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A REVIEW OF FOSSIL TAPIR RECORDS FROM TENNESSEE WITH DESCRIPTIONS OF SPECIMENS FROM TWO NEW LOCALITIES

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ABSTRACT

Eight previously reported fossil tapir finds from Tennessee are re-examined. In addition, descriptions of a tapir skull from Campbell County and isolated teeth and tooth fragments from Freeman Cox Cave and Guy Wilson Cave, Sullivan County, and Bulls Gap, Hawkins County are provided. These remains are examined in light of recent changes in tapir taxonomy; most of the specimens can be assigned to *Tapirus veroensis* Sellards 1918.

INTRODUCTION

Fossil tapir remains have been found in Eocene to Recent deposits in North America (Schultz, Martin, and Corner, 1975), although living forms are presently restricted to tropical and subtropical areas: three species are found in the neotropical region or "low latitudes" of Central America and northern South America and one in Indochina (Hershkovitz, 1954). Hershkovitz (op. cit.) characterized the modern tapirs as omnivorous browsers and grazers, feeding on fruits, leaves and twigs as well as on underwater organisms, and inhabiting moist forests near permanent bodies of water. During the Late Pleistocene, tapirs ranged across eastern North America as far north as Pennsylvania (Hay, 1923) and their remains have been encountered in numerous cave and other deposits from Florida to Pennsylvania. Most of these remains are fragmentary, consisting of sections of maxillae, jaws, and isolated teeth and tooth fragments. One notable exception is the nearly complete skeleton of *T.* cf. *excelsus* recovered in Crankshaft Cave in eastern Missouri (Parmalee, Oesch, and Guilday, 1969). Ten previously reported Pleistocene vertebrate faunas from Tennessee contained tapir remains (Table 1, Fig. 1). Exact dating of these elements is often difficult due to their isolated occurrence, deposition in mixed deposits, or the general lack of datable material in direct association with them. One tapir from Evansville, Indiana was dated at 9400±250 years BP (W-418) (Hester, 1960), but this date is considered too late to be valid. The radiocarbon date from the Guy Wilson Cave deposit, Sullivan County, Tennessee, 19,700±600 years BP (I-4163), which included a tapir tooth fragment, suggests a predominantly boreal fauna (Guilday, Hamilton, and Parmalee, 1975). Datable tapir remains in eastern North America will have to come from an undisturbed primary context.

TAXONOMY

The taxonomy of Pleistocene tapirs is based on cheek tooth size and skull morphology. Isolated fragmentary and even complete teeth are often difficult to place correctly in the tooth row. Eastern North American tapirs were first described and identified as either the fossil *Tapirus haysii* or the living Central American tapir, *T. terrestris*. However, Sellards (1918) described a skull and jaw fragment from Florida, *T. veroensis*, which he was able to clearly differentiate as a species distinct from the living forms. Simpson (1945) used a large sample of *T. terrestris* specimens with which to compare *T. veroensis* and several other Pleistocene tapir species statistically. He felt that *T. tennesseae*, based on 11 teeth from Whitesburg, Tennessee, was synonymous with *T. veroensis* (Simpson, op. cit.). In early descriptions tapir remains generally were referred to as *T. haysii*. Simpson (op. cit.) discussed the merits of *T. haysii* and concluded that the species is indeterminate and the name should be abandoned. *T. copei* was proposed as a new taxon for the large Port Kennedy materials formerly identified as *T. haysii* (Simpson, op. cit.).

In the same paper Simpson (op. cit.) described a new species, *T. excelsus* from Missouri, differing from *T. veroensis* in possessing slightly larger teeth and different length-width ratio of dP_4, but more importantly in the morphology of the sagittal portion of the skull. *Tapirus excelsus* was characterized by a broad flat interparietal region instead of a sagittal crest as in *T. veroensis*. Lundelius and Slaughter (1976) examined skulls of *T. excelsus*, *T. pinchaque* and *T. veroensis* and demonstrated that the sagittal table, characteristic of *T. excelsus*, is a characteristic of immature individuals. The interparietal table is broad in immature individuals and develops into a sagittal crest between the time M^2 and M^3 erupt (Lundelius and Slaughter, op. cit.). Lundelius and Slaughter (op. cit.) conclude that *T. veroensis* and *T. excelsus* represent a single species group distinct from the larger *T. copei*. They feel that *T. excelsus* may be only a local subspecies. The Pleistocene tapirs of central eastern North America are, therefore, referrable to a large species, *T. copei*, and a smaller species, *T. veroensis*.

