FIRST MASTODONT REMAINS FROM THE CHATTAHOOCHEE RIVER VALLEY IN WESTERN GEORGIA, WITH IMPLICATIONS FOR THE AGE OF ADJACENT STREAM TERRACES

David R. Schwimmer, Department of Chemistry and Geology
Columbus College, Columbus, Georgia 31993-2399

ABSTRACT

Fossils of *Mammut americanum*, the American Mastodont, have been recovered from a stream in the Chattahoochee River drainage basin. These fossils imply that at least some local stream terraces are of Pleistocene age.

INTRODUCTION

Fossils from the Pleistocene Epoch are widely distributed in Georgia [see (1) for a synoptic literature review]. These fossils are especially common in some southeastern Georgia counties with coastal marine tidal channels and subtidal dredge spoils (see 2, 3 for illustrated summaries) and in the northwestern part of the state in cave deposits (4-6). An additional diverse Pleistocene fauna is

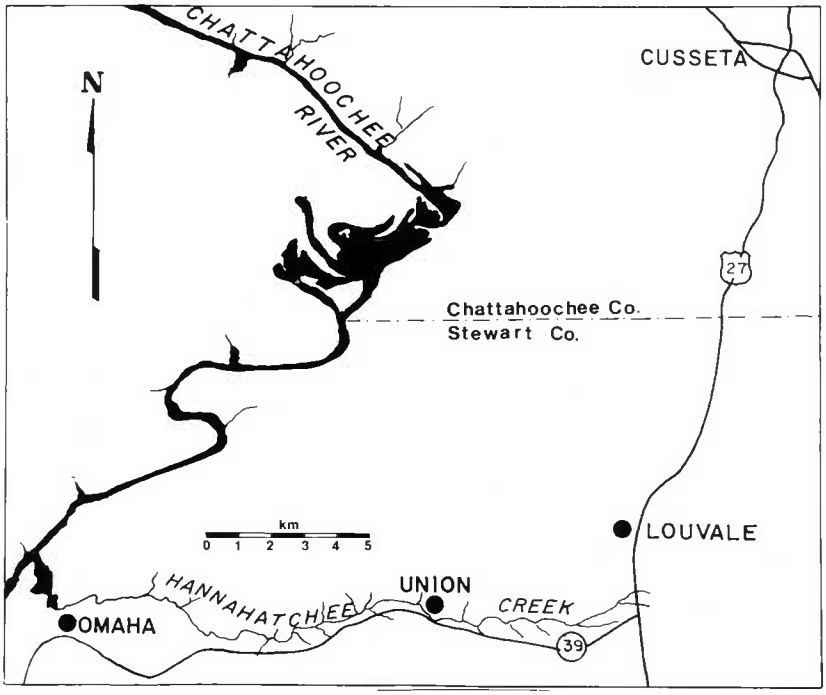

Figure 1. Locality map, showing the position of Hannahatchee Creek relative to the Chattahoochee River. Fossils discussed here were collected in the streambed between Union and Omaha; precise localities are indeterminable.

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described from a Piedmont stream terrace deposit in the central part of the state (7). Pleistocene fossils have not been reported previously from the southwestern margin of the state which lies within the valley of the Chattahoochee River. This lack of evidence for Pleistocene fossils has left the age of the upper stream terraces along the Chattahoochee and its tributaries in doubt. Indeed, the apparent absence of fossils suggested that regional stream terraces were most likely older than the Pleistocene, since fossils of large Ice-age mammals are abundant in geologically young deposits. The only dated stream terrace deposits in central-western Georgia are in the Flint River basin, Taylor County, where the age is mid-Pliocene (Hemphillian land mammal age) based on fossil horse teeth (8).

The discovery of mastodont remains reported here suggests that at least some sedimentary deposits near the Chattahoochee are of Pleistocene age (Fig. 1). A tooth-specimen of *Mammut americanum* is taxonomically unequivocal, and as described below, this species occurs characteristically in sediments from the later Pleistocene.

