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# Large Pleistocene Box Turtle from Southwest Arkansas

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The Red River has been recognized as a source of Pleistocene vertebrate fossils for at least seventy-five years. O.P. Hay (1924) reported an *Equus complicatus* tooth from the vicinity of Shreveport, Louisiana. Hemmings (1982) recognized *Megalonyx jeffersoni*, *Mylohyus nasutus*, *Bison*, and *Mammuth americanum*. Sanders (1994) added *Geochelone* sp., *Holmesina septentrionalis*, and *Palaeolama mirifica*.

Upstream from Garland City, Sanders collected a thick fragment of turtle bone (SAU G.C.1-2) approximately 26 X 48 mm that he tentatively referred to *Terrapene carolina putnami*. The narrow end of SAU G.C.1-2 was originally interpreted as a hinge line, but it is now thought to be a midline suture overlain by the junction of two external scutes. There are seven growth lines parallel to this edge, as might be expected at the junction of two hypoplastra. The bone is 8.7 mm thick at one end of the suture and 6.2 mm at the other end, so it may still be within the size range of *T. c. putnami*. Now, the discovery of an additional specimen, described in this publication, confirms the presence of this large box turtle in southwest Arkansas during the Pleistocene.

One of the authors (JGS) collected a permineralized lower jaw and teeth of a black bear (*Ursus americanus*) near the mouth of the Sulphur River in Miller County, Arkansas, and forwarded it to the Southern Arkansas University archaeology department for evaluation. After a visit to the bear jaw discovery site, an examination of additional artifacts and bones found in southern Miller County resulted in the recognition of an unusually robust turtle bone. It proved to be a right hypoplastron recovered from the right bank of the Red River in the Dixon Bend area (Fig. 1) during July 1998 when the river was at low stage. Mr. Scoggins has generously allowed that specimen to be deposited in the vertebrate paleontology collection of the Shuler Museum of Paleontology at Southern Methodist University under the accession number SMU-75054.

The specimen (Figs. 2 and 3) is "dusky yellowish brown" (10YR 2/2 of the Munsell system, G.S.A., 1991) and has a mass of 74.2 g. Submerged in water, its apparent mass is 40.3 g, indicating an overall density of 2.19 g per cubic cm. Equivalent measurements upon an entire posterior plastron lobe of a Recent *Terrapene carolina triunguis* (specimen A in Table 1) produces equivalent measurements of 18.6 g, 6.7 g for a density of 1.56 g/cc. These two lines of evidence suggest that the specimen can be referred to the

Pleistocene epoch due to the amount of time probably required to achieve its level of permineralization.

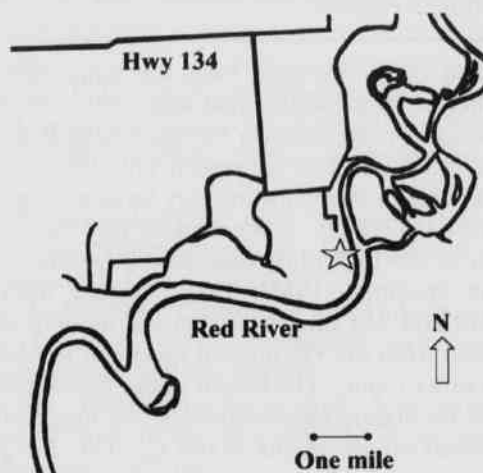


Fig. 1. Map of Red River valley in southeast Miller County, Arkansas. Location where Pleistocene box turtle specimen was recovered is indicated by star. Arkansas Highway 134 connects U.S. Highways 71 and 82.

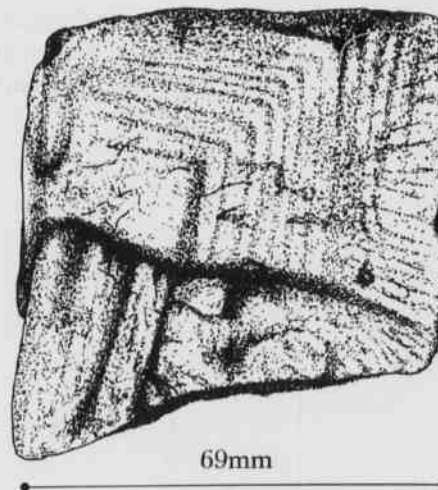


Fig. 2. Ventral view of *Terrapene carolina putnami* right hypoplastron. Anterior hinge line between plastron lobes is at top of figure.

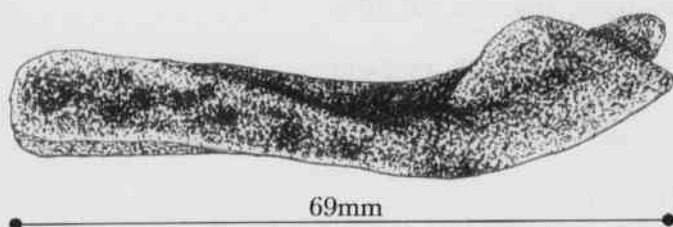


Fig. 3. Posterior view of *Terrapene carolina putnami* right hypoplastron.