NEW TAPIR RECORDS FROM TENNESSEE

Claiborne Cave, Campbell County.
Location: This small cave, containing a shallow permanent "lake," is situated approximately 75 yards west of the mouth of Saltpeter Cave. Webb (1938) described the location of Saltpeter Cave as 11 miles east of LaFollete, 2 miles west of the Powell River. Donn S. Claiborne discovered Claiborne Cave while constructing a road over the hill just to the west of Saltpeter Cave; it had been sealed and undetected until opened by Mr. Claiborne. The location of the cave is 36°21'30"N, 84°08"W.

TABLE 1: *Previously reported tapir remains from Tennessee.*

Locale	Specimens	Identification	Literature and Comments
1 Vess Cave, Anderson County	4 molars 3 molars, 1 canine	*Tapirus haysii* *Tapirus* sp.	Cahn (1939:25). Corgan (1976:58)
2 Craig Quarry, Blount County	5 teeth and tooth fragments	*Tapirus tennesseae*	Corgan (1976:59): Identified by Dr. C. Lewis Gazin, U.S. National Museum (letter to Dr. Stuart W. Maher, July 20, 1950)
3 Whitesburg, Hamblen County	11 teeth: incisor, right P^3, right P^4, left M^1, right M^2, left P^2, right P_3, right P_4, right M_2. left M_2, left M_3	*Tapirus tennesseae*	Hay (1920:88, pl. 3, fig. 4-11), Hay (1923:395). Corgan (1976:68-69)
4 Lookout Cave, Hamilton County	right mandibular ramus, 1 left incisor, 5 molars	*Tapirus haysii*	Mercer (1894:356), Hay (1923:209, 396,397). Corgan (1976:70)
5 Bulls Gap, Hawkins County	4 teeth: left P^4-M^1, Left P^{3-4}. right P^{3-4}, right P^{3-4}	*Tapirus* cf. *veroensis*	Corgan (1976:7), see text.
6 Zirkle's Cave, Jefferson County	unknown?	*Tapirus* sp.	Hay (1923:209, 396). Corgan (1976:80)
7 Kyles Quarry, Monroe County	4 teeth, possible left P^{2-3}, right P^4, letf M^2	*Tapirus veroensis*	Simpson (1941:11, 12). Corgan 1976:80)
8 Baker Bluff, Sullivan County	left P^1 (CM29522)	*Tapirus* cf. *veroensis*	Guilday *et al.* (1978:82), Parmalee and Bogan (1976:87). Corgan 1976:85)
9 Bristol, Sullivan County	left maxillary fragment with two teeth	*Tapirus haysii*	Hay (1923:209, 395). Cogan (1976:86)
10 Guy Wilson Cave, Sullivan County	isolated tooth fragment	*Tapirus* sp.	Guilday, Hamilton, and Parmalee (1975:110). Corgan (1976:87), see text

Material: The tapir skull and an incomplete cervical vertebra were found on a ledge along the east wall of the cave approximately 75 yards from the entrance. A partial skeleton of a cervid was also found lying on the floor about 20 yards inside the mouth of the cave. The tapir skull lacks both zygomatic arches, the premaxillae, the occipital condyles, and the petrous region of the right temporal bone (Figs. 2 and 3). The palate is complete behind the premaxillae as is the left maxillary tooth row, but the crowns of all teeth in the right row are broken away. The two M^3's are present but unerupted. This specimen has a broad, flat interparietal table, indicating a young animal which had not yet developed the sagittal crest (Lundelius and Slaughter, 1976).

