ON THE IDENTIFICATION OF EMYDID *(REPTILIA: TESTUDINES)* SHELL BONES IN THE PLEISTOCENE OF BRITAIN

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INTRODUCTION

Stuart (1979) identified the European pond tortoise *(Emys orbicularis)* in many British Pleistocene localities, mainly on the basis of individual shell bones. But he did not explain how the *E. orbicularis* bones were distinguished from its emydid relative, the striped-necked terrapin, *Mauremys caspica leprosa*. I believe that *M. c. leprosa* could have also existed in the British Pleistocene because it coexists (Escriva, 1987) with the presently exotic British Pleistocene species *Pelodytes punctatus, Hyla arborea, Hyla meridionalis* and *Elaphe longissima* (Holman, 1992, 1993, 1994; Ashton et al., 1994) in eastern Spain.

In 1986, I was able to study many of Stuart's British Pleistocene chelonian specimens in the Zoology Museum at Cambridge and agree that the bones all represent *E. orbicularis*. Nevertheless, I believe it is important to point out characters that distinguish shell bones of these species, especially given the possibility that *Mauremys* bones might be found someday in the British Pleistocene.

In 1992, I was able to study individual shell bones from several specimens of *Emys orbicularis* and *Mauremys caspica leprosa* in the Museo National de Ciencias Naturales, Madrid, Spain. Diagnostic bones were sketched there and form the subject of this paper. Turtle shell bone terminology follows Zangerl (1969) and vernacular and scientific names of the two species follow King and Burke, 1989).

DIAGNOSTIC CARAPACIAL BONES
(Fig. 1)

Nuchal bone. The nuchal bone, the most anterior of the median bones of the carapace, is quite diagnostic in dorsal view. In *E. orbicularis* it is wider than long, anteriorly truncated, and has a cervical scute impression that is less than one-third the length of the bone (Fig. 1A). In *M. c. leprosa* it is about as wide as long, not anteriorly truncated, and has a cervical scute impression that is more than one-third the length of the bone (Fig. 1B).

Third and fourth neural bones. In *E. orbicularis,* in dorsal view, the third neural bone is crossed horizontally by the edge of the vertebral scute impression very near the posterior edge of the bone (Fig. 1C). In *M. c. leprosa,* in dorsal view, it is crossed horizontally by the edge of the vertebral scute impression at about the middle of the bone (Fig. 1D). In *E. obicularis* the fourth neural bone is longer than wide (Fig. 1E). In *M. c. leprosa* it is much wider than long (Fig. 1F).

Suprapygal and pygal bones. These are the most posterior median bones of the carapace. In *E. orbicularis,* in dorsal view, the pygal and suprapygal bones are smooth. In *M. c. leprosa,* in dorsal, view, the suprapygal and pygal bones have a wide, irregular keel.

PLASTRAL BONES
(Figs. 2 and 3)

Hinged plastron. A plastral hinge occurs in *E. orbicularis* and is lacking in *M. c. leprosa.* Evidence of the hinge may be seen in the individual hyo and hypoplastral bones of *E. orbicularis* which are smooth and slightly grooved along the hinge line (Fig. 2) rather than having the dove-tailed sutures of *M. c. leprosa.*

Epiplastra. These are the most anterior paired bones of the plastron. In dorsal view, the epiplastral tubercle of *E. orbicularis* (Fig. 3A) is more weakly developed than that of *M. c. leprosa* (Fig. 3B).

Entoplastron. This is the only unpaired bone in the plastra of these turtles and it lies in the anterior one-half of the shell. In dorsal view, in *E. orbicularis* it is rounded and has a long posteriorly extending spike (Fig. 3C), whereas in *M. c. leprosa* the spike is very short and confined to the dorsal surface of the bone (Fig. 3D).

