Myasthenia Gravis: A Case in which Fatigue of the Forearm Muscles could induce Paralysis of the Extra-ocular Muscles.—MARY B. WALKER, M.D.

It is well known that in myasthenia gravis, weakness throughout the body develops if one group of muscles is exercised. The demonstration shows that during activity, myasthenic muscles liberate a chemical agent which passes into the blood-stream and blocks neuromuscular transmission at the motor end-plates of skeletal muscle elsewhere. The nature of this "curarizing" agent is at the moment unknown. It is suggested that the abnormal formation or imperfect destruction of this agent may be the cause of the weakness and fatigue of myasthenia gravis.

Evidence in support of this view was obtained in a case of severe generalized myasthenia gravis, in which the left eyelid, when not under the influence of prostigmin, droops so that the whole of the iris is covered. At a time when the effect of prostigmin is wearing off, the circulation is cut off in both arms by inflating sphygmomanometer cuffs to 200 mm. Hg. The forearms are then pronated and supinated until they are tired; this usually takes over a minute. No increase in the droop of the eyelid takes place at this stage. The pressure in the cuffs is then released. After a latent period of a minute and a half increased droop develops. In two minutes there is a very great increase in weakness of the muscles generally. The pressure has been maintained for varying periods after the pronation and supination have ceased, with the same results.

Discussion.—Dr. E. A. CARMICHAEL said that this was a most important demonstration if the fact was accepted that the succeeding weakness was caused by some substance which had been manufactured in the muscles exercised and was now circulating through the system. Did Dr. Walker think that this substance was peculiar to myasthenia or was known to occur in or to be manufactured by healthy individuals who exercised the muscles? It had been shown by physiologists that normal muscle, when fatigued, produced a substance which had a curarizing effect on muscles.

Dr. WALKER (in reply) said she thought it quite probable that the substance occurred in normal individuals.

Dr. MILLS said that he had been interested in the latent interval which occurred between the stoppage of the voluntary movements and the end of the four minutes during which the cuff was applied. He wondered what would happen if the circulation were cut off without any movement being carried out.

Dr. WALKER said that the release of the circulation was delayed for four minutes to show that the delay in the onset of increased weakness was due to the circulation being cut off and not to the latent period of one and a half minutes which occurred whether the circulation was cut off or not.

When the forearms were exercised without the circulation being cut off the droop in the eyelid began to increase after one and a half minutes' exercise, and continued to increase for two minutes after the exercise had been stopped. The forearms tired much less readily and the weakness of the other muscles was much less than when the circulation was cut off. The effect of cutting off the circulation for a period without exercise had not been observed.

Dr. DENNY-BROWN said that there was a difference between the disturbance indicated in this experiment and that which was supposed to occur according to the theory that myasthenia was due to an abnormal accumulation of fatigue products. The paralysis of myasthenia was something rather different from fatigue. In the case of a normal person exercise of a muscle below a cuff constricting the circulation was painful, but the failure of muscular contraction in myasthenia was not painful. This seemed to argue against the accumulation of fatigue products in myasthenia, yet Dr. Walker's experiment appeared to indicate that something had passed into the general circulation and could paralyse other muscles.

Dr. CARMICHAEL said that he was impressed by the dramatic way in which the patient had improved even during the few minutes since the experiment terminated and prostigmin had been administered.