

Chelonia

B.Sc. Part-I, Paper-II

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Chelonia is the first order of living Reptiles. These comprises -Tortoises and Turtles.

Distinguished by the by the following characters: -

- There is an osseous exoskeleton which is combined with the endoskeleton to form a kind of bony case or box in which the body of the animal is enclosed, and which is covered by a leathery skin, or, more usually, by horny epidermal plates.
- The dorsal vertebra, with the exception of the first, are immovably connected together, and are devoid of transverse processes.
- The ribs are greatly expanded (fig. 290, r), and are united to one another by sutures, so that the walls of the thoracic cavity are immovable.
- All the bones of the skull except the lower jaw and the hyoid bone are immovably united together. There are no teeth
- The jaws are encased in horn so as to form a kind of beak.
- The tongue is thick and fleshy.
- The heart is three-chambered, the ventricular septum being imperfect
- There is a large urinary bladder, and the anal aperture is longitudinal or circular.
- The lungs are voluminous, and respiration is by swallowing air, as in the Frogs.
- All will pass prolonged periods without food, and will live and move, even for months, after the removal of the entire brain (Redi).
- Of these characters of the Chelonia, the most important and features are the nature of the jaws, and the structure of the exoskeleton and skeleton.
- As regards the first of these points, the lower jaw in the adult appears to consist of a single piece, its complex character being masked by anchyloses.
- The separate pieces which really compose each ramus of the jaw are immovably anchylosed together, and the two rami are also united in front by a true bony union.

- There are also no teeth, and the edges of the jaws are simply sheathed in horn, constituting a sharp beak.
- In the Chelydidae (family of snapping turtle) and Trionycidae (family of soft-shelled turtle), however, the horny jaws are covered with soft skin, constituting a kind of lips.
- The bony case in which the body of a Chelonian is enclosed consists essentially of two pieces,
 - a superior or dorsal piece, generally convex, called the "carapace,"
 - an inferior or ventral piece, generally flat or concave, called the "plastron."

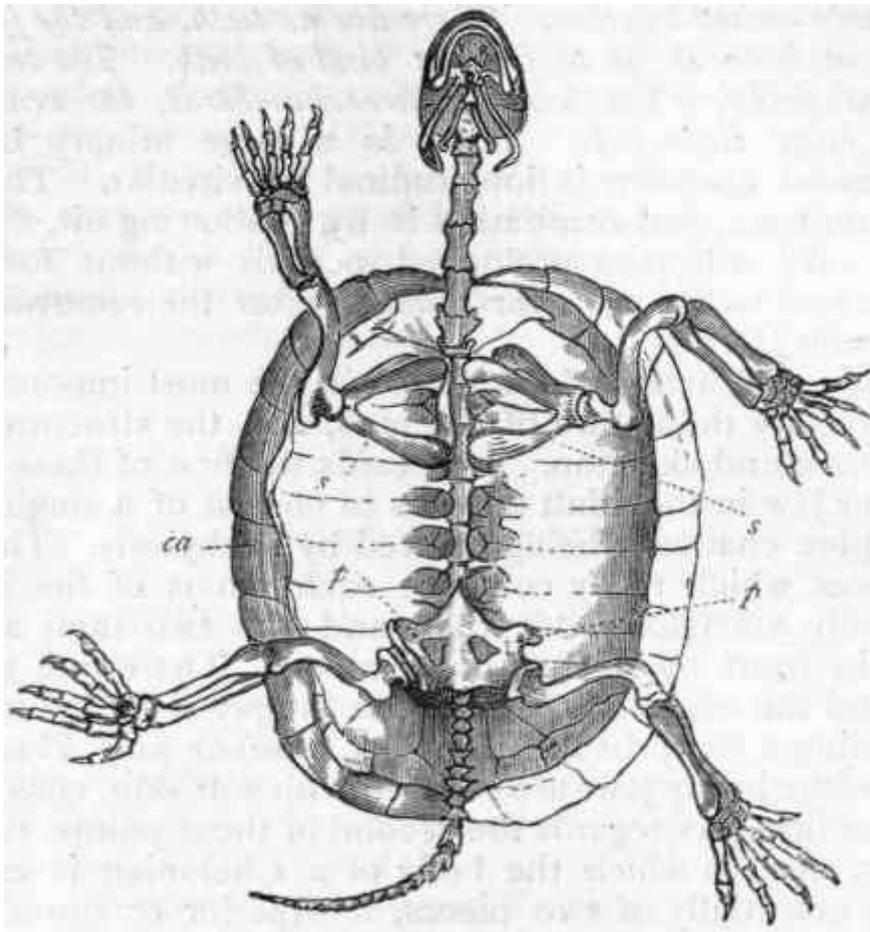


Fig.- Skeleton of Tortoise (*Emys europaea*), the plastron being removed. ca Carapace; r Ribs, greatly expanded, and united by their edges; s Scapular arch, placed within the carapace, and carrying the fore-limbs; p Pelvic arch, also placed within the carapace, and carrying the hind-limbs.

