REMARKS
ON
THE PATHOLOGY OF CHOREA.

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In the session 1865-6, I read at the Medical Society a paper on Chorea, which I withheld from publication at the time, in order that, by further reflection, I might mature the opinions I advanced, and obtain a greater amount of clinical evidence than I then possessed on some of the points bearing on the questions raised.

The chief object of this communication was to show that chorea was not the manifestation of a general condition, whether of the nervous system, as is still commonly held, or of the blood and tissues generally; but an affection of the sensori-motor ganglia at the base of the brain, the corpora striata, and the optic thalami. Dr. Russell Reynolds had already enunciated and ably maintained this view in his work on the *Diagnosis of the Diseases of the Nervous System;* and Dr. Hughlings Jackson, who was present at the meeting of the Society, had independently arrived at a similar conclusion, and had, moreover, assigned a precise character to the lesion of the ganglia by applying the theory of Dr. Kirkes as to the causation of chorea—*i. e.*, embolism of their vessels. These views he has recently developed more fully in an able paper in the *Edinburgh Medical Journal.* It appears to me that chorea is to be regarded as a symptom rather than as a disease, and that it cannot be referred to any single pathological condition. This is what I now endeavour to establish.

It is not necessary here to employ arguments against the opinion that chorea is the expression of a special "diathesis", as described by the late Professor Trousseau, although an hypothesis equivalent to this seems to be extensively held—*i. e.*, that it is due to functional irritation of the nervous system by blood containing some morbid element. If it can be shown that the sensori-motor ganglia alone are affected, this supposition is excluded, without the need of direct disproof.

The considerations which form the basis of the conclusion, that the seat of the morbid changes to which the symptoms of chorea are due is the corpora striata and optic thalami, are as follows.

1. The cerebral hemispheres are not involved, as is seen by the fact that, in a typical case, there is primarily no affection of the intelligence. It is true that, in some cases, the mental faculties are obviously enfeebled, and sometimes there is acute delirium; but in these instances we have chorea *plus* impairment of intelligence—an affection of the hemispherical ganglia, in addition to the affection of the sensori-motor ganglia. It is true, again, that we may have considerable structural damage in the hemispheres without apparent loss of any of the intellectual faculties; and this weakens in some degree the conclusion that absence of intellectual derangement in chorea implies absence of lesion in the hemispheres. It would not be easy to show positively that the cerebellum is not involved; and, as the attempt would necessitate some discussion of the functions assigned to the cerebellum, it will not here be made.

A point of greater importance is to show that chorea does not arise from any morbid condition of the cord. The following considerations on this question are advanced by Dr. Russell Reynolds.

"1. Clonic spasm of the incessantly repeated character is not a phenomenon of persistent spinal irritation. (Tonic spasm is a mark of such a condition.)

"2. The movements (unless very severe, and even then to some extent) are generally controlled by the will; and it is certain that the purely (asensuous) reflections are not amenable to volition, or, at all events, to the same extent.

"3. The spasmodic movements cease during sleep, whereas the phenomena of excito-motor character are increased by this removal of volition. The direction of attention to some other object likewise diminishes the intensity of choreic movements.

"4. The special occasion of increase or of induction of choreic movements are the attempts at volitional action and the emotional changes."

These arguments are open to criticism, and could not be accepted as conclusive. They have, however, considerable weight, especially when taken in connexion with the following, which I have added.

5. Tickling the palm of the hand or the sole of the foot does not excite exaggerated reflex action. If the choreic movements were due to abnormal excitability of the cord, or an undue readiness to respond to impressions, tickling is the kind of stimulation which would, of all others, render this manifest. I have now tried the experiment in a great number of cases. Not uncommonly it causes some amusement to the patient, and there are grimaces and movements due to this emotional state; but, when the smile or laugh has passed off, the tickling is borne without any difficulty, and there seems frequently to be less difficulty in controlling the tendency to reflex actions than in health. Sometimes the tickling is not felt, as such, at all.