MATERIALS

Systematic Paleontology

Order PROBOSCIDEA
Family MAMMUTIDAE Cabrera, 1929
Genus *Mammut* Blumenbach, 1799 (= *Mastodon* Cuvier, 1817)
Mammut americanum (Kerr, 1791)
(Figures 2.1-2.6)

Material: a left upper third molar (M^3) [replica cataloged as CCQ-90-X-Xc]. A left (?) tibial fragment, preserving approximately one-third of distal shaft and ablated condyles.

Localities: lag deposits in Hannahatchee Creek, Stewart County, Georgia. The tooth was collected approximately one Km west of Union, and the tibial fragment was collected in an area near Omaha. Localities of original deposition are unknown.

Repositories: both specimens are retained in private collections. The tooth was collected by Jimmy Stafford of Lumpkin, Georgia: a cast of the specimen is reposited in the research collections of Columbus College. The limb fragment was collected by Len and Josephine Lee of Omaha, Georgia.

Discussion: The molar features a complete crown and nearly complete roots (Figure 2.1-2.3) with distinctively blue-black mineralization evident in the crown enamel. The tooth is of typical morphology with four complete lophs bisected by the median sulcus to from eight cusps, an incomplete fifth transverse ridge composed of several conules, and a tubercule on the posterior border. Discrimination of isolated upper from lower third molars in *Mammut americanum* may be based on several criteria (9) including relative widths of the first two lophs and the presence of a three-part root in uppers. This is an upper third molar (M^3,) in the larger range of adult sizes, measuring 184 mm antero-posteriorly (*i.e.* mesio-distally)

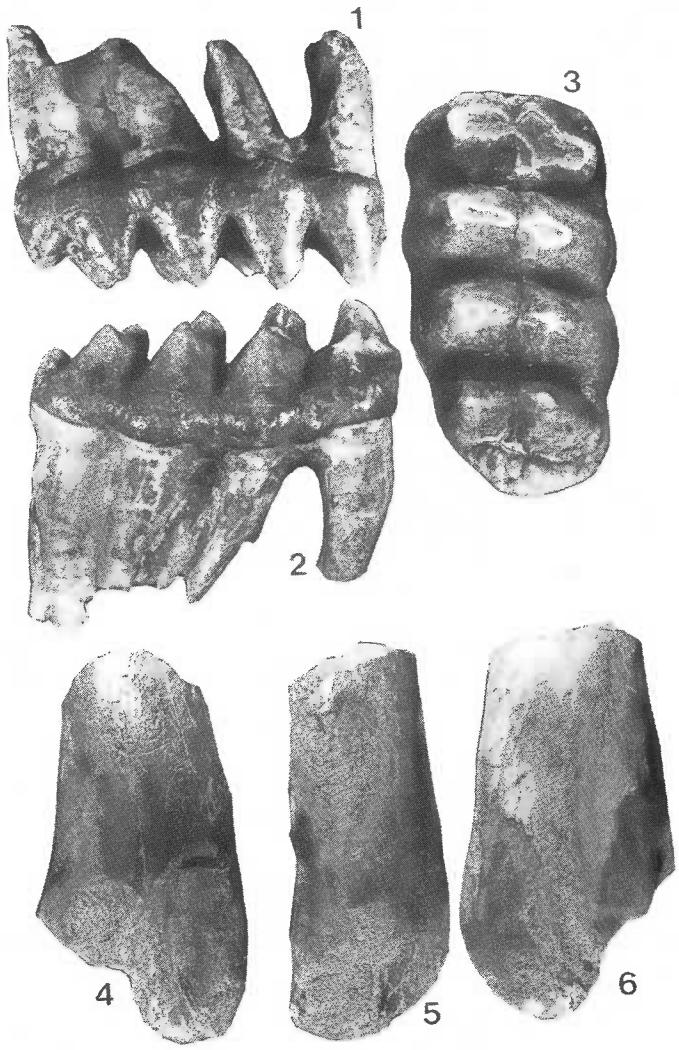

Figure 2. ***Mammut americanum****. 1-3, left third upper molar, lingual, buccal, x 1/3, occlusal, x 2/5. 4-6. (?) left tibial fragment, posterior, medial, anterior, x 1/6.*