- The carapace and plastron are firmly united along their edges, but are so excavated in front and behind as to leave apertures for the head, tail, fore limb and hind limb.
- The limbs and tail can almost always be withdrawn at will under the shelter of the thoracoabdominal case formed in this way by the carapace and plastron.
- head is also generally retractile.

Bony case of Chelonia

Consists of two pieces: -

The Carapace

The carapace or dorsal shield is composed of the following elements:

1. The spinous processes of the dorsal vertebrae, which are much flattened out laterally and form a series of broad plates, which are eight in number, and are termed the "neural plates" (n).
2. The ribs (r r) are united with broad and flattened plates of bone (c' c), which are connected with one another by lateral sutures, and are known as the "costal plates." In some cases, however, the costal plates, instead of being united by the whole of their lateral margins, leave marginal apertures towards their extremities, and these openings are simply covered by a leathery skin or by horny plates.
3. The margin of the carapace is completed by a series of bony plates, which are called the "marginal plates". These are variously regarded as being dermal bones belonging to the exoskeleton, or as being endoskeletal, and as representing the ossified cartilages of the ribs (in this last case the marginal plates would correspond with the "sternal ribs" of Birds). Of these marginal plates the one in the middle line of the carapace in front is known as the "nuchal" plate, and is larger than the rest, while the corresponding plate behind is termed the "pygal" plate.

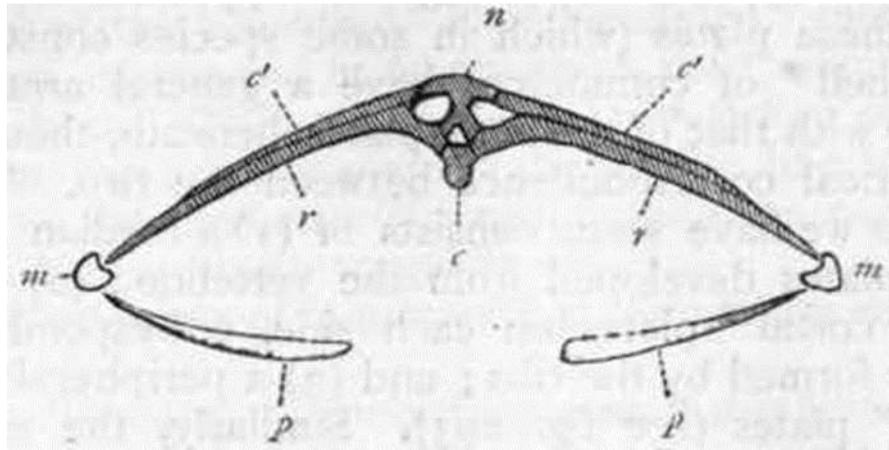


Fig.- Transverse section of the skeleton of *Chelone midas* in the dorsal region. c Body of one of the dorsal vertebrae; n Expanded spinous process or "neural plate" of the same; r r Ribs; c' c' "Costal plates;" mm Marginal plates; pp - Lateral elements of the plastron. (After Huxley.)

