"THE CEREBELLUM."

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BY

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PREFACE.

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This Lecture is published at the special request of numerous Surgeons who have been so kind as to refer to me special cases that have occurred in their regular practices.

The fact that the distribution of this publication could not well be restricted, has necessitated a summary of the results of xperiments rather than iteration of them severally.

The information advanced is, of necessity, fragmentary, but it has taken years to cull, and if it tend but slightly to contribute to the elucidation of the important matter of Cerebellum Function, I shall feel more than repaid for the labour it has involved.

Barnes, 1898.

"THE CEREBELLUM."

The whole of the Nervous System, including the sympathetic and peripheral nerves, as also various epithelia and structures,—are derived from the first of the three blastodermic layers,—the Epiblast, Mesoblast, and Hypoblast, with which the student of embryology has to become so familiarized. The study of the development of the brain is replete with exceeding interest and charm, and the reward of the diligent inquirer who, commencing at the pre-natal state, recognizes the primitive changes and follows them onward with a growing wonder and increasing apprehension of their eventual modifications and purposes, until the embryo, through all its stages, has been ushered into the light of life and traced progressively through an amazing complexity of relationships,—the reward of such an one is incapable of verbal expression; it is certainly most profound.

The principal reason why people who approach the study of the brain and its functions go away disappointed, discouraged, and appalled at the immensity of the subject, is because they allow themselves to be deluded in the first instance into a short but altogether wrong method of research. They begin at the wrong end and fondly hope they will be able to master the subject by taking somewhat of a retrospective view of its tenets, rather than a progressive one.

Briefly, the Cerebellum may be described as consisting of two hemispheres or lobes connected centrally by elongated processes termed Versiform. In addition to such connection, there is that of the middle crus—the greater portion of the Pons Varolii being included in it. The remaining adjacent connections are the superior and inferior crura; the former, with the Vieussens' Valve, forming a junction with it and the Cerebrum; the latter answering the same purpose with the Medulla Oblongata. In structure, the Cerebellum consists of grey and white matter,—the white being the internal, and the grey the external. The convolutions are not at all like those of the anterior brain or Cerebrum, and could not by any but the merest novice be confounded with them. Near the centre of the white substance of each Cerebellum lobe is found the corpus dentatum, a capsule not unlike that of the olivary body of the medulla, and easily recognized upon section through the left lateral part of the Pons. In addition to the corpora dentata there are two other grey nuclei, the roof nuclei of Stilling. These are beneath the central lobule of the superior verniform process.

Microscopic examination of a specimen taken through the cortical part of the Cerebellum reveals:—1. Beneath the Pia Mater, a thickish layer of connective tissue containing numerous surface-ascending, fine-branching fibres termed the processes of the Purkinjé cells, also scattered roundish corpuscles. 2. A single layer of large branched nerve-cells, each with a large spherical nucleus containing a single descending process and many ascending branches extending into the external layer and becoming continuous with the corpuscles therein. 3. The granular—nuclear—layer, consisting of large numbers of neuroglia and other corpuscles, some quite small nerve-cells with minute ramificating terminations—one branch, in particular, extending to the molecular layer. 4. The nerve-fibre layer or arbor vitæ:—those bundles of nerve fibres usually spoken of

as the white brain matter because of their characteristic whitish appearance. They extend considerably, in some cases traceable as far as the Purkinjé cells, in others progressing into the molecular layer, thenceforth losing their medullas and dividing and subdividing as a consistence of the layer itself. Thus the molecular layer is rich in connections, for it contains fibres not only from the cells proper and from the nucleus and central grey matters, but from the Purkinjé cells also.

Now the Cerebellum presents three pairs of groups of white fibres,—one proceeding from the cerebrum, one from the medulla oblongata, and the other principaly transversely commissural. This last pair, familiarly known by the name of restiform bodies, are the inferior peduncles. The first pair, or superior peduncles, proceed almost entirely from the cerebral peduncle tegmentum. They pass to the convolutions via the corpora dentata and comprise the processus e cerebello ad testes with the intermediate Vieussens' valve. The second pair, or middle peduncles, consist mainly of the transverse fibres of the Pons but comprise also the cerebellar fibres derived from the crust of the cerebral peduncles.

The most direct and immediate communication between the cerebrum and cerebellum hemispheres is by decussating fibres originating in the cerebral ganglia which pass backward and ramificate in the imbedded ganglia of the white cerebellum substance. These fibres are severally derived from the crust and from the crura cerebri tegmentum. The cerebrum and the cerebellum combine in contributing fibres toward the formation of the medulla oblongata, continued in the one place from the layers of the crura cerebri, in the other from the restiform bodies.

The central lobe of the Cerebellum is the only part susceptible to irritation, and, inasmuch as it can be traumatically removed in section, one is not surprised