

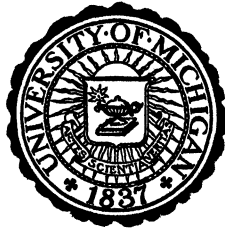
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A SPECIMEN OF *STYLEMYS NEBRASCENSIS*
LEIDY, WITH THE SKULL PRESERVED

BY
E. C. CASE



UNIVERSITY OF MICHIGAN
ANN ARBOR

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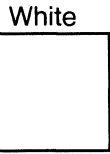
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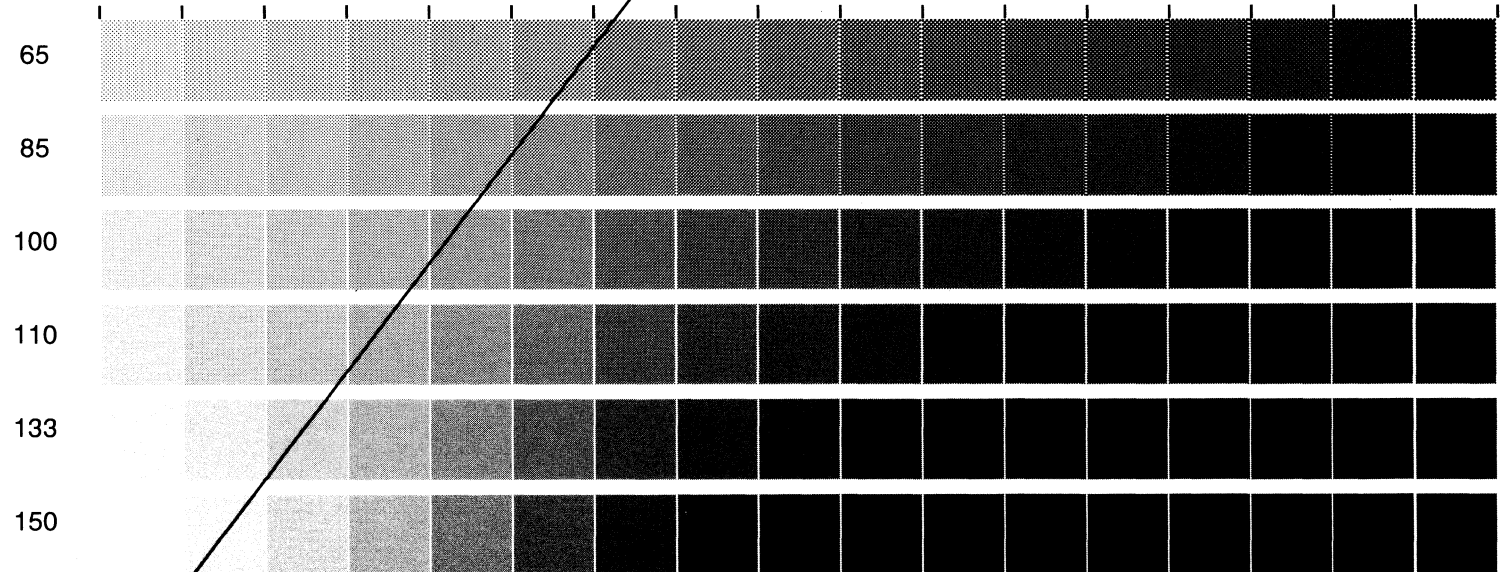
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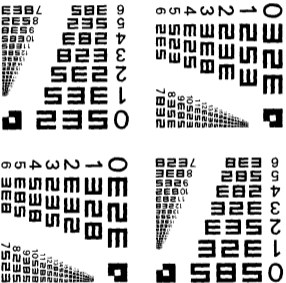
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CONTRIBUTIONS FROM THE MUSEUM OF GEOLOGY

UNIVERSITY OF MICHIGAN

Editor: EUGENE S. McCARTNEY

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ERRATUM

On the cover of the third paper of Volume II the page numbers were erroneously given as 19-120 instead of 19-86.