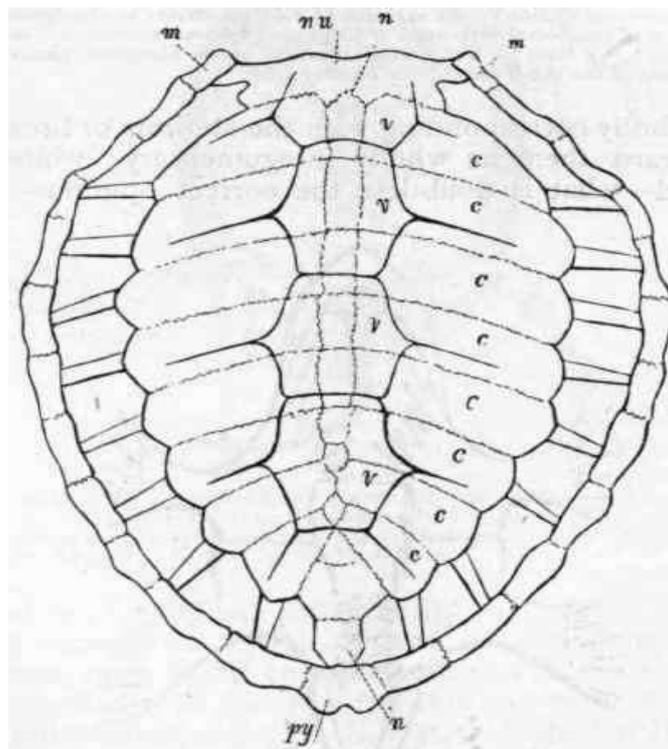


Fig.- Carapace of the Loggerhead Turtle (*Chelone caouanna*), viewed from above (after Owen). In this form, the ribs are separate and free towards their extremities, and the osseous portions of the carapace are indicated by the light lines, while the epidermal plates are marked out by dark lines. n n The first and last of the median series of "neural plates;" c c The expanded ribs or "costal plates;" mm The first "marginal plate" on each side; nu Nuchal plate; py Pygal plate; v v Median series of epidermal plates, or "vertebral scutes."

The Plastron

The "plastron" or ventral shield (fig. 292) is composed of nine bony pieces, of which eight are in pairs, and the ninth is odd. Of the paired pieces, the anterior are the episternals, the middle pairs are the hyosternals and hyposternals, and the hinder pair are the xiphisternals; while the unpaired piece is termed the entosternal (fig. 292 s). The precise nature of the bones of the plastron is still a matter of doubt. Some regard them as wholly corresponding with the sternum or breast-bone; others regard them as wholly integumentary; while others, again, hold - what is doubtless the correct opinion - that the plastron is formed partly of bones belonging to the endo-skeleton proper and representing the sternum, in part at any rate, and partly of integumentary ossifications.

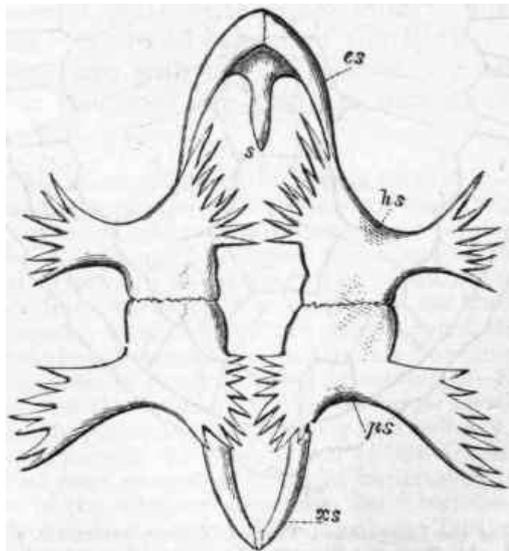


Fig.- Bones of the plastron of the Loggerhead Turtle (*Chelone caouanna*). s Entosternal; es Episternal; As Hyosternal; ps Hyposternal; xs Xiphisternal. (After Owen.)

Both the carapace and plastron are covered by a series of horny plates (rarely wanting), which are developed in the epidermis, and which are perfectly distinct from the bones which they cover.

As encasing the upper surface of the carapace, these plates (which in some species constitute the "tortoise-shell" of commerce) have a general arrangement conforming with that of the bony plates beneath, though there is no numerical correspondence between the two.

Thus, the carapace, as we have seen, consists of : -

- (1) a median series of "neural" plates developed from the vertebrae;
- (2) a lateral series of " costal" plates on each side, corresponding with and largely formed by the ribs; and
- (3) a peripheral series of "marginal" plates

Similarly, the epidermic plates are arranged in: -

- (1) a median, "vertebral," or "neural " series;
- (2) a lateral series on each side, of "costal" scutes; and
- (3) a series of "marginal" scutes.

The "vertebral" scutes, however, are only five in number; and each series of "costal" scutes consists only of four pieces, so that the number of epidermic plates is much smaller than that of the bony plates beneath.

The "marginal" scutes, on the other hand, correspond in number with the "marginal plates " beneath them.

They are, therefore, twenty-four or twenty-six in number, the anterior scute in the middle line being distinguished by the epithet of "nuchal," while the corresponding scute behind is termed "pygal."

The other points of importance as regards the endoskeleton are these:

Firstly, The dorsal vertebrae are immovably joined together and have no transverse processes, the heads of the ribs uniting directly with the bodies of the vertebrae.

Secondly, the scapular and pelvic arches, supporting the fore and hind limbs respectively (fig. 290, s and p), are placed within the carapace, so that the scapular arch is thus inside the ribs, instead of being outside, as it normally is. The scapular arch consists of the shoulder-blade or scapula, and two other bones, of which one corresponds with the acromion process of human anatomy, and the other to the coracoid process, or to the "coracoid bone," of the Birds. The clavicles, as is also the case with the Crocodilia, are absent; but the three anterior pieces of the plastron may represent an inter-clavicle and clavicles.