6. The most conclusive evidence, however, that the phenomena of chorea are not of spinal origin, is furnished by their unilateral character. Almost invariably, the twitchings come on first in one arm and leg, and often last for some time in the limbs of one side before extending to those of the other. (See Dr. Russell's paper in the *Medical Times and Gazette* for May 31st, 1868.) Throughout the affection, again, they usually predominate on one side or the other; and cases are not uncommon in which the chorea is unilateral from first to last—unilateral, that is, so far as the limbs are concerned, though more or less bilateral in the muscles of the eyes, chest, and abdomen.

I have taken considerable interest in these case of hemichorea, as they are termed, for the double reason that they confirm the hypothesis which I advanced in explanation of the incomplete unilateral paralysis in the common form of hemiplegia, and that they seem of themselves to localise the lesion which gives rise to chorea. Some of the cases which have come under my notice I now give.

Case I. *Hemichorea of Left Side: Agitation of Limbs: Partial Paralysis of Face.*—Jane H., aged 16, a dressmaker, stout, muscular, with good colour, and previously having had no illness, came under my care as out-patient at St. Mary's Hospital April 3rd, 1865. She had come to London a month before, having then for three weeks noticed movements in her left hand which interfered with her work. They gradually became worse, and the leg and side of the face were involved. She was said to have raved, and to have been unconscious at times, her eyes rolling. The left arm and hand seemed to be constantly agitated, the chief movements being flexion of the fingers and rotation inwards o the forearm. There was great impairment of power in the limb, with loss of control over it. The left lower extremity was weak, oftenf twitching; the foot dragged. The left side of the face was expressionless; the angle of the mouth was lower than on the right side, towards which the mouth was distorted. There were no movements. All the symptoms were worse from time to time; the agitation did not cease during sleep. There were no abnormal heart-sounds. The catamenia were scanty. Further particulars were noted at subsequent visits.

April 10th. There was less difference between the two sides of the face. The movements of the left limbs were much as before. She had great difficulty in guiding the hand, and took hold of objects between two fingers, not using the thumb. The eyes were "queer"; they moved about against her will at times, and she was compelled to close them. She was low-spirited.

April 24th. She was better. She could pick up objects with the finger and thumb. The face was nearly symmetrical; twitching was now observed in the left cheek.

May 1st. She could pick up a pin. She began to use the hand.

May 29th. She was all but well.

The treatment was dictated mainly by the idea that the chorea and the menstrual insufficiency might have a common cause; and she took two grains of iodide of potassium, ten grains of bicarbonate of potash, and twenty minims of compound tincture of valerian, three times a day; and three grains of aloes and myrrh pill daily.

I may call attention, in passing, to the marked paralysis of the left side of the face—a peculiarity in the case which I have not otherwise observed or seen recorded; and it will be seen that it was preceded and followed by choreic movements.

Case II. *Hemichorea.*—William B., aged 10, became an out-patient under my care November 12th, 1868. He had not been living well lately, losing flesh. He had squinted slightly for eight or nine months. A month previously, he was frightened by screams in an unoccupied house. A week since, he had pain in the right arm and thigh. Slight movements were now noticed in these limbs. He could not button his clothes; he stumbled in walking, and had fallen. There had been no acute rheumatism. A doubtful diastolic aortic murmur was heard.

Nov. 19th. Agitation was more marked; it was confined to the right side, so far as the limbs were concerned; but the ocular muscles were manifestly affected, and the two eyes always moved together. Sometimes the right brow was wrinkled alone; at others, the left was also wrinkled, but always with the right, and always in a less degree. The abdominal muscles were thrown into action bilaterally. He hesitated in speaking, used few words, and omitted the particles.

