

# ON THE REMAINS OF A TURTLE FROM CHOUK'OUTIEN

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The specimen brought to me for study consists of several fragments of the carapace and plastron of a turtle collected by Mr. W. C. Pei of the Geological Survey of China, from Chouk'outien about 40 miles south of Peking. After all the fragments have been cemented together, the carapace still remains in two separate pieces, while the plastron is almost complete. The characters, which these remains show, indicate this form to belong to the family *Emyidae*, and in certain respects allied to the genus *Echmatemys* Hay. Close examination reveals, however, that both the generic and specific characters of this form are different from any of those on record. Hence the following name is proposed for it.

Genus POLYECHMATEMYS Ping, (gen. nov.)

Shell moderately elevated, nuchal plate somewhat hexagonal, neural plates comparatively wide on the average, greatest width either much exceeding or about equal to greatest length. First neural missing, second and third hexagonal, each with anterior margin about equal to the lateral; fourth missing. The following four are also hexagonal, each with the anterior margin much longer than the lateral, with very slight traces of dorsal keels on the last few neurals. Inner and outer extremities of each costal about equal. Plastron long, with lateral portions of hyoplastron and hypoplastron extended latero-dorsally, indicating a broad bridge in connection with the carapace. Entoplastron with posterior third overlapped by pectoral scutes. Plastron broadly notched behind. Both axillary and inguinal buttresses well developed.

GENOTYPE: *Polyechmatemys pekinensis*.

HORIZON: From the Polycene Formation of Hopei (Chihli) Province.

*Polyechmatemys pekinensis* Ping (sp. nov.)

Nuchal plate somewhat hexagonal, anterior border slightly concave, little less than twice as long as posterior, posterior border more concave than anterior, antero-lateral about equal to anterior in length, postero-lateral shorter than antero-lateral, maximal width greater than maximal length. Anterior border

acute-edged, the bone increasing in thickness posteriorly. This state of affairs is well shown on the under side of the bone. Along the median line of the bone the thickness gradually increases for about 10 mm. from the anterior border, then a depression appears, and it suddenly decreases in thickness. The thickening extends latero-posteriorly at first with a gradual decrease, and then with a sudden decrease, thus producing a marked concavity in the posterior half of the bone.

Only six neural plates were found, these probably being the second, third, fifth, sixth, seventh and eighth, all hexagonal; antero-lateral margin of each shortest. Anterior border of second and third slightly concave, posterior border slightly convex. Fifth plate with its anterior and posterior borders less curved. Sixth plate with its anterior border very slightly concave and its posterior straight. Seventh and eighth with both anterior and posterior borders straight. Anterior border of second and third neurals slightly shorter than the posterior, that of the fifth and sixth about equal to the posterior and those of seventh and eighth longer than the posterior.

Measurements of Nuchal and Neural Plates (in mm.)

|           | Length along median line | Length along borders |        | Width along anterior borders |
|-----------|--------------------------|----------------------|--------|------------------------------|
|           |                          | Right                | Left   |                              |
| Nuchal    | 29.0 +                   | 31.2                 | 31.4   | 23.4                         |
| Neural-II | 14.6                     | 13.5                 | 14.0   | 14.3                         |
| III       | 16.3                     | 16.3                 | 16.3   | 15.4                         |
| V         | 14.3                     | 14.5 +               | -----  | -----                        |
| VI        | 10.0                     | 10.0 ±               | 10.5 ± | 19.3                         |
| VII       | 9.1                      | 10.0                 | 9.5    | 19.8                         |
| VIII      | 10.0                     | 9.4                  | 9.4    | 17.6                         |

First costal plates not well preserved. Second almost rectangular in outline, its medial and lateral extremities about equal in length, anterior border slightly concave and posterior slightly concave near its medial extremity and then slightly convex in the remaining part. Third with its medial extremity longer than its lateral, anterior and posterior borders slightly concave,

Fourth with its medial and lateral extremities about equal in length, anterior border slightly convex and posterior slightly concave. Fifth with its medial extremity slightly shorter than its lateral, anterior border slightly convex and posterior comparatively concave. Sixth with its medial extremity shorter than its lateral, and its anterior border convex and posterior concave. Seventh and eighth are not preserved.

