

17. *On an Extinct Chelonian Reptile* (NOTOCHELYS COSTATA, Owen),
from AUSTRALIA. By Prof. OWEN, C.B., F.R.S., F.G.S., &c.
(Read January 25, 1882.)

Order CHELONIA.

Genus NOTOCHELYS*.

Species NOTOCHELYS COSTATA.

Hitherto the fossil reptilian remains transmitted to me for description from Australia have been limited to parts of the skeleton of the great horned Lacertian (*Megalania prisca*, Ow. †).

The first evidence of a Chelonian from that continent was sent in the present year (1881), by our fellow Member Professor Archibald Liversidge, of the University of Sydney, New South Wales. He kindly permitted a mould to be taken of the specimen, with the request that the original should be returned to him after a description and figure had appeared. The mould and casts are in the British Museum, Cromwell Road.

The specimen was found in a formation at Flinders River, Queensland; but the nature and age of the deposit are not stated. It is petrified and, with the imbedding matrix, of great weight.

The fossil consists of an anterior portion of the carapace (fig. 1) and of the plastron (fig. 2) brought into unnaturally close contact by posthumous pressure.

The carapace includes the four anterior and part of the fifth neural plates (fig. 1, *s* 1, 2, 3, 4, 5), and the second, third, fourth and expanded portion of the first costal plates of the left side (ib. *pl* 1', 2', 3', 4'); of the proximal or expanded portions of the right second, third, and fourth costal plates (ib. *pl.* 2, 3, 4,) with a fragment of the first (*pl.* 1 *r*); a portion of the left half of the nuchal plate (*ch*); and portions of the first and second marginal plates of the left side (*m* 1, *m* 2).

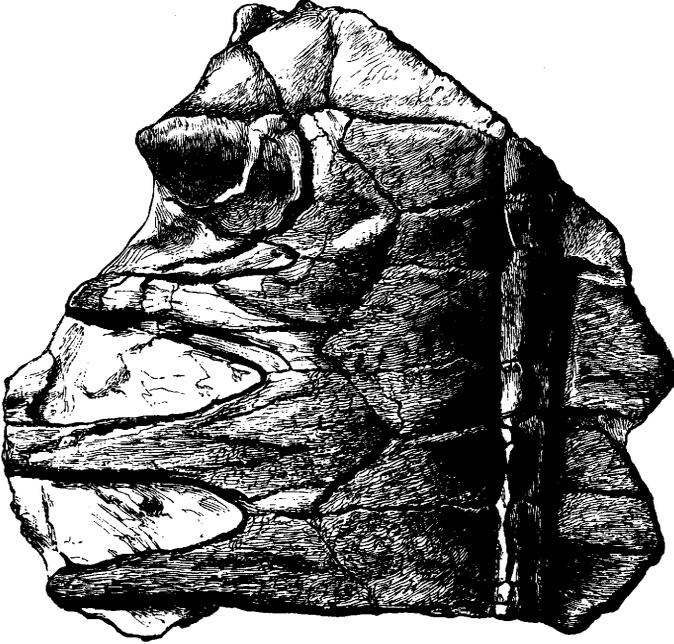
The preserved part of the plastron includes the right and left coalesced hypo- and hyposternals (fig. 2, *hps.* *r*, and *hps.* *l*), indications of the episternals and the entosternal; and, anterior to these parts of the plastron, both scapulo-acromial bones (*s*₁) have been brought into view.

The first neural plate (fig. 1, *s* 1), 1 inch 10 lines long by 9 lines broad, has a small portion of the left antero-lateral angle preserved with the rest of the plate: this slightly decreases in breadth toward the hinder junction with the second neural (*s* 2). The impression of the transverse junction of the first vertebral scute (*v* 1), with the second (*v* 2), crosses the plate *s* 1 near its mid length.

