

and a lateral series of tubercles, forming three short crests; the thorax oblong, covered with three short, continuous keels; marginal shields rather narrow, elongate; sternum cross-like, small compared with the dorsal disk, narrow, slightly rounded before, acute behind, united to the dorsal disk by a narrow lateral process; sternal plates seven, thin, four pairs and a single odd one behind; the first pair elongate, longer than broad (probably the two first pair of other *Emydæ* united); the second pair broad, produced on the side, so as to cover the greater part of the cross-like sternum; the third pair elongate, narrow; the hinder plate rhombic, rather longer than broad, acute in front and behind; the axillary and inguinal plate large, covering the space between the outer lateral edge of the second pair of shields and the marginal plates. The front lobe of the sternum is very moveable at the suture between the first and second pairs of sternal plates, in the young specimen, and has a considerable amount of mobility in the adult specimen.

The shell is brown; the head is dark olive; the temple and the side of the neck pale-marbled; underside of the limbs whitish.

Wagler represents the anal shields of *S. triporcatus* as divided. In the large specimen in the British Museum they are united into a single rhombic shield, as in *S. salvinii*.

10. ON THE GENERA OF CHELYDIDÆ AND THE CHARACTERS FURNISHED BY THE STUDY OF THEIR SKULLS. BY DR. J. E. GRAY, F.R.S., ETC.

It has been very generally observed that the characters which separate the genera of the family *Chelydidæ* are very slight. This only arises from the genera having been hitherto characterized by some easily seen external peculiarities, which are often, as in this case, mere superficial indications of very different internal organizations.

This apparent slightness disappears when the skulls and other parts of the skeletons of the different genera are examined, as may be proved by consulting the figures of the skulls and skeletons given in the Atlas of Plates to Wagler's 'System of Amphibia,' published in 1830, which has been too much neglected by more recent writers on the subject.

Unfortunately we have the bones of only a few examples of the family in the collection of the British Museum, and there are only two skeletons in the Museum of the College of Surgeons; nor do I know of any other osteological collections which have more. These, however, and the figures of Cuvier and Wagler before referred to, are sufficient to show the outlines of an improved arrangement of the genera, and to afford more important characters for them.

I refer to my 'Catalogue of the Shield Reptiles in the British Museum' for the description of the species and more lengthened generic characters, and to the articles by me in the 'Proceedings of

the Zoological Society' for some additional observations on certain genera.

The typical *Chelydidæ* form the first section.

A. *Head depressed, covered with a soft skin, which is sometimes more or less divided on the surface into numerous polygonal plates. The skull depressed, without any or only a very rudimentary zygomatic arch. Temporal depression large, with a more or less wide bony arch at the back, from the ear-bones to the middle of the occiput; the temporal muscles only covered with a skin. Lower jaw weak, slender. The alveolar surface of the jaws thin, with a more or less distinct submarginal ridge.*  
Typical CHELYDIDÆ.

a. *The head very much depressed; beak covered with flesh; lips bearded. Skull very depressed, abnormal; temporal muscles very large, only covered with skin, without any central bony crown to the head; auri-occipital arch very slender, small; lower jaw very slender, weak.* CHELYDINA.

1. CHELYS, Daud.; Gray, Cat. Shield Rept. 60.

*Matamata*, Merrem.

CHELYS MATAMATA, Gray, *l. c.* 60.

Skeleton in Mus. Coll. Surg. no. 960, described by Owen, Cat. p. 187. Figured in Wagler's N. S. Amph. t. 3. f. 5, 15. Skull figured in Cuvier's Oss. Foss. v. 2, t. 11. f. 21-25, t. 12. f. 41.

b. *Head rather depressed, not fringed; beak naked; chin sometimes bearded; skull rather depressed, of normal form, with a distinct central bony crown, and a more or less strong auri-occipital arch; the auri-occipital arch very slender, weak; the temporal depression very large, covered with skin, separated by a very narrow ridge-like crown; shell very depressed, thin.*  
HYDRASPIDINA. (Fig. 1.)

2. HYDRASPIS, Gray, *l. c.* 54.

Intergular and nuchal plate on the margin. Chin two-bearded. Auri-occipital arch distinct.

*Hab.* Tropical America.

\* *Head very large, depressed, with small tessera.*

1. HYDRASPIS RANICEPS, Gray, *l. c.* 55. t. 23. (Skull, figs. 1, 2.)

*Hab.* Brazil.

Skeleton in British Museum.

Fig. 1.

