The Localisation of Cerebral Disease: being the Gulstonian Lectures of the Royal College of Physicians for 1878. By David Ferrier, M.D., F.R.S., &c. London: Smith, Elder & Co. 1878.

It is now about nine years since Hitzig’s and Fritsch’s experiments first attracted public attention to the question of the possibility of localising the centres of motion and sensation in the cortical structure of the brain. Dr. Ferrier has followed up the researches of these physiologists with untiring industry, and his deductions from experimental, as well as from clinical and pathological observation, have met with the most indiscriminate approval from the leading medical periodicals. That he himself does not feel so confident of the result of his inquiries may be inferred from the following passages from his Lectures:—

"Notwithstanding all the laborious researches and speculations which have been directed towards the elucidation of this subject, we do not seem yet to have arrived at any general agreement, except on a very few propositions, some of these even now contested: a position contrasting strongly and unfavourably with the state of our knowledge respecting almost every other organ and function in the body."

"It is not very difficult to discover many causes of this obscurity and confusion. Two of these only I will mention as being specially worthy of note.

"1. It may be asserted without fear of contradiction, that as regards the nervous system more particularly, morbid anatomy is far from being co-extensive with pathology. We know, and are every day confronted with the fact, that the most widely abnormal deviations from healthy functional activity of the nerve-centres may be manifested, which leave no trace discoverable by ordinary dissection, or even by any of our most advanced methods of investigation. For the sake of mental satisfaction, we are constrained to speculate on the intimate molecular changes in the nerve-tissues which lie at the root of neuralgia, convulsions, and various other forms of functional nervous disorder; but they are at present matters only of speculation, and lie beyond the sphere of verification."
"2. The organisation and conditions of activity of the brain are such that we are naturally inclined to believe that interference at any one point must necessarily tend to a general functionary disturbance. The loosening of a pin in a chronometer, it has been said, will derange the whole time-keeping mechanism, but we should not on that account ascribe time-keeping functions to the one part exclusively. So in all cases of cerebral disease, there is a continual source of doubt as to whether the effects are the direct consequences of the lesion, or merely the expression of general functional derangement.

"And when we examine the actual facts and records of cerebral disease, we find in apparently similar conditions so much diversity, that it seems almost impossible, from a clinical point of view, to separate accidental from essential, to distinguish between direct and indirect consequences, or to determine whether phenomena are related by causation, or are mere cases of juxtaposition or co-existence. Nor do the facts of experimental physiology seem so consistent with themselves, or with the undoubted facts of clinical research, as to inspire us with unhesitating confidence as to their accuracy, or as to their applicability to human pathology."

Dr. Ferrier endeavours to meet these objections by observing, that it is not invariably necessary to prove that organic lesions exist in the localised centres, because their functions are deranged. He then proceeds to state dogmatically, "as an axiom," that when mental aberrations, of whatever nature, are manifested, the brain is diseased organically or functionally. Dr. Ferrier is premature in speaking so positively on this point; there are many eminent psychological physicians who do not subscribe to this dogma, and we would refer our readers to an admirable article by Dr. W. A. F. Browne, in the Journal of Psychological Medicine for October 1876, entitled "Problems for Pathologists."

