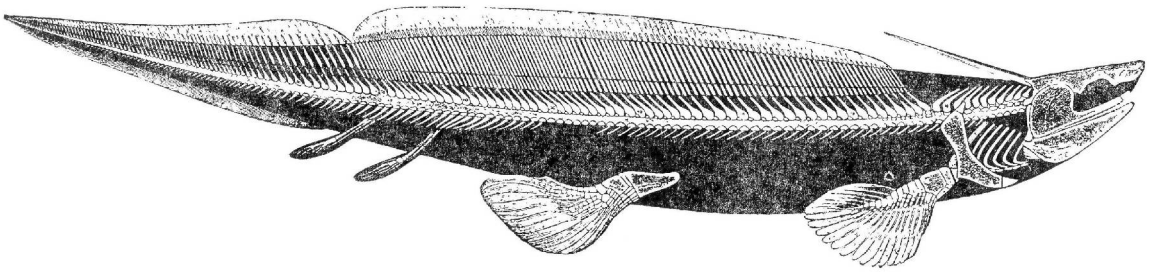
Sharks at Seymour
or
Thin section examination of shark bone from the Arroyo Formation, Witchita Group, HMNS dig site, Seymour, Tx.

By Neal Immega – Geologist and Docent
for use on the CSI blog on the dig at Seymour, Tx
www.hmnspaleo.blogspot.com
1/12/08

If you have not read my previous blog on Shark Coprolites (poop), please look it up and come back here. This blog will be based on that one.

This is the target, a beautiful anatomical drawing of a Xenacanthus shark living in Seymour, Texas during the Permian. I am sure you are thinking that the people in Seymour are having a hard enough time keeping water in their cattle tanks, much less raising sharks in them! That is not the half of it. 292 million years ago, Seymour was in the northern interior part of a vast continent called Pangea. All the land on earth had been mashed together by sea floor spreading. It was dry, the creeks were drying up and the dominant predators, amphibians (croc sized salamanders), were being replaced by drought tolerant reptiles. It was a bad time to be dependent on water.

Poison-Spine Shark - the Xenacanth



Drawing by Dr. B. Bakker

Oklahoma Shark Teeth: Sharks started off as a fresh water species with small and very peculiar looking teeth. The picture below is of the teeth of a xenacanth shark from Oklahoma of similar age to the ones found in Seymour. They look like pickle forks! This is great because these teeth are so distinctive that we should be able to find them and we do. The biggest one is about ¼ of an inch.

Antique real pickle fork!

Xenacanth shark teeth from Oklahoma, biggest is about ¼ inch.

Seymour Shark teeth and spines: For reasons unknown to me, our Seymour teeth are considerably more beat up. The barb part of the tooth is always broken off and the spines are just fragments. This spine is the only one found showing the basal part of the spine where the barbs are missing. One of our diggers (Kim Beck) excels at finding teeth where no one else can see them, which means that our perception that the teeth are rare is wrong. One thing to remember is the these sharks are on the same dental plan that modern sharks are on, meaning that there are lots of teeth per shark. However, there is only one spine per shark and we find that spines are rare.

