

case only proves what is already accepted as true, that there are no centres in this place. Had the same injury been on the left side, speech would have been destroyed. The patient lived five months. There were no symptoms of cerebral origin, as might have been expected.

Dr. D. Clark refers to the researches of M. Flourens, of Paris. These experiments were in their day the best of their kind; but they have been superseded in many cases, much that he taught has been set aside by later observers, and some of his work has been confirmed. His experiments on the brain were of no use in the advancement of our knowledge of localizing cerebral function; but they were of great value in showing that the brain could be operated upon without causing death.

Another case is cited, that recorded by Dr. Thomas Smith, in the London *Lancet*. "The bullet passed in at one temple and out at the other." This case ought not to have been adduced as opposed to the existence of local centres in the brain. The wound was to a part of the brain where there are no centres. It is of value in showing how much injury may be done to the brain and yet have a good recovery.

The last case in Dr. Clark's paper is one that came under his own care. The injury was from a horse's kick. "A section of the skull was crushed in on the right side, near the median line, in the upper part of the frontal and parietal bones." This injury, though very near to the upper part of the motor region, is just in front of it. In this way the centres escaped, which, if injured, would have caused paralysis.

The case of Goltz's dog is referred to as proving the view held by Dr. Clark. To use his own words he says, "I am convinced that localization of function lies in the base ganglia, and not in the hemispheres." Goltz's experiment has been abundantly dealt with, and the conclusions he has drawn from his brainless dog completely overthrown.

Dr. Clark's paper is a very valuable one in three ways. 1st. It shows that the brain may be extensively injured, and there yet be a good recovery. 2nd. It shows that these brain injuries may recover under very unfavorable circumstances. 3rd. It shows that certain portions of the brain do not contain either motor or sensory centres.

While this is true, it would be a matter for deep regret if Dr. Clark's influence, as the head of a large asylum, and by his status of Professor of Psychology in the University of Toronto, should induce medical men to reject the work that has been done on cerebral localization. This would be to turn the hands of the clock back to a date prior to the immortal work of Broca. It would set aside the belief in the researches of Munk, Bechterew, Von Gudden, Hitzig, Westphal, Leyden, Meyert, Landois, Obersteiner, Edinger, Erb, Kussmaul, Wernicke, of Germany; of Charcot, County, Pitres, Richet, Lannegrace, Gombault, Nicati, Gilbert, Moeli, Souris, Broca, Hervé, of France; of Golgi, Bianchi, Sepilli, Luciani, Tamburini, of Italy; of Ferrier, Jackson, Bastian, Gowers, Schäfer, Beevor, Broadbent, Horsley, Sherrington, Brown, Ross, Foster, of Britain; and of Hammond, Jewel, Starr, Seguin, Hamilton, Sachs, Mitchell, Osler, Putnam, Mills, Wood, Folsom, Park, Hun, of America. But this cannot be! The doctrine of cerebral localization is now as firm as the eternal rocks. It can never be argued away. It remains for all to do something, however, to make it more definite, as an aid to medical and surgical progress.

To quote from the last edition of Prof. Foster's work on physiology, we find at section 658 the following words: "These skilled movements are to a large extent, though not exclusively, voluntary movements. We have in a previous section seen reason to believe that the cerebral cortex is in some way especially associated with the development of voluntary movements." The above is the opinion of the first of British authorities. The basal ganglia, or mid-brain, have important functions. This, all physiologists admit; but they do not take the place of the hemispheres. L. Landois, the ablest of German physiologists, says that "after the removal of both cerebral hemispheres, in most animals, every voluntary movement and consciousness of impressions, and sensory perception and signs of intelligent volition appear to cease. On the other hand, the whole mechanical movements and the maintenance of the equilibrium of the movements are retained. The maintenance of the equilibrium depends upon the mid-brain, and is regulated by important reflex channels." J. Hughlings Jackson holds that our movements are represented in the lowest centres, the spinal; that they are re-repre-