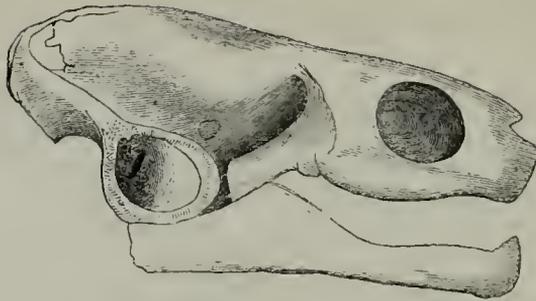
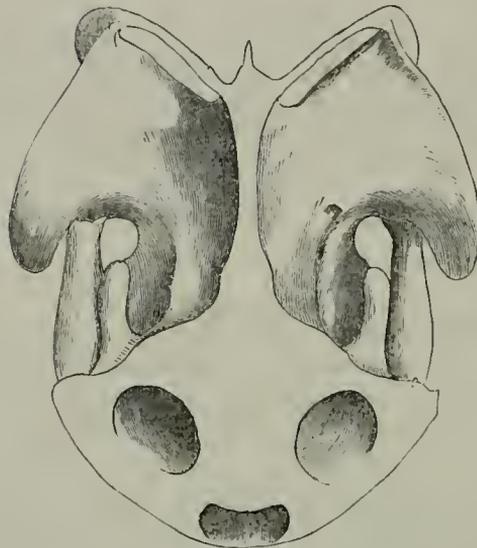


Fig. 2.

Skull of *Hydraspis raniceps*.

\*\* *Head moderate; crown subshielded.* RHINEMYS.

2. *HYDRASPIS GIBBA*, Gray, *l. c.* 55; Dum. et Bib. *Erp. Gén.* t. 20. f. 2.

*H. nasuta*, Gray, *l. c.* 55.

\*\*\* *Head moderate; occipital and superciliary shields enlarged.*  
Phrynops.

3. *HYDRASPIS GEOFFROYANA*, Gray, *l. c.* 57.

*Phrynops geoffroyana*, Wagler, *N. S. Amph.* t. 5. f. 47-51.

The species of this genus are very imperfectly known, owing to the want of more specimens of the animals in different states of growth, some having been established from adult, but the chief from only young examples. I am convinced that they cannot be deter-

mined with accuracy until the osteology of the different species has been compared in the different states of growth. I believe that the three species above named are types of distinct forms.

3. CHELODINA, Gray, Cat. Shield Rept. 58.

Intergular plate within the margin of the sternum. Chin not bearded.

*Hab.* Australia.

\* *Shields of disk very thin, veined.*

1. CHELODINA LONGICOLLIS, Gray, *l. c.* 58.

Skeleton in Mus. Coll. Surg. (no. 961). Shortly noticed by Owen (Cat. Osteol. Col. p. 187).

*Hab.* New Holland.

2. CHELODINA OBLONGA, Gray, *l. c.* 58, t. 24.

*Hab.* North and West Australia.

3. CHELODINA COLLIEI, Gray, *l. c.* 59.

*Hab.* Swan River.

\*\* *Shields of thorax hard, horny.*

4. CHELODINA SULCIFERA, Gray, *l. c.* 59, t. 25, f. 2.

*Hab.* Australia.

4. HYDROMEDUSA, Wagler; Gray, Cat. Shield Rept. 59.

Nuchal plate long, like a vertebral, and within the margin of the thorax. Intergular marginal. Chin not bearded.

*Hab.* Tropical America.

1. HYDROMEDUSA MAXIMILIANI, Gray, *l. c.* 59.

Skeleton figured in Wagler's 'N. S. Amph.' t. 3, f. 2-42.

2. HYDROMEDUSA FLAVILABRIS, Gray, *l. c.* 59.

c. *The auri-occipital arch broad; skull solid; the temporal depression moderate, covered with skin, separated by a broad, flat, bony crown.*

5. PLATEMYS, Wagler; Gray, Cat. *l. c.* 53.

Thorax depressed, light; cavity wide. Crown of head with a continuous skin; temple scaly. Skull rather slight. Chin two-bearded. Legs with large scales.

*Hab.* Tropical America.

PLATEMYS PLANICEPS, Gray, *l. c.* 54.

Skeleton figured in Wagler's N. S. Amph. t. 4, f. 1, 2, 3.

6. CHELYMYS, Gray, Cat. Shield Rept. 57.

Thorax convex, solid; cavity contracted and strengthened by two

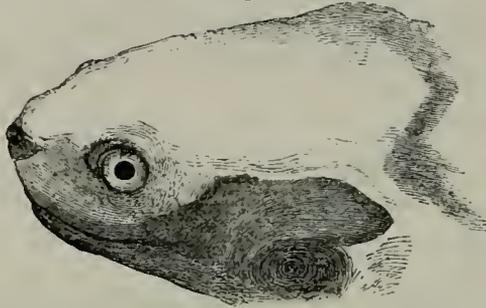
erect bony folds in front. Crown of head with numerous polygonal tesseræ. Skull solid. Chin not bearded. Legs with small scales.

