Fossil of the Month –
Cretaceous Shrimp Claws

By J.P. Cavigelli, Tate Museum Prep Lab Manager

The Tate Geological Museum has a large collection of claws of the Cretaceous ghost shrimp, Callianassa, collected in a construction site here in town. These are two examples of these claws. Ghost shrimps are burrowing shrimps that live in muddy bottoms of the sea and are still found living today in burrows in soft sediments in shallow seas. There are many species of fossil and living Callianassa. Only their claws have a strong exoskeleton, so these are the parts most often found as fossils. Ghost shrimp have unevenly sized claws. The specimen on the left preserves both a large and small claw from one individual. Both large claws in the two photos are about 1 inch (2.5 cm) long.

About five years ago, a local Casperite brought us a few fossils he had collected in a construction site in town. We were impressed with the shrimp claws and other fossils he donated. We organized to collect some more fossils and ended up with a collection representing a good cross-section of the critters living here in the ocean about 100 million years ago. The most common fossils from this site are baculites and shrimp claws, but there are also several types of clams and snails, sea urchins, shark teeth, ammonites, fish scales and vertebrae, and a few crab carapaces. One of the crabs is probably a new species. The fossils are from the Cody Shale, which underlies most of Casper. It was deposited at the bottom of the ocean here about 100 million years ago. Fossils from the Cody Shale are generally found in concretions, but these fossils are unusual in that they were found in the shale itself. Most of them are simply impressions, but the claw on the left retains some original shell material.

We thank Gary Dart for bringing this site to our attention and Lisa Burridge for permission to collect fossils from the house sites as they were being excavated. The construction site is now finished, so we are unlikely to find more fossils from there.
Holiday Open House:
The wind did not keep people from attending our open house on Saturday, Dec. 12, 2009. Close to 150 people visited the museum during the day and it was a hive of activity. Children made mammoth and dinosaur ornaments with Russell Hawley, had their faces painted and took pictures with Santasaurus and Santa Claus. The special exhibit, the casts of the wooly mammoth skull and baby “Dima,” on loan from the Black Hills Institute, was a crowd favorite as were the tours of the prep lab. When we told them that our “Dee” will be even bigger than the Wooly Mammoth skull and tusk on display, they were awed. The excitement grows as we wait for this spring when “Dee” will be the center of attraction in the museum. The geology club came through for us and the students were on hand to assist us with the open house. Volunteers and advisory board members were also present to help us make this a successful day.

Santasaurus and Santa Clause were both at the open house.

News from the Black Hills Institute for Geological Research:
“Dee” made the trip to the Black Hills Institute carefully packed in a semi trailer on Nov. 20, 2009. J.P. Cavigelli went along for the ride and to supervise the unloading of the bones. Neal Larson from the institute said “we were impressed with the quality of the bones and the great job of collecting and cleaning.” He also stated “Dee is very large and perhaps larger than any other mounted Columbian Mammoth.” Several of us from the museum made a trip to visit “Dee” on December 17. We took pictures of and measured the armature base so that we can design the platform and exhibit cases, which will surround the mount in our new Ice Age Exhibit. We hope that our Casper College carpenters can begin working on the platform and cases soon. Work will also need to be done on new lighting and electrical/computer access for the display. See a time-lapse video of the reconstruction of “Dee” for the month of December on the Casper College website, www.caspercollege.edu.

Thanks to a BOCES grant, we were able to order a top of the line weather station for the Ice Age Exhibit. This weather station will be linked to a computer in the display and will allow visitors to view current and historical weather data such as rain amounts, temperature, humidity, wind, solar radiation, UV rays, and soil moisture/temperature. All of this data will also be available on our web page. This is a very exciting time in the history of the Tate Geological Museum.

Museum Exhibits Specialist:
Our new Exhibits Specialist, Patti Wood Finkle, joined us on January 4. Patti received her M.A. in museum science from Texas Tech University in Lubbock, Texas, and she brings a lot of valuable experience with her. Her first task will be coordinating all the details to make the Ice Age Exhibit a reality. We all look forward to working with Patti and I hope that you will stop by the museum to meet her.

