

## A CONTRIBUTION TO THE PLEISTOCENE FAUNA OF NEW YORK STATE

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**ABSTRACT.** An addition to the Pleistocene mammalian fauna of New York State is reported in the form of a fossil antler of the barren ground type of caribou, *Rangifer arcticus* (Richardson). The specimen was discovered two miles north of Schenectady, New York, and thirty feet below the present surface in crossbedded gravel associated with the marginal lacustrine deposits of glacial Lake Albany.

### INTRODUCTION

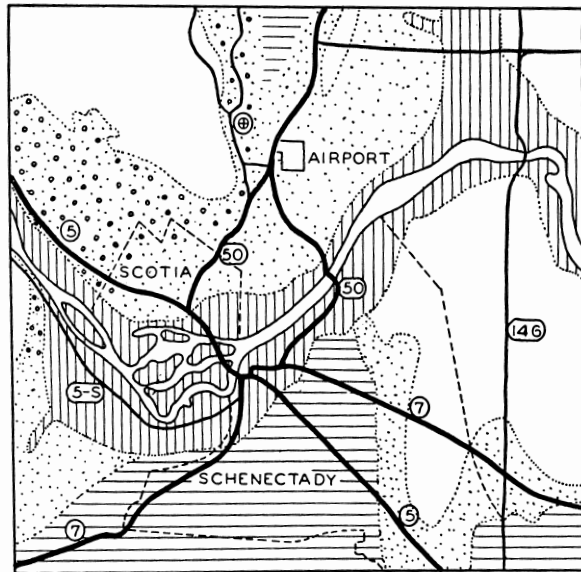
**F**OSSILIZATION of ancient land animals is pure chance; their subsequent discovery is likewise commonly fortuitous. The case under consideration is a typical example.

While operating a sand digger in a sand and gravel pit 0.3 mile north of the intersection of the Swaggertown and Worden roads and 0.5 mile northwest of the Schenectady County airport (fig. 1), Mr. Charles Aubrey uncovered fragments of an antler of the family Cervidae. Verification of the remains as those of a caribou antler was made by Dr. Ralph S. Palmer, State Zoologist of New York. Through the efforts of Mr. Ostrom, the specimen currently reposes in the Department of Geology at Union College.

The preponderance of proboscidean remains over those of the Cervidae in Pleistocene deposits of eastern North America does not necessarily imply that the mastodons and mammoths were numerically superior. It seems probable that in the past, as today, the deer family far outnumbered their proboscidean cousins, but their relatively smaller skeletal parts were more susceptible to destruction than those of the more massive mastodons and mammoths. It is for this reason that the finding of fossil deer remains is a much rarer occurrence.

Within New York State, the earliest record of the finding of remains that are questionably referred to those of caribou is that of Ebenezer Emmons (1845, p. 201) in which it is reported that a jaw of an extinct species of deer was found in Greene County in a marl pit and later a "horn" from a similar pit in Scotchtown, Orange County. Emmons states, "This deer was about the size of the reindeer of the north, and like that animal, was provided with a flattened (though more

slender) horn; but it differs specifically from the reindeer, in the possession of two brow antlers instead of one, on a single shaft, and quite near the base." It is now known that the possession of two brow antlers is not uncommon. Hartnagel and Bishop (1922, p. 90) assert that, "The antlers found were probably those of the barren ground species, *Rangifer arcticus* (Richardson)." The brevity of the original description, however, would not seem to favor a specific designation for this specimen. In his summarization of Pleistocene mam-



## LEGEND








-  AREA OF RECENT DEPOSITION.
-  LAKE ALBANY DEPOSITS. CLAY GRADING UPWARD INTO SANDY CLAY.
-  MARGINAL LAKE DEPOSITS. LAMINATED SANDS ALTERNATING WITH GLACIO-FLUVIATILE DEPOSITS AND WIND-BLOWN SAND.
-  UNMODIFIED GLACIAL TILL. BLUE BOULDER CLAY WITH MAINLY BLACK LITHOGRAPHIC LIMESTONE BOULDERS.
-  SITE OF DISCOVERY OF FOSSIL ANTLER.

