

# RESTORATION AND DISPLAY OF A CROCODILE-LIKE *CHAMPSOSAURUS GIGAS* SKELETON AT THE NORTH DAKOTA HERITAGE CENTER

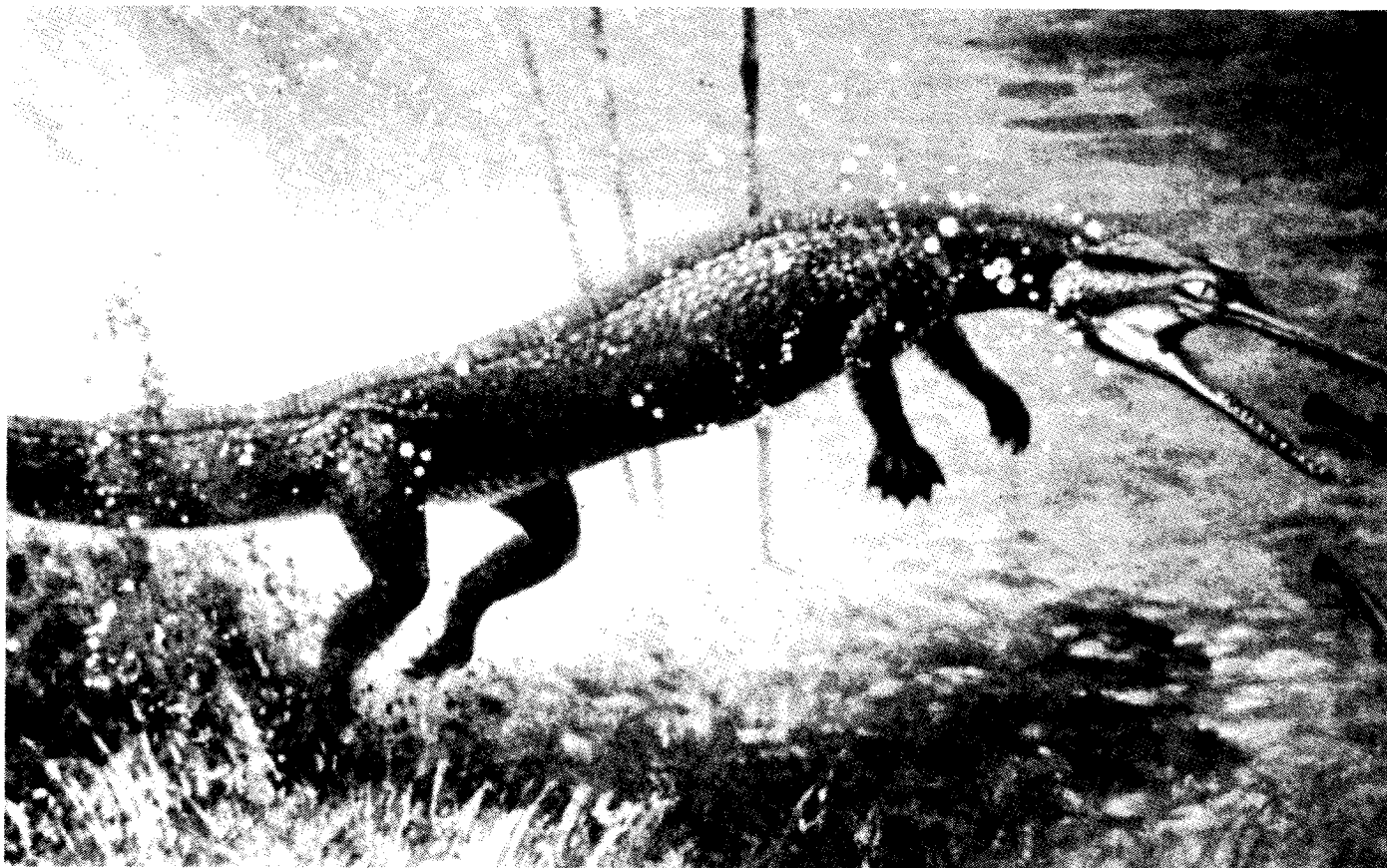
by

John Hoganson and Johnathan Campbell

While hunting sharp-tailed grouse on a hot September afternoon in 1992 geologists Mark Luther (NDGS) and Chris Quinn (Dickinson) discovered several vertebrae of a crocodile-like champsosaur weathering out of the Sentinel Butte Formation. Mark and Chris escorted us to the site — in badlands terrain on United States Forest Service-administered land near Tracy Mountain, Billings County — in October, 1993 to examine the fossils. We determined by additional prospecting for fossils and preliminary excavation that the site had the potential of being one of the most important Paleocene (about 55 million years old) champsosaur sites yet discovered. Additional excavation in the summer of 1994 by us and representatives of the U. S. Forest Service led by Carol McCoy Brown, USFS geologist in Billings, produced two nearly complete skeletons of

*Champsosaurus gigas*. The most complete skeleton (about 85%), with a fairly well preserved skull, was chosen to be reconstructed into a three dimensional skeletal mount for display at the North Dakota Heritage Center.