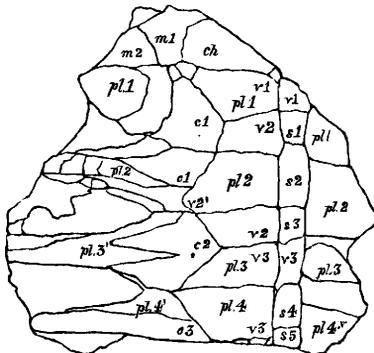
* *vóros*, south, *χελύς*, tortoise.

† Phil. Trans. for the years 1858, 1880 and 1881.

Fig. 1.—*Anterior Portion of the Carapace of Notochelys costata*
($\frac{1}{4}$ nat. size).



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The first costal plate (*pl. 1*) articulates with the entire lateral border of the first neural plate, extends a little in advance of that to articulate with the nuchal plate (*ch*), and also a little beyond the posterior border to join the truncated anterior angle of the second

neural (*s* 2). In this character *Notochelys* differs from *Chelone longiceps**, and agrees with *Chelone breviceps*†.

Only the mesial expanded portion of the first costal (*pl* 1), which articulates also with the nuchal (*ch*) and second costal plates, is preserved; its fore border joins the second marginal plate (*m* 2); the lateral anterior angle also articulates with the first marginal plate (*m* 1). Fractured parts of the narrower rib-like outward extension of the first costal (*pl* 1) are preserved, indicating a length of the entire plate of 5 inches. The breadth of the expanded portion exceeds that of the same part in the succeeding costal plates.

The second neural plate (*ib. s* 2), of greater breadth than the first, has the anterior costal plate (*pl* 1) articulated with the anterior truncated angle. The posterior angles of the second neural are also truncated, but in a minor degree, for articulation with the third costal plate (*pl* 3), in which character it differs from the Eocene Chelonians figured in the under-cited work, some of which, e. g. *Chelone longiceps*, *Ch. subcristata*, *Ch. convexa*, show the second vertebral plate (*s* 2) articulating with the second costal exclusively; others (e. g. *Chelone breviceps* and *Ch. subcarinata*) articulate, as in the existing *Chelone mydas*, with a portion of the second costal, but not with any part of the third costal plate.

The third neural plate (*ib. s* 3) has marginal articulations exclusively with the third costal plate (*pl* 3), and neither the fore nor the hind angles are truncated. In *Chelone subcarinata*‡ the third neural plate articulates with both the second and third costal plates; and in *Ch. breviceps*, in a larger proportion with the second costal—the third vertebral plate here presenting a hexagonal figure, while in the present species it is a parallelogram. Its length, in *Notochelys*, is 1 inch 8 lines, its breadth 9 lines; it is crossed transversely a little in advance of its mid length by the line of junction of the second to the third vertebral scutes (*v* 2, *v* 3).

The fourth neural plate (*ib. s* 4), with a broader anterior border than the third (*s* 3), shows the anterior truncated angles of that border articulating with the third costal plate; the long lateral borders articulate exclusively with the fourth costal (*pl* 4). But a small portion only of the fifth neural plate (*s* 5) is preserved.

The second costal plate (*pl* 2) is larger, but antero-posteriorly narrower than the first. The extent of the posterior suture with the third costal, 2 inches 9 lines, gives that of the expanded part of the plate: beyond the suture it begins to contract to the ordinary rib-like proportions, the preserved extent of which free part is 3 inches. The expanded part is impressed with the lateral angle of the second vertebral scute, from which is extended the impression of part of the junction of the first costal (*c* 1), with the second costal (*c* 2) scutes.

The third costal plate (*pl* 3) has similar proportions of the expanded and rib-like parts to those of the second costal. It articulates mesially with the third neural and the anterior angle of the broader

* *Hist. of British Fossil Reptiles* (4to, 1849), plate 13. fig. 1.

† *ib.* plate 10.