Measurements of Costal Plates (in mm.)

|          | Length of extremity |            | Width  |
|----------|---------------------|------------|--------|
|          | Medial              | Peripheral |        |
| Costal I | -----               | -----      | -----  |
| II right | 14.1                | 13.6 $\pm$ | 46.4   |
| III ..   | 16.4                | 15.0       | 48.0   |
| IV ..    | 15.6 $\pm$          | 15.0 $\pm$ | 49.0   |
| V ..     | 14.0 $\pm$          | 16.1       | 47.0   |
| VI ..    | 16.0                | 15.0       | 42.0 + |

The marginal plates of the left side are preserved in a smaller part of the carapace which can not be fitted with the larger part, because of missing portions. They are the first five. Those of the right side are the second to the eighth inclusive. The shapes of these preserved plates can be made out from the two separate pieces of the carapace.

First marginal plate with outer border acute, its thickness gradually increasing inward, and its outer border much longer than its inner. Second also with outer border acute, thickness gradually increasing inward at its antero-lateral half but more suddenly toward its postero-lateral half and its outer border longer than its inner. Third greatly thickened, its outer border little longer than its inner. Fourth and fifth similar in outline, each with its outer and inner border of equal length. Sixth, seventh and eighth all similar in outline, particularly the former two, outer border slightly longer than inner. Outer borders of fourth, fifth and sixth marginals, posterior part of the outer border of the third, and anterior part of the seventh, with their distal portions extending ventrally, but their extremities not well preserved. Seventh

with outer border thickened at its anterior half, and gradually becoming acute posteriorly. Eighth with outer border acute, its thickness gradually increasing inward. This is true likewise of the posterior half of the seventh.

Measurement of Marginal Plates (in mm.)

|             | Length along<br>medial border | Length along<br>peripheral<br>border |            | Length along<br>medial border | Length along<br>peripheral<br>border |
|-------------|-------------------------------|--------------------------------------|------------|-------------------------------|--------------------------------------|
| Marginal-I. |                               |                                      | Marginal-V |                               |                                      |
| Left        | 11.0 $\pm$                    | 20.0                                 | Right      | 15.8                          | 16.5                                 |
| II.         |                               |                                      | Left       | 15.0 $\pm$                    | 16.7                                 |
| Right       | 12.5 $\pm$                    | 19.5 $\pm$                           | VII        |                               |                                      |
| Left        | 12.8                          | 19.5 $\pm$                           | Right      | 16.4                          | 19.2                                 |
| III.        |                               |                                      | VII        |                               |                                      |
| Right       | 12.8 $\pm$                    | 18.8                                 | Right      | 15.0                          | 19.0                                 |
| Left        | 12.0 +                        | 18.5 $\pm$                           |            |                               |                                      |
| IV.         |                               |                                      | VIII       |                               |                                      |
| Right       | 17.0 $\pm$                    | 17.0                                 | Right      | 14.4                          | 18.0                                 |
| Left        | 17.0 $\pm$                    | 7.0                                  |            |                               |                                      |

The plastron is better preserved and most of the bony sutures can be recognized from its outer and inner surfaces. Epiplastron somewhat fan-shaped, outer border convex and inner border concave, the former longer than the latter. Its inner surface with a great deal of unevenness: a thickened portion extending inward from the middle of the outer border and its medial border also thickened in like manner, thus making a concavity between the two thickened regions. A depression extends across the middle of the epiplastron, dividing it into an outer and an inner portion. It continues to mark off a narrow wedge-shaped portion at the antero-lateral angle of the hyoplastron. This is evidently due to the attachment of the cutaneous muscles.

Endoplastron ovoid in outline, posterior end broader than anterior, with a blunt angulation on its lateral border.

Hyoplastron broader than long with medial and posterior borders almost straight, anterior border rather oblique antero-medially with both its inner (medial) and outer lateral half first slightly concave, and then slightly convex. Anterior portion of its lateral border bluntly edged with a gradual increase in thickness inward as revealed from the inner surface of the bone. Posterior portion starting from the axillary buttress and extending laterodorsally. Lateral border not well preserved. Axillary buttress strongly developed.

