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A Late Pleistocene Antler Artifact from the Klondike District, Yukon Territory, Canada

C.R. HARINGTON[1] and RICHARD E. MORLAN[2]

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ABSTRACT. A modified caribou antler, interpreted as a flintknapper's punch, was collected with hundreds of other Pleistocene mammal bones at Hunker Creek near Dawson City, Yukon Territory. It has yielded a radiocarbon date of 11 350 ± 110 B.P. by accelerator mass spectrometry (AMS). Although the specimen was not found in stratigraphic context, we infer its probable burial history from its radiocarbon age and surface alteration, and its artifactual nature from the way it has been modified. Since it is contemporaneous with Alaskan and Yukon sites containing core and blade technology, the punch may have been used for indirect percussion flaking of stone tools and preforms.

Key words: caribou, *Rangifer tarandus*, Yukon Territory, late Pleistocene, bone tool

RÉSUMÉ. Un bois de caribou modifié, que l'on pense être un poinçon pour éclater la pierre, a été recueilli avec des centaines d'autres os de mammifères du pléistocène au ruisseau Hunker près de Dawson, dans le Yukon. La datation par le radiocarbone, par spectrométrie de masse par accélérateur, a donné 11 350 ± 110 avant le présent. Bien que le spécimen n'ait pas été découvert dans un contexte stratigraphique, on déduit l'historique probable de son enfouissement d'après sa datation par le radiocarbone et l'altération de sa surface, et on déduit son caractère de matériau façonné à partir des modifications qu'il a subies. Vu qu'il est contemporain de sites alaskiens et yukonnais renfermant des matériaux appartenant à la technologie du nucléus et de la lame, le poinçon a pu être utilisé pour le débitage par percussion indirecte d'outils et d'ébauches en pierre.

Mots clés: caribou, *Rangifer tarandus*, territoire du Yukon, pléistocène tardif, outil en os

Traduit pour le journal par Nésida Loyer.

РЕФЕРАТ. На территории Юкон, на реке Ханкер-крик, вблизи города Доусон, среди сотен других костей плейстоценовых животных найден видоизмененный рог карибу, который, как предполагается, является зубилом обработчика кремня. Радиоуглеродной датировкой посредством акселераторной масс-спектрометрии получен возраст 11 350 ± 110 лет. Хотя данный образец найден вне стратиграфического контекста, об истории его захоронения можно судить на основе его радиоуглеродного возраста и поверхностных изменений, а о том, что он является артефактом — по тому, как он был видоизменен. Поскольку найденное зубило современно стоянкам на Аляске и Юконе, содержащим нуклеусо-пластинчатые индустрии, можно предположить, что оно использовалось для получения непрямыми ударами отщепов, из которых изготовлялись каменные орудия и заготовки.

Ключевые слова: карибу, Рангифер тарандус, территория Юкон, поздний плейстоцен, костяное орудие

Translated by Leo Elnitsky

INTRODUCTION

Among ice age vertebrate localities in Canada, those in unglaciated parts of the Yukon Territory are most productive of fossils. Pleistocene mammal bones have been reported near Dawson City (Fig. 1, no. 7) since the turn of the century (e.g., Dawson, 1901; Whiteaves, 1903; Obalski, 1904; Lambe, 1905; Osgood, 1905a,b). Since 1966, the Canadian Museum of Nature (formerly the National Museum of Natural Sciences) has been carrying out a long-term program of collecting and studying Pleistocene vertebrate remains from the Yukon. The objectives of this program include the taxonomy, origins, chronology and paleoecology of animals that have lived there during the last two million years, as well as possible causes of extinction (Harington, 1990). This paper focuses on new evidence for the presence of people in the Dawson area toward the close of the last (McConnell/Wisconsinan) glaciation. The evidence is based on the radiocarbon dating of a modified caribou antler that is interpreted as an artifact.

Dawson area fossils are mainly exposed during placer mining for gold, and 65 fossiliferous localities have been recorded thus far in the region. Most of the fossils, when found in stratigraphic context, occur in frozen organic silt just above the surface of the gold-bearing gravel, and most specimens that have been radiocarbon dated evidently represent animals that lived during the latter half of the last glaciation, between about 30 000 and 15 000 years ago (Harington, 1989).