‡ *ib.* plate 10.

fourth neural. It is impressed by the entering angle of the junction of the second costal scute (*c 2*) with the second and third vertebral scutes (*v 2, v 3*). The length of the rib-like production of the third costal scute from the suture with the second costal is 3 inches 10 lines; the entire length of the plate is 6 inches 9 lines.

The entire extent of the free portion of the fourth costal plate (*pl 4*) appears to be preserved; and its length from the suture with the third costal is the same as in the third: there may be a small terminal portion wanting in both; the breadth and length of the expanded portion seem to have been the same as in *pl 3*; but the fracture of the hind part of the specimen may have removed that margin of the fourth costal.

This plate shows the impression of the lateral angle of the third vertebral scute (*v 3*) at its junction with parts of the second and third costal scutes (*c 2, c 3*).

Of the costal plates of the right side, parts of the expanded portions only are preserved; and they have been partially dislocated from the vertebral plates by pressure from above; only small angular portions of the 1st and 4th are present.

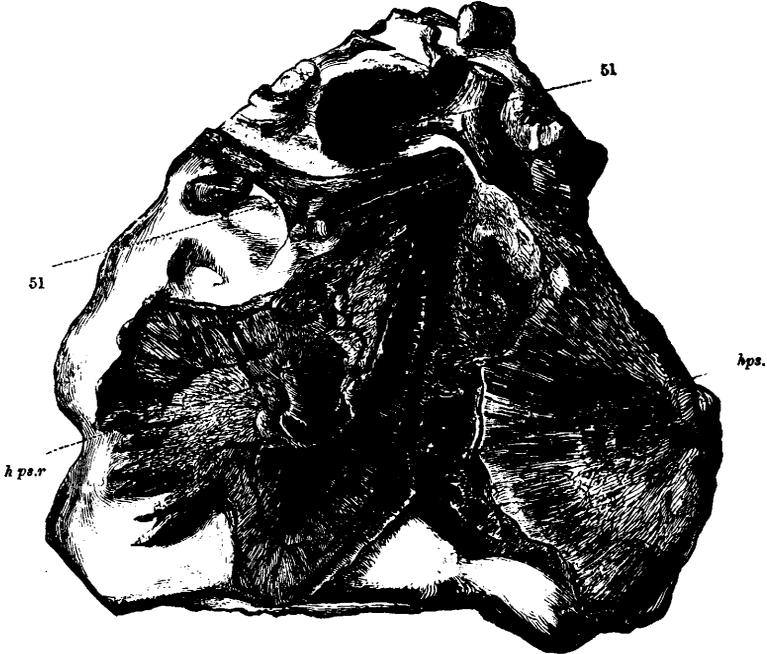
Not more of the nuchal plate (*ib. ch*) is preserved than serves to indicate that the mesial part of its hind border is slightly produced backward to unite with the first neural plate; the rest of the hind border, preserved only on the left side, unites suturally with the fore border of the expanded part of the first costal plate. Laterally the nuchal plate unites with the foremost of the marginal plates (*m 1*); and to this is attached a portion of the second marginal plate.

The breadth of the entire carapace of *Notochelys costata*, taken across the fourth pair of the costal plates, the right plate being restored, is 14 inches. Assuming that about half of the length of the carapace is shown in the fossil, the total length may be estimated at 20 inches.

Of the plastron are preserved the right hyo-hyposternals (fig. 2, p. 182, *hps. r*) and a great proportion of the left (*ib. hps. l*). They appear to have been in contact mesially for rather more than the anterior half of their fore-and-aft extent: the postero-mesial borders diverge at almost a right angle from the mid line. The best-preserved hyo-hyposternal rapidly loses in length as it extends outwards for above two thirds of its total breadth; then it again expands to less than half the mesial length, and terminates in diverging pointed rays, of which the hindmost are longest and narrowest; two of these are bifurcate. They do not appear to have effected any bony union with the costal elements of the carapace.

