change in the vascularity of the limb, or it may be in a measure independent of it. It is worthy of note in this connection that daily variations seemed to take place (about three weeks after the first operation) in the sensibility of the right leg without any corresponding variations in the temperature of the limb.

Although we cannot explain the exact mode in which nerve-stretching acts, we are not in a much better condition as regards many internal remedies which we know to have an undoubted power in modifying processes of disease. We do not on this account hesitate to use quinine or arsenic in ague, or salicylate of soda in rheumatic fever; nor is there any reason why, if nerve-stretching really seems to do good in this or in other chronic diseases of the spinal cord, we should not have recourse to such a procedure. Much of our therapeutics is still empirical rather than rational. What we have to ascertain, therefore, in the first place, is, whether the operation does or does not seem to do good.

Although it is still very doubtful how long the good effects produced by nerve-stretching in locomotor ataxy may last, it seems to me, judging from the results which have been published by others, as well as from my own experience in regard to this case, that its influence over the disease is so decided as to deserve further careful trial. Looking also to the effects which the operation produces upon the limbs, I am disposed to think that it may also prove of considerable service, in conjunction with electrical treatment, in certain cases of chronic spinal paralysis in children or in adults; and I shall take an early opportunity of giving the method a trial in some suitable cases. The increase in the temperature of the limb operated upon may decidedly help to improve the nutrition of its wasted muscles, and thus perhaps render them more amenable to electrical treatment.

CLINICAL LECTURE

ON

CASES OF SPASMODIC DISORDERS IN THE LOWER LIMBS.

Delivered at St. Mary's Hospital.

By C. HANDFIELD JONES, M.B.CANTAB., F.R.S.,
Physician to the Hospital.

GENTLEMEN,—We have lately had a case in the wards which was of interest to me, and I am sure I may say to you, in several respects. Let us occupy our time to-day in taking a retrospect of the story, and in seeing what instruction we may gain from it.

CASE I.—The patient, F. C., was a young girl aged 13, the daughter of a carpenter, who was disabled from work by an injury to his leg, and of a mother, whom I judged, and I trow not unjustly, to be fond, foolish, and anxious. She was herself a sleek-faced little damsel, who lay in her bed with great propriety, at any rate after the first few days, attired in a rather showy red dressing-gown, of a modern cut (as far as my imperfect erudition on such points enables me to affirm), and in bright yellow worsted slippers, which I learned were her own workmanship. She crocheted or did some such fancy work. Altogether there was a good deal in her "pose" to warrant the suspicion which more than one of you entertained, that her malady was largely compounded of, or based on, hysteria. This notion was materially supported by the circumstance that, about three months and a half previously, she had been in the hospital for six weeks on account of fits, which were stated to have been of very frequent occurrence, sometimes three or four in a day, but which were conspicuous by their absence during the whole or almost the whole of her stay. The first fit occurred on September 2nd, 1879, when she was struck on the left temple, and immediately fell down in a fit. Two days after this, while racing at a school-treat, she had another. Since then, she had been continually having fits, which came on after any excitement, and were usually ushered in by drowsiness; the patient then sat down, and the fit came on, and lasted from half an hour to five hours. After a fit, she generally complained of headache. On October 30th, she had a fit in the morning, which lasted four hours; on her recovery, she had lost the use of her legs, and had not been able to stand since. She came to us on November 9th, 1880. The notes, taken probably the day after, say that her aspect was healthy, that her manner was natural, and that she behaved well and gave no unnecessary trouble. Her legs were very sensitive to touch, though she could scarcely stir them from the bed, and she was quite unable to stand. When the

