
PALEOCENE POND AND CRETACEOUS COASTAL FOREST EXHIBITS TO BE INSTALLED IN THE CORRIDOR OF TIME AREA OF THE NORTH DAKOTA HERITAGE CENTER

By John W. Hoganson

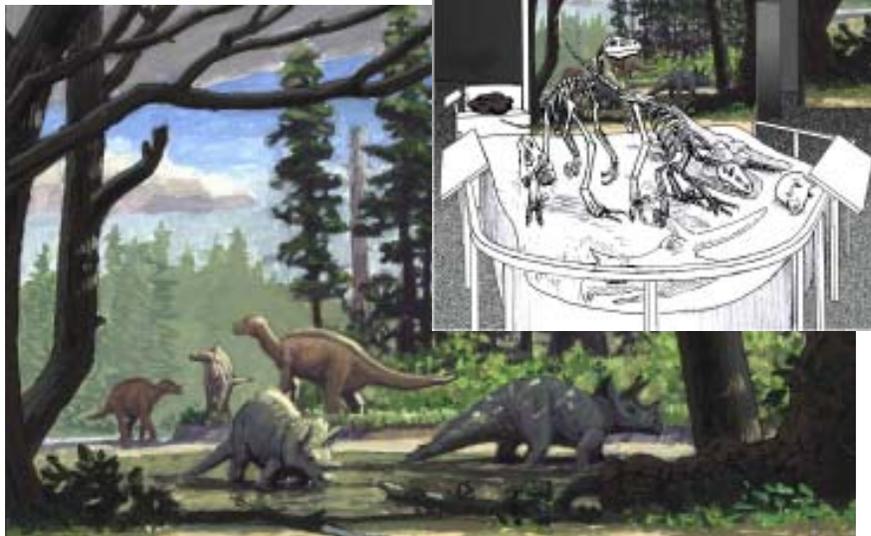
One of the objectives of the Memorandum of Understanding between the North Dakota Geological Survey and State Historical Society of North Dakota is to collaborate in developing exhibits about North Dakota's ancient life in the North Dakota Heritage Center in Bismarck. The area as one enters the Main Gallery of the Heritage Center has been designated the Corridor of Time where displays of fossils from different geologic time periods are to be exhibited. The first of these major exhibits depicts life in the oceans that covered North Dakota during the Cretaceous about 80 million years ago. The skeleton of a 24-foot-long mosasaur (marine reptile) called *Plioplatecarpus*, is featured in that exhibit with fossils of other creatures that lived in the Cretaceous seas including sharks, other fish, plesiosaurs (marine reptile), birds, clams, snails, cephalopods, crabs, and shrimp. Two new exhibits, one recreating a Paleocene pond and the other a Cretaceous coastal forest habitat are being completed and will be installed this year.

The Corridor of Time exhibit area will show the diversity and progression of life in North Dakota before the appearance of humans.

Cretaceous Coastal Forest Exhibit

During the Late Cretaceous, about 68 million years ago, a huge delta, on the scale of the Mississippi Delta today, occupied most of the western part of North Dakota. The margin of the delta and shore of the Western Interior Seaway to the east of the delta was at about the longitude of Bismarck.

Sketch of the Cretaceous Coastal Forest Exhibit by Split Rock Studios.

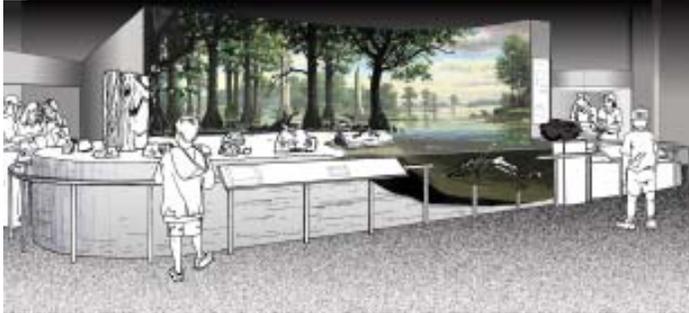


Streams and rivers flowed across the delta and much of the delta was forested with exotic plants. The climate was subtropical to warm temperate. This delta was inhabited by some of the most interesting animals that ever existed on Earth, dinosaurs. We have collected fossils of these animals that were entombed in the deltaic sediments, now called the Hell Creek Formation.