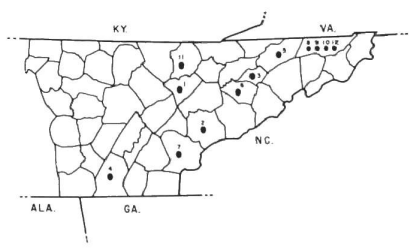

FIG. 1: *Location of tapir remains in East Tennessee; numbers correspond to site locations listed in Table 1. New locales: Claiborne Cave, no. 11; Freeman Cox Cave, no. 12.*

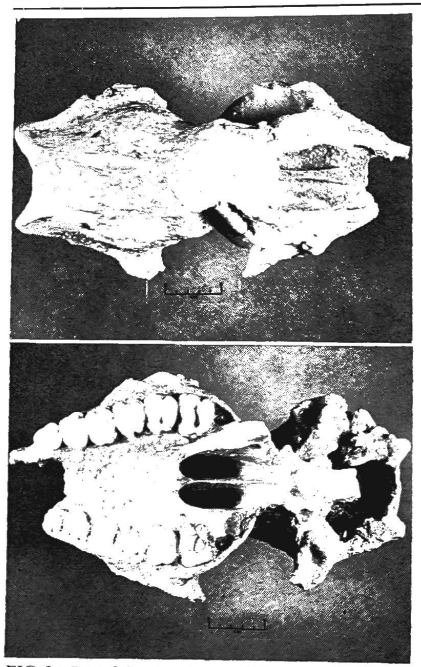

FIG 2: *Dorsal (top) and ventral (bottom) views of* T. veroensis *skull from Claiborne Cave, Tennessee.*

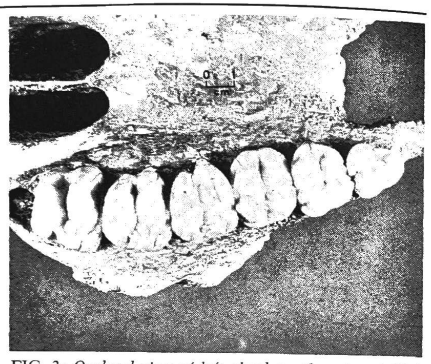

FIG. 3: *Occlusal view of left cheek-tooth series of Claiborne Cave specimen referred to* T. veroensis.

Measurements of the left maxillary teeth are listed in Table 2 and are compared with those of *Tapirus copei* and *T. veroensis*. The Claiborne Cave specimen falls well below the range of tooth measurements for *T. copei* and well within the Observed Range for the Florida specimens of *T. veroensis*. Therefore, this specimen is referred to *T. veroensis*.

TABLE 2: *Comparison of maxillary tooth measurements of Claiborne Cave specimen with* Tapirus copei and Tapirus veroensis.

	Tapirus veroensis Data on Florida specimens (Lundelius & Slaughter 1976:236)		*Tapirus copei* (Simpson 1945:69)		Claiborne Cave Specimen
Tooth*	Observed Range	Mean	Observed Range	Mean	Measurements
P^1L	17.5-20.8	18.9	22.4-24.9	23.8	19.2
P^1W	14.9-18.6	17.3	19.6-21.5	20.4	17.8
P^2L	18.7-21.1	19.9	21.9-24.0	22.6	20.3
P^2AW	19.6-23.2	21.5	25.5-26.5	25.9	20.0
P^2PW	22.8-25.8	23.9	27.4-27.9	27.6	24.0
P^3L	19.0-22.0	20.5	22.7-24.5	23.7	21.1
P^3AW	22.0-26.3	24.5	27.0-29.5	28.6	24.0
P^3PW	24.1-26.5	25.1	26.1-29.0	28.1	25.0
P^4L	20.0-22.9	21.5	24.1-26.4	25.3	21.7
P^4AW	24.2-28.6	26.9	29.9-31.8	30.6	23.1
P^4PW	22.5-28.9	26.2	28.4-30.1	29.3	21.7
M^1L	20.2-23.8	22.6	25.8-26.4	26.1	22.8
M^1AW	24.2-28.4	26.3	28.9-31.1	30.3	25.7
M^1PW	22.3-26.2	24.2	25.8-27.9	27.3	23.3
M^2L	23.5-27.0	25.3	27.3-29.7	28.1	25.6
M^2AW	26.3-31.1	29.2	31.3-34.9	32.6	27.7
M^2PW	23.8-28.4	26.2	28.0-31.5	29.7	24.4

*L=Mesiodistal length, W=Buccolingual width, AW=Anterior width, PW=Posterior width.