Case III. *Left Hemichorea.*—Thos. B., aged 7, came under my care at St. Mary's Hospital October 10th, 1867. He had had hooping-

cough and bronchitis all the previous winter, having been four months confined to his room. The second dentition was going on; the first of the incisors had appeared fifteen months before; only two were now present in the upper jaw, and there was no room for more. There was no heart-affection. Four months previously, the parents noticed shaking of the left hand; and he threw things about. This had gradually become worse. Now the left hand and arm were agitated, especially when used, or when the other hand was being used. He had very little power in compressing the fingers with the left hand. The left leg dragged more at one time than at another. The face was slightly affected; it was quiet when he was left alone. The bowels were confined. He was subject to occipital headache once or twice a week. He was ordered eight grains of powdered rhubarb, with soda and hydrargyrum cum cretâ, every night; and cod-liver oil and iron wine, a drachm of each, three times a day.

Oct. 24th. He was complaining of his head. The left hand was quiet while hanging by the side; it shook when raised, and when force was exerted by it. The left leg was quiet while he stood; it shook when he walked. As before, exertion with the right hand caused increased shaking of the left. The movements were not the characteristic irregular motions of chorea, but a shaking to-and-fro.

Nov. 7th. He had gained flesh, and could exert more pressure with the left hand. There was no great change in other respects. He did not again attend. He had continued to take the oil, and for a week had had bromide of potassium.

CASE IV. *Right Hemichorea.*—Anne W., aged 18, a servant, came as an out-patient on May 3rd, 1867. She had had right hemichorea eighteen months before, which lasted two months. Up to that time, she had not seen the catamenia. Her recovery dated from their establishment. For three months she had had agitation in the right hand and arm, and to a less degree in the leg, with occasional twitching of the face and eye. Sometimes articulation was difficult. The movements ceased during sleep. The right hand was weak, and sensibility was obviously diminished in the right side of the face and in the right hand and arm. The bowels were regular; the appetite good. The catamenia were regular, but scanty. She was ordered to take three grains of iodide of potassium, four minims of Fowler's solution, and twenty minims of compound spirit of ammonia, in an ounce of infusion of calumba, three times a day.

May 28th. She was much better. There was very little agitation of the arm or leg; no movements in the face. The catamenia were more abundant (on 17th); appetite good.

June 4th. She was not quite so well. There was more movement of the hand; and she had had twitching of the right side of the face. She was hard worked and harassed by the housekeeper over her. She looked well and strong.

June 11th. She was better; but the leg sometimes dragged as if paralysed, and was agitated. A prick was felt much more distinctly on the left hand and left side of the forehead than on the right. She was never hysterical. The dose of iodide of potassium was increased to five grains; and she took also two drachms each of cod-liver oil and iron wine three times a day. She improved, and went into the country, where she soon completely recovered. Her mother stated that the right eye would dance and turn inwards, while the left did not move. Nothing of this kind was seen by me.

CASE V. *Left Hemichorea.*—E. G., aged 17, a servant, mostly engaged in washing and ironing, came as an out-patient to St. Mary's Hospital on October 12th, 1868. She had never had acute rheumatism; but, two years previously, had had chorea, and was in hospital for four months. She was three months in bed. She said she was cured by galvanism. She was a stout, well-grown girl, with a good colour. For two months she had had agitation of the left arm and leg, with pain in the arms, worse while under observation, from excitement. Movements were seen also in the left side of the face; the occipito-frontalis muscle (the frontal belly) acted on both sides, wrinkling up the forehead, mostly on the left side. The jaw moved from side to side; and, when the tongue was protruded, it was shortened, flattened, and elongated by turns, from choreic contractions of its muscles, but always symmetrically, showing bilateral action. There was also bilateral action of the muscles of the chest and abdomen, and of the diaphragm. The movements continued during sleep. There was little apparent diminution of strength in the hand of the affected side, or loss of sensibility. She attributed the attack to a "swing". The catamenia had not been regular for two years; and she had not had sufficient food for some time. There was no cardiac murmur; but the heart's action was irregular—apparently, however, in consequence of the spasmodic action of the diaphragm. She was for some time seen by my clinical assistant, who gave her valerian, iodide of potassium, arsenic, iodide of potassium again, and iron, in quick succession.

