

II.—THE DEVELOPMENT OF NERVE CELLS WITH SPECIAL REFERENCE TO THE DEVELOPMENT OF THE CHROMATIC SUBSTANCE OF THE CELL BODY.

Several attempts have been made to determine the origin of the Nissl granules, but all have failed to detect it. Vas made some interesting observations on the chromatin of foetal sympathetic ganglion cells but did not attempt to ascertain the origin of the chromatic substance of the cell body. Eve found the chromatic substance completely filled the cell body at an early date. The cells of the vagus ganglion were the first to show an appearance like the adult cell with regard to the distribution of this substance. Szczawinska, working with selachian embryos, did not trace it further than the stage in which the cells were uniformly stained. Bühler⁵² states that foetal cells are devoid of granules, but does not ascertain the origin of the granular substance. He did, however, notice that the nuclei of young nerve cells are basophile and gradually become oxyphile as development proceeds. Timofeev observed that in chick embryos the basophile substance increased markedly in amount in the cells of the spinal ganglia, between the fourth and sixth day of incubation. He says nothing of its origin and evidently considers it cytoplasmic.

The chromatic substance which forms the Nissl granules is undoubtedly derived from the nuclear chromatin. A series of pig embryos from 7mm. onward to birth was the chief material used for these observations, but calf, sheep, rabbit and chicken embryos were used to confirm the results.

The embryos were fixed in the bichloride-bichromate mixture or in micro-corrosive fluid. Material intended for chemical methods was fixed in alcohol.

The development of the chromatic substance which forms the Nissl granules is closely connected with the morphological development of the cell. His⁵³ showed that the neuroblasts are derived from cells, lying, in mammals, next the medullary canal, which he calls germinating cells. These cells have a protoplasm which may be divided into an outer clear

⁵² L. c., p. 46.

⁵³ His, W., "Die Neuroblasten und deren Entstehung im embryonalen Mark," Arch. f. Anat. u. Phys., Anat. Abth., 1889, p. 249.

Also, "Histogenese und Zusammenhang der Nervenelemente," Arch. f. Anat. u. Phys., Supp., 1890 p. 95.