A SPECIMEN OF *STYLEMYS NEBRASCENSIS* LEIDY, WITH THE SKULL PRESERVED

E. C. CASE

THE expedition from the Geological Museum of the University of Michigan to Montana and Wyoming in the summer of 1924 recovered from a small patch of Oligocene clay on Hat Creek, a tributary of Old Woman Creek, in Niobrara County, Wyoming, a large part of the skeleton of a small turtle of the genus *Stylemys*, and apparently of the species *S. nebrascensis*. The interest of the specimen centers primarily in the presence of the skull and the cervical vertebrae, although much of the rest of the skeleton is present — the carapace, partly complete; the plastron, complete; the pelvic girdle, complete; the thoracic girdle, complete on the right side; both femora, both humeri and parts of the lower limb bones.

In his *Catalogue of the Fossil Turtles of North America* (Publication Number 75 of the Carnegie Institution of Washington), Hay lists but two skulls, one not associated with any other parts, and one of a small individual, associated with enough of the carapace to insure its identity. The skull figured by Hay does not show all the sutures and those shown do not all agree with the one here described. The present specimen, Number 9318 of the University of Michigan collection, has the skull perfect except for the left squamosal bone, which was found detached and slightly injured.

The *upper surface* of the skull (Fig. 1) is very similar to that of the skull figured by Hay, Figure 488, p. 389, of his *Catalogue*, except for a greater bluntness of the anterior end due to a slight incrusting of the premaxillaries.

The *lateral surface* (Fig. 2) does not show the premaxillary-maxillary suture; the nasal-frontal suture is nearer the poste-

rior than the anterior edge of the orbit; the jugal-postorbital suture is about opposite the middle of the posterior border of the orbit; the jugal-maxillary suture is on a level with the lower border of the orbit. In outline the jugal is very different from that of the Gopher turtle which Hay cites as the most similar

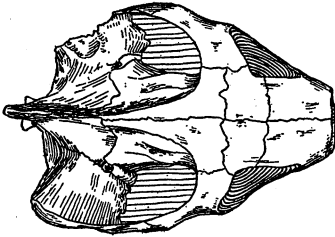


FIG. 1. Upper view of the skull. $\times 1$

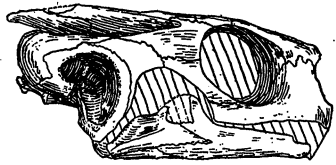


FIG. 2. Lateral view of the skull. $\times 2$

to *Stylemys* among living forms. In the former the jugal is a nearly oval plate which takes very little part in the posterior border of the orbit as it articulates with the posterior edge of a rising process of the maxillary, which nearly joins a descending process from the anterior edge of the postorbital. Hay's figure shows this suture running directly downward from a point opposite the center of the orbit and dividing the cutting edge of the jaw into an anterior, maxillary portion and a posterior, jugal portion. The author of this paper can only consider this as an unfortunate misinterpretation of the specimen by Hay.

The postorbital sends a process backward forming the upper edge of the temporal bar; it touches a similar anterior extension of the squamosal, just, and only just, excluding the quadrato-jugal from any part in the upper edge of the bar.

The quadrato-jugal joins both the postorbital and the jugal anteriorly and rises so far in the bar as to form the major portion of its posterior half.

The lower edge of the squamosal is somewhat broken, but occupies the usual position. The posterior portion is more swollen than in the specimen figured by Hay and there is not the sharp angulation at the lower posterior corner.

The quadrate has the stapedia groove completely closed. The cavity has been cleaned out and presents a very interesting appearance, radically different from that of *Gopherus*. The anterior part of the cavity is relatively shallow for a short distance; then there is a deepening which forms a cavity extending forward and inward; the posterior border of this cavity is formed by a sharp and narrow projection from the inner wall of the quadrate, which runs downward and forward towards the stapedia foramen; a slight fracture breaks the continuity of the lower end of the projection; behind it the cavity extends into the squamosal bone. A somewhat similar projection occurs in *Chelydra*, but it is entirely anterior to the stapedia foramen and there is no indication of the anterior cavity.

The lower surface (Fig. 3) conforms in most particulars to the condition found in *Gopherus* and illustrated by Hay for *Stylemys*, but there are one or two important differences. The stapedia groove is definitely closed and the closure is reinforced by the development of a reflected portion of the quadrate, resembling the development of the callus over the umbilical opening of some gastropods. The ophisthotic is distinctly separate on the lower surface and ends in a free distal surface sharply marked off from the squamosal. The pterygoids meet the vomer and the palatines in a horizontal suture, but the pterygoids are visible external to the palatines for a considerable distance forward; this is the condition figured by Hay for *Testudo impensa* (Fig. 567, p. 432) and *Testudo osborniana* (Fig. 553, p. 423). The palate is deeply arched; the lower jaws are tightly set in position and prevent any view of the triturating surface.