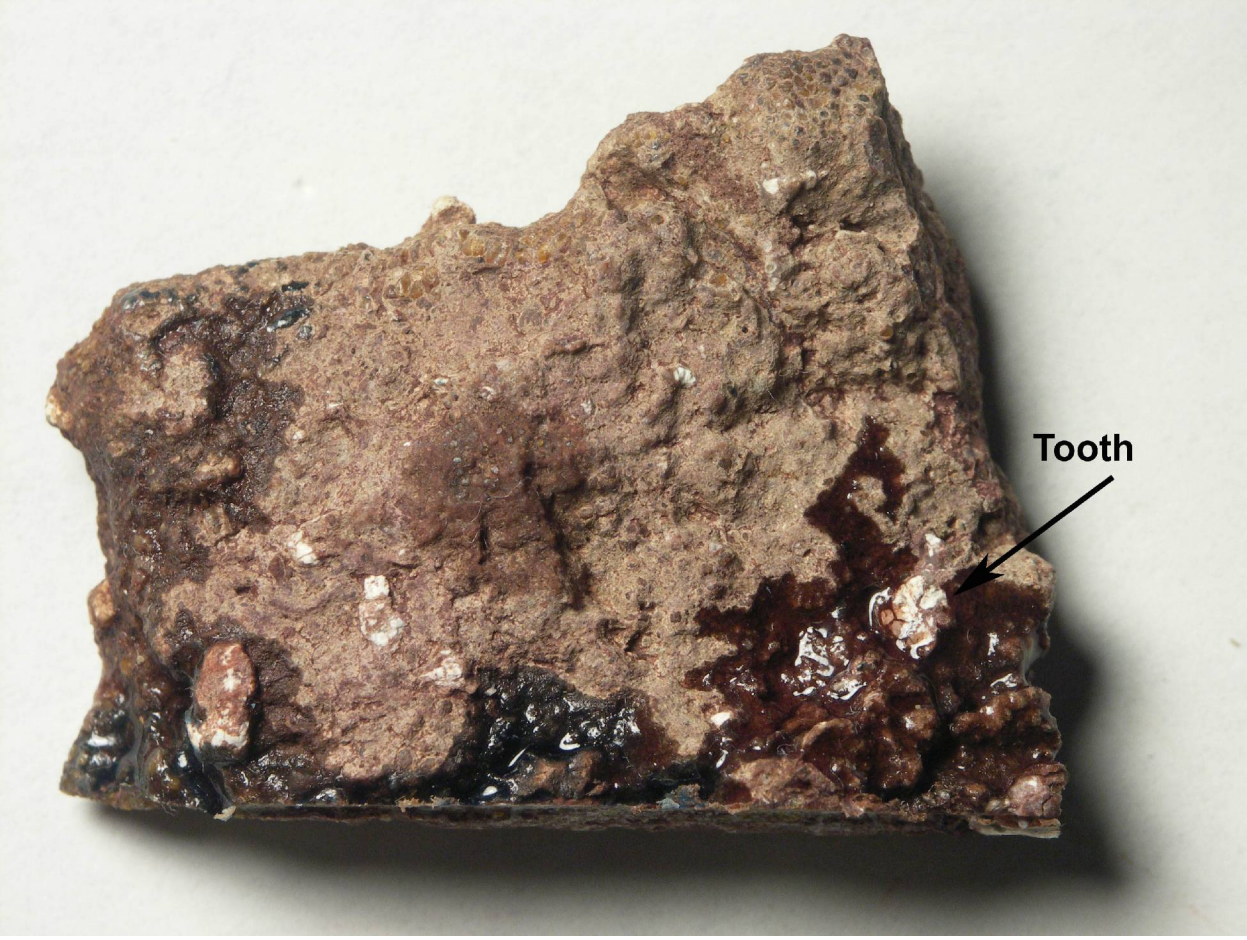
Xenacanth shark tooth from Seymour, Tx. About ¼ inch.

Xenacanth shark spine. About 3/8 inch.

Shark Cartilage: We are finding shark skull pieces all over our site called Amiee. In spite of the modern fad of using shark cartilage for cancer therapy, I do not think these would work because they are really hard and calcified (and really past the expiration date!). These are subtle, being 1 to 3 inch square pieces of what looks like bumpy rock. I suspect that these are the brain cases of the Xenacanth shark. It is a marine myth that sharks do not have a calcified skeleton. Calcified shark vertebra are not uncommon at major shark tooth sites (like the quarries at Midlothian, Tx), but they are almost always large as if the calcification process occurs in old and large individuals. Xenacanth sharks do better and ossify their skulls. This is a piece from which I cut a thin section. You can see the blue epoxy on the bottom edge. The bumps from the ossification show up better on one side than the other. I think this is the outside of the skull.

