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A NEW GROUP OF NERVE-CELLS

IN THE

SPINAL CORD OF THE FROG

(RANA PIPIENS AND RANA HALECINA).

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In the posterior (inferior) portion of the brachial enlargement, quite near the third and fourth pairs of spinal nerves, I find a distinct mass of ganglion cells, the nuclei of which measure in rana pipiens about :0125–:015 m.m., and are more nearly spherical than those of the larger cells of the (anterior) inferior horns, or than those of the smallest cells. This fact in regard to the form of the nuclei can be seen in fresh preparations. Anteriorly in longitudinal sections, this mass or column extends, at least in this species (rana pipiens), as far as a plane about three millimeters behind the large brachial nerve roots. The group appears to be a numerous one, and in transverse sections, where it is seen lying near the outer margin of the gray substance, just above the superior border of the central canal; often twelve and sometimes twenty nuclei can be counted. No similar group exists in the spinal cord of rana pipiens, if we except a small one of from three to five cells, seen in transverse sections of the middle portion of the conus medullaris. The location of this group observed both in longitudinal and transverse sections, and the medium size of the nuclei con-

tained in the ganglionic bodies composing it, are two constant characteristics which I have established beyond doubt by the use of sufficient time and material. Karabanowitsch * divides the nerve-cells of the frog's spinal cord into three classes: the largest, the medium-sized, and the smallest cells, basing his division upon measurements of nuclei. His "sensitive cells," or those of the second category, had nuclei measuring :015 m.m., and were therefore taken from the group above described, although the existence of the latter seems to have escaped his notice. He noticed (and his researches were made on comparatively fresh preparations) that the protoplasmic material or cell wall, so called, is less highly colored by carmine than is that of the large inferior (anterior) horn cells. I am able to confirm this observation, but can not agree with him in regarding them as embryonic structures. Reissner † makes two classes only, large and small cells, and refers to none of medium size, nor did he notice or figure any such group as that which I have described.

He noted fully the separation into two groups which occurs just below the second pair of nerves, but here the superior (posterior) group lies in cross-sections below the level of the central canal, and is composed of cells with large nuclei; whereas that which furnishes the subject of this article lies above the superior margin of the canal, and consists of cells with medium-sized nuclei, as before stated. Wyman,‡ on the "Nervous System of Rana Pipiens," found but one distinct group: those of the inferior (anterior) horns, which are repeatedly called posterior horns, although the accompanying cut makes his meaning plain.

Have we here to do with the homologue of Clarke's columns? Gerlach, on the nerve cells of the human spinal cord, in Stricker's "Hand-Book" (translation) states, on page 635: "The largest cells are found in the anterior, the smallest in

* "Ueber den Bau des Rückenmarkes vom Frosche." St. Petersburg, 1872.

† "Der Bau des centralen Nervensystemes der ungeschwänzten Batrachier." Dorpat, 1864.

‡ Published by Smithsonian Institution, Washington, 1853, *vid.* pp. 19, 20.

the posterior horns, and those of medium diameter in that region of the spinal cord lying to the side and a little back of the central canal—the columns of Clarke." The group, then, which we are here considering corresponds, in all points except the extent of space which it occupies antero-posteriorly, with the cells of the lateral columns. The reader is referred to the "Anatomical Hand-Book" of Henle for a careful *résumé* of the work of Clarke and Stilling, and for much original text, with plates on the lateral tracts of the spinal cord, bearing in mind that, as before stated, in the posterior (lower) portion of the lumbar region, a trace of this group is also found in the frog.