

the neck; but approaching the head there is more freedom of movement up and down, and the head itself turns freely in both planes on the nearest two joints. So the general direction of the bending of the neck is sidewise, and when the animal resorts to the shield for protection, it turns the head to one side,¹ and does not carry it directly back, bending the neck under the dorsal column, as is the usual way. The unusual length of the dorsal spinous apophyses, and the long extension of the bony walls of the body in front of the dorsal column and of the first costal arch, clearly depend upon the habit of these Turtles of bending the neck sidewise. The arch of the atlas is firmly fixed to its body; it is also firmly fixed to the body of the epistropheus, and closes over it, so that this one arch with two vertebral bodies acts fully as one vertebra, which articulates as such with the occipital condyle, and the vertebra next behind.

The head is broad across the ears, low at the hind end of the brain-box, and almost flat in front of it. The middle of the floor of the skull, from the occipital condyle to the alveolar surface, is almost straight. The walls of the ear cavities, as they open from the brain-box, reach far forward and downward, and a line across the middle of the outer ends of these cavities would pass nearly over the middle of the brain-box. The brain-box is very low; the lateral occipitals meet over it, and the occipital crest raises the parietals up some distance, but they fall fast forward, and at their front ends the roof and floor of the skull are brought together, leaving the passage from the brain cavity forward, and the open space on each side, very small and low; the roof is raised a little in passing forward over the cavities of the eyes and of the nose. The eyes are placed far forward, and look upward as well as outward. The jugals and postfrontals are broad behind the eyes, and lie for the most part immediately upon the pterygoids and palatines. There is no arch from the ear region forward, but instead there is one over the temporal muscles, formed by the meeting of the mastoids and parietals. The front wall of the ear cavity curves sharply forward. There is a deep, large depression in the mastoid behind the os tympani for the passage and attachment of the digastric muscle. The roof of the mouth is very broad: the pterygoids have no depression in their outer edges; they turn down on the os tympani, reaching as low as the articulating surface, so that there the roof of the mouth is a flattened arch, but at the front end it is curved up toward the outer edges.

The upper alveolar surface is merely a slight depression in the thickness of the jaw. The floor of the nasal cavity projects forward beyond that surface.

¹ All the fresh-water Turtles which have this structure of the neck have been united by Duméril

and Bibron into one group, under the name of Pleurodères, as a sub-family of the Elodites.