

3. *Dutch Retrospect.*

"*Over de Pathogenese der Epilepsie:*" *Nederlandsche Tijdschrift voor Geneeskunde*, No. 1. 1888. Dr. G. JELGERSMA, Fourth Medical Officer at Meerenberg Asylum.

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In an exhaustive and interesting essay under the above heading Dr. G. Jelgersma treats in the "*Nederlandsche Tijdschrift voor Geneeskunde*" regarding our present knowledge as to the pathology of epilepsy and epileptiform affections. He commences with a short historical sketch. The first who, after a laborious experimental investigation, pronounced a definite opinion as to the origin of this malady was Nothnagel. Tenner and Kussmaul had already before him worked in the same direction and furnished material which Nothnagel utilized for propounding his theory; but these investigations were not conclusive, and it was Nothnagel who first completed them. Most of these experiments were published at different times in Virchow's "*Archiv*;" the theory itself, fully elaborated, is to be found in v. Ziemssen's "*Handbuch*," wherein Nothnagel has written a monograph on the subject of epilepsy. Nothnagel found that he could by irritation of the pons Varolii induce contraction of the voluntary muscles of the body (placing in this region his so-called "contraction centre"), but he could not convince himself with certainty whether consciousness was present or absent in the subjects of his experiments. "The adoption of this hypothetical 'contraction centre,' a centre which under normal circumstances is never called into function, is a somewhat hazardous supposition; but if we regard him to mean this as a rendezvous for motor innervation we may, considering the degree of the then existing anatomical knowledge, let it stand—at the present moment we can, however, assert more definitely that such a theoretical centre does not exist. The ganglion cells of the pons may have many connections, but with the direct pyramidal tracts they are in all likelihood not united; and as regards the large motor ganglion cells in the region of the fourth ventricle these are bound together, like the usual reflex centres in the spinal cord, with the long motor tract. According to the existing anatomical knowledge of the medulla oblongata it is thus probable that the tonic and clonic contractions observed by Nothnagel in his experiments were not caused by the irritation of a circumscribed centre in the medulla, but that in all probability they must be considered as reflex contractions, or as contractions due to conduction of the irritation along the pyramidal tracts." Nothnagel further, to elucidate the symptoms of epilepsy, betakes himself to the vaso-motor centre in the medulla oblongata, irritation of which causes a narrowing of the blood-vessels in the pia mater and in the cortex cerebri. Both these centres in an epileptic

seizure appear in a condition of irritation, whereby 1. universal muscular contractions; 2. anæmia of the cortex cerebri, and by that means unconsciousness, are induced. This, in short, is sufficient to define the position adopted by Nothnagel. A relatively short time after Nothnagel had developed his theory as to the origin of epilepsy the experimental investigations of Ferrier, Fritsch, and Hitzig, and after them of Golz and Munk, became known. Nothnagel himself collected in a profound treatise the clinical data bearing on the localization of the functions of the cortex cerebri. Exner produced a like study, while Luciani for a short time demonstrated experimentally on this subject. With data such as these a new application of these recently-developed phenomena as to the type of disease named epilepsy arose. Observers knew that by irritation of circumscribed areas of the brain-cortex simple movements could be brought about; and thus Nothnagel in the declaration of his experiments was found to have omitted one particular, and that the possibility that the muscular contractions observed in epilepsy might be of cortical origin. Where, moreover, the irritant applied to the cortex was properly strengthened there ensued in like manner unconsciousness, which symptom thus also need not of necessity proceed from the vaso-motor centre in the prolongation of the spinal cord. He then proceeds:—"When we more closely consider the series of phenomena which follow in consequence of such cortex-irritation, then there is exhibited, in so far as can be followed in the higher mammals, a great conformity to the epileptic attack. The contractions became universal, there ensued complete unconsciousness, the animals experimented on frothed at the mouth, the froth being sometimes tinged with blood in consequence of injury to the tongue or lips by the teeth. The attack in point of time began shortly after the commencement of the irritation and continued for some time after its cessation. Munk in a comparatively recent publication has maintained that the contractions following cortex-irritation were at first clonic and subsequently tonic, just the reverse of the phenomena observed in an epileptic seizure. In none of the works of later experimenters have I, however, met with this again, so that the statement requires further confirmation. With regard to the question whether this attack thus experimentally brought about is actually equivalent to a genuine epileptic seizure there exists some disparity of opinion. Unquestionably it may be taken for granted that it simulates it in a greater degree than any other artificially induced convulsive seizure." By a large number of investigators, then, it is held that by irritation of the brain-cortex an attack can be produced which exhibits a great likeness to an epileptic seizure (Albertoni, Luciani, Unverricht, Franck, Pitres, Rosenbach, and others). This convulsion can be produced from any portion of the brain-cortex, most easily, however, from that known as the motor area; by irritation

of the non-motor centres the irritant must be stronger or of longer duration. For the production of such an attack it is of much greater importance that the irritant influence should be of longer duration than that it should be increased in intensity. With a weak stimulant there will at first be no result, but the seizure comes on and runs its course in the usual manner when persevered with for a while. The course of such a seizure, the irritant being the same in nature, intensity, and degree, is in every case similar. This concerns mainly the consecutive order in which the muscular contractions appear, and this order appears to be dependent on the classification and disposition of the centres for different muscular groups in the cortex. It was observed that when the contractions began in the orbicularis palpebrarum it proceeded next to the facial muscles, then to those of the jaw, neck, arms, trunk, and lower extremities, *i.e.*, in the proper consecutive order in which the different motor centres lie next to each other in the brain-cortex. At times small digressions were noticed, one of the muscular groups being omitted. These digressions were probably due to a lesser susceptibility to irritation of certain centres, perhaps also to the anæsthetic employed; at no time, however, were the orbicular contractions directly followed by those of the lower extremities. When a midlying centre was chosen as the starting point for the stream of irritation it was noticed that the contractions spread out in both directions, the consecutive order, however, not being so definite or so plainly followed. With a constant strength and duration of the irritation the contractions were limited to the opposite lateral half of the body, and thus gave a representation of an unilateral seizure accompanied with more or less complete loss of consciousness, thus clinically simulating the Jacksonian form of epilepsy. When the irritant was continued or increased in intensity, contractions of the same lateral half of the body ensued, beginning in every case in the lower extremity and slowly working their way to the vertex, thus in a reverse order to that noticed in the course pursued in the other lateral half. This transition to the same lateral half never took place unless all the muscle groups of the opposite lateral half were implicated in contraction. It is not with any certainty proved that this described seizure may be likened in full to an epileptic attack.

The above is a summary of the results arrived at by experimenters of recent date, and which we may accept as having been in every way fully confirmed.

*(To be continued).*