On 15 August 1973, while collecting Pleistocene mammal bones at the placer-mining operation of John Erickson and Herman Liedtke, on Hunker Creek (Dawson Locality 16; Fig. 1, no. 8; 63°55′N, 138°52′W), the first author noticed a large bullet-shaped piece of caribou antler (Fig. 2). It appeared to have been purposely shaped for use as a punch, and it was

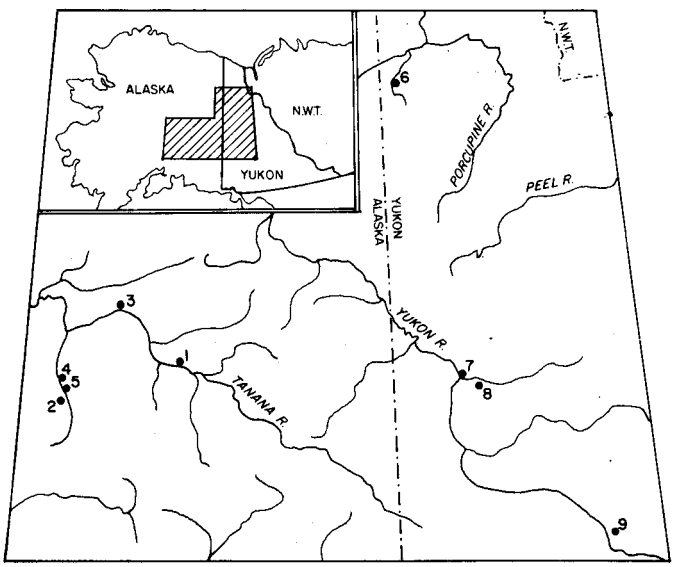

FIG. 1. Map of a portion of Alaska and Yukon Territory (shaded area in inset), showing localities of sites and cities mentioned in the text. Alaska: 1, Broken Mammoth; 2, Dry Creek; 3, Fairbanks; 4, Moose Creek; 5, Walker Road. Yukon: 6, Bluefish Caves; 7, Dawson City; 8, Hunker Creek; 9, KbTx-2.

[1]Paleobiology Division, Canadian Museum of Nature, P.O. Box 3443, Station D, Ottawa, Ontario, Canada K1P 6P4
[2]Archaeological Survey of Canada, Canadian Museum of Civilization, P.O. Box 3100, Station B, Hull, Quebec, Canada J8X 4H2

accessioned by the Archaeological Survey of Canada, Canadian Museum of Civilization (formerly National Museum of Man), where it is catalogued as KlVi-1:1. Preliminary remarks on the specimen are in Harington (1975, 1977, 1989), Harington *et al.* (1975), and Bonnichsen (1979).

From a stratigraphic viewpoint, a great thickness of "muck" (miner's term for loess or reworked loess containing organic matter) overlay the gold-bearing gravel on the downstream side of the excavation. Erickson said that most of the bones had come from the interface of the muck and gravel, but that, rarely, bones were found higher up in the muck. This supports earlier observations (Harington and Clulow, 1973; Harington, 1987:Fig. 33). Although the stratigraphic position of the Hunker Creek antler tool was not documented, we can infer from its radiocarbon age (see below) that it probably came from a position near the interface of the muck and the peat unit that commonly overlies it in this and many other parts of the Yukon (e.g., Hunter and Langston, 1965:Fig. 1; Harington, 1977:Fig. 5).

DESCRIPTION OF THE TOOL

The specimen was compared with a series of antlers in the Canadian Museum of Nature collections. Based on its size, shape and cortical thickness, it is part of a caribou (*Rangifer tarandus*) antler and probably was derived from the main beam of an adult male just above the bez tine (Fig. 3A). Unfortunately, we cannot reconstruct in detail a sequence of manufacturing steps or other modifying processes that led to the production of the specimen, because the entire surface has been altered by some kind of chemical or physical attack. As a result, the surface is slightly but uniformly pitted (e.g., Bonnichsen, 1979:29-30, Plate III-4a; Bromage, 1984:Fig. 4), and any tool marks or other surface traces that might have reflected a production process have been removed. However, we can suggest a general series of actions that would be needed to achieve the gross morphology of the specimen.

The antler is nearly flat at one end and bluntly pointed at the other (Fig. 3B). The flatter end, or butt, is slightly keeled, sloping downward and outward about 5-10° from the horizontal, with cortical tissue as smooth as the sides of the antler. The sides taper gradually to a blunt point that terminates in the cortical tissue to one side of the spongy medulla. The asymmetrical position of the medulla can also been seen on the butt (Fig. 3C). The specimen has a total length of 128.3 mm, and the butt varies in diameter from 35.6 to 37.6 mm. A scar on one side, measuring 30.2 mm long and 11.7 mm wide, has been formed by detachment of a flake from an impact on the edge of the butt. The flake scar terminates in a small hinge fracture. The only other observable surface features are the buff colour and some small desiccation cracks.

