next great advance in cerebral localization was made by Hughlings Jackson (1861), who, from a study of the forms of epilepsy, now appropriately known by his name, furnished cogent reasons for believing that certain convolutions near, and functionally related to, the corpus striatum had a direct motor significance. The whole subject of cerebral physiology and pathology was revolutionized by the discovery, first made by Fritsch and Kitzig in 1870, that certain definite movements could be excited by the direct application of electrical stimulation to the definite regions of the cortex cerebri in dogs.

The characters and conditions of the excitability of the cerebral cortex were discussed. In normal states, the grey matter of the cortex is entirely, or almost entirely, insensible to mechanical stimulation; when, however, the cortex becomes inflamed and congested by exposure, or traumatic lesion, it becomes irritable to mechanical stimulation. The most effective excitant is the application, by closely-approximated electrodes, of a galvanic or a faradic current of moderate intensity. When an animal is sufficiently narcotised to abolish all restless or spontaneous movements—and the anæsthesia must not be too profound, else all reactions cease—the application of the electrodes to different regions calls forth definite motor reactions with such uniformity that, when once the limits of the said region have been accurately defined, one may confidently predict the exact movement which will occur in animals of the same species. This fact, which is beyond all dispute, has been frequently demonstrated by Ferrier, Horsley, and others. The chief objection to the direct excitability of the cortex itself is found in the fact that, even after removal of the cortex, similar reactions are still obtainable when the electrodes are placed on the subjacent medullary fibres. It is, *a priori*, most likely that there is also functional differentiation of the cortical centres to which the medullary fibres are distributed, and that the grey matter is, under normal conditions, the natural excitant of the reactions which we are able to produce by artificial stimulation with the electric current, and a comparison of the respective reactions of the cortex and medullary fibres indicates such differences as can only be explained on the supposition that the cortical centres are themselves excitable. A much stronger current is necessary to produce the ordinary reaction by exciting the medullary fibres. The time lost between the application of the stimulus and the occurrence of the muscular contraction is much greater in the case of the cortex than in that of the medullary fibres. The significance of this fact is, that the grey matter does not act like an inert layer which merely allows transmission of the electric current to the medullary fibres, but like other nerve centres, stores up and transforms the stimuli which it has received into its own energy. There is also a characteristic difference in the muscular curves registered on stimulation of the cortex and medullary fibres respectively. The effects of localized destruction of the cortex are the counterpart of those of irritation, however produced, and we may conclude from this that there is the same functional differentiation of the cortex as in the medullary fibres.

The lecturer then described in detail the phenomena of electrical irritation of the brain of the monkey, more especially as determined by his own experiments and those of Horsley, Schafer, and Beevor, which, though in all essentials confirming his own, have been marked out with more elaborate detail and minuteness.

The *prefrontal lobe* gives no, or very doubtful, response to electrical stimulation. *Behind this and anterior to the precentral sulcus*, stimulation causes opening of the eyes, dilatation of the pupils, and movements of the head and eyes to the opposite side. At the upper extremity of the central convolutions—ascending frontal, ascending parietal, and postero-parietal lobule—and extending over the margin of the hemisphere into the posterior part of the marginal convolution, or para-central lobule, electrical stimulation causes movements of the lower extremities.

Below the leg area and partly in front of it and occupying the middle third, or rather two-fourths, of the central convolutions, there is a region, stimulation of which causes movements of the upper extremity. Corresponding regions were indicated in the brain of the dog, cat, and rabbit.

Below the arm area, and occupying the lower third of the central convolutions there is a region, stimulation of which causes movements of the face, mouth, and tongue.