cramps and contractions occurring during life." (*d*) In both, glycogen is converted into sugar. Do not all these coincidences in appearances and effects point strongly to a similarity of processes in muscular contraction and cadaveric rigidity? Of course the parallel is not complete in every particular. It is said that the muscular sound emitted during ordinary muscular contraction is absent. This sound is attributed to vibration of the muscle substance. Might it not be due in part to the altered circulation in the ordinary muscle during contraction, for it is well known that the blood channels, under certain circumstances, give out a musical note? In rigor mortis, of course, the circulation of the blood ceases, as does also the removal of waste products. That the muscle substance continues to vibrate in rigor mortis is evident, because chemical changes are still taking place there, as is shown by what is said above, and especially by "a marked accession of heat"; (*b*) and "heat is only another form of motion." (*c*) So that, after all, it would seem as if the atoms of the muscle continue to vibrate, even though no sound is audible.

That indefatigable observer, Dr. Brown-Sequard, some time ago, related to the Biological Society of Paris, "some experiments he had made, by a special instrument, to determine the movements of single muscles in the body after death. He found that there was a very considerable degree of contraction and relaxation, as much, for example, as two and a-half millimetres in a muscle measuring only six millimetres in length. He thought that the results of his experiments disproved the theory of coagulation in the muscular tissue as the cause of cadaveric rigidity (*d*).

I am not necessitated to prove that rigor mortis is due to post-mortem contraction of the muscles; but in the absence of any other satisfactory explanation of this state, I am entitled to refer to it in support of my thesis; and I would ask those who dissent from this view, and who, in consistence with their theory, must hold that nerve stimulus is necessary to muscular contraction, to account for the presence of nerve force under the conditions referred to.

(*a*) Wood's Prac., Vol. I, p. 717. (*b*) Foster, p. 542.
(*c*) Rosenthal, p. 42.
(*d*) N. Y. Med. Rec., Jan. 9, 1886.

SPASMS IN VOLUNTARY MUSCLES.

It would, perhaps, be no difficult task to show that even voluntary or striated muscles pass into a state of partial spasm or contraction during life, much oftener than might at first sight appear, under a form of "irritation," which may very properly be regarded as consisting in a lowering of nerve activity.

"Irritation" is not increased nerve action. A splinter under the nail is attended by a loss of tactile sensibility. A mote in the eye irritates, but it obscures vision. Why should indigestible food oppressing the digestive functions of a child be regarded as a source of increased nervous "discharges"? Such sources of irritation ought to be considered as depressing, rather than exciting nerve action; a view of the case for which authorities have been already quoted, and others are to follow.

Dr. Anstie wrote, "convulsive action of the muscles, as everyone knows, are very common complications of neuralgia," and the same acute observer held that "pain is not a true hyperæsthesia; on the contrary, pain involves a lowering of nerve function" (*e*).

Dr. Hilton, in his work on "Rest and Pain," points out that the irritation of peritonitis induces contraction of the abdominal muscles. In the same way, pleuritis renders the chest-walls fixed by spasmodic contraction of its muscles; while the muscles of an inflamed joint, he says, "are invariably contracted, and continually tend to increased flexion of the limb, not because such a position is easiest for the patient, which is not always the case, but owing to a reflex perturbation transferred to the muscles of the adjoining surface." (*f*) That peripheral irritations *do* produce nerve paralysis, must be admitted on the authority of Dr. Brown-Sequard (*g*), and others.

What is the "irritation" in these cases but a mild form of nerve paresis, just as "the irregular mucular action" which shows itself in tremor, fibrillary contractions, or in spasm, denotes the failure of the ordinary nervous restraint over the corresponding muscles.

Why should "morbid conditions of the medulla oblongata," avowedly depending on "defective

(*e*) Anstie, Neural., p. 12. (*f*) *Ibid.*, p. 96.
(*g*) Lect. Cent. Nerv. Syst., pp. 160, 170.