Hyoplastron longer than broad, with its anterior and medial borders somewhat straight. Posterior portion of lateral border slightly convex, bluntly edged, with gradual increase in thickness inward. Anterior portion starting from inguinal buttress extending laterodorsally, inguinal buttress strongly developed.

Xyphyplastron with its anterior and medial borders appearing comparatively straight in spite of some unevenness. Lateral border bluntly edged with a gradual increase in thickness inward, two convex curvatures along the lateral border which divides it almost in two equal halves. Posterior border oblique postero-medially, concave, thus in continuation with its fellow from the opposite side making the posterior extremity of

Measurements of Plastron (in mm.)

|                   | Length along border |            |                     | Length along medial border | Length along posterior border |
|-------------------|---------------------|------------|---------------------|----------------------------|-------------------------------|
|                   | medial              | peripheral |                     |                            |                               |
| Epiplestron right | 19.0 ±              | 36.3       | Hyoplastron right   |                            |                               |
| left              | 20.9 ±              | 37.5       | left                | 34.2 ±                     | 43.9 ±                        |
|                   | Greatest            |            | Hyoplastron right   | 48.4 ±                     | 32.0 ±                        |
|                   | length              | width      | left                | 46.                        | 31.0                          |
| Endoplastron      | 23.7                | 28.4       | Xyphyplastron right | 28.7 ±                     | 15.0 ± (oblique)              |
|                   |                     |            | left                | 29.7                       | 15.0 ± (oblique)              |

the plastron broadly notched. On the inner surface of the xiphyplastron much thickening has occurred along its lateral border, and this extends to the portion of the hyoplastron which is posterior to inguinal buttress. A line of depression runs along the entire medial margin of this thickening, indicating attachment of cutaneous muscles.

The horny shields of the carapace are recognizable only to a certain extent. Nuchal scute small and narrow, anterior border slightly concave, lateral somewhat convex, posterior not clear, but apparently concave. First vertebral with the anteriolateral border concave, other borders not clear. Second apparently octagonal, anterior border not preserved, anteriolateral partly preserved, concave, posteriolateral slightly concave on the left and somewhat irregular on the right; posterior border in two parts, each extending posteriomediaally and slightly convex. Third clearly octagonal, with anterior border in two parts, each extending anteriolaterally and slightly concave, both anteriolateral and posteriolateral slightly concave, posterior border in two parts, each extending posteriolaterally and slightly concave. Fourth with anterior border in two parts, each extending anteriomedially and slightly concave, posteriolateral partly preserved, slightly concave, anteriolateral slightly concave, other borders not preserved.

Only the second and third costal scutes of the right side are completely preserved, while the first and fourth have each only a small part preserved in the present specimen. Each is rectanguloid in outline, its medial border convex and its lateral border slightly so. Near the medial extremity of each costal scute its anterior border shows a decided convexity, and its posterior border a decided concavity, which almost divides each border into two. The lateral borders of the costal scutes are peripheral to the bony suture between the costal and marginal plates.

First marginal scute much wider (sinistro-dextral direction) than long (anteroposterior), peripheral border much longer than medial. Second smaller, its anteriomedial border longer than the posterolateral, and its peripheral border longer than the medial. Third, fourth, fifth, sixth and seventh marginal scutes not completely preserved, and including their ventral bendings all seeming to be wider than long. Eighth with the medial border of its ventral portion not clear.