We have considered several processes that might account for the morphology of this specimen: 1) intraspecific aggression, 2) fluvial transport, and 3) artifact manufacture. Intraspecific aggression occasionally fractures antlers, but fresh antlers do not fracture with smooth, slightly keeled transverse surfaces, as seen on the butt of this specimen. Desiccated antlers may fracture transversely, but the fracture surfaces are very rough, with the spongy medulla in a different plane from the cortical tissue. One of the desiccation cracks on this

FIG. 2. Some partially sorted Pleistocene mammal bones from Erickson's and Liedtke's placer-mining operation near Discovery Claim on Hunker Creek in the Klondike District (15 August 1973). Mammoth bones are top left, horse bones are below them with a few caribou bones to the left, and bison bones are in the pile to the right of the horse bones. The caribou antler artifact, circled, is lying in the pile to the right of the mammoth bones.

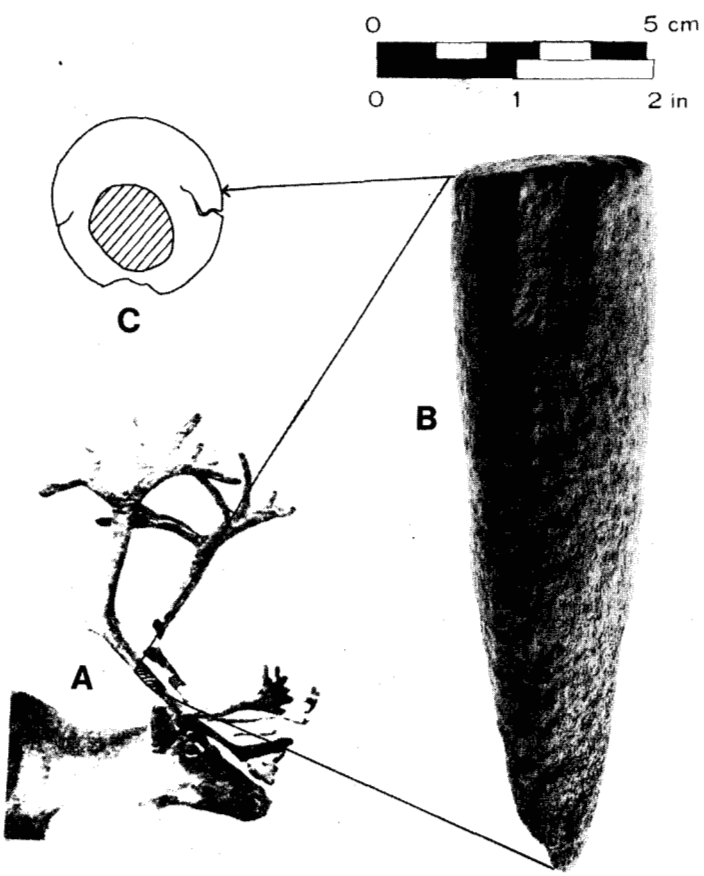

FIG. 3. Caribou antler punch from Hunker Creek (KlVi-1:1), Yukon Territory. A) probable source region of the antler artifact; B) obverse view, showing the flake scar adjacent to the butt (top) of the punch; C) sketch of the butt, showing asymmetrical position of the medulla.

specimen bifurcates the flake scar, whereas the edges of the scar would have been located along cracks if the flake had been detached from a desiccated antler.

Fluvial transport might erode an antler surface, but we doubt that it would ever produce differential erosion that would cause the antler to taper to a point. Furthermore, given its suspected origin near the top of the muck, it is unlikely that the specimen was exposed to fluvial transport. Instead, it was probably buried first in loess or peat and then redeposited by colluvial processes.

With these considerations in mind, we consider that artifact manufacture is the most plausible explanation for this antler specimen. The slightly keeled butt is an expected morphology for a grooved and snapped antler beam (e.g., Poplin, 1976). The asymmetrical position of the tip is a logical choice for tool performance, because the spongy medulla is too weak to sustain use. The position of the flake scar adjacent to the butt, where a hypothetical hammerstone or mallet would strike, suggests that the tool was used as a punch. It is noteworthy that the flake was detached where the cortex is thinnest (Fig. 3C).

