

ILLUSTRATIONS OF DISEASES OF THE NERVOUS SYSTEM.

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NO. I. RAMOLLISSEMENT OF GREY MATTER OF THE MEDULLA SPINALIS.

CASE. Mr. P., æt. 63, came under my care in August 1838. He was a merchant, and had been constantly engaged in extensive speculations : a man of acute intelligence, resolute will, and excitable passions. He was rather above the average height, and strongly built ; and had always been of active habits, both of mind and body. About five years before I first saw him, after dining with some hard drinkers, and fully participating in the depth of their potations, he was attacked with burning pain on the instep of the left foot, which nearly disabled him from walking, but was unaccompanied by any external appearance of inflammation. This feeling continued for some time, and gradually terminated in diminished sensibility of that foot and leg, up to about the middle of the calf. Shortly afterwards, the right foot and leg became similarly affected ; and this state continued persistent during the remainder of his life. He always complained of heat in the parts, and stated that, in walking, he felt as if he were treading upon heaps of warm bran.

About a twelvemonth after the above-mentioned occurrences, Mr. P. first perceived that he passed an inordinate quantity of urine ; and, at the same time, he was greatly tormented with thirst. He applied for advice, and was informed that he laboured under diabetes. He accordingly submitted to very rigorous discipline, one material item of which was an almost total abstinence from fluids. His urine, carefully examined by several chemists, was found to contain no sugar. Having persevered in this line of treatment for two years without any benefit, he adopted, on the recommendation of Dr. Prout, an entirely different course, living again in the way to which he had been formerly accustomed, *i. e.*, rather generously. Under this system, his general health greatly improved, and the supposed diabetic symptoms gradually wore away.

During the severe frost of January 1838, Mr. P. stood, on one occasion, for some hours on the ice ; and, on his return home, found that both his great toes were frost-bitten. The ulcers resulting from this accident healed but very slowly ; and for seven weeks he was confined entirely to his bed. I should mention that, for many years, he had been troubled with varicose veins in the legs. Shortly after leaving his bed, Mr. P. drove, on a very cold day, to Roslin, a distance of about six miles from his residence, and sat for some time with the left side of his face to an open window. During this ride, he felt an unusual degree of stiffness of that side of the face ; and, when he arrived at his friend's house, found that he was unable to hold anything in his left hand. This did not arise from loss of muscular power, but from the greatly diminished sensibility of the cutaneous textures, which, he now perceived, had extended over the whole of that side of the body, but was most complete in the hand and fingers. There was no distortion of any portion of the face. In this state he continued, notwithstanding the most active

treatment by bleeding, both local and general, blistering of the head and spine, and severe purgation, until about the 11th or 12th of August, when he suddenly perceived a dimness in the vision of both eyes. On the 15th, the sight of the right eye was entirely lost for some hours, but returned again. On the 16th, I saw him, with my friend Dr. J. Renton, and found him in the following state: General health apparently very good. Not the slightest distortion of any features. All ordinary motions performed perfectly, but much feeling of stiffness, and as of a weight in the hands, especially the left. Great, but not total, loss of common sensation, over the whole of the left side of the body. The muscular sense was entire. The eyes presented nothing remarkable, the pupils contracting readily and freely. He could see distant objects more clearly than near ones; and the indistinctness of vision varied much at different times. Taste and smell were perfect. He had no headache, and but little occasional giddiness. He complained much of pain in the back, when driving over rough roads. Cutaneous transpiration was entirely suspended. The appetite was good; the tongue clean; and the bowels regular, and answering easily to medicine. Pulse from 70 to 80, of good strength. A seton was inserted in the neck; the diet was carefully regulated, and means were adopted to improve the state of the capillary cutaneous circulation, which was very feeble. We also made a few (about six) trials with galvanism; but our patient would not persevere in the use of this agent. When first employed, it excited no sensation at all; but subsequently its influence was felt, each time more distinctly.

September 26th. Mr. P. was not so well. He complained much of pain in the left hand and arm, with general uneasiness. Pulse 100, and full. His face wore a contracted and unhealthy aspect. He had so strong a prejudice against bleeding, from the effects of former treatment, that all that could be done was to prescribe a purgative and low diet. These means, however, gave great relief, and he was much better during the next two days; though his family observed that his temper, always irritable, was now unusually so.

September 29th. He still complained much of pain, and of a feeling of distension in the left hand. Pulse 90. Tongue clean, and bowels open. During this day, he was much irritated and excited by an accident which happened to one of the members of the family. In the afternoon he had rigors, and was unable to walk; and, when carried to bed, could not turn himself. We were not summoned until the next morning; but his friends administered two purgative pills. During the night, he was very restless, and somewhat delirious.