In our Cretaceous coastal forest exhibit we will recreate a river habitat along the delta coast. Partially buried in a river sand bar will be the skeleton of a *Triceratops* dinosaur as if the animal had recently died. Scavenging the *Triceratops* carcass will be two small meat eating dinosaurs, dromaeosaurs. The dromaeosaur skeletons will be casts because we have not recovered a complete skeleton of these kinds of dinosaurs in North Dakota, although we have found many dromaeosaur teeth indicating that they lived here. These were small, only about six feet tall, but vicious dinosaurs. The remains of the duck-billed dinosaur, *Edmontosaurus*, including jaws, and skin impressions will be in the exhibit courtesy of Tyler Lyson of Marmarth who collected the specimens. A complete leg of *Edmontosaurus*, also from Tyler, will be mounted on the wall near the exhibit to provide scale to show the enormous size of some of these creatures. Teeth and other fossils of *Tyrannosaurus rex* will also be displayed. The skeleton (cast) of a *Pteranodon* (flying reptile) with a wing span of 10 feet will be suspended from the ceiling above the river scene. Fossils of many other animals that co-existed with the dinosaurs on the delta will be included such as turtles, fish, clams, and

snails. Leaf fossils, fossil conifer cones, amber and other plant remains will help reconstruct the ancient habitat. A background mural showing many of the animals and plants as we think they appeared when alive will bring the diorama to life.

Sixty-five million years ago one of the greatest worldwide biological catastrophes ever experienced on earth killed off the last of the dinosaurs and, by some estimates, about two-thirds of all life. This is called the K-T (Cretaceous-Tertiary) boundary extinction event. North Dakota is one of the few places in North America where this event is documented in the rocks. One theory to explain the extinction event is that an asteroid



**Sketch of the Paleocene Pond Exhibit
by Split Rock Studios.**

struck Earth creating a disruption in climate, which exterminated many plants and animals. Our new Cretaceous exhibit will interpret this event by featuring a meteorite found in North Dakota.

Paleocene Pond Exhibit

During the Paleocene, from about 60 million to 50 million years ago, western North Dakota was a hot, steamy lowland. Rivers and streams meandered across this lowland that was punctuated by lakes and ponds. Vast coal swamps occupied many areas. The climate was subtropical to perhaps tropical. At times, forests, containing huge exotic trees, including *Magnolia*, bald cypress, *Ginkgo*, dawn redwood, and even palm, covered much of the landscape. Small mammals and birds resided in these forests. The ponds and swamps were inhabited by crocodiles, crocodile-like champsosaurs, alligators, salamanders, several kinds of turtles, numerous species of fish, snails, clams, and insects. This was after the extinction of the dinosaurs so the largest animals, and some of the main predators, were crocodiles, which grew to lengths of 16 feet or so. Western North Dakota at that time was similar to some areas in the southeastern United States today.

Our Paleocene pond exhibit will provide a glimpse of a western North Dakota habitat during that time. A skeleton of the crocodile-like *Champsosaurus gigas* will be submerged in the pond hunting for fish. The pond will also be occupied by turtles and aquatic plants, including lily pads. Dragon flies and other insects will be found on the plants. "Drifting" along the shore of the pond will be a petrified log with a small crocodile skeleton attached to it as if the crocodile was basking in the sun. A skeleton of a lemur-like mammal, *Plesiadapis*, will be

scurrying up another petrified tree. Numerous kinds of fossils will be partially embedded in the sandy shore of the pond including snails, clams, and leaves. The exhibit will feature many of the beautifully preserved leaf fossils collected by Clarence Johnsrud, near Trenton, North Dakota, and donated by him to the State Fossil Collection. This exhibit will also explain how lignite coal formed by compaction and alteration of vegetation that accumulated in the bottom of the swamps. A large painted background mural will illustrate our concept of the ancient pond and its inhabitants.

Additional Funding Needed to Complete the Exhibits

We organized an advisory group of scientists and a focus group of area families to help develop ideas of what should be included in the exhibits and how the information should be presented. The exhibits are now in the design stage, and Split Rock Studios of St. Paul, Minnesota was awarded the contract to complete the designs and fabricate the exhibits. All the fossils used in the exhibits, except those mentioned earlier, are in the North Dakota State Fossil Collection and are in final stages of preparation. Completion of the exhibits, however, depends on funding. The North Dakota Geological Survey and State Historical Society of North Dakota have secured \$153,000 for the exhibits so far. Most of this funding is from a generous donation by the Clarence Johnsrud family from Trenton and Williston. We still need to raise another \$50,000 through private donations. If you are interested in contributing to this project contact John Hoganson at the NDGS (701) 328-8000, or by e-mail jhoganso@state.nd.us. We are moving forward with the exhibits and plan to have a grand opening in the summer of 2006.