

DESCRIPTION OF TWO SPECIES OF FOSSIL TURTLES,
TOXOCHELYS STENOPORA AND CHISTERNON? IN-
TERPOSITUM, THE LATTER HITHERTO UNKNOWN.

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The thanks of the writer are due to the officers of the United States National Museum for the opportunity to describe and illustrate the materials which represent the two species of fossil turtles which form the subject of the present paper.

TOXOCHELYS STENOPORA Hay.

The remains of this species which are here described were obtained from Mr. C. M. Sternberg, of Lawrence, Kansas, in the Niobrara beds along Butte Creek, Logan County, Kansas.

The catalogue number in the U. S. National Museum is 6013. The specimen presents a large part of the bones of a single individual, but in a considerably disturbed condition. Plate 5 shows the position of the various bones after the removal of the matrix that overlay them. Apparently all the bones of the skull are present, but to a considerable extent separated from one another. Very few vertebræ have been preserved. The elements of the carapace have mostly been displaced; those of the plastron to a less extent. The pelvis is missing, as well as most of the bones of the hinder limbs.

The specimen is identified as *Toxochelys stenopora*, but there are not wanting some discordant characters.

The individual was a small one. The carapace had an estimated length^a of 160 mm. and a width of 167 mm. The width is indicated by some undisturbed right and left peripherals and by the elements of the plastron. The carapace is relatively broader than that of *T. bauri* Wieland.

The front of the skull, including the maxillæ, the vomer, the palatines, and the prefrontals, lay on the slab so as to present the palatal surface (Plate 5, 1). On being removed and cleared from matrix it shows the nasal opening and the anterior half of the orbits. The nasal opening is small, being narrow, as in the type of the species.^a Its width is 5 mm., its height is 7.5 mm., but this has evidently been

^a Hay, Fossil Turtles of North America, p. 172, fig. 217.

reduced by some downward crushing of the prefrontal bones. The orbit seems to have had a fore-and-aft diameter of about 17.5 mm. The width of the interorbital space is 11 mm. A comparison of the snout of this specimen (Plate 5, 1) with that of the type-specimen will show that that of the latter was considerably blunter. This may be due to the greater age of the type-specimen, to sex, or possibly to a difference of species.

On the plate the numeral 8 is placed on what seems to be the outer surface of the left quadratojugal; numeral 9 is on the inner surface of the left jugal. The numeral 10 is on the inner surface of the right jugal, partly covered by a costal plate. The left postorbital, 4, presents its inner surface and lies against the left parietal, but not in the natural relation of the two bones. The numeral 5 is on the outer surface of the right parietal. The inner surface of the right post-frontal, 11, is shown. Attached to its hinder end, apparently in its original place, is the right quadratojugal. The numeral 7 is on the inner surface of the left squamosal. The supraoccipital, 6, has its hinder end directed upward on the plate. It did not have the great height that the same bone of the type had.^a The left opisthotic, joined to the corresponding prootic, presents its upper surface, 2. Through the wrenching of the supraoccipital from its place, the brain cavity has been exposed, and is seen just above and a little to the right of the numeral 2. The pterygoids are seen in position in front of the brain cavity.

The lower jaw, 3, has been little removed from the position occupied by the skull at the death of the animal. The upper surface of the jaw is exposed to view. The lower jaw greatly resembles that of the type of the species,^b including the section of the symphysis.

The skull appears to have had a length, from snout to occipital condyle, of nearly 55 mm. One of the ceratohyal bones is seen at the hinder end of the left ramus of the lower jaw.

The structure of the carapace can not be completely determined. Its hinder portion is missing. The nuchal, 18, has the form of that of *T. latiremis*, as figured by Case.^c It is quite different from that of *T. bauri* Wieland.^d

On the left side of the carapace there is a series of eight peripherals, 19-26, in their natural relations. It is pretty certain that the anterior one, 19, is the first. The anterior five of the right side are present, 35, 36, 27, 28, 29. The first of the right side and that of the left are separated by a distance equal to the width of the nuchal. The third peripheral on each side, 21 and 27, contains a pit for the end of a rib. Other peripherals, 30, 31, 32, and 34, have been washed forward

^a Hay, Fossil Turtles of North America, fig. 219.