September 30th. When I saw him, he was lying on his back, with his eyes closed, and brows much contracted. The right hand and arm were in incessant motion, and often carried to the head. Tongue very foul. Pulse 120, full, hard, and bounding. Head hot. Pupils somewhat dilated, but sensible to light. He was easily roused, but lay in a kind of stupor, and did not seem willing to be disturbed. He was very restless, but made no complaint of the head. He was bled largely, until an impression was made upon the pulse; a purgative was administered, to be repeated if the bowels did not act freely. An evaporating lotion was directed to be applied to the head, and warmth to the feet.

October 1st. He was very restless and talkative during the night. The bowels were once moved. He refused to take the second dose of medicine, and would not allow the lotion to be applied to the head. The blood drawn was strongly buffed and cupped. The pulse was softer. There was erysipelatous redness of the right thumb and arm, extending nearly to the elbow. Another purgative was ordered, and a lead lotion to the inflamed part. In the evening, the pulse had become harder, and he was again bled. The bowels had been freely opened; the stools were copious, black, and offensive. He was more quiet, and perfectly sensible, making no complaint of pain, except in the inflamed arm. *The sensibility of the feet was found to be greatly increased.*

October 2nd. There was no improvement. The urine and fæces were passed involuntarily. He was perfectly sensible when roused; slept much, and wandered occasionally. There was no intolerance of light. The face was frequently flushed, and the temperature of the head exalted; but at times there was great pallor and diminished heat. He died during the night.

Sectio cadaveris, forty-two hours after death. There was little, if any, appearance of decomposition. The scalp and cranium were very thick. The dura mater was somewhat thicker than usual, and more adherent to the subjacent parts. There was a considerable sub-arachnoid effusion; also much bony deposit in the arteries of the brain, which also contained a good deal of air. The base of the brain was extremely vascular, especially about the optic commissure and the locus perforatus, where it had a uniform pink colour. The ventricles were much distended with fluid, a considerable quantity of which flowed also from the spinal canal. The fibres of the crura cerebri and pons were unusually distinct. The medulla oblongata presented the same appearance: it was hard, and apparently shrunk in size. The floor of the third ventricle was very soft and pulpy. Both corpora striata were softer than natural, but unaltered in colour. The membranes of the spinal cord were unusually vascular. The cord itself, in the cervical and upper dorsal regions, was of a natural consistence externally; but the centre was almost reduced to a state of fluidity, presenting the appearance of thick cream. This was most particularly remarkable at the part where the cervical plexus comes off. Below, it was harder; but we did not examine the lumbar region.

REMARKS. This case possesses many instructive features, and especially illustrates, in a very marked way, the difficulties which, in the present state of our knowledge, beset a consistent interpretation of the phenomena of Diseases of the Nervous System. It appears pretty evident from the history, the course of the symptoms, and the lesion found after death, that the spinal cord was, from the first, the organ at fault. The marks of intra-cranial disease, with the exception of the softening of the floor of the third ventricle, and perhaps the partial ramollissement of the corpora striata, were, in all probability, of quite recent origin, being merely the evidence of the last fatal inflammatory attack. The persistent burning pain in the instep would seem to have been the first indication of central mischief. It was clearly not dependent upon any mere local affection; for, independently of the absence of

all proof of such by any external signs, the fact that this pain terminated in numbness of the whole foot and a considerable part of the leg, and was followed by a similar condition of the other extremity, is quite conclusive. The cause of both must have been identical, and should be sought for in some pathological condition of that organ, from which all the affected parts received their nervous supply. The exact nature of that condition it is, of course, impossible to affirm; but seeing that the exciting cause appears to have been the undue stimulus of excessive drinking, we may not unreasonably conjecture that it was of an inflammatory character. But that it was not of any great extent appears also evident, from the long period during which the paralytic symptoms remained stationary. They did not increase in severity, nor were any other portions of the body invaded; but, on the other hand, they did not in the smallest degree diminish; consequently their cause, whatever that might be, remained still in operation. And here we meet with another proof that that cause was central, in the sudden and alarming increase of anæsthesia, produced by the exposure to severe cold, which constituted the next great step in the development of the nervous symptoms; for these, it will be observed, did not constitute a new set of phenomena, but were merely an extension and exaltation of those which had previously existed. The progress of the case henceforward was not very different from what might have been predicated, on the supposition that the medulla spinalis was organically affected; and dissection showed that such had been the case.