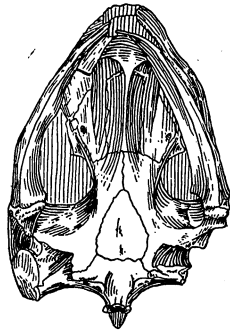


FIG. 3. Lower view of the skull. $\times 1$

The posterior surface shows that the articular face of the condyle is decidedly concave and sharply tripartite.

Measurements of the skull:

Length from extremity of condyle to anterior end	41.5 mm.
Width across quadrates at the articular surface	29
Central part of postorbital bar to anterior end	19
From the same point to extremity of the condyle	21
Width of the postorbital bar	2.5
Width of the temporal bar	5.2
Width of interorbital space	11.4
Antero-posterior diameter of orbit	11.5
Vertical diameter of orbit	10.6
Width of pedical of quadrate	5

The *cervical vertebrae* (Fig. 4) are preserved nearly complete from the second to the sixth, with a fragment of the seventh. The author has described and figured the fourth to the eighth

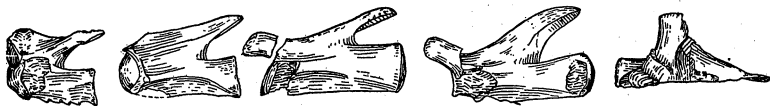


FIG. 4. Lateral view of the cervical vertebrae, numbers 2 to 6. $\times 1$

cervicals in a much larger specimen (*American Journal of Science*, Vol. XLVII, pp. 435 - 438, 1919) of the same genus and species, so that the entire series with the exception of the atlas is now known. In the present specimen the sixth has the characteristic vertical anterior zygapophyses which makes it possible to place the others, as they are preserved in a continuous series. The neural spine of the axis has a well-defined pit near the anterior extremity, apparently for the attachment of a ligament. The form of the various vertebrae is shown in Figure 4.

The *pelvis* is preserved complete with the exception of the extreme distal ends of the ilia. The ventral view is shown in Figure 5. In lateral view it closely resembles the pelvis of *Testudo vaga* figured by Hay (Fig. 545, p. 416) except that the ischium appears to lie more nearly at a right angle to the line of ilium-pubis. The ischia and pubes are not united at the symphysis and the posterior ends of the ischia are not so heavy as described by the author for the larger specimen; this may be merely a character of age.

The femora and humeri correspond very closely to the figures

given by Hay if due allowance is made for the difference in size and probable age.

The scapula of the right side is complete (Fig. 6). It is slightly more open than that figured by Hay for *Testudo vaga* (Fig. 541,

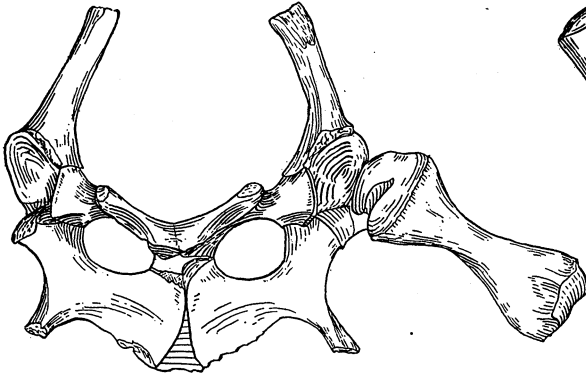


FIG. 5. Lower view of the pelvis with the right humerus in position. $\times 1$



FIG. 6. Right scapula-coracoid. $\times 1$

p. 416). The procoracoidal portion is 32.5 mm. long, measured from the center of the glenoid cavity, and the vertebral portion is 47.5 mm. long, measured from the same place. The shaft of the vertebral portion is slightly flattened and then gradually expanded to the nearly oval distal extremity.

The coracoid of neither side is complete, one having lost the distal end and the other a portion from the middle of the shaft (Fig. 7). It is apparent, however, that the distal end was much less expanded than in *Testudo vaga* as figured by Hay (Fig. 542, p. 416). As nearly as can be estimated the total length of the bone was 30 mm.



FIG. 7. Right coracoid. $\times 1$

A single phalange shows that the foot was broad and short, but strongly built. The phalange is 4 mm. broad and 3 mm. long.