The scutes of the plastron are better shown. Gular scute with the anterior border convex and much wider than the posterior, somewhat wedge-shaped. Humeral with the peripheral border convex, the medial border straight and ex-

Measurements of Scutes of Carapace (in mm.)

|        | Greatest     |             |             | Length along | Width along |
|--------|--------------|-------------|-------------|--------------|-------------|
|        | Length       | Width       |             | medial       | peripheral  |
|        |              |             |             | border       | (marginal)  |
|        |              |             |             |              | border      |
| Nuchal | 9.0          | 6.0         | Marginals I |              |             |
|        |              |             | Left        | 21.8         | 23.8        |
|        |              |             | II          |              |             |
|        |              |             | Left        | 13.5±        | 20.9        |
| Costal | Length along | Width along | III         |              |             |
| right  | medial       | posterior   | Right       | 14.5±        | 19.6±       |
|        | border       | border      | Left        | 14.2         | 19.1        |
|        |              |             | IV          |              |             |
| I      | —            | 39.4        | Right       | 17.5         | 19.0±       |
|        |              |             | Left        | 17.0±        | 17.5±       |
| II     | 31.6±        | 40.3        | V           |              |             |
|        |              |             | Right       | 19.0±        | 18.0±       |
| III    | 29.6±        | 31.9        | Left        | 18.8±        | 17.5±       |
|        |              |             | VI          |              |             |
|        |              |             | Right       | 18.9±        | 19.1±       |
|        |              |             | VII         |              |             |
|        |              |             | Right       | 16.9±        | 21.0±       |
|        |              |             | VIII        |              |             |
|        |              |             | Right       | 15.5±        | 19.0±       |

tremely short, the former about seven times longer than the latter. Anterior border almost straight and posterior with its peripheral portion concave and the remaining portion almost straight. Pectoral rectanguloid in outline, wider than long, anterior border straight in its medial section and convex in its peripheral third, medial straight, lateral slightly convex, posterior markedly concave. Abdominal also somewhat rectanguloid, width slightly greater than the length, anterior border markedly convex, posterior slightly convex, medial almost straight, lateral only partly preserved and somewhat concave. Femoral with an injury across its middle, but the two parts still holding together, longer than wide, rectangular in outline. Anterior border longer than the posterior, slightly concave, posterior border slightly concave, medial apparently straight, and shorter than the lateral, lateral slightly convex. Anal smaller than is usually the case, both anterior and lateral borders gently convex and longer than the posterior and medial respectively; medial shortest and somewhat straight, posterior concave.

Length from neural plate 2 to 8 inclusive 87 mm. and from marginal plate 2 to 8 inclusive 124.2 mm.

## Measurements of Scutes of Plastron (in mm.)

|         | Length along borders |            |           | Length along borders |           |         | Length along borders |           |
|---------|----------------------|------------|-----------|----------------------|-----------|---------|----------------------|-----------|
|         | medial               | peripheral |           | medial               | posterior |         | medial               | posterior |
| Gular   |                      |            | Pectoral  |                      |           | Femoral |                      |           |
| Right   |                      | 20.0 ±     | Right     |                      |           | Right   | —                    | 25.0 ±    |
| Left    |                      | 19.3 ±     | Left      | 35.5 ±               | 43.5 ±    | Left    | —                    | 25.0 ±    |
| Humeral |                      |            | Abdominal |                      |           | Anal    |                      |           |
| Right   | 2.5 ±                |            | Right     | 38.4 ±               | 34.0 ±    | Right   | 11.7 ±               | 15.0 ±    |
| Left    | 2.5 ±                | 35.9 ±     | Left      | 36.5 ±               | 30.0 ±    | Left    | 13.0 ±               | 15.0 ±    |

Length of the plastron along its median line 148.5 mm.

HORIZON AND LOCALITY Polycene formation of Chouk'outien, Hopei (Chihli) Province. Coll. Mr. W. C. Pei.



