

Triceratops Skull Exhibited at North Dakota Heritage Center

by John W. Hoganson

In 1986 the North Dakota Geological Survey and U.S. Forest Service--Custer National Forest signed an agreement to cooperatively manage paleontological resources on Custer National Forest administered lands in North Dakota, particularly in the Little Missouri National Grasslands area of western North Dakota. That commitment was reaffirmed in 1995 when the agreement was updated and re-endorsed. As a result of this partnership, inventories have been conducted in paleontologically sensitive areas in the Little Missouri National Grasslands. As a result, many important fossil sites have been mapped and their significance assessed. In 1995, during one of these inventories, a skull of the dinosaur *Triceratops* was found weathering out of the 65-million-year-old Hell Creek Formation north of Marmarth, Slope County. That specimen was subsequently excavated by a crew consisting of North Dakota Geological Survey and U.S. Forest Service personnel assisted by numerous volunteers (Figures 1 & 2).



Figure 1. Jeff Silkwood (USFS) pointing to a *Triceratops* brow horn partially exposed in the Hell Creek Formation.

The skull was restored at the Geological Survey paleontology laboratory in the Heritage Center by Johnathan Campbell (Figures 3 & 4). After the restoration was completed, the specimen was transported to Billings, Montana and was temporarily exhibited at the Custer National Forest headquarters. The specimen is now back at the Heritage Center for permanent exhibit (see *Newsletter* cover). An interpretive panel accompanies the skull and an additional *Triceratops* brow horn is included in the exhibit to encourage a "hands on" experience by the museum visitor.

Triceratops (derived from the Greek words meaning three-horned face) was one of the largest and heaviest of the numerous species of horned dinosaurs. This dinosaur grew to lengths of 30 feet and could weigh as much as five tons (Figure 5). Even though the front legs of *Triceratops* were short, they were powerfully built to support the weight of its enormous head. The skull of *Triceratops*, often 6 feet long in adult specimens, is distinctive because it is equipped with two long brow horns, one short nose horn, and a large, solid, bone frill that covered its neck. It had powerful jaws that ended in a parrot-like beak. These jaws contained batteries of teeth adapted for shearing fibrous plants. Damage (like is seen on the Heritage Center specimen) to many *Triceratops* skulls suggests that these animals probably sparred with one another by locking horns and shoving and twisting, possibly to win mates or establish territory. It has been suggested that *Triceratops* may have charged predators, such as its contemporary *Tyrannosaurus rex*, similar to an enraged rhinoceros. The remains of *Triceratops* are some of the most common dinosaur fossils found in North Dakota.

The North Dakota that *Triceratops* inhabited during the Cretaceous was quite different from the North Dakota of today. At that time, a well-drained lowland corridor existed between the rising Rocky Mountains and the Western Interior Seaway to the east. Western North Dakota was part of this lowland. Sediments eroded from the Rocky Mountains were carried to the lowland by rivers and streams and were deposited in a huge delta complex similar to today's Mississippi River delta in Louisiana. These sediments, now called the Hell Creek Formation, contain dinosaur fossils and are exposed in the badlands near Marmarth and in buttes south of Bismarck and Mandan. It is the only rock formation exposed in North Dakota that contains abundant dinosaur fossils.



Figure 2. Michele Gutenkunst (volunteer) and Carol McCoy Brown (USFS) excavating part of the *Triceratops* frill.

North Dakota's climate during the late Cretaceous was probably subtropical, similar to that of south Florida today. Woodlands, ponds, and swamps that existed on this deltaic coastal plain provided abundant habitats for many kinds of exotic plants and animals, including several species of dinosaurs (Figure 5). In addition to *Triceratops*, several other dinosaur taxa are represented by fossils in the Hell Creek Formation of North Dakota including *Torosaurus*, *Tyrannosaurus*, *Albertosaurus*, *Thescelosaurus*, *Pachycephalosaurus*, *Stygimoloch*, *Edmontosaurus*, *Troodon*, *Sauromitholestes*, and *Dromaeosaurus*. Freshwater fishes, salamanders, lizards, turtles, crocodiles, birds, snails, and clams coexisted with the dinosaurs. Fossils of small, rodent-size mammals are also found, but rarely, in the Hell Creek Formation. *Triceratops*, and the other dinosaurs that inhabited North Dakota at the same time were some of the last dinosaurs to live on earth before the mass extinction event at the end of the Cretaceous about 65 million years ago. The top of the Hell Creek Formation marks the extinction of the last of these dinosaurs.

Restoration and display of the *Triceratops* skull results from a cooperative effort between the North Dakota Geological Survey, United States Forest Service--Custer National Forest and State Historical Society of North Dakota. Funding for excavation and restoration of the skull from the United States Forest Service is gratefully acknowledged.



Figure 3. Johnathan Campbell restoring one of the *Triceratops* brow horns in the Survey's paleontology laboratory at the North Dakota Heritage Center.

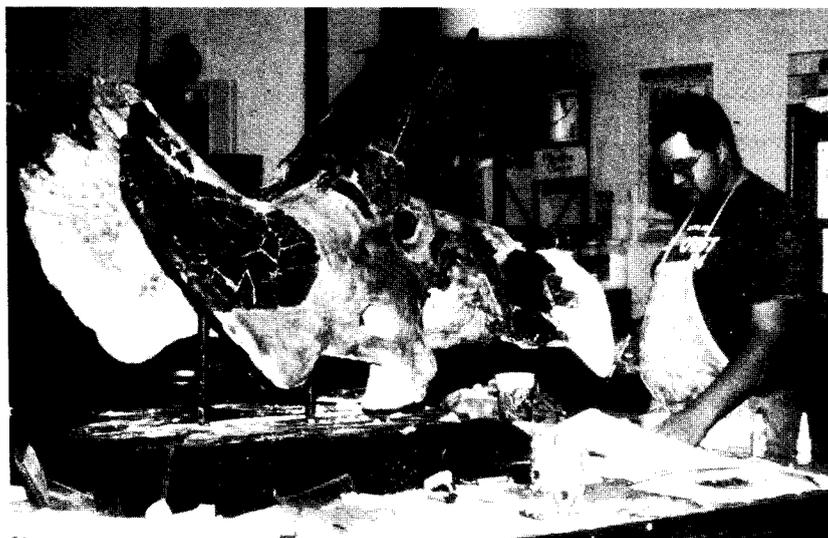


Figure 4. Johnathan Campbell with nearly completed *Triceratops* skull in the Survey's paleontology laboratory.

Figure 5. About 65 million years ago western North Dakota was a deltaic coastal plain containing woodlands, swamps, and ponds. This painting, by Eleanor Kish of the Canadian National Museum of Natural Sciences, depicts that kind of habitat. In this picture, two of the great horned dinosaurs, *Triceratops*, are shown on a bayou mudflat in a forest of bald cypress and gum trees.