The left hyo-hyposternal shows the best-preserved mesial border, the anterior portion of which seems to have underlapped the corresponding border of the right bone. The underlapping portion shows two large angular processes, each an inch broad at the base, and contracting to a point; they are followed by a series of six or seven smaller processes diminishing in size as they recede in position.

Fig. 2.—Anterior Portion of the Plastron of *Notochelys costata*
($\frac{1}{4}$ nat. size).



In both elements of the plastron the exposed surface has lost some substance near the mesial margin. Sufficient, however, remains to throw welcome light on the affinities of this Chelonite.

The characters of the carapace might be interpreted as those of a true Turtle (*Chelone*) not modified sufficiently to bear a subgeneric distinction. But those of the plastron show the well-marked characters of the part in *Trionyx* and *Chelys*; the hyosternal and hyposternal, which are separated by a persistent transverse suture in *Chelone* as in *Emys* and *Testudo*, have coalesced, and so completely in *Notochelys* as to leave no trace of the original presence of the suture in the immature reptile. The hyosternal element in Chelonians where the plastron is best ossified, as in the extinct Eocene kinds, does not extend backward beyond the second vertebral scute on the fourth neural plate*; whereas the single plastral bones (fig. 2, *hps*), extend backward beyond the third vertebral scute (fig. 1, *v 3*), and probably beyond the fifth neural plate; for the hindmost angles of both plastral bones have suffered fracture. Sufficient is preserved, laterally, to show that the carapace and plastron were not united

* Compare Hist. of Brit. Foss. Rept. pl. 1 (*Chelone breviceps*), pl. 13 (*Chelone longiceps*), pl. 14 (*Chelone convexa*). See also Cuvier, Ossemens Fossiles, tom. v. pt. ii. (4to, 1824) pl. xiii. fig. 6 (*Chelone mydas*), fig. 7 (*Chelone caretta*).

together by bone; consequently the freshwater (Emydian) and terrestrial (Testudinarian) groups of *Chelonia* are out of the pale of comparison. In the absence of the alternate broadening and narrowing of the mesial and lateral ends of the costal plates also *Notochelys* differs from the foregoing groups, and resembles both the *Chelydes*, *Trionyces* and *Chelones*.

The impressed indications, however, of the size and shape of the vertebral (*v* 1, 2, 3) and costal (*pl* 1, 2, 3, 4) scutes remove the present Chelonite from the family of soft Turtles (*Trionycidae*), and manifest its affinity to the Chelydians. But a comparison of the characters shown in the preserved portion of the bony cuirass indicates differences which have generic value.

These modifications, especially of the carapace, show a nearer affinity to the marine Turtles (*Chelone*) than the known Chelydians exhibit, and indicate a more generalized type in the Australian fossil. This adds to the interest with which we hope to hear of the precise geological position of the bed, which, with its included fossil, has undergone such complete petrification.

I have only to add that the open angle between the scapula and its connate and elongate acromial process (fig. 2, 51) more resembles that in *Chelone caretta* than in any existing species of *Chelys* or *Trionyx*.

The details necessitated for determination of the extinct Chelonians of our Eocene formations (Hist. of Brit. Foss. Reptiles, vol. i.) have led me to note characteristics of my present subject in aid of the comparisons which our Australian fellow workers may have to institute with respect to subsequently discovered fossil remains of *Chelonia* in their continent.

DISCUSSION.

Prof. SEELEY regretted that the specimen upon which the paper was founded was not upon the table. It would also have been helpful if the author had attempted a restoration. He pointed out how much the elements of the plastron must have been displaced. He could not help suggesting that the hyo-hyosternal bones were not combined, but that those preserved were the hyosternal bones only. If this were possible, he doubted the propriety of the name *Notochelys*, as, if the above point were not proved, there was nothing to separate the genus from *Chelone*. Had the peculiar modification of the plastron supposed by the author existed, he should have expected more marked differences in the carapace. At the same time the value of the contribution could not be doubted.