

Aquilano. The author finds that the largest skulls are those of the Mediterranean race, and dolicho-mesocephalic, not—as he had expected, and as some authorities state—the brachycephalic. While this result may, doubtless, be accepted for Italy, we need not, therefore, on this account refuse to accept the opposed result obtained by many recent investigators in other countries (the Tyrol, Holland, etc.). Giuffrida-Ruggeri has carefully worked out the relation of the male to the female skull, and finds that for the whole of the country it is 100 to 89.6; as compared with other countries this is a medium result, and the author considers that 90 to 100 may be considered as the average relation of the capacity of the feminine skull to that of the masculine skull. It is a clearly written, interesting, and useful paper.

HAVELOCK ELLIS.

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## 2. Neurology.

*The True Motor Centres* [*Die Wahren Centren der Bewegung*]. (*Neur. Cbl.*, Dec. 2nd, 1904.) Adamkiewicz.

Dr. Adamkiewicz observes that ever since Fritsch and Hitzig in 1870 showed that, on electrical irritation of the cortex of the cerebrum, groups of muscles functionally related could be excited, it was thought proved that the cortex was the starting-point of the movements of the body and had motor functions. He claims to have shown in 1889<sup>(1)</sup> that by the destruction of the cortex cerebri the animal only loses the psychical functions of thought, of feeling, and of will, but not the capacity for movements, which is quite unaffected. An animal without the cerebrum retains its natural attitude and performs all the movements of the body if artificially excited. On the contrary, it has not the power to initiate any movements. It follows from this that the cortex does not belong to the motor apparatus, but it is the organ in which all psychical action arises, and from which issue excitations for the movements of the body.

The common opinion is that the will arising from the cortex sends its impulses through the corona radiata, the inner capsule, and the crura cerebri down to the direct and crossed pyramidal tract, and thence through the anterior roots of the spinal nerve, whereby contractions of particular muscular groups are excited. This view confused the psychical and motor parts of the apparatus of the will in an unphysiological manner. There was no definite limit, where the organ of the will ended and the motor apparatus began. But we may infer from the size and structure of the mass of grey matter that such a division exists, and that this mass must contain, arranged in a regular manner, not only all the centres of the movements of the body, which, since Fritsch's and Hitzig's time, have been erroneously assigned to the cortex, but also arrangements for the conveyance of those excitations which come from the anterior parts of the cortex, those of representation and will. That the basal ganglia of the hemispheres can be either the motor centres of the movements of the body

or the principal organs of this great function is contradicted by their anatomical connections, from which it follows that they are rather presiding organs (*Schalt organe*) of certain parts of the brain than the principal bonds of connection of the brain with the whole motor apparatus.

We must therefore seek in another place for the central organ of the bodily movements. The origin of muscular movements, which as regards physiological function stands next to mentalization, would bespeak the largest portion of the central nervous system after the cerebrum. These considerations induced Dr. Adamkiewicz to seek in the cerebellum the central organ for bodily movement. Laborious experiments, begun in 1900 and now concluded, have confirmed these suppositions and led to the following conclusions.

The cerebellum is the main organ of movement, as the cerebrum is the main organ of the mental function. The destruction of the cortex cerebri puts an end to the mental functions without altering the motor mechanism injury to the cerebellum suspends the whole function of movement without harming the psychical function; and as there are especial functional areas in the cortex so there are especial areas in the substance of the cerebellum for particular combined movements. As on the surface of the hemispheres there is a localisation of the mental function, so there is on the surface of the cerebellum a localisation for motor functions, motor centres for the head, the trunk, and the extremities. These centres have a separate and fixed situation. They are on the same side as the muscular groups to which they transmit impulses. The muscles of the extremities are represented in the cerebellum with triple centres. Each anterior and posterior extremity has its own motor centre, and there is another for these two combined, besides a common centre for all the four limbs. The whole four are therefore represented in the cerebellum by seven motor centres. These views the Professor proposes to demonstrate in a coming work.

WILLIAM W. IRELAND.

(<sup>1</sup>) "Die Pathologie des Gehirns," *Sitzungsber. d. k. Akad. der Wissensch. zu Wien. Math.-naturw. Cl.* lxxxviii. S. 113 ff.—(<sup>2</sup>) *Die Funktionsstörungen des Grosshirns.* Berlin, 1898, Hans Th. Hoffmann.

*On Localisation of the Functions of the Cerebellum* [*Saggio di localizzazioni Cerebellari*]. (*Riv. de Pathol. Nerv. e. Ment.*, May, 1904.) Pagano, G.

Dr. Joseph Pagano has also been investigating the functions of this structure which has so much perplexed physiologists. He observes that Weir Mitchell was the first to show that the cerebellar cortex responded to artificial stimuli. Nothnagel came to the conclusion that excitations of the cerebellum provoke muscular contractions on the same side of the body, and Ferrier demonstrated the existence of pains which influenced the movements of the eyes as well as of the head, limbs, and pupils. Mendelssohn, using weak electrical currents, was unable to confirm Ferrier's localisation, but he found that electrical excitation of the cerebellum provoked movements of the eyes and of some other parts of the same side of the body. Arguing from the well-observed influence of lesions of one side of the cerebellum on the same side of the body,