Nov. 12th. She was not better; was perhaps a little quieter at night. This morning, she had been unable to speak; at the visit, she spoke well and readily. She was ordered to have two drachms of succus conii three times a day.

Nov. 16th. The movements were less violent, but she did not feel so well. The conium was continued. A daily dinner was given from the "St. Mary's Kitchen", and a dose of calomel and jalap.

It is not necessary to give the details from week to week. The dose of conium was rapidly increased till its physiological effects were produced, without any influence over the symptoms being manifest. After this, iron was given in large doses, and for a time cod-liver oil. No marked improvement took place till about the middle of January 1869. This coincided with the administration of sulphate of zinc, in doses rapidly increased to six grains, with tincture of valerian; but it would not be safe to conclude that the amendment was due to the treatment. At the time when the chorea was leaving the patient, the skin at the ends of all her fingers cracked; and painful fissures formed, which did not readily heal. According to her account, the same thing took place during her recovery from the former attack; and I have seen several cases in which a cutaneous eruption came out in the course of chorea.

CASE VI. *Left Hemichorea.*—Maria H., aged 15, a milliner, became an out-patient on September 3rd, 1866. For two months she had been weak in the left side, with movements of the arm and leg, which had been gradually becoming worse. She had twitching also of the left side of the face, and slight evidence of paralysis in it. Sensibility, tactile and painful, was diminished in the left side of the face and left hand. She was constantly sighing. The catamenia had not been seen. She took iron and quinine for a week.

Sept. 10th. She was about the same. The movements continued, and both the left arm and leg were very weak. She let things fall from the left hand. She was weak. Appetite good; bowels regular. She was ordered three minims of liquor potassæ arsenitis with compound spirit of ammonia in infusion of calumba, and cod-liver oil and steel wine.

Sept. 13th. She was not better. The movements, impaired muscular power, and defective cutaneous sensibility of the left side of the face, arm, and leg, were as before. The medicines were continued.

Sept. 27th. She was better. She went into the country, and soon recovered.

CASE VII. *Right Hemichorea, becoming general.*—Caroline H., aged 11, became an out-patient on October 3rd, 1867. She had had acute rheumatism two years in succession, March 1866 and March 1867; and, after the last attack, suffered from chorea. Chorea was again present, affecting the right side only. The child was very thin and pale. There was no cardiac murmur. Cod-liver oil and steel wine were ordered, and three minims of liquor potassæ arsenitis.

Oct. 21st. The chorea was worse; with the characteristic choreic movements, there was a continuous shaking of the right arm, such as is seen in paralysis agitans. There was no action of the facial muscles. Pain in the back was complained of. She was ordered to continue the oil and steel wine, and to take, in place of the liquor potassæ arsenitis, three minims of a solution of phosphorus in oil.

Oct. 28th. She was better, but had pain in the arm.

Nov. 18th. After an absence of a fortnight, the movements were more violent, and the left arm was affected as well as the right. After this, she quickly improved, both in general health and in diminished severity of the symptoms; and ceased to attend after January 13th, 1868, quite recovered.

CASE VIII. *Right Hemichorea, becoming for a short time general.*—E. N., aged 17, became an out-patient on June 1st, 1868. She had chorea at the age of seven, but had had good health since. On December 6th, 1867, she had an illegitimate child, which she suckled for a short time only. The catamenia had reappeared once. Twelve days before coming to the hospital, she had an interview with the father of her child, which was attended with much excitement. Two or three days afterwards, her mother noticed twitchings in her right hand, which were much worse at times. She had fits of excitement and extreme depression. She slept, but groaned and sighed. She was well nourished and robust-looking. While she was under observation during the visit, the movements were slight, and confined to the right arm, leg, and face. There was no cardiac murmur. She was ordered to take thirty minims of ammoniated tincture of valerian in an ounce of infusion of gentian three times a day.

June 8th. She was not better. Five minims of liquor potassæ arsenitis, twenty minims of compound spirit of ammonia, and an ounce of infusion of calumba, were substituted for the mixture previously given.

June 11th. She was worse; the movements were bilateral.