The cause of the surface pitting is unclear, but both acid attack and particle abrasion are known to produce such features (Bonnichsen, 1979; Bromage, 1984). Acid attack might be responsible for the pitting if the antler were originally buried near the base of a peat layer. Particle abrasion could easily explain the pitting if the antler were exposed to blowing silt and sand prior to burial; impacts by silt and sand grains have been observed to cause pitting on bone surfaces in both actualistic and experimental studies (Brain, 1967:99; Bromage, 1984:164). On the Hunker Creek punch both the shaped surfaces and the flake scar are equally pitted, showing that the antler surfaces were altered after the artifact was abandoned.

DATING

Scores of well-preserved specimens (Fig. 2) were collected from this locality at about the same time as the artifact, including steppe or long-horned bison (*Bison priscus*), woolly mammoth (*Mammuthus primigenius*), small Yukon horse (*Equus lambei*), caribou (*Rangifer tarandus*) and rarer forms such as helmeted muskox (*Symbos cavifrons*), American lion (*Panthera leo atrox*) and wolf (*Canis lupus*). In general appearance, the caribou antler artifact looks similar to bones of extinct animals with which it was found, and the first author suspected that it was more than 15 000 years old (Harington, 1975). This view was influenced by a radiocarbon analysis of another caribou antler specimen from the same collection that yielded a date of 23 900 ± 470 B.P. (I-8580). The artifact could not be dated at that time without sacrificing it entirely, but the new method of AMS dating, requiring only a few grams of sample material, has afforded an opportunity to determine the age of the specimen.

The artifact was sampled for AMS dating on 4 August 1988. There was no evidence of contamination due to root penetration, leaching, humus, etc. The sample was removed from the side opposite the flake scar. Since the specimen had been cast using a silicon rubber mould, there might have been traces of plasticine or wax left on the surface (although none was visible in the sampling area). As a precaution, surface material was removed to a depth of about 2 mm, using an electric drill. Two spots about 20 mm apart were drilled and the resulting antler powder cleared away. Then a 2.2 g sample was removed from the interior by drilling two 8 mm diameter holes to depths of about 15 mm each. Clean drill bits were used for each operation (Canadian Museum of Nature, Paleobiology Division Conservation Files). The sample was submitted for AMS dating on 8 August 1988.

Chemical pretreatment and AMS target preparation were performed at Beta Analytic Inc. in Coral Gables, Florida. The sample was physically cleaned, then crushed and placed in dilute, cold acid that gradually dissolved the mineral portion of the antler sample. The remaining collagen fraction was combusted and the carbon dioxide purified and reacted with hydrogen on iron catalysts to produce graphite. The graphite was applied to copper targets, which were sent to Eidgenossische Technische Hochschule (ETH) in Zurich, Switzerland, for triplicate AMS measurements (M. Tamers, pers. comm. 1989).

The resulting date is 11 350 ± 110 B.P. (Beta-27512 ETH-4582). This date has been adjusted for total ^{13}C fractionation effects resulting from natural processes and laboratory procedures. The ^{13}C contents were measured concurrently with ^{14}C. This date indicates that people were present in what is now the Dawson area of the Yukon near the close of the last glaciation.

DISCUSSION

When this punch was first recognized in 1973, it represented an intriguing but isolated find that could not easily be related to the existing body of archaeological evidence in Alaska and Yukon. During the past two decades, that body of evidence has grown considerably, with new discoveries at many sites in this region. In particular, we note the accumulating evidence for late Pleistocene blade and microblade technology at several sites in central Alaska (Powers and Hoffecker, 1989; Powers *et al.*, 1990; Goebel *et al.*, 1991), Bluefish Caves in northern Yukon (Cinq-Mars, 1990) and site KbTx-2 in south-central Yukon (Clark, in press). This evidence suggests a sensible context for an antler punch that could have been used for indirect percussion flaking (see Crabtree, 1972:88). The radiocarbon date on the Hunker Creek punch fits within the span of the Nenana complex (11 000 to 12 000 B.P.), characterized both by core and blade and by core and flake technology (Goebel *et al.*, 1991). Except for the recently discovered Broken Mammoth site (Yesner, 1991), most of the Nenana complex sites, such as Dry Creek, Moose Creek and Walker Road (Fig. 1), contain very little preserved organic material, and the Hunker Creek punch may well provide our first glimpse of the non-lithic tool kit with which stone tools were made.

Other intriguing, isolated finds of both stone and bone artifacts were reported from Pleistocene muck deposits in the Fairbanks, Alaska, area more than a half century ago (Rainey, 1939, 1940). Unless they have been contaminated by preservatives, the bone artifacts should be restudied and sampled for AMS dating, and the stone tools should be examined for datable residues.

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