Thirtieth Anniversary: March 6, 2010 – SAVE THIS DATE!!!
If you were at the open house you were able to see the Chris Navarro sculpture of Dee, which will be sold in a live auction during our Tundra to Tate fundraiser. It is currently on display in the museum gallery.

2010 Annual Tate Conference:
June 4, 5, 6, 2010 SAVE THESE DATES, TOO!!!
The theme for the conference is Beneath Wyoming Waves: Marine Paleontology. The call for papers will be going out soon.

Summer/fall field trips:
• July 5-9 — see summer ’10 class schedule
• July 19-23 — see summer ’10 class schedule
• Aug. 23-27 — see fall ’10 class schedule
• Sept. 13-17 — see fall ’10 class schedule

Good news:
Many of you may have heard the rumor that J.P. Cavigelli, our field operations and prep-lab manager had been offered a job in Ohio and was leaving us in January. We are very happy to announce that he turned down that job and is staying with us. Now that the Mammoth is about completed, we’re going back to working on dinosaurs.

Membership:
We will be getting notices out shortly to people whose memberships have expired or are due to expire soon. If you’re not sure of your status feel free to call me at 268-2077 and I will check our records. If you want to become a member, you may visit the museum or go to our website and print out a membership application.
Q: How can Mars have volcanoes without plate tectonics? How can a planet not have plate tectonics at all, for that matter? Or is it just that Mars is no longer active? I am confused.

-- Emma Narotzky (via e-mail)

A: On Earth, chains of volcanoes form near the boundaries of tectonic plates, but volcanoes can also form over ‘hot spots’ under the Earth’s crust. Just such a hot spot is responsible for the formation of the Hawaiian Islands. Millions of years ago a volcanic island, Kauai, formed over a hot spot in the Pacific Plate. But then the movement of the plate carried the island away from the hot spot and the volcanic activity stopped. However, by then a new volcanic island, Oahu, had started to form over the hot spot’s new location under the crust. In a similar manner the other islands in the chain formed, one after the other, as the tectonic conveyor belt carried the Pacific plate to the northwest. It’s like a gigantic island-forming assembly line.

Mars once had a liquid inner core (maybe it still does – we can’t be sure yet) albeit much smaller than the Earth’s, and it also seems to have had hot spots in its crust. But without plate tectonics to move the crust around, a volcano would have stayed over the same hot spot for hundreds of millions or even billions of years, while lava just continued to pile up on its flanks. It would have been like taking all of the islands in the Hawaiian archipelago and dumping them one on top of the other. The result: supersize volcanic peaks like Olympus Mons which, at 26,000 meters high, makes Mount Everest look a bit like an anthill.

Plate tectonics works on Earth because our planet has a relatively large liquid core and a hot, plastic mantle overlain by a thin rocky crust. The mantle material moves in huge, vertical gyres called convection cells which, in turn, move the thin, overlying crustal plates around. The very great size of the Earth has helped hold in its original internal heat and kept the core melted and the mantle moving. Since Mars is so small, it cooled off much more quickly, leaving it with a tiny liquid core surrounded by a cool, stiff mantle and a thick crust. Convection cells aren’t able to form in the mantle of modern Mars and the crust is too thick and heavy for them to move around even if they did. Nevertheless, it is possible that some limited tectonic activity took place on Mars in the past. As the Mariner Rift Valley widened about 3 billion years ago it seems to have pushed a chunk of crust, the Solis Planum, up against Aonia Terra forming a mountain range called Thaumasia.

Russell J. Hawley, Tate Geological Museum Education Specialist
Dee the Mammoth

Adopt-a-Bone

The Adopt-a-Bone program has been very successful. Below is a list of the skeleton bones still available for adoption:

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All proceeds will be used to help raise Dee the Mammoth. Visit the Tate Geological Museum for more information or call 268-2447 or www.caspercollege.edu.