June 22nd. Agitation still continued bad, but was confined to the right side. The right hand was much weaker than the left. Speech

(articulation) was affected at times; the tongue felt too big for the mouth, and she talked thickly. At times she was not able to speak. There was great depression of spirits. Bowels regular; appetite good.

The treatment was continued, and from this time she improved. On July 6th, she had no agitation of the limbs at all; but occasionally the mouth was affected. She now ceased to attend.

CASE IX. *Left Hemichorea, becoming slightly bilateral: Tumour of Spinal Cord: Disease of Suprarenal Capsules.*—This case is referred to by Dr. Chambers in his *Clinical Lectures*, and I have given a brief account of the points of interest in the *Pathological Transactions;* but the details have never been published. H. M., aged 23, a needlewoman, was admitted into St. Mary's Hospital on November 1st, 1861, under the care of Dr. Chambers. She had never had acute rheumatism; had always been healthy, but not strong, liable to headaches, and subject to dysmenorrhœa. Two years previously, she had been disappointed in love, and had felt it greatly. She had become low and despondent, subject to headaches, and her friends had noticed that she was becoming brown.

The present illness began with headache and giddiness. She was turning round one day, when she suddenly fell down, not unconscious, but unable to rise. She called for assistance, was got to bed, and there remained for a fortnight. She suffered from pains in different parts of the body and limbs, vomited after every kind of food, and from the first was unable to keep the left hand still; it felt numb also, and she could not grasp anything with it. Very soon, movements were noticed in the left leg.

When she had been out of bed a week, she went on a visit to her sister. The omnibus journey (from Islington to St. John's Wood) fatigued her greatly. She became gradually worse, the head being jerked about, and the limbs feeling as if they would drop off.

When I first approached her, she was quiet; but, during my examination, the eyes twitched about; the head moved; the forehead was wrinkled; the mouth was distorted; the jaw was in action; and the left arm and leg were much agitated, the right limbs only slightly. The movements were said to be greater during sleep, or when dozing, than when awake. Speech was difficult and hesitating. Her memory was apparently not good; but she gave her history in much greater detail than is here set down, except about the love affair, which she confided to a patient. The pulse was 110. The heart-sounds were weak and sharp; there was no murmur. The skin was browned to a degree sufficient to attract my attention, and to be noted, but not exciting any suspicion of Addison's disease.

As she became worse, the mental faculties were affected. On November 8th, she was restless in the night; fell out of bed twice; attacked the nurse, bit and struck her. She refused food, and asked petulantly to be let alone. There were movements in the left limbs only, not violent.

Nov. 9th. She lay on her back, taking no notice, apparently asleep, but occasionally opening her eyes and looking round. The left arm and leg seemed to move under the clothes; the right arm was lying on the pillow, quiet. She refused to put out her tongue, and made faces when asked. The pupils were contracted and sluggish. The extremities were cold. She died during the following night.

POST MORTEM APPEARANCES.—There were scattered tubercles under the pleura at the apices of both lungs. The heart was healthy. The suprarenal capsules were large, yellow, nodulated, exhibiting the changes characteristic of advanced Addison's disease. The brain was healthy, as to naked-eye appearances and consistence. A tumour of the size of a haricot bean was found on the posterior aspect of the dorsal part of the spinal cord, about two inches above the lumbar enlargement; it consisted of nerve-fibres, connective tissue, and vessels radiating from near the axis of the cord.

[*To be concluded.*]

GRATUITOUS MEDICAL ADVICE IN CHINA.—The gratuitous distribution of medicine is quite common in China. In the summer especially, certain remedies much prized by the people may be obtained free of charge from societies which include this among other objects for which they are instituted. There is a very common mode of practising the healing art, professedly from benevolent motives, in which a selfish motive is too apparent. Notices may continually be seen placarded in public places, calling the attention of the public to some distinguished personage of the Æsculapian school who has learned his art at the capital, or from some foreigner, or from some distinguished native practitioner, or by communication with the genii, who is desirous of relieving those who are in a condition of suffering and distress, and will give them an opportunity to avail themselves of his knowledge and skill without charge, except for the cost of medicine.—Nevins's *China and the Chinese.*

REMARKABLE SPECIMEN OF DISEASE IN BONE.