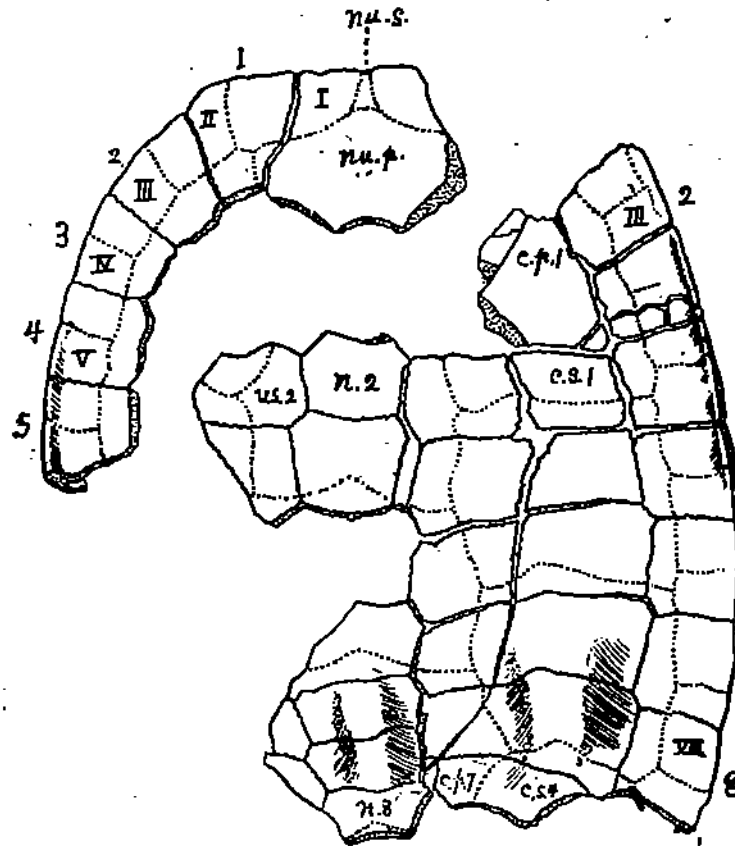


Fig. 1. Dorsal view of Carapace, *Polychmatemys pehinensis* Ping, sp. nov. (1/3 Nat. Size). c.p. 1—c.p. 7, costal plates; n. 2—n. 8, neural plates; 1—8 marginal plates; c.n. 1—c. s. 4, costal scutes; nu. s. nuchal scute; v. s. 2, vertebral scute; 1—VIII, marginal scutes,

1890

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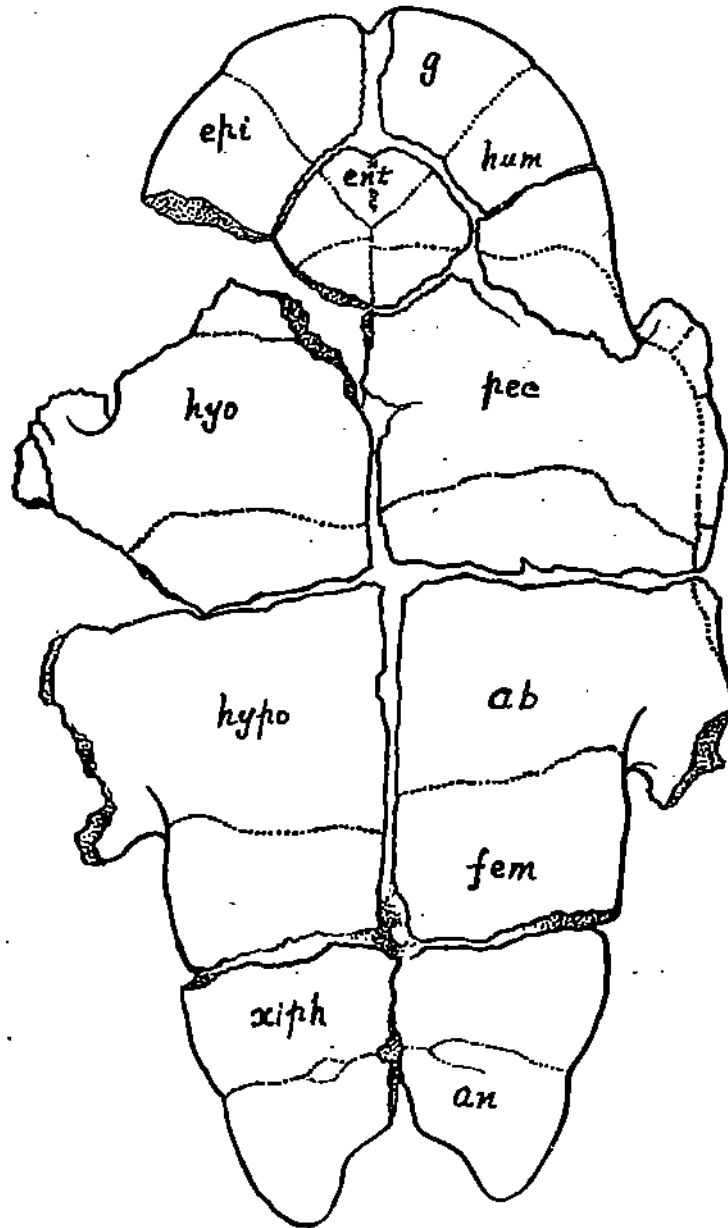