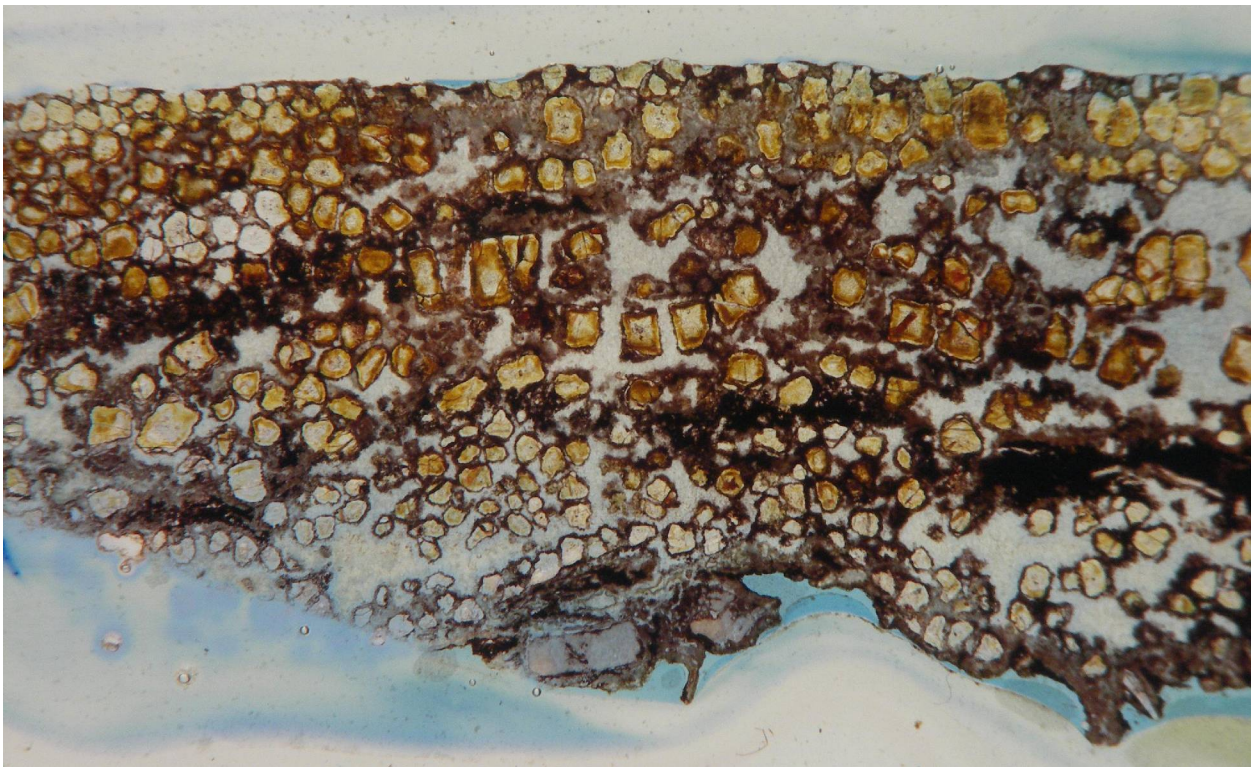
Shark cartilage from Seymour, Tx. Outside of the skull. 2 inches.

The inside of the skull show fewer bumps but there are teeth! I have marked the best one.



Shark cartilage with teeth. Inside of the skull. 2 inches.

The thin section of the skull shows that the calcification is nodules of calcium phosphate. I need a better scope to identify the matrix. The upper edge is the outside of the skull. The irregular inside of the skull seems to be outlined by nodules, indicating that shape may be primary. All the pieces I found were float at the site. Although I have found many pieces at the site (estimated to cover 2 square feet), none of them are as complete as reported by Dr. Roemer in the paper below by Dr. Schaeffer.



Thin Section of shark cartilage. About ½ inch.

The landowner has told us that the Smithsonian removed a shark at the site called Amiee and the shark float that I found may be from that dig. It bothers me some that we have yet to encounter any shark skull pieces in place.

References: The site for shark and ray information. www.elasmo-research.org

Schaeffer, Bobb, 1981 paper on the Xenacanth shark brain case from the Permian of Texas. This is a free download of a 72 page PDF file at this URL
http://tinyurl.com/2ypufq