

It has further been demonstrated by Semon and Horsley that excitation of the lower extremity of the ascending frontal convolution causes phonatory closure of the vocal cords.

The areas for the head and eyes, arm and leg, extend over the margin of the hemisphere into the mesial aspect or marginal convolution.

Excitation of this marginal convolution from before backwards causes movements of the spine, tail, and pelvis; behind these, extension of the hip, flexion of the leg, and lastly, movement of the foot and toes.

Stimulation of the angular gyrus causes movements of the eyeballs, and occasionally of the head, to the opposite side.

Excitation of the occipital lobe causes movements of the eyeballs, but less constant and less easily excited than from stimulation of the angular gyrus.

Stimulation of the superior temporal gyrus causes pricking of the opposite ear, opening of the eyes, dilatation of the pupils, and direction of the head and eyes to the opposite side.

Stimulation of the hippocampal lobule or anterior extremity of the hippocampal gyrus in monkeys, dogs, cats, and rabbits, cause torsion of the nostril on the same side, as if from irritation applied directly to the nostril itself.

Whether complete parallelism obtains between the brain of the monkey and the brain of man is a question which, until recently, could only be answered by reference to the facts of localized lesions.

Movements of the opposite sides of the body have been observed by stimulation of the cortex through the dura mater. Recently, surgeons have, on many occasions, resorted to gentle faradization of the cortex, in order to define accurately the regions which they desired to extirpate for the cure of focal epilepsy. One case has been reported by Horsley, another by Keen. The results correspond very closely with the position of the various centres as already defined.

Two other cases are recorded, and the following comment is made: All these results are in close harmony with those obtained on stimulation of the cortex of the brain of the monkey; therefore, we have reason to believe that, *cæteris paribus*, the functional relations of the human cortex are identical with those of the lower animals.

Facts may be adduced which justify the conclusion that the areas, as a whole, are as completely differentiated from each other as the limbs themselves, or one organ of sense from another.

The question as to the signification of the motor reactions which result from the electrical stimulation of the different cortical regions is disputed. The method of excitation itself is not competent to solve these questions, and requires, as a complement, the strictly localised destruction of those areas, stimulation of which gives rise to definite motor reactions.

A careful consideration of the reactions in different orders of animals, and the fact that similar movements are in some cases excitable from different cortical regions, led Ferrier to believe that they might have various significations, and he formed the hypothesis that some might be due to stimulation of motor regions proper, while others might be looked upon as the associated expression of subjected sensation. On this hypothesis he instituted localized destructive experiments, and thus determined the existence of sensory or perceptive centres, respectively related to the different forms of sensibility, as well as of centres, more especially, if not exclusively, motor in character.

The existence of distinct sensory centres has been confirmed by succeeding physiologists and clinical research, and Ferrier has the satisfaction of thinking that such errors as he has committed in the delimitation of the various sensory regions have been errors more of omission than of commission, and that the localities in which he originally fixed the respective sensory areas correspond, in part at least, with the position assigned to them by the most reliable experimental clinical methods.

(To be continued.)

## THE PATHOLOGY OF GENU VALGUM, OR KNOCK-KNEE.

BY PROFESSOR HUMPHRY, F.R.S.

Mr. Keetley's paper on "Genu Valgum" in the number of the *Illustrated Medical News* for December 7, suggests to me to make a few remarks on the pathology of the affection.

I have for many years taught that the *essential* feature of genu valgum is a *deficiency in growth at the outer part of the lower epiphysial*