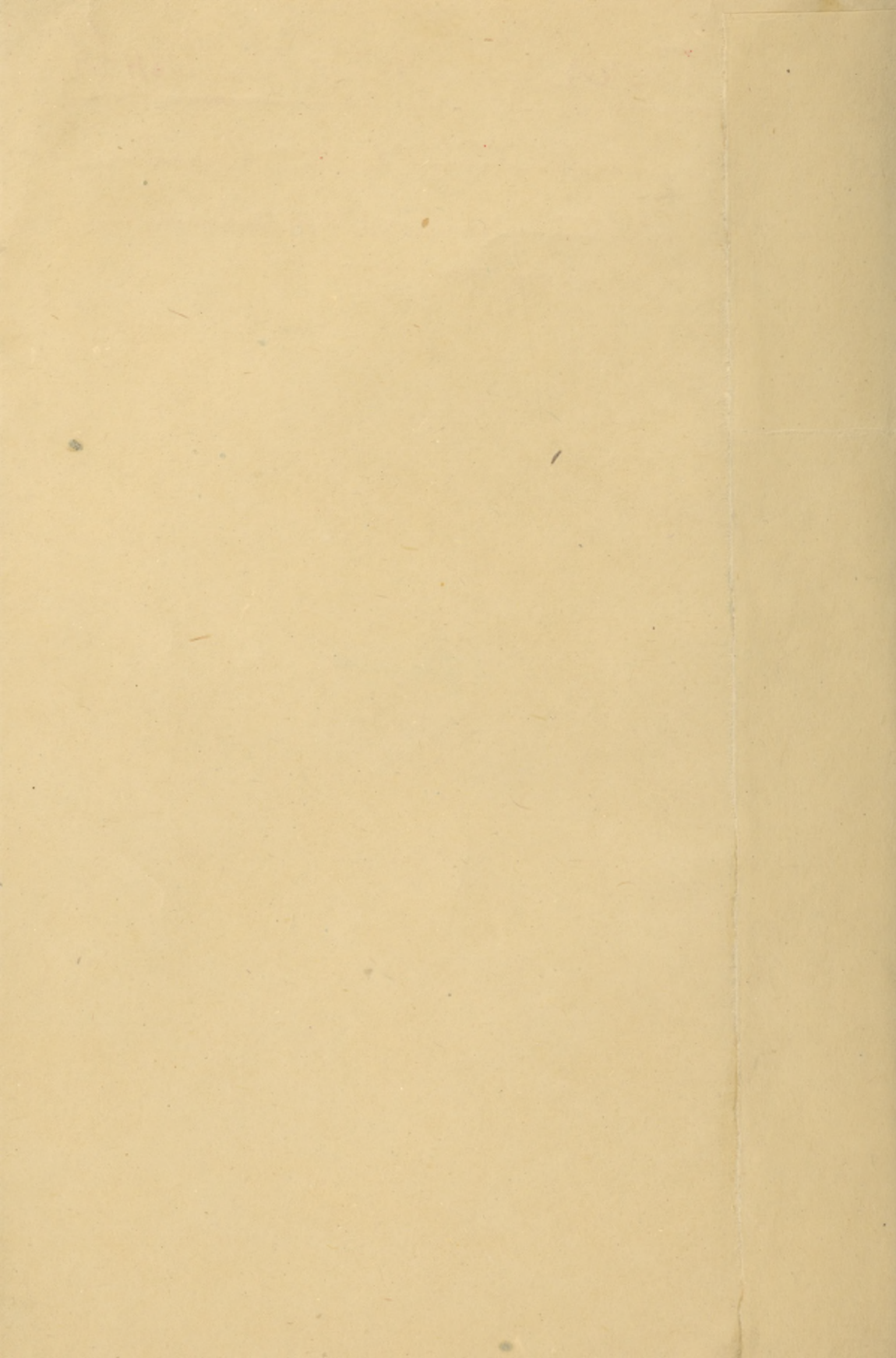


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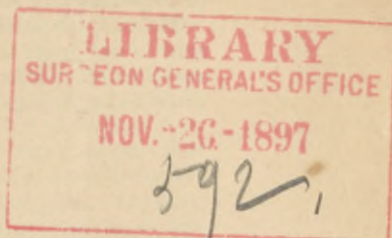


A CONTRIBUTION TO THE LOCALIZATION OF THE
MUSCULAR SENSE.

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THERE has been some discussion in regard to the existence of a muscular sense, or sense of the position of the limbs as derived from sensations arising in the surface, joints, and muscles, which can serve as a guide to movement. It has been claimed by some that a perception of movement is an inherent power of the motor area. It has been held by others that a muscular sense is separate from the voluntary motor function, and that it has a different cortical localization.

Without entering fully into this discussion, we desire to record the following very interesting case, which seems to give conclusive proof that the muscular sense has a localization of its own entirely independent of the motor impulse. The case is quite comparable to an accurate physiological experiment upon the cortex of the brain, although, as will be evident to the reader, no such experiment was intended. We have not been able to find in the literature of the subject any similar case.

