

Where did giant beavers live? A possible giant beaver lodge was discovered near New Knoxville, Ohio about 1912. Part of a *Castoroides* skull and the lodge were located in a peaty layer surrounded by loam. The lodge was said to have been roughly 1.2 m high and 2.4 m in diameter, and formed from saplings about 7.5 cm in diameter.

Giant beavers seem to have preferred lakes and ponds bordered by swamps as their habitat, because their remains have been found in ancient swamp deposits so often. Perhaps a rather sudden reduction of these surroundings due to changing climate linked with the giant beaver's apparent inability to build dams like those of *Castor canadensis* and its inability to disperse readily overland to new drainage systems when drought occurred may have resulted in its extinction and the survival of the smaller, more adaptable modern beaver. Likewise, the Eurasian "giant" beaver, *Trogotherium*, gave way to the living Eurasian beaver (*Castor fiber*), but earlier.

Giant beavers evidently died out near the close of the last glaciation about 10,000 years ago. Because they coexisted with early humans in North America, it seems unusual that there is no evidence that people hunted them. Surely a *Castoroides* pelt would have made an excellent coat or sleeping robe!

C.R. Harington  
March, 1996

Giant Beaver. Reproduced courtesy of  
the Canadian Museum of Nature, Ottawa

Additional Reading:

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# Beringian Research Notes

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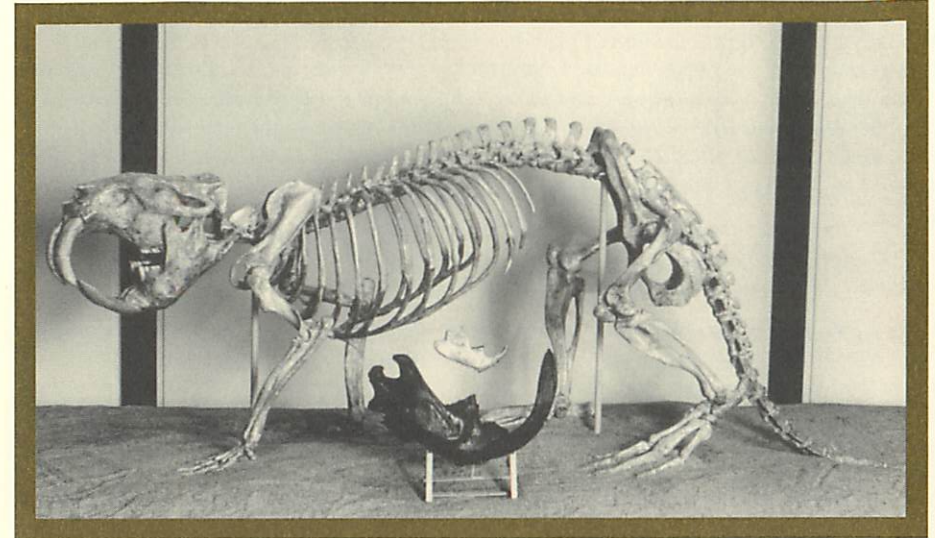


Figure 1: Cast of giant beaver skeleton with lower jaws and teeth of: giant beaver from Porcupine River, Yukon (bottom) and modern beaver (above),

## Giant Beaver

The giant beaver (*Castoroides ohioensis*) was the largest rodent in North America during the ice age (Quaternary - the last 2 million years). How did it look? How large was it? How is it related to living beavers (*Castor* sp.)? These are just a few of the questions people ask when they first hear about the giant beaver.

Unlike the woolly mammoth (*Mammuthus primigenius*), cave bear (*Ursus spelaeus*) and steppe bison (*Bison priscus*) whose images are so vividly recorded on the walls of European caves by Stone Age (Paleolithic) hunters, there is no record of the giant beaver's actual appearance. However, the great similarity between giant beaver and modern beaver skeletons leaves no doubt that the two animals were much alike in appearance and were adapted to similar surroundings.

But there was one remarkable difference size! A skeleton displayed in Chicago's Field Museum is nearly 2.5 m long the size of a black bear (*Ursus americanus*). An animal of this size may have weighed as much as 200 kg compared to a 1 m-long modern beaver weighing about 30 kg. Modern beavers are, to put it simply, "distant cousins" of *Castoroides*.



Other differences were in the teeth and tail of the giant beaver. Unlike modern beavers with their short smooth-surfaced cutting teeth (incisors), giant beavers had cutting teeth up to 15 cm-long with prominently-ridged outer surfaces. Perhaps these strong enamel ridges would have acted as girders to support such long teeth. Although experts on ancient life (paleontologists) do not agree on the function of the cutting teeth, it seems that they could have acted as both wood cutters and gougers. Giant beaver cheek teeth also differ from those of modern beavers in their larger size and simpler enamel configuration. Molar teeth of *Castoroides*, like its relatives *Dipoides* and *Procastoroides*, typically have grinding surfaces with an s-shaped enamel pattern.

By studying the length and width of giant beaver tail vertebrae in relation to those of modern beaver and its actual tail dimensions, I estimate that *Castoroides* had a scaly tail that was about 65 cm long, 12 cm across the base and 14 cm across the widest part. Definitely a beaver-like tail, but relatively narrower. Although well adapted for swimming, the hind legs of giant beavers are relatively short. Considering the great weight of the animals, their ability to disperse overland as some living beavers do, would have been reduced.

The first recorded remains of this animal were found in a peat swamp near Nashport, Ohio, and were described, but not named, by S.R. Hildreth in 1837. The geologist J.W. Foster called the specimen *Castoroides ohioensis* in a publication a year later.