The only material which might be considered to be associated with the tapir is the cervid skeleton found close to the present entrance to the cave. This partial skeleton, severely rodent-chewed, was tentatively identified as elk (*Cervus* cf. *elephas*) by John E. Guilday, Carnegie Museum, Pittsburgh, Pennsylvania. The animal was quite small and therefore possibly a female, based on comparative measurements of specimens in the Department of Anthropology, University of Tennessee, Knoxville, and the Section of Vertebrate Paleontology, Carnegie Museum of Natural History. The tapir skull is on loan from Donn S. Claiborne, Lafollete, to the Zooarchaeology Section, Department of Anthropology, University of Tennessee, Knoxville.

Freeman Cox Cave, Sullivan County.
Location: This small, slightly downward sloping shaft is located in the left bank of the South Fork Holston River, 36°29′10″N., 82°11′20″W., east of the community of Riverside and about 5.5 miles south of Bristol.
Material: One left and two right lower molars, and one lower cheek tooth fragment, one right P^1, one right P^2, one left P^3, one right P^3, and one right upper molar fragment (Fig. 4). The four lower molars and the right upper molar fragment are referred to *Tapirus* sp. The four complete upper premolars compare closely with *Tapirus veroensis* (Table 3). These isolated tapir teeth were recovered by Charles C. Coney, Kingsport, Tennessee from the cave's first level hallway, November 30, 1973, and donated to the Zooarchaeology Section, Department of Anthropology, University of Tennessee, Knoxville.

Guy Wilson Cave, Sullivan County.
Location: This cave is located 2.5 miles south of Bluff City on the south side of the South Fork Holston River Valley, 36°27′N., 82°13′W. (Guilday, Hamilton, Parmalee, 1975).
Material: One left M^1(?) which lacks the posterior third (Fig. 4). The anterior width of the tooth is 26.0 mm. The fragmentary condition of the tooth precludes identification beyond *Tapirus* sp. Guilday, Hamilton and Parmalee (1975) reported caribou, dire wolf, porcupine, mammoth, *Megalonyx, Platygonus compressus, Phenacomys intermedius* and *Synaptomys borealis* from this faunal assemblage. The matrix has been extensively disturbed so any evaluation of contemporaneity is not possible, although several of the forms are indicative of former boreal conditions in the area. The tapir represented in this assemblage, on the other hand, may have been either a late Pleistocene or early Holocene addition to the deposit. This partial tooth is housed in the Zooarchaeology Section, Department of Anthropology, University of Tennessee, Knoxville.

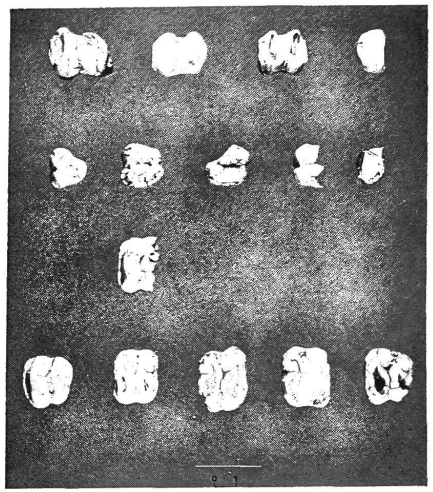

FIG. 4. *Isolated tapir teeth from Tennessee caves. Top row, Freeman Cox Cave: lower molars. Second row, Freeman Cox Cave: right P^1, right P^2, left P^3, right P^3, 1 upper molar/premolar fragment. Third row, Guy Wilson Cave: ?M^1. Fourth row, Bulls Gap: left P^4-M^1, left P^{3-4}, right P^{3-4}, right P^{3-4}, left P^4-M^1.*

Bulls Gap, Hawkins County.
Location: These teeth were collected four miles northeast of Bulls Gap, Hawkins County, in 1921. The collector is unknown. These specimens are on display in the Department of Geology Museum, University of Tennessee, Knoxville.