faradic current was applied, there was no response for about twenty seconds, and then the muscles acted powerfully, and severe pain was felt. On tickling the soles, reflex contractions sometimes occurred, and sometimes did not; one foot was affected at times more than the other. The feet were at times pointed, and extension of them was painful, and strongly resisted by the calf-muscles. This, however, was not quite constant; to-day the right foot could be brought into its natural position. The patellar tendon-reflex was well marked. She complained of pain in the left back and on the left side of the abdomen. On the 12th, when taken out of bed and held up, she could not move her legs at all, or make any attempt to support herself; the feet were turned inwards, the soles raised, the legs in a state of rigid spasm. I could not flex them with any ordinary effort, and any great force applied to them caused much pain. When lying in bed, the rigidity at times seemed to be less, but at others was complete. The remedies indicated were evidently such as might reasonably be expected to calm an excited state of nerve and muscle. To produce relaxation, I might have employed belladonna, chloral, bromides, physostigma, and others; but I selected two, one of which was an old well-approved means, and the other a modern, of which I had lately been making trial in the analogous state of asthma with advantage. I ordered a warm bath to be given every night, and two minims of a one per cent. solution of nitro-glycerine three times daily, with a teaspoonful of cod-liver oil twice daily. On the 15th, she could draw up her right limb fully, and allowed me to move it quite easily; it was in its natural state; the left was just as before, quite rigid in extension, and could not be flexed. I increased the dose of nitro-glycerine to three minims. On the 16th, the pulse was 90, soft. There was no giddiness nor flushing of the face. The right foot was drawn up when the sole was tickled; the left did not move; but she was conscious when the sole or the leg was touched. She was quite unable to stir the left leg voluntarily. There was no blueness or coldness of the left foot; it felt to the hand as warm as the right. On the 18th, a subcutaneous injection of one-sixtieth of a grain of atropine was directed to be made daily, and the other remedies continued. On the 20th, she had regained the use of both legs, could walk the whole length of Victoria Ward (thirty yards), and could just stand on either leg. Reflex action now occurred on tickling the sole of the left foot, or perhaps voluntary; the foot was drawn up, and the leg bent at the knee. She was first able to bend the knee in the warm bath on the night of the 18th. The sequela of the fit, the spasm, having thus yielded, the next indication appeared to be to prevent the recurrence of the primary disorder, for which, of course, bromide suggested itself. I ordered her bromide of ammonium gr. viij; tincture of cinchona ʒss; compound spirit of ammonia ℥v; decoction of cinchona ʒss—three times daily; and to continue her oil. On the 22nd, she was walking about well, and could walk a good way along a single plank of the floor. On the 26th, she complained of a pain in her great toe, and looked, I thought, pale; I therefore ordered ten grains of saccharated carbonate of iron to be taken twice daily; and, on December 2nd, I sent her out. She came to hospital on the 6th to show herself, looking very well; and, at my request, stepped up on an ordinary chair and jumped down again to the floor. I dismissed her apparently quite well, but shall not feel surprised if she returns, sooner or later, with some other neurosis, or a recurrence of the same. June 18th, 1881. This expectation has up to this time not been realised.

Before offering any comments on this case, I will relate some others which appear to be of the same kind.

CASE II.—E. B., aged 23, single, was admitted on April 27th, 1878. Her eyes were grey, and her hair rather light. She had been ailing a month, attending as out-patient three weeks. She was taken worse on the 27th; she had a fit, in which she lost consciousness, but did not bite her tongue; her hands were contracted, and her feet, and her body all drawn up. She never had a fit before; she had globus hystericus at the time. There had been no mental worry. The catamenia were regular, too copious the last time. She slept well. Her appetite was not good.—April 30th. The left hand was now all right, but the right hand was somewhat swollen, and was pained by movement at the wrist; the pain extended up to the shoulder. To-day the fingers were extended, but yesterday they were flexed partially, and were more or less rigid. The feet appeared normal, but movement at the ankle-joints caused pain, and was strongly resisted by the muscles; the pain extended up to the calves of the legs. She was ordered bromide of potassium, 10 grains; iodide of potassium, 3 grains; compound spirit of ammonia, 10 minims; water an ounce—three times a day. Diet simple—milk, beef-tea.—May 2nd. She was in much the same state, taking, since the 29th ult., mistura sodæ salicylatis four times daily. She had at first a dose every hour for four doses.—May 6th. Both hands were quite free, but the ankles were not; she

could not stand. April 13th. She was quite in the same state; the face was morose and sullen; she complained of pain in both feet when they were moved; the feet appeared quite normal. Ten grains of assafoetida were given in two pills every two hours.—April 16th. She was sitting up dressed, could walk now, and was much better.—April 20th. She was doing well, walking about. After this, she took bark and ammonia, and went out well on the 27th.