*Champsosaurus gigas* (*champsos*=crocodile, *sauros*=reptile, *gigas*=very large), initially described by Dr. Bruce Erickson of the Science Museum of Minnesota, is one of several extinct species of crocodile and crocodile-like reptiles that once inhabited western North Dakota. As suggested by its name, *C. gigas* was the largest species within the *Champsosaurus* group, attaining lengths up to about 10 feet. The eosuchian reptile *C. gigas*, although not a true crocodile, resembled the living long-snouted gavial crocodylians. *C. gigas* skeletal parts, particularly vertebrae, are commonly found in Paleocene-

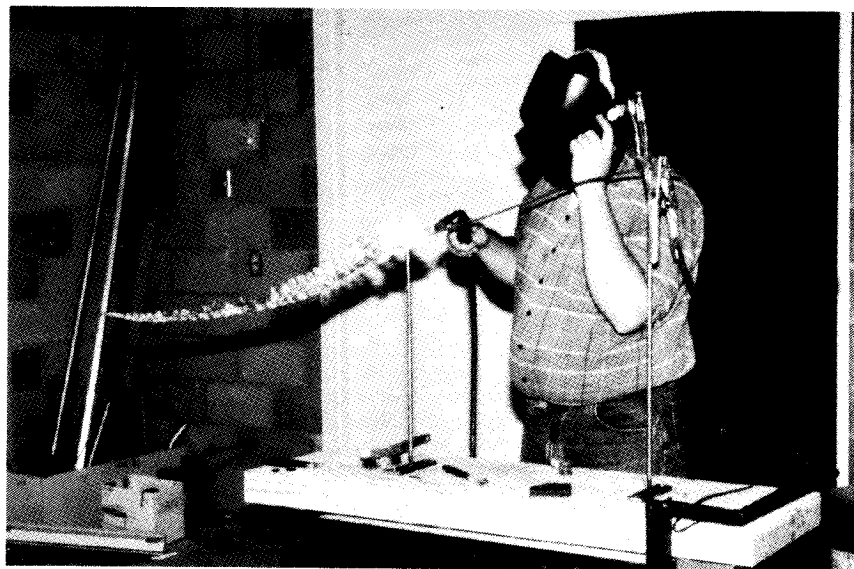
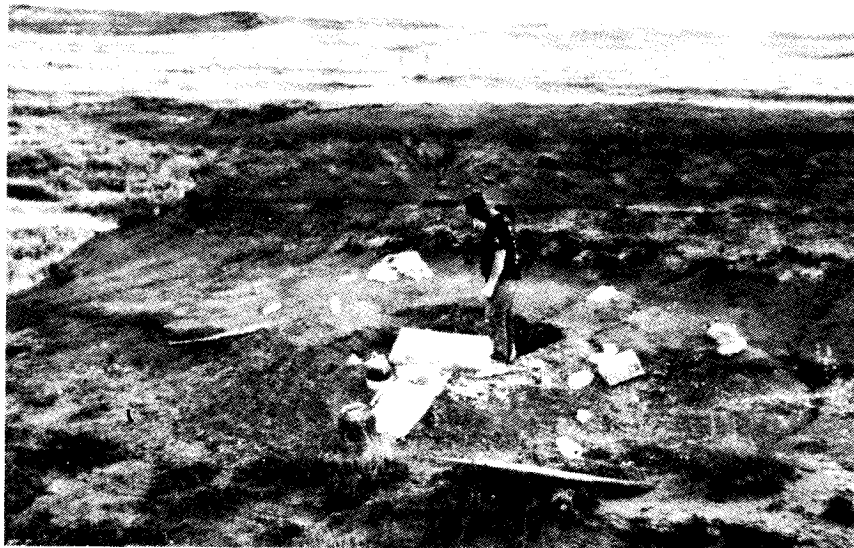


*Life restoration of Champsosaurus lunging off the bottom of a pond after a fish. Painting by Jerome Connolly, The Science Museum of Minnesota.*

age rocks in North Dakota, but nearly complete skeletons are extremely rare. We have also recovered many other fossils from the thin, fossil-bearing carbonaceous claystone at the Tracy Mountain site including the remains of turtles, alligators, crocodiles, fish, and freshwater snails and clams.