Traumatic epilepsy characterized by psychical attacks; headache; trephining; removal of small angioma; loss of muscular sense in the right arm, lasting six weeks; recovery.—S. F., aged twenty-one, is the son of healthy and intelligent parents, with a personal and family history free from any rheumatic or syphilitic taint or alcoholic habit. Up to his fifth year he was a bright and healthy child. He then received a severe fall on his head, followed by unconsciousness for twelve hours. Since that accident he never completely regained his mental balance, and has suffered from pain on the left side of his head. He seemed fairly bright at his lessons, and was willing to study, but was very easily excited and accustomed to give way without adequate cause to emotional impulses, either of joy or anger. When sixteen years of age he received a second fall on his head, followed again by unconsciousness for several hours. Since the second accident all his symptoms have been decidedly aggravated. The headache is located by him in the left parietal and occipital regions, and the maximum point of pain seems to be at a point half-way from the parietal boss to the median line, and at this spot a small scar can be seen, and there can be felt a slight irregularity of the surface of the skull, suggestive of a fracture. The pain from which he suffered,

though continuous, was subject to exacerbations. In connection with the sudden increase of pain, the boy would develop a maniacal condition, in which his actions were extravagant, his speech abusive and profane, and in which he at times indulged in acts of violence toward his family and employers. In consequence of these attacks, which occurred every few days, or, when under treatment by bromides, every three or four weeks, he was unable to keep up with his classes at school or to pursue any steady employment.

He was not particularly bright or intelligent, though he could not be said in any sense to be demented. Between the attacks he had no clear recollection of what had occurred during an attack, and on several occasions he had lost consciousness; he had never had any convulsions. All



remedies having failed to produce any relief of these distressing symptoms, it was thought justifiable to trephine him at the site of the pain. It was thought that in all probability there had been a fracture of the skull at the time of the fall and a local pachymeningitis beneath the fracture, as well as some injury of the brain substance. Very careful tests made before the operation failed to reveal any disturbance of the special senses or any disturbance of motion.

Operation, February 10, 1894. After reflection of the scalp flap, considerable thickening of the tissues was noticed, especially of the pericranium, which was very adherent to the skull. Directly under the cicatrix was a slight linear depression upon the surface of the bone. With an inch trephine a button of bone was removed, its centre being one and a quarter inches to the left of the median line, one and three-quarters inches behind the fissure of Rolando, and an inch above the pari-

etal bone. There was no evidence of fracture on the inner table, and the dura mater appeared normal. The opening in the skull was enlarged by rongeur forceps. When the dura was incised and reflected there was no evidence of any internal pachymeningitis, but the surface of the brain and pia presented an abnormal appearance. A large number of veins of the pia mater appeared to be distended and increased in size, so that a vascular mass consisting exclusively of veins was present just under the trephine opening. This mass of veins, covering a space three-quarters of an inch in diameter, contrasted very markedly with the normal appearance of the pia at adjacent portions. The larger veins leading into this mass of vessels were tied with catgut, which was passed in a needle under the vessels, and probably at four points the superficial layer of the brain cortex was slightly lacerated by the passage of the needle and the tying of the ligature. The brain cortex about this mass appeared to be normal, but it was explored by the hypodermatic needle with a view of the possibility of finding some cyst beneath; nothing was found. The wound was then closed. Recovery from the surgical operation was steady and progressive. He was fit to be discharged from the hospital in ten days.

Immediately after the operation the boy noticed a peculiar awkwardness in his right hand and arm. When examined this was found to consist of a most pronounced condition of ataxia, all finer co-ordination of movement being impossible. Thus any attempt to grasp a pencil or a glass of water, or to pick up a pin, resulted in most excessive motions without the possibility of carrying out the desired movement; the attempt to place his finger upon his nose with his eyes closed failed, the finger frequently being carried up above the head or far to one side. When his eyes were closed he was absolutely unable to tell what position had been given to his fingers or hand by the examiner. He did not know whether his hands were closed or opened. When his hand was placed in a position and he was requested to put the other hand in the same position, his eyes being shut, he was totally unable to do so. There was altogether a complete loss of muscular sense in the hand and wrist. At the same time his actual power was greater in the right hand than in the left; there was no disturbance whatever of tactile sense or the sensations of temperature and pain. There was no similar disturbance in the leg, and his gait was perfect; there was no affection of the face or the eyes. It was evident that the effect of the operation upon a spot in the brain about at the junction of the superior and inferior parietal convolutions, clearly posterior to the posterior central convolution, had resulted in a loss of muscular sense in the opposite hand and forearm without any disturbance of other sensations or of the power of movement.

This condition of ataxia remained stationary for about three weeks, and then gradually subsided. On April 10th, when he was last examined, no trace whatever remained, and the boy is practically well, being free from his old headache, feeling much brighter and more active, and having had no return of his attacks of epileptic nature.