What about their ancestry? A primitive beaver called *Dipoides* that occupied Eurasia and North America during the late Tertiary (some 5 million years ago) evidently gave rise to *Procastoroides*, a large beaver about two-thirds the size of the giant beaver. It is worth noting that slight enamel ridges were first seen on the cutting teeth of the Idaho beaver (*Procastoroides idahoensis*), although the closely related Sweet's beaver (*Procastoroides sweeti*) lacked them. So probably the Idaho beaver, or a very closely related form, gave rise to the giant beaver about 3 million years ago. A study of the development of the cheek-tooth pattern in giant beavers also supports the *Dipoides* - *Procastoroides* - *Castoroides* lineage.

Another "giant beaver" (*Trogontherium* - not much bigger than a modern beaver) lived in Europe and Asia during the early part of the ice age. Despite some basic similarities in shape, *Trogontherium* and *Castoroides* are at extreme ends of two different lineages. However, perhaps both had developed similar ways of living in relation to modern beavers, with which they coexisted.

*Castoroides* ranged from Florida to the Yukon, and from New York State to Nebraska, but it has not been found outside of North America. Giant beavers seem to have flourished in the region south of the Great Lakes toward the close of the last glaciation. In fact, three nearly complete specimens are known from Fairmont and Winchester, Indiana, and from Minneapolis, Minnesota.



Figure 2: Model of a giant beaver (*Castoroides ohioensis*). Height: 2.5 metres. (CMN photo)

The most northerly records are from the Old Crow region of the Yukon Territory<sup>1</sup>, which lies 150 km north of the Arctic Circle. Here, many fossils (consisting largely of jaws, teeth, leg bones and vertebrae) have been found in deposits varying in age from the last (Sangamonian) interglacial (about 130,000 years ago) to the early part of the last (Wisconsinan) glaciation (about 60,000 years ago)<sup>2</sup>. Fossils show that both giant beavers and modern North American beavers (*Castor canadensis*) coexisted near Old Crow during the last part of the ice age. The only giant beaver fossil found elsewhere in Canada is a cutting tooth from last interglacial deposits in the Don Valley, Toronto.

How did giant beavers get so far north? And when? Perhaps they spread rather rapidly northward into the Yukon through chains of lakes which tend to form along the southern margin of the Canadian Shield (for example, during the present interglacial — the relatively warm period covering the last 10,000 years some are: Lake Superior, Lake Manitoba, Lake Athabasca, Great Slave Lake and Great Bear Lake). A likely time for this northward shift would have been near the beginning of a warm period such as the last interglacial, when ice sheets of the second last (Illinoian) glaciation were melting back.

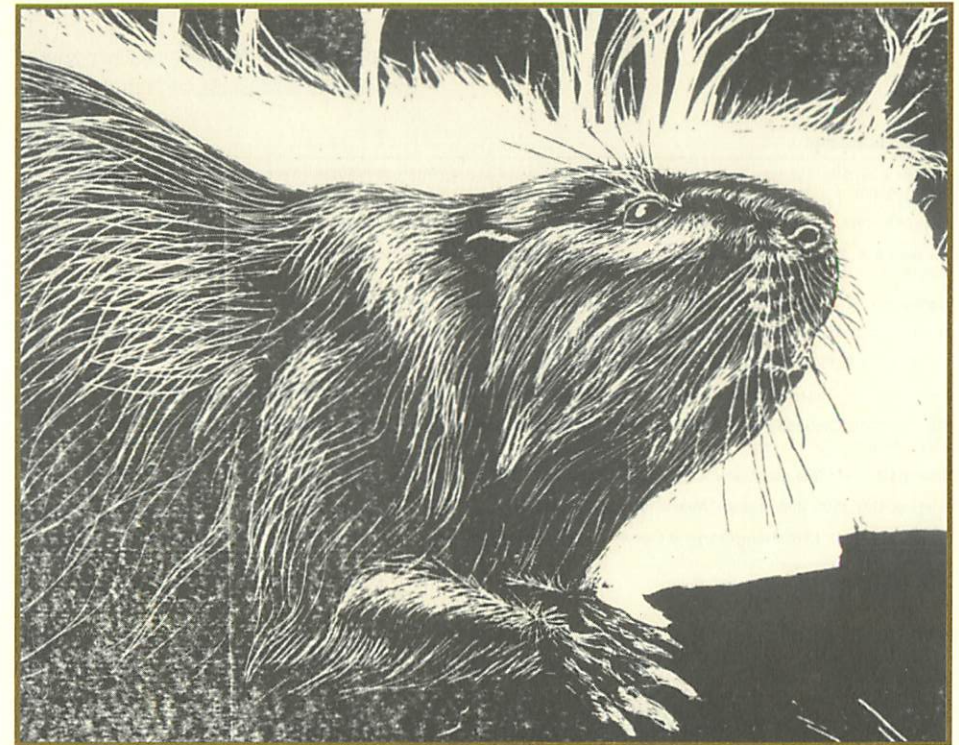


Figure 3: Restoration of detail of front part of body of giant beaver (*Castoroides ohioensis*). Sketch by Bonnie Dalzell.

<sup>1</sup> I have found evidence of only one giant beaver specimen from Alaska. It consists of a small fragment of an incisor tooth (F:AM 65185), with the characteristic outer ridges, collected from Cripple Creek near Fairbanks in 1942.

<sup>2</sup> The ice age included four major glaciations: the oldest is known as the Nebraskan, and was followed by the Kansan, Illinoian and Wisconsinan. Between these were the warmer interglacials (Aftonian, Yarmouthian and Sangamonian), in which the climate was similar to that of today.