

of the body of each vertebra.* Frequently the sides do not quite meet, and the leaves, which are developed from the upper surfaces of the vertebræ, now form arches over the spinal cord, and are united above by spinous processes. Yet the whole skeleton in these fishes remains in the incipient stage of ossification, being more or less cartilaginous; and where the ossific process has begun, it has not advanced the length of producing union between the pieces formed from the separate centres of ossification. Where they meet without uniting, they form no sutures, but overlap one another. Thus the bony structures are detached, and often completely isolated; affording to the physiologist an opportunity of studying the earlier stages of this interesting process, and marking with distinctness the number of the elements of each bone, and the relative situations of their centres. This knowledge is more especially of importance towards understanding the formation and connexions of the bones of the head, which are very numerous and complicated; and the investigation of which has been prosecuted with extraordinary diligence by Geoffroy St. Hilaire and other continental zootomists.

It is here, more especially, that we obtain the clearest evidence of the derivation of the cranial bones from vertebræ analogous to those of the spine. The occipital bone, in particular, corresponds to a spinal vertebra in all its essential elements. In many fishes, the body of this bone, being lengthened out to form the posterior part of the basis of the skull, becomes the basilar portion. We find, on its posterior surface, the same cup-like cavity as in the true vertebræ, and it is joined to the next vertebra in the same manner as the spinal vertebræ are joined to each other. Its crest has

* A small aperture still remains, establishing a communication between the cavities the whole length of the spine. This is supposed to be designed to obviate the compression of the fluid in the different cells or cavities during the motions of the spine. The vertical sections, Fig. 189 and 190, of two contiguous vertebræ in different fishes, will convey an idea of this gradation of development.