

NERVOUS SYSTEM.

With respect to the nervous system, I am indebted to the Challenger collection for very valuable additional data. In former publications (IX, X) I have dwelt at length on the peculiar arrangement of nervous tissue in the Nemertea as I had found it to exist in specimens that were obtained at Naples; I am now enabled to give a more exhaustive description of this important system, and will commence by a short account of certain points in the latest investigations into the nervous apparatus of the lower forms of animal life, in order the better to explain the bearing upon questions of general morphology which the arrangements as we find them in the Nemertea may happen to have.

The general and important conclusions arrived at by Kleinenberg in his classical Memoir on Hydra, conclusions which have since found their way into handbooks and textbooks as Kleinenberg's Theory of the neuro-muscular cells, have of late years been emendated by O. and R. Hertwig. These investigators have propounded a general hypothesis on the phylogenetic development of the nervous system, which in their treatise *Das Nervensystem und die Sinnesorgane der Medusen* (Leipzig, 1878), is formulated (p. 170) as follows:—

“We assume that in all Metazoa the ectoderm from which the (animal) nervous system, with its motor and sensory terminal apparatus, has originated, was primitively constituted of a simple layer of homogeneous cells in the same way as may be noticed everywhere in the earliest ontogenetic stages. We further assume that these cells, or at least part of them, have at an early period entered into mutual connection by protoplasmic processes, and have thus formed a more closely connected cell-stratum. According to our hypothesis, and on the principle of division of labour between the cells thus connected, there has been gradually developed a primitive nerve system out of this connected stratum. Whilst certain of these cells secreted contractile substance, others were provided on their surface with tactile hairs, and a third set acquired very numerous connections, the simple epithelium cells of the one-layered ectoderm thus becoming gradually and more or less simultaneously differentiated into epithelial muscle-cells, sense-cells, and ganglion-cells. Their protoplasmic connections, modified into specific nerve substance, have *pari passu* become converted into a plexus of nerve fibrils. When, later on, the ectoderm became constituted of more than one layer, the ganglion-cells were the first (of all the three elements just mentioned) to separate from the surface epithelium and to acquire a deeper situation.”

Balfour, in his *Comparative Embryology* (vol. ii. p. 333), accepts the leading features of this important hypothesis, partly substituting it for the earlier suggestion of Kleinenberg.

The latter, in his latest publication,¹ revindicates his original theory against the

¹ *Zeitschr. f. wiss. Zool.*, Bd. xliv. p. 204.