^b Idem, fig. 214.

^c Univ. Geol. Surv. Kansas. IV, pl. 82, fig. 3.

^d Fossil Turtles of North America, fig. 229.

from their original positions in the skeleton. The pygal is not present.

A few neural bones are present, 12-16. These show that there was a sharp keel running along the middle of the carapace. The number 17 is placed at the side of an ossicle that had a position across the suture between two of the neurals, as in other species of the genus.

Several of the costal plates are present, but some are missing. They have the form usual in the genus, the distal half being very narrow, 37-39, 41-47, 53.

The plastron is present, except the left epiplastron and probably the right xiphiplastron, but the various bones have been slightly disturbed. The front of the plastron was covered with other bones in a way to hide it, and some of these had to be lifted temporarily.

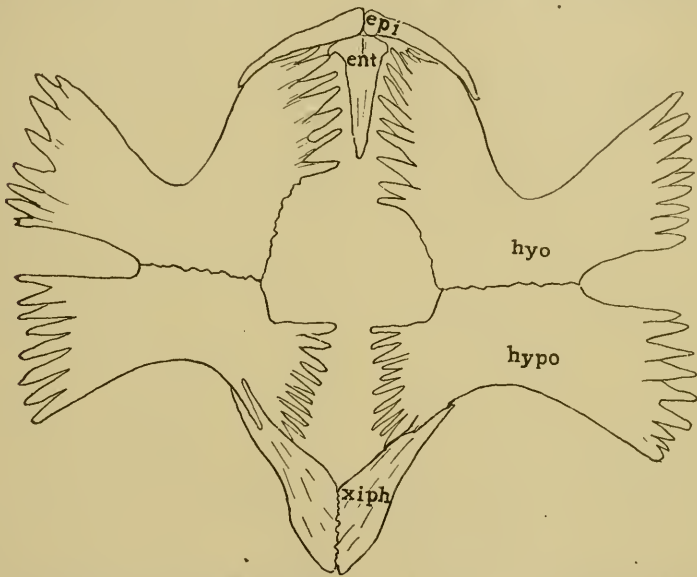


FIG. 1.—*TOXOCHELYS STENOPORA*. PLASTRON. $\times \frac{3}{8}$. *ent*, ENTOPLASTRON; *epi*, EPIPLASTRON; *hyo*, HYOPLASTRON; *hypo*, HYOPLASTRON; *xiph*, XIPHIPLASTRON.

As accurately as possible, the plastron has been restored in fig. 1. The epiplastra and the entoplastron have not, so far as known to the writer, been hitherto observed. Each epiplastron is a narrow, curved bone 33 mm. long, whose blunt anterior end joins its fellow. These bones were not prolonged forward as they are in *Chelydra* and the *Cheloniidæ*. The entoplastron is a spear-shaped bone, close to 10 mm. wide in front and narrowing posteriorly to a blunt point.

The other bones of the plastron resemble closely those of the type of the species.^a The bridges have a width of 38 mm., which is equally divided between the hyoplastron and the hypo-plastron. The xiphi-

^a Fossil Turtles of North America, fig. 220.

plastron is 40 mm. long and 11 mm. wide. The hyoplastron and the hypoplastron of the one side seem not to have come into contact with those of the other. There is a large umbilical fontanel.

The scapulae, 56, 57 are both present. The right coracoid, 54, is 27 mm. long. The humeri, 55, 58, are each 27 mm. long. The head of that of the right side appears behind a costal, 47, that of the left humerus behind another costal, 39. The left radius and ulna are seen between the scapula, 56, and the humerus, 58. Some fore-foot bones appear in front of the peripherals bearing the numbers 20 and 21. A phalanx, probably of the first digit, extends from the lower jaw, 3, to the right parietal, 5.

CHISTERNON? INTERPOSITUM, new species.