Hypoplastra. In *E. orbicularis,* in dorsal view, the inguinal scute impression is wide and subtriangular (Fig. 3E), whereas in *M. c. leprosa* it is elongate and narrow (Fig. 3F). Moreover, the hypoplastral bone of *E. orbicularis* is wider than in *M. c. leprosa.*

Xiphiplastra. The xiphiplastra are the most posterior paired bones of the plastron. In *E. orbicularis* the articulated xiphiplastra form a shallow xiphiplastral notch (Fig. 3G), whereas in *M. c. leprosa* the articulated xiphiplastra form a deeper xiphiplastral notch (Fig. 3H).
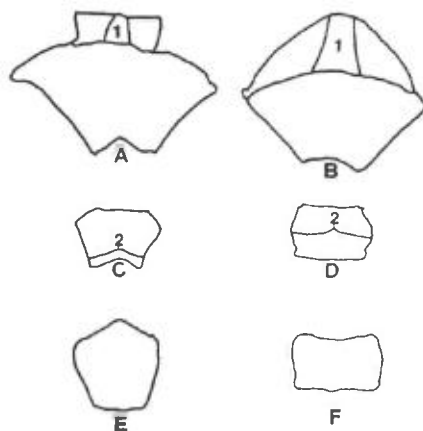

Fig 1. Carapacial bones (in dorsal view) of *Emys orbicularis* and *Mauremys caspica leprosa.* A, nuchal bone of *E. orbicularis;* B, nuchal bone of *M. c. leprosa;* C, third neural bone of *E. orbicularis;* D, third neural bone of *M. c. leprosa;* E fourth neural bone of *E. orbicularis;* F, fourth neural bone of *M. c. leprosa.* Key to numbers: 1, cervical scute impression; 2, edge of vertebral scute impression.

SUMMARY

Pleistocene chelonian remains in Britain mainly occur as individual shell bones. At present, all of these bones appear to represent the European pond tortoise, *Emys orbicularis.* Nevertheless, considering the modern distribution of some exotic British Pleistocene herpetofauna, it seems possible that the Mediterranean pond terrapin, *Mauremys caspica leprosa,* could have occurred in the British Pleistocene. Thus, a discussion of diagnostic shell bones in the two species has been presented.
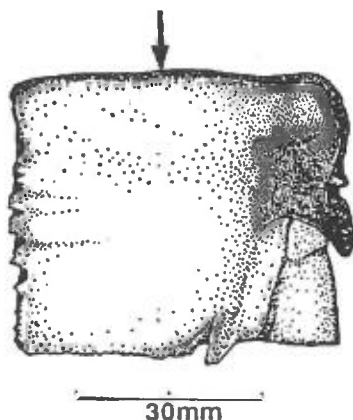
ACKNOWLEDGEMENTS

30mm

Fig 2. Right hypoplastral bone (in dorsal view) of fossil *Emys orbicularis* from the late Pleistocene of Shropham, England, showing the smooth, slightly grooved surface along the hinge line (end of arrow).
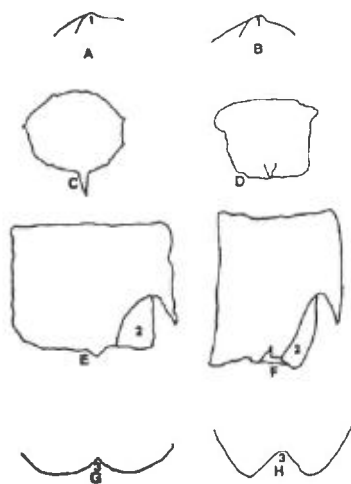

Fig. 3. Plastral bones (in dorsal view) of *Emys orbicularis* and *Mauremys caspica leprosa*. A, tubercular portion of left epiplastron of *E. orbicularis;* B, tubercular portion of left epiplastron of *M. c. leprosa;* C, entoplastron of *E. orbicularis;* D, entoplastron of *M. c. leprosa;* E, right hypoplastron of *E. orbicularis;* F, right hypoplastron of *M. c. leprosa;* G, fused xiphiplastra of *E. orbicularis;* H, fused xiphiplastra of *M. c. leprosa*. Key to numbers: 1, epiplastral tubercle; 2, inguinal scute impression; 3, xiphiplastral notch.

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