet, in situations like this, I find that if I just slow down to a snail’s pace and diligently search every inch of the clutter, I can usually find something good.

This time was no exception as I found numerous intact clusters of fossil giant barnacles, 2 more shark teeth, several types of undamaged fossil shells, an incomplete fossil cervical vertebra from a whale, some fossil coral, 2 echinoids, 2 fossil moon snails and 4 pieces of what I thought were chunks of "fossil sea bottom that contained crab or shrimp burrows". One of these rocks was 8 inches long and had several very complete tunnels in it.



That last item is where it gets interesting. Flo Streat (our former club member and avid fossil collector [now deceased]) had always told me that the one-inch diameter holes and tunnels in this rock-hard material were made by shrimp or crabs. But this time, I googled it and found a reference to a recent (2022) scientific article published by Dr. Stephen Godfrey of the Calvert Marine Museum. It seems that the article had pictures of a rock with holes in it that looked very much like the one that I had found. The googled article explained in detail that the "rock" was coprolite from a marine crocodile from the Miocene period (8 to 22 million years old) and the "holes" in it had been made by an unknown organism that ate "poop".



Although my specimen had all the correct tunneling and scratch marks inside the burrows, I was still unsure. So, I emailed Dr. Godfrey with some pictures. He replied:

*"Hi Dave, Many thanks for your email and great photos. Yes, that is what you have found. J
It's unusual for coprolites like that to be found at Matoaka. I include the published paper here.
Best, Stephen J. Godfrey PhD Curator of Paleontology
Calvert Marine Museum"*

So, this rock that I had found was actually a "specimen" of crocodile feces that had been "burrowed" by a poop-eating critter millions of years ago and was then fossilized. And because it is so unique in the fossil world, it had been given its own scientific name --- *Transexcrementum cuniculus*. It had turned out to be a really great fossil hunting trip. WOW!



The Abstract of the article [titled "**A new ichnotaxonomic name for burrows in vertebrate coprolites from the Miocene Chesapeake Group of Maryland, U.S.A** by Stephen J. Godfrey and Alberto Collareta"] follows: A new ichnotaxonomic name, *Transexcrementum cuniculus*, is applied to tubular (cylindrical) tunnelings in coprolites. The type series of *T. cuniculus* consists of burrowed vertebrate (probably crocodylian) coprolites that originate from the Miocene Chesapeake Group of Maryland, U.S.A.

These complex trace fossils exhibit the following combination of characters: burrows not lined nor backfilled; opening and transverse sections sub-circular; diameter supra-millimetric, up to ca. 20mm, rather constant throughout; inner termination(s) rounded/conical; tunnel morphology straight or gently curved, sometimes branching; internal sculpturing sometimes present in form of short and irregularly oriented scratches and gouges. Clusters of the same kinds of gouges may also mark the outer surface of the coprolite.

The tunneling tracemaker likely engaged in coprophagy; however, it is unclear what kind of organisms could have produced these burrows. Judging from the overall rarity of *Transexcrementum cuniculus* occurrences in the fossil record, the tracemaker responsible for the burrows might also have been rare, or fed on feces only occasionally.

