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W. D. Frankforter
Sanford Museum

time from post-Niagaran to pre-Wapsipinicon. The rubble lies on eroded Niagaran and below the Wapsipinicon breccia.

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A Late Wisconsin Giant Beaver in Northern Iowa

W. D. FRANKFORTER[1]

Abstract. Few discoveries of giant beaver, *Castoroides*, remains have been made in Iowa and these have usually been found under circumstances precluding determination of their geologic ages. The specimen reported herein from near Garner, Hancock County, Iowa, was recovered from a peat bed which lies within the border of a late Wisconsin, probably Cary, terminal moraine. According to radiocarbon dates recently announced for organic muck overlying till in a nearby peat bog the minimum date for the till would have to be approximately 12,000 b.p., thus older than Two Creeks interstadial.

This find, places the giant beaver in Iowa during Two Creeks time or possibly slightly later. This is the latest survival yet reported for this form in Iowa and compares favorably with its terminal date reported in Ohio.

Other giant beaver finds in Iowa are described and some general statements are made about the development of this animal.

INTRODUCTION

Remains of the giant beaver, *Castoroides*, have been rarely found in Iowa. A recent discovery near Garner, Hancock County, is only the seventh specimen to come to the attention of the author. Four have been mentioned previously in scientific reports and the remainder are discussed herein.

The Garner specimen consists of a fragment of the upper left third molar, the lower left second molar, and a partial incisor from the left ramus. These items were found by Mr. Richard Brouwer in a peat deposit on his farm two miles south and one mile west of Garner, in the S½, NE¼, sec. 11, T. 95N., R.24W. They were discovered in 1960 and were taken to Robert Brower of Garner, who was then a student at the State University of Iowa, Iowa City. He, in turn, submitted them to the author for identification and, subsequently, they were donated to San-

[1] Sanford Museum, 117 East Willow, Cherokee, Iowa.

ford Museum, Cherokee, Iowa, by Mr. Brouwer. They have been entered in the Museum records under number 19-60-Z.

The discovery of these specimens resulted from excavation of the peat for commercial purposes. In the process the peat is temporarily piled nearby to permit drying and the giant beaver teeth were found on one of these piles, according to Mr. Brouwer. Therefore, the original depth of the specimens is unknown. During a visit to the locality on August 20, 1960, by the author, Mr. Brouwer reported bone fragments had appeared periodically in the peat over the past few years. Small fragments of what may have been bison bone were noticed scattered through the excavated peat on that date. Very little peat has been removed since that time and there has been no opportunity to check the deposit for fossil remains *in situ* while peat removal was in progress.

The developmental history of the giant beaver in America has not been fully reported and the literature consists primarily of brief descriptions of new species and references to finds in various parts of the country.

The ancestor of the giant beaver is considered to be *Procastoroides* known from pre-Kansan beds in Nebraska. The type of *Procastoroides sweeti* was described by Barbour and Schultz (1937) from lower Pleistocene deposits near Broadwater, Nebraska. This form is about three-fourths the size of *Castoroides* but lacks the longitudinal grooving of the incisors typical of the more recent forms. In eastern Nebraska a single fourth premolar of *P. sweeti* was found and illustrated by the author (Frankforter 1950, p. 23, fig. 15). This came from gravels underlying Kansan till in the western edge of Cuming County in what may be considered the Atchison formation.

The first report on the giant form in which a scientific name was applied was published by J. W. Foster (1838). He named a somewhat damaged skull found near Nashport, Muskingum County, Ohio, *Castoroides ohioensis*. Since then remains of this unusual animal have been found throughout the United States with the exception of the Southwest and West Coast areas.

One of the most complete early skeletons discovered came from a swamp in Randolph County, Indiana, and is at Earlham College, Richmond, Indiana. Another essentially complete skeleton is at the University of Nebraska State Museum, Lincoln, and came from Yarmouthian beds near Rushville, Nebraska.

Iowa Finds

In Iowa the specimens reported in literature are as follows: (1) An upper left incisor pumped from sands in the bottom

of the Nishnabotna River near Oakland (Calvin 1911, p. 215, pl. 23; Hay 1914, pp. 82, 467, pl. 72, figs. 1-4).

(2) A skull found by Ray Leonard in 1921 in the SE¼, SE¼, sec. 32, T.78N., R.39W., near Corley on the Nishnabotna River.

(3) A water-worn incisor from the Turin gravel pit mentioned by Calvin (ibid., p. 215).

(4) An incomplete incisor from gravels of uncertain age near the western edge of Des Moines. This was reported by O. A. Thomas (1921).

Specimens being reported for the first time are as follows:

(5) A large upper right incisor from the Turin gravel pit. This new discovery was made by Sharon Worman, Storm Lake, in 1956 and was donated to Sanford Museum where it is part of a sizeable collection of mammalian fossil remains recovered from this pit within the past six years. This incisor is water-worn but is essentially complete. It agrees closely with the Earlham College specimen (Hay 1914, p. 459). The incisor has a width of 24 mm. and an anterior-posterior diameter of 23 mm. Thus, it is assumed to belong to the same species, *Castoroides ohioensis*.

(6) A left ramus with all cheek teeth present but with the end of the incisor missing. In addition, some minor parts of the posterior end of the ramus are lacking. The specimen was reported to the writer by Mr. Christie Hein, State Conservation Officer, Glenwood, Iowa, and was identified from a tracing sent in by Mr. Hein. No information was received regarding its provenance. The drawing revealed a typical ramus of the species, *C. ohioensis*, but a more positive identification can only be made with the specimen in hand.

(7) The Garner beaver molars are smaller than those illustrated by Hay (1914, pl. 72) for the Earlham specimen and the incisor is too incomplete to afford reliable measurements. At the present time it is believed advisable to refer this individual only to the genus *Castoroides* and await further study to determine its specific affiliation.

Geologic Age

The peat deposit from which the Garner beaver was recovered lies at the southern end of a low divide between a southeast trending drainage and the East Branch of the Iowa River which flows toward the southwest at this point. The surface of the peat is covered with a dense growth of vegetation which is still contributing to the build up of peat.

The Brouwer peat bed is approximately 10 miles north and 3 miles east of the McCulloch peat bog reported by Ruhe, Rubin, and Scholtes (1957, pp. 686, 687). Radiocarbon dates of 11,660 ± 250 and 11,790 ± 250 years b.p. on organic muck between the peat and an underlying gray, calcarous till, establishes a minimum date for the till which indicates (ibid., p. 687) "that this portion of the Des Moines lobe associated with the Altamont moraine also is older than Two Creeks."

The Brouwer pit appears to be within this same morainic system and thus the terminal date for giant beaver in Iowa would be circa 11,000 b.p. This is very close to the terminal date (11,480 ± 160 b.p.) given by Hester (1960, p. 69, Table 5) for *Castoroides sp.* at Northern Lights, Ohio, and indicates that the giant beaver was a late Ice Age inhabitant of Iowa.

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