

Hertwigs' objections, and maintains that these naturalists have furnished arguments in favour of his hypothesis rather than of their own interpretation (*loc. cit.*, p. 205). Kleinenberg holds that the naked nerve-cells of *Hydra*, that are in mutual and direct communication, may transmit a stimulus by contact without the intervention of a delicate network of inter-cellular protoplasmic threads forming a network. He, moreover, holds that the epithelial cells had all of them the double significance of nerve-cells and muscle-cells, *i.e.*, were true neuro-muscular cells before further division of labour set in, whereas the Hertwigs maintain that this division of labour took place between epithelial cells that were not yet physiologically so far differentiated.

A nerve plexus, which covers a very large surface, was actually demonstrated by the brothers Hertwig not only in *Actinia* and other Coelenterata but also in the Chætognatha. Of the latter O. Hertwig says:¹—

“By the fact of the nerve-fibres crossing and decussating in the most complex and diverse ways, there is formed a nerve plexus which spreads over the whole surface of the body, and in which the above described nerve-stems represent the single collecting tracts.”

A more or less similar plexiform arrangement of nerve-tissue has since been demonstrated in nearly all the lower groups of invertebrates, Annelids² and Arthropods excepted. Thus in the works of Lovén, Greeff, Teuscher, Ludwig, and Carpenter the nervous system of the Echinoderms is described as offering many analogies with the type propounded as the most primitive by the Hertwigs.

Nemertea, Turbellaria, Trematodes, and Cestodes can now be very fully compared, as far as their nervous system is concerned, with Hertwig's starting point, when we consider the results obtained by myself (IX, X)—which were afterwards confirmed (II) by Dewoletzky—for Nemertea; by Lang, Graff, and Pintner for Turbellaria, Trematodes, and Cestodes.

Among aberrant forms one of the most striking examples of a thick epiblastic nerve-plexus with longitudinal collecting tracts is offered by *Balanoglossus*, as described by Spengel and more lately by Bateson. We shall have occasion again to refer to this interesting nervous system further on.

For Mollusca, remnants of a more or less plexiform arrangement were found to exist in the Amphineura by myself³ (*Proneomenia*) and by Haller⁴ (*Chiton*), and also in other groups of Mollusca by Semper,⁵ Simroth,⁶ and others.

¹ Die Chætognathen, p. 34.

² Lately Fraipont (*Archives de Biologie*, 1884, p. 274) has demonstrated the presence of an intermuscular nervous plexus in *Polygordius*, *Protodrilus*, and *Saccocirrus*, and thus opened the possibility of also bringing the Annelids within the region of comparison so far as this point of their organisation goes. Bergh describes a nerve-plexus in the larval *Aulostoma* (*Arbeit. Zool. Zoot. Inst. Würzburg*, Bd. vii. p. 238). As to Arthropods there are facts which also point in the same direction, *e.g.*, that Hoek mentions “a continuous network of ganglia and nerves” on the inner surface of the integument in Pycnogonida (*Zool. Chall. Exp.*, pt. x. p. 116).

³ *Niederländ. Archiv f. Zool.*, Suppl. Band, 1881.

⁴ *Zool. Anzeiger*, No. 76.

⁵ *Archiv f. Mikr. Anat.*, Bd. xix., p. 124, 1877; *Arbeit. Zool. Zoot. Inst. Würzburg*, Bd. iii., 1877.

⁶ *Zeitschr. f. wiss. Zool.*, Bd. xxxii. p. 304.