But, having arrived at this point, we meet here with much more formidable difficulties. The only pathological change at all sufficient to account for the symptoms observed during life (I mean those which preceded the fatal cerebral attack), was the ramollissement of the grey matter of the cord. How does this comport with our knowledge of the functions of that portion of the organ?

The opinion most commonly held at present by physiologists, is, that the grey matter, wherever found, is the source of power, the medullary fibres merely serving the purpose of conductors. Disease, therefore, of this part should manifest itself either in perversion or in destruction of power. In the case before us, it was the latter; and, so far, all appears plain enough. But, though sensation was almost annihilated, the power of motion remained but little impaired; and herein lies our chief difficulty. That which would account for the loss of sensation, should also, if the generally received hypothesis be correct, have involved the loss of motion. But this was not observed. Nor are the obscurities involving this subject at all diminished by references to other recorded cases. Dr. Abercrombie quotes from Ollivier an interesting case, in which a similar pathological condition existed, but with symptoms very different. "The affection began with numbness of the forefinger of the left hand, which gradually extended over the hand and arm. After some time, the other hand and arm became affected in the same manner; and, after a year, the lower extremities. All the limbs then became paralytic, *but without loss of feeling*.¹ The legs were bent upon the thighs, and the thighs upon the abdomen, and

¹ There is here some little obscurity in the report. Did the *numbness*, spoken of above, disappear, as the other symptoms were developed?

the arms rigidly flexed across the thorax, with the points of the fingers pressed against the palms of the hands. If attempts were made to move the limbs from these positions, they were thrown into spasmodic contractions with much pain. The patient died in this state at the end of eight years from the commencement of the disease. Along nearly the whole length of the cord, there was a central cavity full of a soft grey mucus. It was considered as arising from ramollissement of the grey central matter of the cord. The parietes of the cavity were formed by the white matter in a healthy state."¹

It is not easy to reconcile these discrepancies, nor indeed to account satisfactorily for the phenomena of Ollivier's case standing by itself; for the spasmodic contractions, into which the limbs were thrown, when attempts were made to straighten them, were evidence that motor power was not annihilated, though volition could not call it into action. And the disorganization was too complete to allow us to fall back upon the supposition, that there was a state of continued irritation in the nervous centre, producing the permanent contraction when at rest, and the spasms under fresh excitement. For a less extent of disease, this might be a correct explanation; but it will not apply to such a degree of structural mischief, as is involved in the conversion of the interior of the cord into a canal filled with grey mucus.

But leaving this case, and turning our attention again to that one which is the more immediate object before us, let us inquire if it be possible to offer any explanation of its symptoms and morbid appearances, which shall preserve intact the foregoing hypothesis, "that the *vesicular* is the truly dynamic nervous matter, the source of all nervous power."² Todd and Bowman, in their very admirable work on Physiological Anatomy, from which the above statement is quoted, contend that the *posterior* horns of the grey matter of the cord, "as being the part in which the sensitive roots are implanted, participate largely in the mechanism of sensation; and that, by their union with the brain, they become, *pro tanto*, a part of the centre of sensation, so long as that union is unimpaired."³ The impulse of volition, again, exerted primarily in the grey matter of the brain, acts through the fibres of the anterior pyramids (which they regard as merely commissural) on the *anterior* horns of the grey matter of the cord, which in its turn stimulates the motor roots of the implanted nerves, and produces muscular contractions. Now, if it could be shown that, in the particular example we are discussing, the posterior cornua of the grey matter were most diseased, and had become, as a consequence, most profoundly degenerated, their analogues in front still retaining somewhat of more healthy structure, we should be able to reconcile the difficulties of the case at once. This it is not possible to do; for the examination was not by any means sufficiently minute; and, therefore, any explanation thus founded can merely rank as a supposition. This is but an unsatisfactory position; but it is the best, so far as I can see, which can be assumed.

On one occasion, during the last fatal attack, it was noticed that the sensibility of the feet was greatly increased. Did this depend upon the cerebral excitement? or might not the quickened circulation in which

¹ On Diseases of the Brain, etc. Third edition, p. 349.

² TODD and BOWMAN. Physiological Anatomy, vol. i, p. 322. ³ Ibid. p. 331.

the cord, in common with other organs, must have shared, have stimulated, for a time, its half-destroyed energies?