The single known specimen of this species was collected during the summer of 1908 by Mr. C. F. Kay, of the U. S. Geological Survey, in the Livingston coal field of Montana. The formation is the Fort Union. The more exact locality is given as T. 5 S., R. 19 E. This is in Carbon County, about 10 or 15 miles west of north of Red Lodge, and on or near some of the sources of Red Lodge Creek. The catalogue number of this specimen in the U. S. National Museum is 6058.

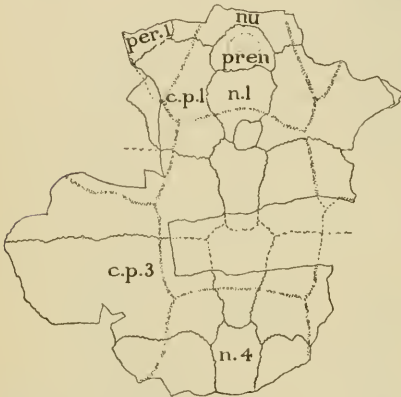


FIG. 2.—CHISTERNON? INTERPOSITUM. PART OF CARAPACE. $\times \frac{1}{3}$. c. p. 1, FIRST COSTAL PLATE; c. p. 3, THIRD COSTAL PLATE; n. 1, FIRST NEURAL PLATE; n. 4, FOURTH NEURAL PLATE; per. 1, FIRST PERIPHERAL; pren, PRENEURAL BONE.

The individual is represented by parts of the anterior two-thirds of both the carapace and the plastron. Such parts as can be fitted together are represented by figs. 2 and 3. The other fragments throw little light on the characters of the species. The sutures between the various bones remained open during life, and may now be followed without difficulty.

The species is referred with some doubt to the genus *Chisternon*, hitherto known only from the Bridger. It possibly belongs to *Boremys* Lambe, known hitherto only from the Belly River beds of Alberta, British America. As in both genera, there is present a preneural bone. In *Boremys* there are supramarginal scutes, in *Chisternon* none. It is possible that in this Fort Union species there were such scutes, but there is little on which to found an opinion. The distal extremity of one costal is present, and this shows no indications of any sulcus crossing it.

The individual was a rather large one, the width having been about 300 mm. The length may have been somewhat greater.

The nuchal bone is broad, about 55 mm., and is more like that of *Boremys* than it is like that of *Chisternon*.^a The preneural is intermediate in size between that of each of the genera just named, being 18 mm. along the midline, 24 mm. transversely. The first neural is pyriform, 32 mm. long, 26 mm. wide. A part of the posterior end appears as a small separate bone. Each of the three succeeding neurals has a part missing, making its length somewhat doubtful. On the underside of each first costal there is a thickening which joined the axillary buttress. Fragments show that these buttresses were strongly developed.

The first vertebral scute is narrow in front, expanding backward to 60 mm. On each side of it there is a small supernumerary scute. The second vertebral scute is 70 mm. long and 66 mm. wide. Only a part of the third vertebral is represented. In the center of the preneural there is a small flattened ring, as if there had been here a small scute; but the ring is not connected with other sulci. The preneural is not crossed by a sulcus subdividing the first vertebral scute, the latter resembling thus that of *Boremys*.

The plastron furnishes us with knowledge of all essential parts, except the hinder lobe. The length of the anterior lobe is 70 mm., its width about 100 mm. At each end of the gulo humeral sulcus there is a rather deep notch. The entoplastron is 25 mm. long and 19 mm. wide. The mesoplastra are only about 7 mm. wide at the midline, but they expand to 63 mm. where they join the bridge peripherals. There are small intergulars and rather large gulars, the latter joining along the midline 21 mm. The humerals measure along the midline 40 mm.; the pectorals, 63 mm.; the abdominals, 30 mm. These measurements agree more closely with those of *Boremys pulchra* than with those of either of the species of *Chisternon*.

On the left bridge, the only one represented in the specimen, there are shown three inframarginal scutes; but there was evidently another in front of the anterior of the three.