Fig. 1. Sketch map showing the glacial geology of the vicinity of the fossil caribou antler locality. (Modified from Stoller, 1911.)

mals, O. P. Hay (1923) omits mention of this discovery, either considering the find to be other than that of a caribou or else inadvertently overlooking it.

In 1853, an antler and parietal bone of a caribou were discovered in a peat bog, 6 feet below the surface, at Fairytown, New York. However, the report of this find was not published until some 70 years later (Norton, 1924, pp. 132-133). The antler now rests in the Society of Natural History at Portland, Maine. The main shaft has a length of 23½ inches (59.7 cm.), a diameter of 1¼ inches (3.2 cm.) just above the burr, and one branch 8 inches (20.3 cm.) in length, 4½ inches (11.4 cm.) from the burr; both have broken tips. Due to the lack of completeness of the specimen it is impossible to classify it further than to say that it is definitely a caribou antler.

Joseph Leidy (1860, p. 194) related an account by Dr. G. J. Fisher of the finding of an antler of a reindeer in the vicinity of Sing Sing, N. Y. The specimen was found 6 feet below the surface in a peat bog almost an acre in extent that appeared to be the site of an ancient lake. It is further stated, "Dr. Leidy observed that there is a similar specimen of an antler of a reindeer in the museum of the academy which had been found near Vincentown, New Jersey at a depth of four feet. . . ." It is regrettable that the dimensions of the antler were not recorded for the whereabouts of the specimen is unknown. If we are to rely on Leidy's observation of the similarity to the accepted caribou find in the museum of the Philadelphia Academy of Natural Sciences, then Fisher's account is a valid caribou discovery.

Almost a century has elapsed since the last remains of fossil caribou have been found within the Empire State. This, together with the lack of adequate description and location of previous discoveries, prompts the writers to present the information embodied in this article.

#### GEOLOGIC SETTING

The stratigraphy at the discovery site (fig. 1) is as follows:

##### Post-Pleistocene:

- 9-10 feet Yellowish-brown sandy loam intermingled with "blow" sand consisting of fine subangular frosted quartz grains denoting an aeolian origin.
- 0-3 feet Crossbedded pebble gravel channeling the underlying lacustrine deposits.

## Pleistocene:

- 6 feet Laminated coarse grain sand; angular to subangular quartz grains constitute about 90 percent of the deposit. The remainder consists of kaolinized feldspar, hornblende, chlorite, mica, shale fragments, and some garnet. The grain size averages 1 mm. in diameter. Lake Albany sediments.
- 16 feet Coarse crossbedded river-laid gravel intermingled with exposed coarse sand and here and there interbedded with fine wind-blown sand. Interpreted as foreset beds formed in Lake Albany. Fossil antler found 2 feet above floor of pit.

Stoller (1911) mapped these sediments as near-shore deposits in Lake Albany. At its maximum, this transient Pleistocene lake occupied that part of eastern New York extending from Fort Ann on the north to Kingston on the south and extending for some 25 miles eastward from a point 4 miles west of Schenectady (Woodworth, 1905, pp. 176-178). The gravel in which the specimen was found is considered to be deltaic sedimentation of the Iromohawk River, a name applied by Fairchild (1912, p. 32) to the period of glacial flow of the outpourings of glacial Lake Iroquois and the other Great Lakes through the Mohawk Valley. Angular and subangular cobbles of Schenectady sandstone, a Middle Ordovician formation which does not extend farther than 10 miles west of Schenectady, imply a short distance of transportation and close proximity to the source. Marginal type sedimentation is clearly shown all along the southern and eastern rim of the "Glenville Hills," a relatively high area to the northwest of Schenectady not inundated by the Iromohawk waters.

