

skin, the sensory thickening begins to grow backwards along the lateral surface of the trunk. This thickening is the rudiment of the so-called lateral line. . . . The so-called lateral nerve is formed from the deeper portion of the sensory thickening. . . . That there is no actual growth backwards of the nerve is obvious enough."

Recapitulating, we must acknowledge that the mode of origin of the ganglia of the cephalic nerves, as described by these authors, is certainly a peculiar one—a mode of development *sui generis*. One of Beard's accompanying diagrammatic figures, reproduced in Wiedersheim's second edition (1886) of the *Lehrbuch der Vergleichenden Anatomie* as woodcut No. 265, moreover, shows how the position of the cephalic ganglion, developing as an ectodermal proliferation, is in this early stage eminently lateral, a conclusion corroborated by the figures of his actual sections. This primitive position is, of course, gradually lost, and could never be predicted from a study of these ganglia and their position and significance in the adult animal. Yet it is not without significance, when seen in the light of the suggestion here brought forward. And that the interpretation of the phenomena in question as given by these authors is not universally accepted, thus leaving room for new suggestions, is proved by the following citation from Ransom's and d'Arcy Thompson's latest article,<sup>1</sup> running as follows:—"Although the lamprey presents a well-marked lateralis nerve, it has not also a regular lateral line, for the sense-organs of the skin are scattered and without segmental arrangement. The sense-organs do not, therefore, appear to be in direct relation with the spinal ganglia, and the view of the close connection between them (Spencer, Beard, Froriep) does not receive support. . . . It seems more natural to consider the lateralis as a relic of the extensive and irregular commissure system connecting the posterior roots of *Amphioxus*."

Passing from a consideration of the embryonic ganglia to their connection in the adults, I must mention the connection of the ramus lateralis vagi with cephalic nerves anterior to the vagus. I will not here give a description of the numerous varieties presented by this nervous connection, but merely refer to the arrangement in Vertebrates so low as the lampreys. We there find, according to Johannes Müller, the ramus lateralis originating from the seventh as well as from the tenth pair of cephalic nerves, and if we compare the very satisfactory figure which was only lately<sup>2</sup> given by Ahlborn of this arrangement, we must recognise that this nervous connection is important, and has more the aspect of a direct forward continuation of the nervus lateralis than of a sensory branch from the facialis, establishing a connection between it and the vagus.

Ahlborn mentions the existence of a similar connecting stem reaching further forward still, and connecting the trigeminus and facialis. How these connections vary in the different adult Vertebrata will not be discussed here.

The different facts and speculations here brought forward in connection with the

<sup>1</sup> On the Spinal and Visceral Nerves of Cyclostomata, *Zool. Anzeiger*, No. 227, July 1886.

<sup>2</sup> *Zeitschr. f. wiss. Zool.*, Bd. xl, pl. xviii.