A CASE OF DIPHTHERIA, WITH ABSENCE OF KNEE JERKS.

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WM. C., æt. 4, was admitted into St. Thomas's Hospital, under my care on August 18th, 1888, and died on August 23rd. 1888. By some mistake I never saw the child during life.

He had been strong and healthy all his life (except for measles at eighteen months) until two months before admission, when his mother and her four children, the patient among the number, had sore throats, foul breath, and pain in the ears. No doctor was called in. After the throat got well the patient spoke with a nasal twang, fluids regurgitated through the nose, the voice got weak, so that he could barely make himself understood, and he became hardly able to walk.

On admission temperature was 98.6 F.; pulse 120, regular; tongue moist and coated with white fur; appetite said to be good, and bowels regular.

Body well nourished, no wasting of muscles observable. The patient used his arms and legs naturally, and could walk, but somewhat feebly.

Speech was indistinct and nasal in quality and difficult to understand. In drinking he choked a little, but there had been no regurgitation since admission. He made a snoring noise in respiration, and coughed a little. Soft palate and uvula did not move well. Throat not swollen or inflamed, but contained much mucus, chest moved well; no obstruction to the entry of air, physical signs normal. Heart normal. Knee-jerks absent. Urine 1025; no albumen or sugar. Eyes natural in every way.

During the rest of his life the temperature was often slightly elevated, and owing to difficulty in swallowing he had to be fed by a nasal tube. A trace of albumen appeared in the urine, and he got rapidly feeble.

On August 22nd he had two bad attacks of dyspnoea, attended with soft stridor. The diaphragm and inter-costal muscles were acting fairly well, and there was no evidence of pulmonary disease. As these attacks made feeding very difficult, and as the breathing was evidently obstructed in some way tracheotomy

was performed. On the day following it he had two or three attacks of dyspnoea, not so severe as before, and blueness and pallor came on suddenly. The pulse was fairly good and temperature normal. He died suddenly on August 23rd, apparently from stoppage of respiration.

Post-mortem Examination.—Body pale and thin, but well formed; heart, liver, lungs and spleen were all perfectly healthy in appearance. Lungs shewed here and there slight collapse, but were otherwise normal. Brain was generally hyperæmic, otherwise natural. Spinal cord looked healthy throughout.

The tonsils were somewhat enlarged, but free from membrane or any signs of acute inflammation. The soft palate and uvula were thick, almost cedematous in appearance. Larynx normal.

Thinking this was a favourable case for investigating the cause of the absence of the knee jerk in diphtheria, I hardened and had cut for me the spinal cord, the anterior crural nerve, and the quadriceps extensor muscle. The nerve and muscle proved to be perfectly healthy, but the spinal cord, though in the main normal, presented a very peculiar pathological alteration. The seat of it was in the large motor cells of the anterior columns; in them the change was very marked, but I was unable to make out any such alteration in the smaller cells of the posterior cornu. There were no evidences of inflammation to be found, and the other constituents of the cord were natural. The alteration in the multipolar cells is well reproduced in the figure, and consisted of a number of very large granules, completely filling the cells, and taking the logwood stain very deeply.

So numerous were they that they often completely obscured the nucleus. Their was a peculiar regularity about their arrangement, which is well seen in the figure, and the processes of the cells were often beset with them. In the latter situation they were long and appeared parallel with the direction of the process. The appearance was no ordinary granular condition, seen sometimes even in normal cords, but something quite unusual. Mr. Sherrington to whom I showed the sections said he had never seen such a condition before. On looking through a variety of preparations the only cases in which I found something of a similar kind were cases of myelitis.

The pneumogastric nerve I also examined microscopically and found it quite healthy. In several other cases of diphtheria which have come under my notice I have examined the paralysed nerves and muscles and found them healthy.

In the present case the alterations in function produced by

the disease were widespread and severe as was proved by the presence of the nasal twang and regurgitation of fluids through the nose: by the weakness of his voice, and his difficulty in walking: by the absence of knee jerks, difficulty in swallowing, the trace of albumen in the urine, and finally by his death from stoppage of respiration. I am led to believe that the paralytic phenomena, and the absence of knee jerks were due in all probability to a change in the motor cells of the central nervous system, partly because the examination of nerves and muscles in this and in other cases proved negative, and partly because of the alteration found in the motor cells of the spinal cord.

The question naturally arises what gave rise to these changes. At present we are not in a position to make any definite assertion on this point. But if, as is probable, diphtheria is produced by micro-organisms, we can readily suppose that the vital changes which these organisms undergo in their growth upon the surfaces of the body and possibly in its interior produce certain poisons which being absorbed act specially as nerve poisons: and that the changes observed in the motor cells of the cord in the present case were the results of the action of such a poison. This is more likely than that the micro-organisms produce these results by their actual presence. For one cannot demonstrate their presence by the ordinary methods, and the paralytic phenomena often present themselves after all evidence of the original disease has disappeared, if we may judge by the absence of fever and of local inflammation. But the change in nerve cells produced by such a poison might well take considerable time to be recovered from. It does not seem to me that it would be fatal to this theory if in future examinations cases in which the knee jerk may have been absent, and the patient may have died from pulmonary or other troubles, no changes should be found in the cells of the spinal cord. For the poison might act in a lesser degree without producing serious disorganisation of nerve cells: and the knee jerks appear to be a singularly delicate test of the complete healthiness of the reflex arc in connection with them, and are abolished by slight causes.

If, however, changes should be absent in cases which have run so severe a course as the present, and which have been marked by serious and widespread paralytic phenomena, then the alterations found by me in the motor cells in this case will have to find some other explanation.