*Hab.* Australia.

\* *Nuchal shield broad and well developed; hinder margin of shell entire.*

1. CHELYMYS MACQUARIA, Gray, *l. c.* 57; Ann. & Mag. N. H. 1863, xii. 98. (Head, fig. 3.)

Fig. 3.



*Chelymys macquaria.*

\*\* *Nuchal shield none; hinder margin of the young shell dentated; vertebral plate nodulose.*

2. CHELYMYS DENTATA, Gray, Ann. & Mag. N. H. ser. 3. xii. p. 98.

*C. elseyi*, Gray.

*Hab.* North Australia (*Mr. Elsey*).

B. *Head covered with hard, symmetrical horny plates. The skull with a largely developed zygomatic arch, which is often dilated posteriorly, so as to cover the upper hinder part of the temporal muscle with a bony case. Lower jaw strong. Beak naked. Nuchal and gular plate marginal.*

a. *Head depressed, with a deep longitudinal frontal groove. The skull depressed. Zygomatic arch moderately developed. Temporal muscles covered with hard dermal shields. Alveolar surface of the jaws thin, with a small submarginal ridge. Claws 5—5. Africa. Emydoid Chelydidæ.*

7. STERNOTHÆRUS, Gray, Cat. Shield Rept. 51; P. Z. S. 1863, p. 192.

Front lobe of sternum mobile, with an internal process on each side.

*Hab.* Africa and Madagascar.

\* *Crown-shield on a line with the back of the tympanum. Tanoa.*

1. STERNOTHÆRUS SINUATUS, Gray, P. Z. S. 1863, p. 193 (figure of head).

2. STERNOTHÆRUS DERBIANUS, Gray, *l. c.* 52, t. 22; P. Z. S. 1863, p. 194.

*Pentonyx gabonensis*, A. Dum. Arch. d. Mus. x. p. 164.

\*\* *Crown with oblong shields, and small scales behind over the tympanum.* Notoa.

3. STERNOTHÆRUS SUBNIGER, Gray, *l. c.* 52; P. Z. S. 1863, p. 195. *Var.* Ann. & Mag. N. H. 1863, xii. 405.

*S. castaneus*, Dum. et Bib. Erp. Gén. t. 20. f. 1.

\*\*\* *Crown with three shields. Head elongate.*

4. STERNOTHÆRUS NIGER, Gray, *l. c.* 51; P. Z. S. 1863, p. 196. *Hab.* Madagascar.

8. PELOMEDUSA, Gray, Cat. Shield Rept. 52.

Lobes of sternum solid, immoveable.

*Hab.* Africa.

\* *Pectoral shields small, short, triangular; humeral large; occipital with small shields.* Pentonyx.

1. PELOMEDUSA GEHAFIÆ, Gray, *l. c.* 53.

\*\* *Pectoral and humeral shields equal, oblong, four-sided; occipital largely shielded.* Pelomedusa.

2. PELOMEDUSA SUBRUFÆ, Gray, *l. c.* 53.

3. PELOMEDUSA NIGRA, Gray, Ann. & Mag. N. H. 1863, xii. 99. *Pentonyx du cap*, A. Duméril, Arch. du Mus. xiii. t. . f. 3.

b. *Head swollen. Skull very solid. Zygomatic arch much dilated posteriorly, so as to cover the temporal muscles with a bony case to the occiput. Alveolar surface of the jaws wide, callous, with several ridges. Claws 5—4. America. Chelonoid Chelydridæ.*

9. PODOCNEMIS, Gray, Cat. Shield Rept. 61.

Head subdepressed. Nose with a central groove. Temporal muscle partially covered with skin. Skull figured and described in Owen's Cat. Osteol. Mus. Col. Surg. p. 203, no. 1056.

\* *Alveolar surface of the upper jaw with three ridges: the hinder broad, low, margining the edge of the inner nostrils; the two front sharp-edged, diverging to the end of the maxillary edge; the first one short. Head broad, short.* Podocnemis.

1. PODOCNEMIS EXPANSA, Wagler, N. Syst. Amph. t. 4; Gray, Cat. Shield Rept. 61, t. 27 (shell), t. 37. f. 1 (skull).

\*\* *Head elongate, narrow. Alveolar surface of the upper jaw with two sharp edges; ridges parallel to the edge of the jaw and the opening of the inner nostrils; the hinder ridge thinnest, and nearly on the margin of the opening of the inner nostrils.*  
Chelonemys.

2. *PODOCNEMIS DUMERILIANA*, Wagler, N. Syst. Amph. 135; Gray, Cat. 62, t. 28.

*Emys expansa*, Cuvier, Oss. Foss. v. pt. 2, t. 11. f. 9-12 (skull), not Dum. et Bib.