by 104 mm transversely (*i.e.* bucco-lingually) across the metaloph. Bucco-lingual width across the protoloph is 95 mm. Cingula are moderately developed on buccal and lingual margins, and only weakly-developed cristae interrupt transverse valleys behind the pretrite cusp; collectively, these features categorize this tooth as the "smooth variety" (9, 10). The tooth was fully erupted at the time of death. This tooth has partially worn anterior cusps which shows that the individual was mature. The excellent preservation of most tooth surfaces, especially some terminal roots, suggests that this mastodont's original burial locality was near the site where the molar was dredged from the stream bed.

The limb-shaft fragment is badly water-worn and uninformative at the assumed proximal end of the shaft. The distal end retains a vestige of the medial (?) condylar surface. This appears to be a left tibial fragment with a maximum shaft cross-dimension of 241 mm distally. The size of this fragment suggests the individual was of typical adult size (9-13). The length of the fragment as preserved is 407 mm (Figures 2.4-2.6). It may, therefore, have come from the same individual as the tooth, given that stream traction-load transport could have rolled the tubular bone fragment several km downstream from the tooth site. Both specimens show relatively little chemical-physical alteration, other than the striking blue-black mineral coloration of cortical bone in the tibial fragment and of the enamel in the molar. However, the tooth roots retain the typical off-white color of fresh ivory. The tibial fragment shows no permineralization on either trabecular bone regions or the medullary cavity.

ANALYSIS

M. americanum is reported from North American deposits as old as the later Blancan mammal age of the late Pliocene (maximum 3.5 million years before present [yr. BP]) in the Pacific Northwest and Florida (13-14), and as young as 7000 yr BP in Florida (15). Nevertheless, the species was apparently rare in the eastern continent in deposits from before the Rancholabrean land mammal age of the late Pleistocene [beginning ca. 400,000 yr BP (13-14)], after which time it became extraordinarily abundant until becoming abruptly exinct in the early Holocene. Discovery of American mastodont remains in deposits within the Chattahoochee River basin therefore implies that at least some of the regional sediments are from the later Pleistocene. The excellent preservation of the molar, as well as the lack of mineral infilling in the tibia, further suggest that these fossils have come from the younger range of *M. americanum* dates.

It would be clearly useful to find the original depositional site(s) for these fossils. The tooth specimen must come from deposits either in the highest banks above Hannahatchee Creek or, more likely, in a streamside bog along the stretch between Louvale and Union, GA. The tooth was collected in the Fall of 1990 following previous seasons of unusually heavy precipitation. Therefore, it is likely that the tooth washed into Hannahatchee Creek recently via a swollen, perhaps intermittent tributary drainage.

The ages of terrace deposits along the Chattahoochee River and its tributaries are very poorly constrained. Fluvial terraces on the Georgia Coastal Plain are topographically separable and measurable, and they may be in part correlative

with coastal terraces (16); however, each drainage's isostatic history may distort geodetic relationships. The Chattahoochee Valley, in particular, has undergone significant entrenchment and rebound in recent geologic history (8, 16). These American mastodont fossils are therefore a useful marker to show that at least one deposit proximal to the Chattahoochee River is of probable Pleistocene age.

The notably blue coloration of both mastodont fossils bears on another question in regional Pleistocene studies. The term "blue clay" is a popular usage for deposits containing artifacts and fossil bones along both sides of the Chattahoochee Valley (*e.g.* 17). The origin of this term is obscure, and individuals in the region are heard frequently using the term to describe all local darker-colored deposits, including those of Cretaceous age. Nevertheless, an undiscovered Pleistocene overbank peat or other paludal sedimentary environment along the Chattahoochee drainageway may be both the source of the mastodont fossils considered here and the "blue clay" term.

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