

that all the nine sternal bones of the Turtles are not mere dermal ossifications, as Rathke,¹ misled by the attachment of the muscles inside, would suppose, but that they really belong to the skeleton, being regular cartilages with distinct forms, and of the same shape as the bones in the adult. In the same way we have ascertained that the marginal bones are mere ossifications of the skin, and by no means to be compared with the long bridges which connect the true ribs and the sternum in Birds, as Geoffroy, and after him, Duméril and Bibron, believed.² We found, farther, that that strange crosspiece, the foremost transverse bone in the carapace, is a regular skeleton bone, though I do not venture to call it either a rib or a transverse process of the last neck vertebra, as one might perhaps think it to be. There are limits to explaining and homologizing. We cannot make up a Bird from the bones of a Turtle, nor a Man from the bones of a Fish, as some anatomists have recently tried to do, who misunderstood the great thoughts of Oken and other philosophers respecting the structure of the skeleton.

If we go back to the earliest stages of growth of the Testudinata to ascertain the true character of their bony shield, it will be easy to show that the bony walls which, in the adults, form the dorsal and pectoral shields, consist at first simply of cells, out of which the skeleton, the muscles, and the skin are formed in the end, in all Vertebrates, and that it is not the skin only which is here absorbed into the skeleton, but the whole animal wall. This view of the case may render more intelligible the apparently abnormal position of the limbs, and the mode of attachment of the pectoral muscles.

SECTION VI.

THE SKELETON.

Head. The skull in the Turtles is more solid and compact than in the Saurians and Ophidians; the bones of the face, in particular, are immovably fixed to the skull-box; the os quadratum is also soldered to it by a tight suture as in Crocodiles and in Mammalia, while in the other Reptiles and in Birds it is jointed to the skull only by ligaments and a socket. The lower jaw is formed of one solid, bony arch, the soft symphysis between its branches having entirely disappeared as in Birds, while in Saurians this symphysis always remains more or less carti-

¹ See Rathke, Ueber die Entwicklung der Schildkröten, p. 122.

² Geoffroy, in Annales du Muséum, vol. xiv. Duméril and Bibron, in Erpétologie générale, vol. i.