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THE accompanying photograph represents a portion of the humerus of a patient who died recently in the Hull Infirmary from the results of advanced renal degeneration. He was also the subject of constitutional syphilis; and, during his stay in hospital, suffered from fracture of the bone, from which the specimen is taken. The history is as follows. The man was about thirty-six years of age, and by occupation a groom. Primary syphilis, contracted seven years ago, was followed by a copious rupial eruption, and nodes on the tibiæ. Albuminuria was known to have existed about eighteen months before his death. About a month after his admission as an in-patient, his attention was called to a change in shape of the upper part of the right arm; at first sight, the bone appeared as if bent, but manipulation left no doubt as to the existence of a fracture, the seat of which was just above the insertion of the deltoid. There was no history of any violence inflicted on the part either before or after his admission; and the actual moment of the occurrence of the fracture appeared to be unknown to

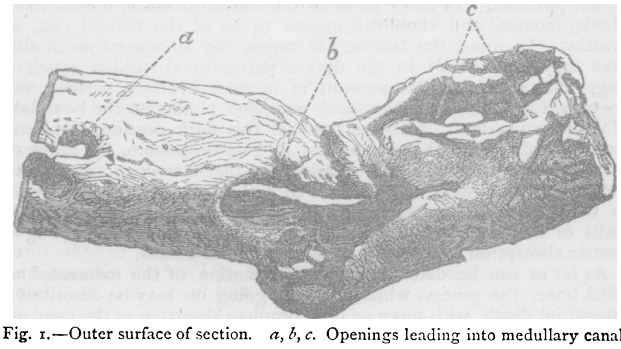

Fig. 1.—Outer surface of section. *a, b, c.* Openings leading into medullary canal.

him. Union was supposed to be perfect about two months after the injury was noticed. A liability to fracture has long been looked upon as one of the effects of syphilis upon the bones; but though such a condition, as Mr. Holmes says, "apart from ulceration and the separation of necrosed portions," is doubted by some, as I have, within a few years, seen two other cases of fracture occurring, upon the application of slight force, in syphilitic subjects without any symptom of ulceration or necrosis, I looked upon this as a similar case. The man died about seven months after the fracture took place; and as it is seldom, I fancy, that an opportunity occurs for a *post mortem* examination of a fracture of this sort, I had the portion of bone removed.

When the soft parts were detached by maceration, a very remarkable condition was disclosed. Upon the anterior surface of the bone, three large openings were found leading into what had been the medullary cavity; this canal was almost blocked up by bony deposit, towards

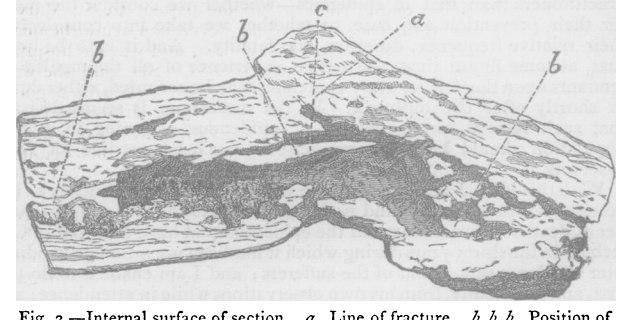

Fig. 2.—Internal surface of section. *a.* Line of fracture. *b, b, b.* Position of openings internally. *c.* New bone at outer extremity of fracture.

the ends of the section; but, curiously enough, less so immediately opposite the fracture. The edges of the centre opening were rounded, and the periosteum was continued over them. The other openingswere apparently more recent, and more nearly resembled the condition of ulcerated bone. The fracture was perfectly transverse; but, although some new bone had been deposited at the outer margin, it could be seen, when the parts were in a moist state, that the union was only fibrous.