

## *Digging for a dinosaur*

By Geoff Casey, Special to the Press

Digging for a dinosaur is not as easy as it may seem in the movie "Jurassic Park," where it simply required a few sweeps of the paleontologist's brush to uncover the specimen. There it lay, just like you would see in a museum display! Last week 24 middle school students and 11 teachers from across eastern Montana discovered that while digging for dinosaurs can be exciting, it's not as easy as the popular movie makes it seem, and sometimes a lot of patience is required to unearth even a single bone.

I got to join the teachers as one of the project participants; for me this was the fulfillment of a desire to do a dino dig that goes back perhaps 20 years, to the time when I first came to Montana as a visitor.

Teachers and students were divided into several different teams, and each team did a scientific inquiry as it uncovered either a triceratops frill, palm leaves, or a dinosaur bone bed or investigated the sedimentary strata. Each team posed a question it wanted answered and then formulated a hypothesis to answer the question. Data was collected in order to either confirm or reject hypotheses.

While at times the digging became rather tedious, excitement broke out in the camp when a portion of a t-rex tooth was found and then when the fossilized teeth of an ice-age bison were uncovered. A graduate student working with a group on plants broke open a rock revealing the well-preserved and detailed branch of an angiosperm (flowering plant) that perhaps will be sent to the Smithsonian for further study.

Other rather neat specimens found at the arroyo, or coulee, located on a ranch near Circle, Mont., were a tyrannosaurus rib bone and a triceratops horn. The rock they were found in is cretaceous in age.

This summer dino adventure was all a part of the Paleo Exploration Project, which is overseen by the University of Montana's Paleontology Center in Missoula. The director of the project is Heather Almquist. The lead paleontologist of the project and the director of the Paleontology Center is Dr. George Stanley. The project is funded by a grant from the National Science Foundation. During the week that this article is scheduled to be published, another group of students and teachers will be out at the arroyo, perhaps continuing with the same study sites or starting new ones.

When the students weren't digging for dinosaurs, they stayed in teepees and tents at the Boy Scout Camp at Fort Peck, supervised by faculty of the University. I heard that they had good meals to eat, including tacos. They spent their evenings playing soccer or volleyball, or sitting around a campfire singing songs with Dr. Stanley accompanying on guitar.

When they were working in the arroyo, the student and teacher teams wanted to know how the dinosaurs came to be deposited in the layers of rock they were found in. They studied the grains of the sedimentary strata, collected coordinate readings using GPS units, took notes using PDAs and notepads and, of course, used the traditional tools

of paleontology: pick axe, rock hammer, chisel, and brush. Had the dinosaurs lived in the area, in say a swamp or beside a lake, or had they been washed in by flood waters? The teams wanted to know.

Dr. Marc Hendrix, a sedimentologist with the University of Montana at Missoula, was on hand to help with the study of the sediments and strata. He demonstrated a technique for distinguishing if mudstone is made of silt or clay. A small portion of sediment is put between the front teeth and worked back and forth. A gritty feel indicates that the sediment is made of silt. If there is a smooth feel, the sediment is made of clay. I have a hunch this technique did not become popular with the students.

Everyone took a break from the hard work and toured the Fort Peck Paleontology Field Station, where they observed how dinosaur fossils are made ready for museum exhibits. The fossils are first cleaned with various instruments, and then replicas of the actual fossilized bones are cast. When you look at a dinosaur in a museum, you are usually looking at a replica of the dinosaur. The actual bones are too heavy to put on display.

When it was time to get back to work, students and teachers headed with their data for a computer lab that had been set up at the Fort Peck Hotel. Students worked with GIS maps and with Google Earth to input their data. Google Earth uses government satellite imagery of the earth's surface and so most groups worked with a satellite image of the arroyo. Students I worked with learned to put pictures into a Google Earth. With a click of the mouse, a picture of, say, a triceratops could be brought up on the screen associated with a certain GPS data point.

One interesting computer in the lab took a 3-D image of a palm leaf fragment. This same sort of technology was used in the BBC production "Walking with the Dinosaurs" to create the dinosaurs seen in the documentary.

On the last day of the project, the teacher and student teams presented their findings to parents and others through interesting power point presentations, some of which were very cleverly done. The presentations took place in a lecture room at the Fort Peck Interpretive Center. This was followed by a barbecue for everyone.

The adventure will continue next summer. The Paleo Exploration Project will be accepting applications from middle school students next spring. Students from Judith Basin County will be welcome to apply. There is no cost to go to the camp.

By the way, for teachers who are interested, the Paleo project will be accepting applications, likely this fall, for next summer's dig. The weeklong dig is part of a series of workshops that can be taken either for university credit or for OPI renewal units. I would recommend taking this course of workshops. You don't have to necessarily be a science teacher to apply. Teachers who participated this summer were in math or in technology and some were in science. At least one teacher was a sixth-grade teacher.

A number of fossils found at the dig site will be on display at the Judith Basin County Museum beginning this July and at the Stanford School this fall so that students and

teachers and the public can get an idea of what was found at Fort Peck. Sorry, the fossil finds mentioned above will only be available in pictures if pictures are available.

Oh, and one more thing about "Jurassic Park." Some participants of the Paleo Exploration dig were wondering about velociraptors, those villains of the movie. Well, Dr. Stanley informed us that the real velociraptors were quite a bit smaller. They were actually the size of coyotes.