## DESCRIPTION

Grant (1902, p. 176) divides all members of the genus *Rangifer* into two groups, the barren ground caribou and the woodland caribou. The distinction between the two divisions is based on antler architecture. The antlers of the barren ground group are round, slender, and long in the main beam in proportion to the small size of the animal. The beam and the tines are but slightly palmated and have less than thirty points. In contrast, the woodland caribou possesses antlers which are flatter, thicker, short in the main beam, liberally palmated on both the beam and tines, and have more than thirty points. The bez tine, the tine immediately above the brow antler, is elaborately developed in the woodland caribou and Grant (p. 182) considers this the most distinguishing feature sep-

arating the two types. Conforming to this accepted division, the specimen under discussion represents an antler of the barren ground type of caribou, and comparison with the descriptions and illustrations of the five modern species discloses that it is conspecific with *Rangifer arcticus* (Richardson) (fig. 2). It is so classified because of the virtual non-palmate character, few points, long main beam, and general "arm chair" appearance. The sole divergency in likeness to the modern *R. arcticus* is that the described fossil shows the main shaft to terminate in a gradually tapering single point whereas the living species all show a multiple pointed palmate tip. This is interpreted as a minor variation of antler architecture for it has been shown that there is extreme diversity of antler configuration in all of the Cervidae. Nonetheless, there are certain basic characteristics of antler structure which may be utilized for identification with reasonable assuredness. It is for this reason that the antlers of the barren ground type of caribou are said to have an "arm chair" appearance while the woodland caribou presents a "treetop" appearance (Hornaday, 1904, p. 133).

The fossil is a fairly complete left antler with a beam 51

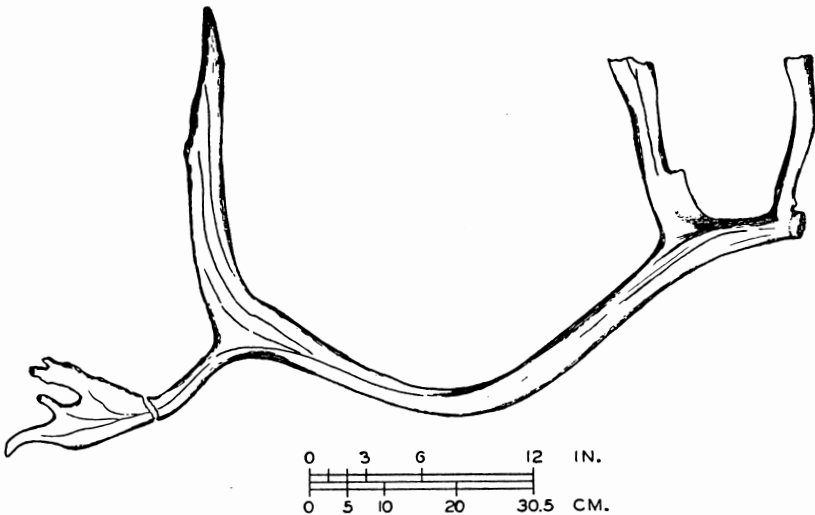


Fig. 2. Sketch of antler of *Rangifer arcticus* (Richardson). Note particularly the singular pointed main shaft and the roughly parallel grooves indicating the positions of the veins leading to the blood vessels when the antler was in the velvet stage.

inches (129.5 cm.) in length and  $1\frac{1}{2}$  inches (3.8 cm.) in diameter at the burr (fig. 2). Slight palmation is first apparent 27 inches (68.6 cm.) from the burr but continues for only some 10 inches (25.4 cm.) toward the gradually tapering, rounded single point of the main shaft. Bifurcation of the main shaft occurs 32 inches (81.3 cm.) from the burr where a broken branch increases the total spread an indefinite amount.

Both the brow and bez tines are partly broken off. The former is  $7\frac{3}{4}$  inches (19.7 cm.) in length and  $2\frac{1}{4}$  inches (5.7 cm.) in width at the broadest point. The latter has 10 inches (25.4 cm.) showing and is 2 inches (5.1 cm.) wide at the broadest point. Both are but slightly palmate in character. Noteworthy is the fact that the brow tine is only  $\frac{3}{8}$  inch (1 cm.) from the burr; the bez tine is 5 inches (12.7 cm.) from the point of attachment to the skull.