The ratio of the distance from the hinge line to the median juncture of the abdominal scute suture divided by the total length of the plastron for specimens B and C in Table 1 are 19.7% and 23.5%, respectively. These ratios are similar to a value of 20.4% for the very large specimen measured by Holman (1965). It is estimated that the total plastron length of the individual represented by the Arkansas Pleistocene specimen (SMU-75054) would have been between 213 and 254 mm, based on the modern animals, with the ratio from the Pleistocene specimen resulting in a prediction of 245 mm. The length of the upper shell carapace would be slightly (approximately 5%) longer than the plastron, based on specimens A and C. The *T. c. putnami* type specimen suggests a total carapace length of 265 mm.

SMU-75054 displays a zone (2.5 X 1.0 cm) in the postero-lateral corner that lacks growth lines. That area represents embryological growth or a loss of the lines due to abra-

sion. There are 14 growth lines on its ventral surface in a distance of 2 cm anteriorly and 4.1 cm medially. Zangerl (1969) has cited this pattern of asymmetry in *Terrapene* growth and states that Cagle (1948) found growth rings can be "successfully used to determine the individual age of specimens... However, the method is applicable only during the most active growing phase of the individual and should be used with caution." All the borders of the Red River specimen appear to be natural separations between bones, indicating that the animal was not old enough to fuse its sutures as it would when it reached adulthood.

The length of time the large box turtle subspecies existed is difficult to determine. The type specimen of *T. c. putnami*, described by Oliver Perry Hay in 1908, is a left hypoplastron, less complete than SMU-75054 in that it is missing the postero-lateral corner. It was dredged from the bottom of the Alifia River in Florida about a mile above its entrance into Tampa Bay by the archaeologist and ethnologist, Professor Frederick W. Putnam. The turtle genera *Trachemys* and *Hesperotestudo*, along with horses and tapirs, were recovered with what was then called *Terrapene putnami*, and the beds were correlated with beds in DeSoto County, Florida, that had been declared to be of "Older Pliocene age," but Hay (1908) recognized "the evidence appears to be contradictory." Auffenberg (1958) declared, "New material indicates that the pieces are almost certainly Pleistocene." *Terrapene carolina putnami* is known from terraces of the Trinity River north of Dallas, Texas (Holman, 1965). These terraces have been referred to the Sangamon Interglacial, which preceded the last, or Wisconsinan, glacial episode. As presently understood, the Sangamon has been dated as

**Table 1. Measurements (in mm) of *Terrapene carolina* plastra and carapaces**

	<i>T.c. putnami</i> SMU-75054 Miller Co., AR	<i>T.c. putnami</i> Lewisville Denton Co., TX	<i>T.c. triunguis</i> Specimen A Washington Co., AR	<i>T.c. triunguis</i> Specimen B Arkansas	<i>T.c. triunguis</i> Specimen C Montgomery Co., MO
hinge line to median juncture of abdominal scute suture	50	55	21.0	25.5	34.7
width of plastron	68.5 x 2	160	62.8	81.4	88.8
length of posterior lobe of plastron		169	60.4	77.1	87.4
total length of plastron	213 to 254 (estimated)	269	anterior lobe missing	129.3	147.6
total length of carapace			104	carapace fragmented	139

extending approximately from 120,000 to 110,000 years ago (Harland *et al.*, 1990). The turtle has also been found in deposits as recent as 12,000 years ago, which makes it contemporary with the Clovis culture of Paleo-Indians (Johnson, 1987).

*Terrapene c. putnami* is found as far west as eastern New Mexico (Johnson, 1987), as far north as Meade County, Kansas, eastward to southern South Carolina (Roth and Laerm, 1980) and is abundantly represented in the fossil deposits of Florida (Auffenberg, 1958; Holman, 1995). The Arkansas specimen therefore falls within this geographic range, but does represent the first verified record of the taxon for the state.

Even though *T. c. putnami* is thought to be extinct in its pure form, it is possible that it left a significant genetic contribution within the extant species, *T. c. major*. If this assumption is correct, "Pleistocene box turtles of the *Terrapene carolina* ssp complex document the intricacies and complexities of the speciation process over a geologically short period of time as much as any fossils have ever done" (Holman, 1995). Therefore, it is hoped that documentation of this specimen may contribute to a wider understanding of the spatial relationships between various units of this complex species in time and space.

**ACKNOWLEDGMENTS.**—The authors wish to acknowledge the skill of Roger Hinton of the Southern Arkansas University Department of Art for the preparation of Figures Two and Three. Figure One was drafted by John Scoggins, based on the Road Number Map of Miller County, Arkansas, prepared by the Arkansas State Highway and Transportation Department Planning Division in cooperation with the U.S. Department of Transportation, Federal Highway Administration. The continued interest and support of Mrs. Nelene Harris of the Fouke, Arkansas, high school science department has moved this project forward.

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