The two species of *Podocnemis* are well distinguished by the shape of the dorsal disk, and by the smaller size and more elongated shape of the head of the animal; but I am not aware that the distinction which exists between the two species in the structure of the skull has been before recorded.

In the British Museum there are two skulls of each species, received from Mr. Bates, from Ega. And it is important to observe that the skull figured by Cuvier (Oss. Foss. vol. v. part 2, t. 11. f. 9-12) as *Emys expansa* is one species, and that figured by Wagler (N. Syst. Amph. t. 4) as *Podocnemis expansa* and by me in the 'Catalogue of Shield Reptiles in the British Museum' (t. 37. f. 1) is the other.

They are very similar externally; but the skulls of *P. expansa* are much larger and much broader, compared with their length, than those of *P. dumeriliana*. The frontal plate of the latter species is much larger compared with the size of the head, and it is also longer and narrower, than the same plate in *P. expansa*. The ridges on the alveolar surface of the upper jaws of the two species are very distinct; and this distinction seems permanent, as it has been observed on three specimens of the skull of *P. expansa*.

In *P. expansa* there are three ridges; the two front ones are nearly parallel, and they diverge from the centre towards the hinder end of the maxillary edge, so that they are at an angle both with the maxillary edge and with the edge of the internal nostrils; the front of these two ridges only half the length of the hinder one. The third ridge is scarcely raised, broad, rugose on the edge of the concave cavity for the internal nostril.

In *P. dumeriliana* there are only two ridges, both of which are parallel to the edge of the jaw and the edge of the palatine cavity, which are nearly parallel to each other. The front of the two ridges is much the strongest and largest; the hinder one is shorter, narrower, but well developed and very near the edge of the palate-opening, as is well represented in Cuvier's figure of the skull of *Emys expansa* (Oss. Foss. t. 11. f. 9-12).

In the skull of the older *P. expansa* the two front ridges become higher, more tubercular, and do not increase in length with the size of the skull; so they appear shorter in proportion, and the tubercular ridge on the margin of the opening to the internal nostril is less distinct. The skull of a very young specimen of this species is

figured by Wagler in his Atlas to his N. Syst. Amph. (t. 4. f. 5-9) as *Podocnemis expansa*, and the skull of a full-grown but not adult specimen in plate 27. f. 1, in my 'Catalogue of Shield Reptiles in the British Museum;' but, unfortunately, in the latter figure the artist, in the otherwise very accurate figure, has scarcely made the two front ridges at a sufficient angle with the edge of the jaws and the opening of the internal nostrils.

In the 'Archives du Muséum' (vol. vi. p. 242), M. Auguste Duméril describes a third species of *Podocnemis*, under the name of *P. lewyana*, which was received from Bogota and Venezuela, which appears by the figure (that is to say, if it is correct) to have an oblong, broad, transverse instead of a long frontal plate; but, unfortunately, there are no details of the skull given.

10. PELTOCEPHALUS, Dum. et Bib. ; Gray, Cat. Shield Rept. 61.

Head high, subcompressed. Nose produced, on a level with the forehead, rounded above, without any groove; nostril apical. Temporal muscles entirely covered with bone.

*Hab.* Tropical America.

PELTOCEPHALUS TRACAXA, Gray, *l. c.* 61; Spix, Test. Bras. t. 4, 5.

The skull of this genus bears some resemblance to that of the *Cheloniadæ*, in having a vaulted bony arch covering the temporal depressions, which is entirely formed of the parietal bones. It differs from the skull of the Marine Turtle in the vomer not being ossified, and hence the internal nostrils are not divided by a septum (see Owen, Cat. Osteol. p. 203).

Both in *Emydidæ* and *Chelydidæ* there is a large-headed group; and both the large-headed Terrapins are, at the same time, provided with a bony case for the temporal muscle. This may be to protect the head, which is too large to be contracted within the thorax; but this is not usually the case, as the true small-headed genera of *Chelydidæ* have the temporal muscle more naked than any genus of *Emydidæ*, yet the animals never withdraw their head, and only shelter it by placing it when at rest under the sides of the shell.

11. DESCRIPTION OF THE NEW LIZARD (*SPATALURA CARTERI*, GRAY), FROM LIFE\*. BY HENRY CARTER, ESQ.

"Noticing that, in your specific description of *Spatalura carteri* (P. Z. S. 1863, p. 236), you have inserted in a parenthesis the words 'dry from spirits,' I am inclined to think that you would be glad of more information on the colour-markings of this Lizard when fresh, which the following extract from my MS. Journal, written when the animal was caught, will, I hope, afford:—

" "Ground cinereous, six pairs of white spots between the back of

\* Extracted from a letter to Dr. J. E. Gray.