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Reprint of awada Lancet. July.

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ELECTRICITY AND BRAIN POWER.

BY SIR JAMES GRANT, M.D., F.R.C.P., (LOND.) Consulting Physician General Hospital, Water St., and St. Lukes Hospital, Ottawa.

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Professor Heger, of Brussels, in a paper presented at the International Congress of Physiology held at Cambridge, England, in August, 1899, stated that, "an important property of the cerebral nerve cell, is its variability in reaction, as regards its cell body, its processes and its epidendritic granules. Changes in all three portions may co-exist, or occur separately under different conditions, the further significance of which is important, and demands investigation."+

The evolution of mental power being closely associated with healthy brain cell action and the activity of the neurons of the cerebral ganglionic centres, the following facts may be of interest, as evidence that defective mental activity unassociated with structural change, may be very materially improved, by the transmission through the brain of modified electric currents by the application of a neurotone.

CASE No. 1.-(J.B.), aged 75 years, small stature, pulse and temperature normal, well formed and generally enjoys excellent health, until 1890, when after excessive horse exercise, in the mountains of British Columbia, he experienced a feeling of weariness and fatigue, followed gradually by weakness in his limbs, and considerable loss of power, in ordinary locomotion. Within the past four years, the steps became shorter and shorter, until he walked with considerable difficulty and uncertainty. No loss whatever of complete sensation in any part of the body, or evidence of paralysis, only defective muscular power, and a disposition to occasional slight involuntary escape of urine. Feby. 5th, 1900, placed under neurotone treatment every second day, consisting of applications to the spine, abdomen, limbs and sides of neck (parotid regions) and the free use of Parishes' food with general tonics. At present there is a marked change for the better in the entire system, of a progressive and gradual character. The face, which until recently was pale and exsanguine, has a much healthier appearance, the minute vessels having filled up, through increased assimilative action, in the alimentary canal, the result of electrical action and general muscular power so far improved, that he steps out with considerable ease and comfort. The patellar tendon reflex is perfect in the right leg, but slightly lessened in the left, no trouble from escape of urine. During

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*Read before the Ottawa Medical Society, March 23, 1900. †British Med. Journal, Sept. 2, 1899. the past year memory has been defective, so much so that usual business was conducted imperfectly. Within the past week memory was so far restored, could conduct usual official duties with comfort, facts, figures and general data causing little inconvenience, in fact the whole mental condition giving evidence of marked improvement.

The improvement in mental power under such circumstances is an attractive feature which opens up a wide field for research, particularly when not dependent on any serious disease of the central nervous system. No indication of touch paralysis, such as first recorded by Wernicke of Germany. In the neurotone examination of the body I observed that the entire left side had a moderate diminution of sensation, compared with the right side, but as to muscular development and tonicity, no appreciable difference When first seen he could not stand on either leg which he now does with ease. Vision in both eyes perfect, and the other senses normal, and no history whatever of syphilis.

Within the past year I have been much impressed with the diagnostic importance of conditions in the line of anæsthesia, long anterior to loss of power, or the outcrop of paralysis. This is the period for active treatment, to ward off change of structure, and paralytic conditions, otherwise, almost certain to follow. With respect to anæsthesia such may be, either cerebral or spinal in its origin, and as Williamson of Owens College has pointed out, when there is loss of sensation, in cerebral disease, in a portion of a limb only, the boundary line of the anæsthesia, is more or less at right angles to the long axis of the limb, but in spinal diseases, when anæsthesia is in a portion of a limb only, the boundary line of anæsthesia runs more or less parallel with the long axis of the limb. Hemi-anæsthesia has been known to end abruptly in one limb, and by post-mortem examination found to be produced by lesions of the internal capsule at the posterior third of its posterior segment. The most remarkable result is the sudden termination of hemi-ancesthesia in hysteria, which is of exceptional character. In those cases where a patient feels generally out of sorts without being able to define any particular symptom, it is prudent to make a careful neurotone examine ion of the different regions as to anæsthesia, as I have found such to exist without any apparent systemic indication, and to prove most instructive, as to the line of treatment that should be followed.

CASE No. 2.—THERMO-AN ASTHESIA, OF FOUR MONTHS' DURATION.

A. P. at 44 years-married and two of family, a farmer, well developed, weight 165 lbs., uniform and no particular change in years. Has usually enjoyed excellent health. Never used alcohol or tobacco, except an occasional chew Never experienced any accident, or injury to No consumption in family. No indications of syphilis. spine or head. Parents lived to a good old age, and father died of paralysis. Rests well at night and enjoys his food. Knee jerk, plantar reflex, and abdominal reflex perfect, also the superficial or skin reflexes generally normal. No evidence of the slightest loss of power in the affected parts, and sensation, No affection of the cranial nerves. as a whole perfect. Precisely the same reduction of temperature, fully one degree in left foot, as in the left hand. The grasp and other movements of the arms, are uniform, and in parts are equal in both sides. The optic discs are normal, co-ordinating

power uniform. About four months ago experienced partial occasional numbness and coldness in left hand, and a sense of prickling in the same arm, also the same feeling of numbress and coldness in the left foot, particularly the toes, ordered a "black draught," and Parishes' food with ferruginous tonics, saline sponging to spine and the body generally, and the free application of the neurotone to the chief ganglionic centres. Here is a case of well defined thermo-anaesthesia, without loss of sensation to tactile or painful impressions. It has been noted that in cases of lesion of the pons, there has been anæsthesia, to pain and temperature, on the side opposite to the lesion, while tactile sensation has been unaffected. In the present case, the existence of any corebral disease, is not defined, even although there is evident localized reduction of temperature and What the precise condition of the system tactile sensation retained. which induces this evident local reduction of the temperature, is difficult to define. The recent remarkable discoveries regarding the structure of the nervous system, may doubtless throw new light, on many nervous phenomena, of health and diseases. M. Capitan of Paris, (La Nature, Nov. 25, 1899), states, that the nerve cell, once regarded as a small, polygonal mass, with prolongations at the angles. through the able investigations of Nissl, von Lenhossek, Ramon-y-Cajal, Golgi and Prof. Mathias Duval, as well as other active observers, have demonstrated, that this actual simple nerve cell, is complicated in other ways. In its structure, an amorphous substance, called chromatin in packed grains, and in which are distributed bundles of fibres, forming a net work of considerable regularity in the meshes of which are packed, the grains of this peculiar From the cell arise a large number of proand interesting substance. longations in all directions, compared with the rootlets of a plant. These cell prolongations are not continuous, but simply approach each other, and possess contiguity, but not continuity. Thus we observe how recent histologic and biologic investigations, as to nervous structure, have made quite a revolution in our ideas, of this portion of the system. As to this particular case, in arriving at a diagnosis of the entire condition, it is well to bear in remembrance, that it is still a disputed point with physiologists, whether the so-called motor area, has any sensory function, as great destruction of the motor cortex has been known to exist, without any sensory symptoms being produced, Dr. Williamson of Owens College, states in the Medical Chronicle, February, 1899. "I have seen cases of extensive destruction of the motor area of the cortex by tumour growths, (verified by autopsy) in which during life, I have not been able to detect any anæsthesia, and I have also found sensation normal, when the autopsy has revealed extensive softening of the motor area, of the cortex. Under such circumstances it is prudent to observe cautiously, treat carefully, and await practical results.

May 26th. This case has so far made a good recovery, temperature now being normal throughout.

150 Elgin St., March 23, 1900.

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