inco-ordination of the part in connection with the damaged part.

Dr. Thomas is to be congratulated on an excellent work, the result of much patient research and compilation. Undoubtedly the best part of the book is the anatomical section. The book suffers somewhat from repetition and numerous *résumés*. Like many foreign works, it lacks an index, but the orderly way in which the subject-matter is arranged compensates somewhat. It is well illustrated, most of the drawings being original.

De l'interdépendance functionelle des centres corticaux du langage. By Dr. Fitz Sano. (*Journal de Neurologie et d'Hypnologie*, 1897.)

Sano begins his paper by a detailed account of an interesting case of aphasia resulting from softening of the posterior third of the superior temporal convolution, and the posterior two thirds of the supra-marginal convolution of the left side. The patient suffered from word-deafness, alexia, agraphia, jargonophasia, and paraphasia, and although he could repeat words that were said to him he soon forgot them. Sano accepts the usual opinion as to the position of the visual, auditory, and motor speech centres, but does not think that there is a special writing centre. His view of the physiology of speech is that there are originally the sensory motor centres, which are in early life connected directly with each other by association fibres (the primitive paths). As life progresses further paths develop, leading to certain co-ordinating or association centres, where the various impressions received are co-ordinated into ideas. Speech is the result of the *combined action* of all these centres, and injury to any one of them impairs speech, since the motor, visual, auditory, and co-ordinating impulses are all equally necessary for the perfect conception of words. Sano does not think there is any necessity for the hypothetical ideation centre, since the "idea" of the word is simply the result of the co-ordination of certain motor acts and sensory impressions. Of these centres the auditory is the most important, since hearing is primordial, and speech and writing are subsequently acquired by the memory of the sound of words.

Sano accepts the usual subdivision of aphasia into motor,

sensory, and complete. Like Déjerine, he distinguishes a pure aphasia, when the centre is left intact but the centrifugal or centripetal fibres are destroyed. In such case there may be word-blindness, or word-deafness, or incapacity for speech, but intelligence and internal speech are unaffected, since none of the centres have been attacked. He is of the opinion that transcortical aphasias, resulting from lesions of the associating fibres between the centres, are purely theoretical. Anatomical grounds for his views are put clearly forward, and there are accounts of the modes of partial recovery and partial preservation of speech in cases of aphasia. In addition there is a criticism of the various schemes of the mechanism of aphasia advanced by Kussmal, Bastian, Crocq, and others.

The paper is one of great interest, and should be read in the original, as it is not one that can be easily condensed into a digest.

Les localisations motrices dans la moelle lumbo-sacrée. By Fitz Sano. Société Belge de Neurologie, 1897.

In this paper Sano advances the opinion that there are within the cord certain definite groups of cells, which act as nuclei to certain muscles or groups of muscles, and that these nuclei are as distinct and invariable as, for instance, the subdivisions of the oculo-motor nucleus into groups of cells supplying the various ocular muscles. His opinion is supported by the examination of the spinal cord in four cases of amputation in the human subject. He found that there were definite changes in certain groups of nerve-cells in the anterior horn. These changes were similar to those described as *réaction à distance* by M. Marinesco and others, except that having reached a certain stage of chromatolysis they remained without further alteration for seven months in one case, and beyond being eccentric in position, the nucleus continued healthy. Sano was further supported in his opinion by the results obtained by injecting the vessels of the cord of a cat. He found that there was distinct evidence that many of these groups of cells or nuclei had terminal vessels and definite blood-supply. The nuclei which Sano was able to localise were as follows:—The muscles of the foot and leg are supplied by a nucleus in the dorso-lateral group of the anterior horn cells between the fourth sacral and third lumbar segments; the glutei by an antero-lateral group between the