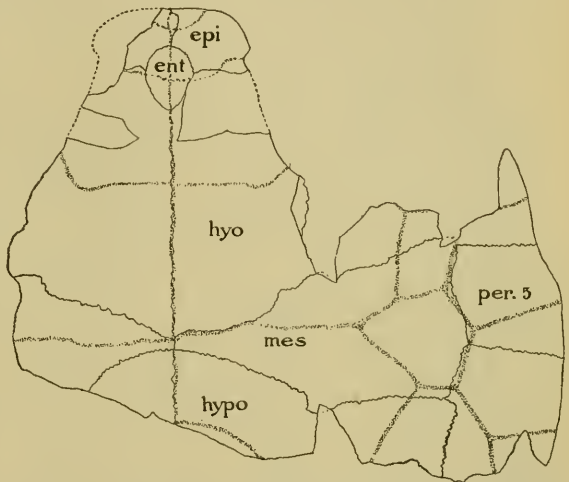


FIG. 3.—CHISTERNON? INTERPOSITUM. PART OF PLASTRON. $\times \frac{1}{3}$. ent, ENTOPLASTRON; epi, EPIPLASTRON; hyo, HYOPLASTRON; hypo, HYOPLASTRON; mes, MESOPLASTRON; per. 5, FIFTH PERIPHERAL.

^a Fossil Turtles of North America, figs. 72, 76, and 88.

EXPLANATION OF PLATE 5.

1. Palatal surface of the front of the skull.
 2. Left paroccipital. Above and to the left of the numeral is the protic; above and to the right is the basisphenoid.
 3. Dentary bones, showing the triturating surfaces. The hinder end of the left dentary lies against one of the ceratohyals. The upper end of this ceratohyal lies against the left pterygoid. The right pterygoid touches the hinder end of the right dentary.
 4. Left postfrontal, inner surface. Below it lies the left parietal, showing the outer face. The descending process is directed upward and toward the right.
 5. Right parietal, inner surface. The descending process is directed downward.
 6. Supraoccipital, with the posterior process directed upward.
 7. Left squamosal, inner face.
 8. Left quadratojugal.
 9. Left jugal, inner surface. Orbital surface on the left and looking downward.
 10. Right jugal, inner surface. Orbital surface on the right and looking downward.
 11. Right postfrontal, inner surface, hinder end upward. Above it and apparently in natural relation to it is the right quadratojugal.
 12. A neural bone, with the median ridge toward the left.
 13. Part of a neural.
 14. A large neural, showing its inferior face.
 15. A short neural, the numeral on the median ridge.
 16. A neural.
 17. An ossicle that occupied a position across the suture between two neurals.
 18. The nuchal bone, upper surface.
 - 19-26. Peripheral bones, first to eighth of the left side.
 - 27-29. Peripheral bones, third to fifth of right side.
 - 30-34. Peripherals, all probably of right side.
 - 35, 36. First and second peripherals of right side.
 - 37-39. Costal bones.
 40. Right epiplastron.
 - 41-47. Costal bones.
 48. Left hyoplastron.
 49. Left hypoplastron.
 50. Right hypoplastron.
 51. Left xiphiplastron.
 52. Right hyoplastron.
 53. A short costal bone.
 54. Right coracoid, its left end lying on the right hyoplastron.
 55. Right humerus, its proximal end showing behind the numeral 47.
 56. Left scapula, the shaft directed upward, the procoracoid process to the right.
 57. Right scapula, the shaft passing under that of the left scapula, the procoracoid process directed backward.
 58. Left humerus, the proximal end passing backward under costal numbered 39.
- Above the numeral 54 there is seen a slender bone whose head is toward the left. This seems to be one of the reduced first ribs. The head of this bone lies against the entoplastron. The anterior end of the latter bone is overlain by the extremity of the procoracoid process of the right scapula, 57.



SKELETON OF TOXOCHELYS STENOPIORA. $\times \frac{1}{2}$.

FOR EXPLANATION OF PLATE SEE PAGE 196.