TABLE 3: *Measurements of Tapir teeth from Bulls Gap and Freeman Cox Cave.*

Bulls Gap, Hawkins Co.		Freeman Cox Cave, Sullivan Co.		*Tapirus veroensis* (Lundelius and Slaughter 1976:236)		
				Tooth	Observed Range	Mean
Left P^4-M^1	L. 23.0	Right P^1	L. 18.4	P^1L.	17.5-20.8	18.9
	AW. 24.7		W. 17.5	P^1W.	14.9-18.6	17.3
	PW. 22.0	Right P^2	L. 20.7	P^2L.	18.7-21.1	19.9
Left P^{3-4}	L. 19.9		AW. 18.9	P^2AW.	19.6-23.2	21.5
	AW. 25.7		PW. 19.4	P^2PW.	22.8-25.8	23.9
	PW. 25.4	Left P^3	L. 17.6	P^3L.	19.0-22.0	20.5
Right P^{3-4}	L. 21.2	Right P^3	L. 19.2	P^3AW.	22.0-26.3	24.5
	AW. 25.9	Lower left cheek tooth	L. 25.2	P^3PW.	24.1-26.5	25.1
	PW. 24.4		AW. 18.8	P^4L.	20.0-22.9	21.5
Right P^{3-4}	L. 21.7		PW. 17.2	P^4AW.	24.2-28.6	26.9
	AW. —	Lower right cheek tooth	L. 26.5	P^4PW.	22.5-28.9	26.2
	PW. 27.1		AW. 20.2	M^1L.	20.2-23.8	22.6
Left P^4-M^1	L. 21.4		PW. 18.1	M^1AW	24.2-28.4	26.3
	AW. 26.0	Lower right cheek tooth	L. 22.2	M^1PW	22.3-26.2	24.2
	PW. 23.0		AW. 18.6	M^2L.	23.5-27.0	25.3
			PW. 17.6	M^2AW.	26.3-31.1	29.2
				M^2PW.	23.8-28.4	26.2

L.=Mesiodistal Length, W.=Buccolingual Width, AW.=Anterior Width, PW.=Posterior Width

Material: Five maxillary teeth (Fig. 4; Table 3). One left P^4 or M^1: crown unworn but with roots chewed away by rodents; measurements for the length are at the upper limit for the length of the fourth premolar and the posterior width is below the Observed Range for the first molar. One left P^3 or P^4: roots have been chewed off by rodents and the crown is moderately worn; tooth measurements compare favorably with those listed for P^3. One right P^3 or P^4: crown extensively worn; complete lingual root with some rodent chewing; the two buccal roots are broken off. One right P^3 or P^4: crown extensively worn with the anterior cusp worn flat, roots chewed off by rodents; tooth measurements compare closely with P^4. One left P^4 or M^1 consisting of six fragments: crown extensively worn, roots chewed away by rodents. This tooth was displayed with other vertebrate materials from Bulls Gap but lacked locality data; it is assumed to be from the Bulls Gap locale. Based on the comparative tooth measurements of these five teeth (Table 3), they are identified as *Tapirus* cf. *veroensis*. No data are available concerning the circumstances under which the teeth were recovered. The late Dr. R. Lee Collins, Department of Geology, University of Tennessee, Knoxville, identified these teeth as cf. *Tapirus tennessee*, but they should now be referred to *T.* cf. *veroensis*.

Discussion

The Claiborne Cave tapir skull provides important information on the distribution and cranial morphology of Late Pleistocene eastern North American tapirs. The tooth measurements of this specimen correspond closely to those of *Tapirus veroensis* from Florida, although the broad interparietal table is similar to that described by Simpson (1945) for *T. excelsus*. The combination of *T. veroensis* tooth size with an interparietal table in the Claiborne Cave skull matches the immature specimen of *T. veroensis* described from Texas (Lundelius and Slaughter, 1976). The recovery of this partial skull adds support to the concept advanced by Lundelius and Slaughter (op. cit.) of osteological change in proportion and form of the tapir skull during growth of the animal.

Reconstruction of the ecology and faunal associations of the tapir in the eastern United States is incomplete. However, Simpson has commented that "Recent tapirs occur almost exclusively in tropical rainy and humid mesothermal climates (of Koppen's system), and fossil North American tapirs are found mainly in areas that are now, and probably were when they lived here, humid mesothermal" (Simpson, 1945). Parmalee, Oesch and Guilday (1969) follow up Simpson's comment by suggesting that northern advances of tapirs most likely occurred during a Wisconsian interstadial or during early postgalcial times. The 12 Tennessee fossil tapir localities (Fig 1) all occur within the Ridge and Valley Physiographic Province of East Tennessee (Fenneman, 1936). This province provided suitable habitat for the tapir and probably served as a corridor for its northward movements into Virginia and Pennsylvania. However, tapirs appear to have blanketed eastern United States at the time, including the Piedmont and Coastal Plain, but the paucity of records beyond mountainous areas may be due to a lack of caves—the most abundant source of fossils.

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