

be somewhat less marked than in the anterior swelling, but in which the original significance as parts of the central system should still be indicated either by histological or by embryological features.

To these latter conditions nothing can answer in the Vertebrate nervous system excepting the so-called *ramus lateralis vagi*. It is present in all Vertebrates above *Amphioxus*, long and important in the aquatic Ichthyopsida, gradually disappearing when the aquatic medium is exchanged for an air-breathing existence, and finally only retained in the higher Vertebrates as the inconspicuous *ramus auricularis vagi*.

Its course is indeed strictly lateral, and has always been a puzzle to anatomists. Stannius¹ characterises the existence and the course of this sensory nerve along the trunk down to the tail as "one of the most interesting facts of anatomy."

None the less startling is its development. Whilst Balfour attempted in this respect to bring it on one line with the other parts of the peripheral nervous system, the corresponding results of Semper, Goette, van Wijhe, and Hoffmann are all in the contrary direction. They have seen the *nervus lateralis* appear as *an independent product of the epiblast*, arising *in loco* along its whole length, its formation often even preceding that of the spinal nerves. These results have again been fully confirmed and definitely established by the latest investigator of the problem, Beard,² who also gives a detailed description and figures of the connection between the *nervus lateralis* and the *vagus ganglion*, both of them so much more massive and conspicuous in early embryonic stages than later on.

And now that we are attempting to find out whether there is a possibility of comparing the lateral nerve-stems of lower worms with the *nervus lateralis* of Vertebrata, we are naturally led to consider, in the second place, the question whether the anterior swellings of these lateral stems (the paired brain-lobes of the worm) may have their morphological equivalents, their remnants, in the set of anterior nervous swellings that are found in the head on a level with the *nervus lateralis*, and longitudinally connected with it; viz., the variable set of ganglia of the cephalic nerves.

As to the origin of these ganglia of the cranial nerves I have no observations of my own, and must rely on the data of other observers.

It is suggestive to give the opinion of the three latest investigators of the development of these organs in different groups of Vertebrates in their own words.

Professor A. Froriep,³ who studied Mammalian embryos, writes (*loc. cit.*, p. 35):—"The ganglia (of *facialis*, *glossopharyngeus*, and *vagus*) enter into a peculiar, very intimate connection with the epiderm"; further (p. 40), "these ganglionic connections with the epiderm must probably be regarded as rudiments of organs which have phylogenetically

¹ Das peripherische Nervensystem der Fische, p. 108.

² The System of Branchial Sense-Organs, &c., in Ichthyopsida, *Quart. Journ. Micr. Sci.*, November 1885, p. 95.

³ Ueber Anlagen von Sinnesorganen am *Facialis*, &c., *Archiv f. Anat. u. Phys.*, 1885, Anat. Abth.