When Dr. Ferrier asserts that he cannot find the slightest evidence to prove that the same parts may be destroyed in both hemispheres of the brain without producing mental disturbance, and presumes that this is in favour of a localisation of mental functions—confounding mental faculties with bodily functions—it is plain that he is not cognisant of all that has been written on the subject, both at home and on the Continent. Dr. Bateman, in his "Darwinism tested by Language," mentions the case recorded by Velpeau, of a patient in whom both the anterior lobes of the brain were destroyed by a cancerous tumour, without his speech being affected. (See Gazette des Hôpitaux from April to June 1865.) He mentions another case—one recorded by M. Peter—of a man who fractured
his skull by a fall from a horse, and, after recovering from the initial stupor, regained the power of speech, though after death the two frontal lobes were found to be reduced to a pulp. There is another crucial instance, which we first mentioned in an article on "Materialistic Physiology," in the Journal of Psychological Medicine for April 1877. The case was briefly as follows: The patient was admitted into St. Mary's Hospital, suffering from syphilitic disease of the frontal bones. During the week that he was in the hospital, his mental faculties were not impaired, though after death it was found that the anterior lobes of both hemispheres were entirely disorganised. The particulars of the case were furnished to us by Mr. Alfred Eugenius Roche. We therefore think Dr. Ferrier very premature in affirming, as he does at page 94, in reference to the supposed connection between aphasia and lesion of Broca's region, that it "is no longer merely an empirical generalisation, but a derivative law, which in my opinion is established on as firm grounds as any other fact in scientific medicine." But we think we have shown that he has not yet proved that the localisation theory is a great discovery, or unquestioned fact, like the circulation of the blood or the reflex function of the nervous system.

Before entering upon the discussion of the clinical and pathological aspect of the theory of localisation, he candidly acknowledges that we are not to expect too much from it, for he says, "but for the aid of physiological experiment, pathology would not even yet have succeeded in arriving at much beyond general indications."

In the motor area Dr. Ferrier includes "the bases of the three frontal convolutions, with those bounding the fissure of Rolands, viz., the ascending frontal, or anterior central (Ecker); the ascending parietal or posterior central (Ecker), with its superior continuation, termed the postero-parietal, or superior parietal (Ecker) lobule; together with the internal aspect of the same, which by our French brethren is generally called the paracentral lobule." Definite portions of the motor area are supposed to have especial influence on the movements of the leg, hand, facial, oral, and lingual muscles of the opposite side.

Dr. Ferrier affirms that after careful investigation he has not been able to find convincing proof of a destructive lesion in the motor area which was not associated with motor paralysis. Brown-Séquard, however, believes that in all cases of paralysis from cortical lesion, there is something that intervenes between the antecedent and the ensuing effect—a sort of inhibitory influence, exercised by the lesion on the centres which are supposed to possess the lost functions.
The greater part of Dr. Ferrier's work consists of detailed, reports of upwards of seventy cases of lesions of the brain extracted from the writings of leading authorities on cerebral pathology, which he thinks support his views; they are illustrated by diagrams, and we recommend them to the attention of our readers. We do not, however, consider them conclusive, but we are far from desiring to check the spirit of inquiry; we only object to the hasty manner in which he has drawn his general inferences. I may mention one instance especially—one in which Brown-Sequard differs from him, the theory of cross-currents. This author enumerates no less than two hundred cases of paralysis occurring on the same side of the brain. With this and innumerable other exceptions, the neurologists should not be quite so indiscriminate in their admiration of the localising theory, as if it were a recognised law. One exception would be fatal to any law, even to the law of gravity. They should take warning from the fate of the theory of evolution, which is falling to pieces under the scientific shots which have riddled it to its very centre.

The conclusion of Dr. Ferrier's work shows that in spite of the confident tone which he has assumed, he has secret misgivings as to the ultimate success of that part of his theory which relates to sensory centres:—

"I have now brought under your notice a considerable number of facts, both positive and negative, in reference to the localisation of special sensory regions in the human brain; and though the positive clinical evidence is as yet comparatively scanty, and leaves much to be desired, I entertain the hope and belief that it will not long remain so. And I trust that those who rely more on the evidence of human pathology and the phenomena of disease than on the facts of experiment, even on the most human of the lower animals, and do not therefore share my own very decided convictions as to the localisation of special sensory regions, will take the facts I have adduced into careful consideration, and when opportunities occur, investigate the conditions as to sensation in cerebral disease with rigorous care and exactitude. For only thus are we likely to arrive at a solution of the doubts and difficulties which still surround this important question."

A scientific worker may make a thousand experiments without having the good fortune to make a valuable discovery; therefore, though willingly according to Dr. Ferrier all honour for his industry and genuine love of science, we cannot place him in the same rank with those who have been able to establish a great and general principle.

J. M. W.