Fig. 2. Ventral view of Plastron, *Polyechmatemys pkinensis* Ping, sp. nov. (Nat. Size). ento., entoplastron; epi., epiplastron; hyo., hyoplastron; x., xiphoplastron; g., gular scute; hum., humeral scute; pec., pectoral scute; ab. abdominal scute; fem., femoral scute, an., anal scute.



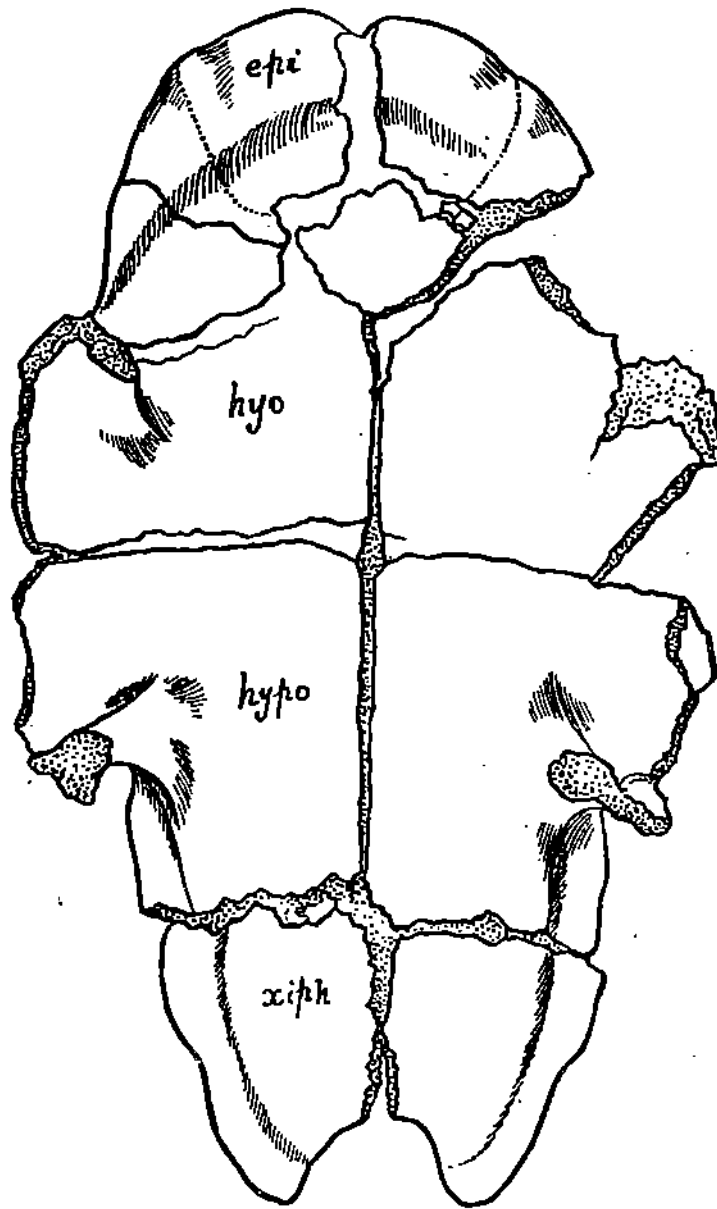


Fig. 3 Inner surface of Plastron, *Polyechmatemys bekinensis* Ping, sp. nov.  
(Nat. Size). For explanations, see Pl. II, Fig. 2.