Vertebral centrums are present from the cervical to about the middle of the tail in the restored specimen. Six caudal vertebrae are estimated to be missing from the back part of the tail. If this estimate is correct, the tail of *Champsosaurus gigas* is shorter than previously thought (Campbell and Hoganson, 1995). The skull is complete but was badly crushed due to compaction and the lower jaws were fused to the uppers. Separation of the skull from the lower jaws and re-inflation of the skull to its three dimensional original shape was accomplished by prying apart and removing bone pieces and gluing them back together with either Super Glue or 5-minute epoxy. Most limb bones were present. Parts that had to be fabricated were either broken or missing and included pieces of the pectoral and pelvic girdles, neural arches, ribs, chevrons, and some foot bones. These were made from Plaster of Paris with internal wire supports.

*Champsosaurus gigas* inhabited ponds and swamps in western North Dakota about 55 million years ago when the climate was subtropical, probably similar to Florida's climate today. This was about 10 million years after the last of the dinosaurs became extinct. It is believed that *C. gigas* was an aggressive underwater predator that fed on fish because of its hydrodynamic



*Top - Champsosaur skeleton encased in a plaster field jacket at the Tracy Mountain site.*

*Middle - Johnathan Campbell freeing the champsosaur skull from rock.*

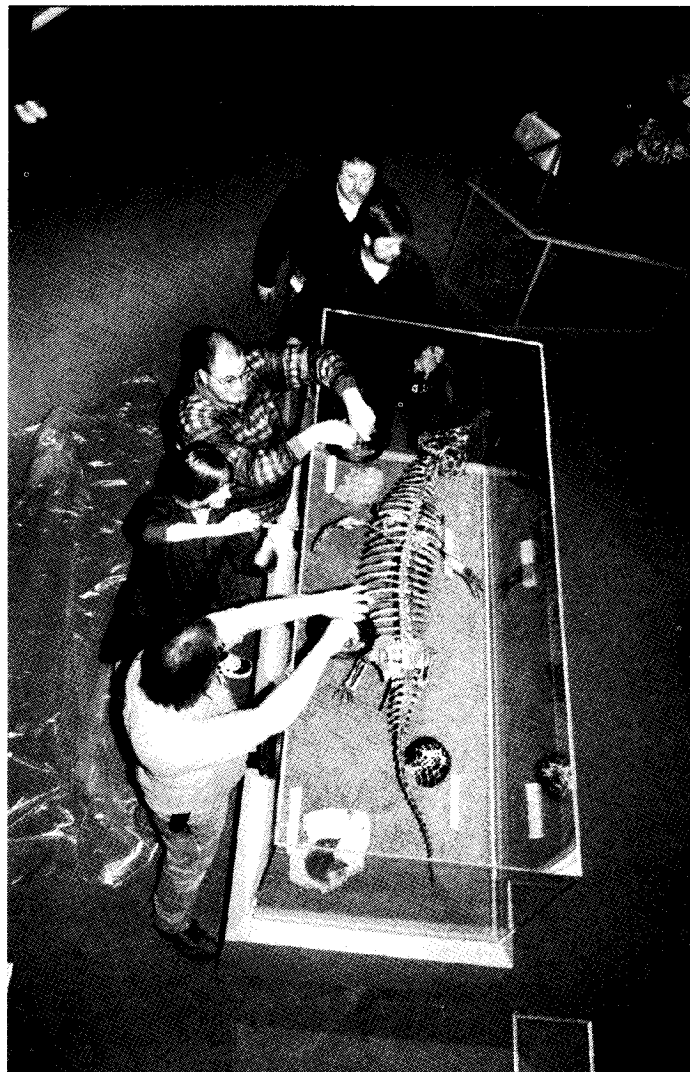
*Bottom - Johnathan Campbell welding a support frame for the champsosaur skeleton.*

body, powerful back legs, and long snout lined with sharp, pointed teeth. It is likely that these animals spent much of their time submerged in water, lying on the bottom waiting for prey. When a fish swam by, the champsosaur would quickly lunge off the bottom after it, propelled by its large, powerful back legs. We hope that the posture of the restored skeleton suggests that activity to the viewer.

Restoration of the skeleton by Johnathan Campbell took three months to complete. Claudia Berg and Brian Hushagen of the State Historical Society of North Dakota were responsible for exhibit design and specimen cabinet construction. Funding for the restoration and exhibit was from the United States Forest Service--Custer National Forest, State Historical Society of North Dakota, and North Dakota Geological Survey.

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Campbell, J. M., and Hoganson, J. W., 1995, *Champsosaurus gigas* Erickson: a restored and mounted skeleton (ND94-225.1) in the North Dakota State Fossil Collection: North Dakota Academy of Science Proceedings, v. 9, p. 64.



*Top - Installation of the Champsosaurus skeleton in the Heritage Center. l. to r. Mark Halvorson, Claudia Berg, Johnathan Campbell, John Hoganson, and Brian Hushagen. Photo by Todd Strand, Photo Archivist, North Dakota State Historical Society.*

*Bottom - Johnathan Campbell and Carol McCoy Brown, U. S. Forest Service, attaching foot bones to the skeletal mount.*