There are nine points preserved but doubtless this does not represent the original number. Three of the points could not be fitted into the mounted specimen but presumably were part of the brow and bez tines.

In the region of bifurcation of the main shaft, three prominent grooves exist roughly parallel to the length of the beam. These impressions evidently mark the position of the veins which led to the blood vessels when the antler was in the velvet stage. Hardened brown areas adhering to the surface of the antler are interpreted as remnants of the original velvet.

It is difficult to estimate the size of the animal in life for barren ground caribou have large antlers relative to their body size. This produces the effect of magnifying both the height and bulk of the wearer.

#### SIGNIFICANCE

The current discovery is the third authenticated one of its kind in New York State and the first in eastern North America in which the antler was preserved in gravel (Hay, 1923, pp. 224-245). In addition, illustrations of fossil caribou remains prior to this publication are lacking.

Some idea of the environmental conditions prevailing in this portion of the country during the latter stages of the waning Wisconsin ice sheet may be obtained, for presumably the modern *Rangifer arcticus* frequents much the same type of habitat as his Pleistocene predecessors. This would suggest that tundra conditions existed adjacent to Lake Albany

in which the region appeared as a virtually treeless landscape with only low-growing vegetation. Evidence of wind-blown sands lends impetus to the supposedly treeless condition, for dune sand is whipped about only where obstacles such as trees are scarce or absent. This species of caribou evidently migrated northward as the ice waned, for today *R. arcticus* is not found south of the fifty-fourth parallel. The most southerly penetration recorded is in the vicinity of the eastern shore of the juncture of Hudson and James bays (Grant, 1902, map).

It is thought that the fossil represents a shed antler for no skeletal bones were found associated with it. If the antlers were attached at death, it would be thought that some of the more resistant portions of the skeleton such as the teeth, skull bones, or leg bones would have been preserved inasmuch as the less resistant antler fragments were preserved so splendidly. Undoubtedly quick burial due to rapid deltaic sedimentation favored the preservation.

The location of discovery poses somewhat of a problem. Assuming that the Adirondacks were completely covered by continental ice and that as the ice melted the Adirondack island slowly became larger, it is rather perplexing to understand just how the antler happened to be found on the northwest shore of Lake Albany, when presumably that was the Adirondack island side of the lake (Fairchild, 1912, plate 17). The assumed volume and turbulence of a river such as the Iromohawk seems to preclude the possibility that the caribou could have swum to the northern bank. It is conceivable that at this stage in the recession of continental ice, the Adirondacks may have had an eastward land connection and that the glacial waters of the Champlain and Hudson valleys were separated by land in the Fort Ann-Whitehall area, although Woodworth (1905, pp. 177, 178) implies the two valleys to have a water connection. The writers favor the theory that the antler was not shed at the spot where it was ultimately found, but that it was carried to its discovery site by the waters of the Iromohawk. The abnormally high velocity and volume would prevent the antler from sinking to the bottom and, on entering the open water of Lake Albany, the velocity would be checked causing both the antler and the detritus carried to be immediately deposited.

Due to the recent findings of Flint and Deevey (1951), our

concept of the time that has elapsed since the last ice sheet (Mankato) began to wane has been considerably shortened. The whole process of deglaciation has seemingly progressed more rapidly than has heretofore been supposed. Recent radio-carbon dating determinations place the earlier part of the draining of Lake Iroquois as  $4,930 \pm 260$  years ago and the early Nipissing stage of the Great Lakes as occurring  $3,656 \pm 640$  years ago (Flint and Deevey, 1951, pp. 264, 265). On the basis of this recent information and judging by the antler's position with respect to the Iromohawk deltaic deposits, the fossil is estimated to be approximately 4,500 years old.

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