It is greatly to be regretted, that no direct experiments were made to ascertain the condition of the excito-motor functions. If the action of the sphincter ani be reflex, as Dr. Marshall Hall supposes, then in the perfect manner in which its office was performed, until within the last few days of life, we have one proof that they were entire. But if Todd and Bowman be correct in their opinion, that its active contractions are mainly excited by voluntary influence, then, of course, its healthy condition will merely serve as an additional illustration of what was manifested in the muscles of the limbs and trunk, viz., that the stimulus of volition remained in great measure operative. And, probably, the circumstances under which it failed eventually, may be regarded as some evidence in favour of the last-mentioned view; for it was when the brain itself was diseased, and when the power of volition generally failed, the patient having become unable even to turn himself in bed, that the urine and fæces were passed involuntarily.

There is one other point of interest in the case, to which I would refer in conclusion, and that rather in the way of question than of affirmation. May not the spurious diabetes, with which my patient was afflicted about a twelvemonth after the commencement of his illness, have been caused by the pathological condition of the spinal cord? We have abundant evidence of the influence of the nervous system over the secreting organs, especially the kidneys; witness the large discharges of limpid urine, which so commonly accompany the hysterical seizure. And this instance is one very much to the purpose; for though it is probable, that, in many cases, the urinary apparatus is stimulated from direct sympathy with the primarily affected uterine nerves; yet in others, and more especially when the flow succeeds instead of preceding the attack, it appears rather the indirect result of irritation propagated to the spinal cord, and thence reflected on the kidneys. And if this be the case, it is not difficult to understand how another, and more permanent, state of excitement in the cord should originate and keep up an undue action of these secreting organs. I do not know what was the state of the skin, as regards its transpiration, at that time; but when Mr. P. was under my care, the perfect absence of all perspiration was most marked. This has often been observed in cases of paralysis; and that it depends upon the same cause as that which produces the paralysis itself, is proved by the fact that, in some cases, "while perspiration is abundant on all other parts of the body, there is no perceptible moisture on those which are paralysed."¹ In this, therefore, we have the converse phenomenon to the first; at least, if the hypothesis indicated above be founded in truth.

About the same time that Mr. P. was under my care, I attended a case which, at the commencement, presented the ordinary symptoms of continued fever. On the eighth day, the patient, a young man, became suddenly comatose; and, at the same time, a *most copious and universal sweat* broke out. His fæces and urine were passed involuntarily, *the latter in inordinate quantity*. On the night of the eleventh day, he

¹ Library of Medicine, vol. ii, p. 275.

suddenly recovered his consciousness, and was able to speak, though very imperfectly; but the other symptoms remained unabated. He gradually sank, and died on the morning of the thirteenth day; the extraordinary secretion of sweat and urine continuing to the last. There was no dissection. Here, again, the symptoms of disturbance in the nervous centres, and the abnormal excitement of the secreting organs, were coincident.

Torquay, November 27, 1849.

CASE OF IDIOPATHIC TETANUS SUCCESSFULLY TREATED.

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THOUGH cases of Idiopathic Tetanus, and those in which the symptoms supervene gradually, are usually more tractable than the traumatic and acute forms; yet, as the disease is, under all circumstances, so frequently fatal in its result, it is conceived that the following may be worthy the notice of the profession.

CASE. Samuel Sessions, a labourer, residing at East Acton, forty-eight years of age, was admitted into the Royal Free Hospital, on the 2nd of November, 1847. He stated, at the time of his admission, that he had taken cold on the 17th of October, while working in a potatoe field and perspiring, and shortly after felt some stiffness, and difficulty of moving the left leg; this was followed by similar stiffness of the right leg, and cramp in the back; and subsequently the neck and muscles of the jaws became affected. On the 21st, he was scarcely able to open his mouth; and when he succeeded in separating his jaws, they suddenly snapped to, and bit his tongue. Since this time, he had been quite incapable of taking any solid food. Soon after the locked-jaw came on, he began to suffer occasionally from severe spasms, more especially when he made any exertion, as in the effort of getting out of bed. In these attacks the body was drawn back, the legs extended, and the stomach became hard and painful. He had several paroxysms of this description during the last week; and the day before his admission, he had one more severe than any of the former attacks. He stated, that though formerly of intemperate habits, he had latterly lived regularly, and had been but poorly off for some time.

When seen on the 3rd of November, he expressed a wish to be got out of bed; but, immediately on placing his foot to the floor, he was seized with one of the severe paroxysms. His body became arched backwards, his limbs were rigidly extended, the abdomen was excessively tense, and the muscles of the jaws contracted, and he cried out from the severity of the pain in the epigastrium and back; the pulse also became very hard and rapid. When the attack subsided, the pulse became feeble and less frequent, the face was pale, and there did not appear to be any tenderness of the spine; the jaw could with difficulty be opened to a small extent, and the tongue was found dry and furred; the bowels were confined, and had been so from the com-