CASE III.—E. Br., aged 14, female, was admitted on January 22nd, 1878. Both parents were subject to attacks of rheumatism. She herself had never had any kind of fever. About a year ago, she first had an attack of rheumatism, after the disappearance of which she remained free until the 19th. On admission, she complained of great pain in the chest, aggravated by breathing. She had now no pains in the limbs or elsewhere. There was good resonance of the chest, and good breathing in both lungs. The heart's sounds were normal. She slept badly. She had a good appetite. Her bowels were regular. She was ordered simple diet (fish, milk, and beef-tea), and two grains of iodide of potassium with ten minims of compound spirit of ammonia in an ounce of decoction of aloes three times a day.—January 25th. She complained of pain in the neck, particularly when she moved her head. She still complained of pain in the chest, also of pains in both her knees. She was ordered an ounce of salicylic acid mixture three times daily.—January 29th. She felt better to-day; had no pain in the neck, but great pain in her knees. She was ordered to have a warm bath each night; she had it last night.—February 4th. She complained of great pain in the neck and shoulders, and of pain in the knees. Her legs were flexed at an acute angle on her thighs, and she could not extend them, or suffer them to be extended, without great suffering; the flexor muscles were tense, and resisted strongly. She had very bad headache. The heart's sounds were normal. The appetite was good; the bowels regular. She was now narcotised by ether, when the resistance of the muscles entirely ceased, and the legs were perfectly mobile at all the joints. They were then put up in straight splints.—February 6th. The splints were removed; she did not complain of pain. The contraction did not return again for some time. She was ordered, on the 7th, twenty grains of saccharated carbonate of iron daily, and half a drachm of ammoniated tincture of valerian in water three times a day.—February 11th. She was up, could just make a shift to stand and hobble with a good deal of support, but was quite unable to stand alone. There was a decided tendency to rigidity of the long flexors. She was ordered a drachm each of tincture of cinchona and ammoniated tincture of valerian in an ounce of infusion of valerian three times a day.—February 18th. She could walk in a hobbling way a few steps; managed to walk down some (a dozen) steps to-day from an upper ward to a lower.—February 21st. She was improving slowly. Three ounces of port wine were ordered.—February 28th. She was walking much better, almost naturally.—April 4th. She had a good colour, and walked well, and was going out.

CASE IV.—F. R., aged 11, was admitted on June 4th, 1878. He had been ill since Christmas last, and had been better, but had relapsed. The left hand and wrist were swollen and tender; the other limbs were free. Temperature 101°. There was no murmur at the mid-sternum; but the second sound was accentuated. Pulse jerky, soft, regular, 115. His face was somewhat flushed. He was thirsty. The tongue was natural; the bowels open. He was ordered half an ounce of mixture of salicylate of soda every two hours.—June 5th. Temperature 97°; pulse 102. He slept well last night, and seemed to be altogether better. The urine was not albuminous.—June 10th. The pain in the joints was all gone. His appetite was good. He slept well. Temperature 97.8°.—June 13th. He was ordered three grains of citrate of quinine and iron in water three times a day.—June 21st. He was to have gone out to-day; but the last three days he had had attacks lasting about five minutes, in which his right leg was affected with spasmodic jerking of the muscles, very evident to the touch, attended with pain. He kept, at these times, the limb extended by pressing on the front part of it with his hand; otherwise it would be drawn up. No other limb was affected. He could touch my index tip with his own steadily. The heart's sounds were normal; the bowels open; the tongue clean. His father said he never had chorea.—June 22nd. At 3 P.M., another spasmodic attack occurred; he fell down on the other knee—could not walk. He said the soles of his feet felt hard and sore.—June 27th. He had another attack of convulsive movement of the leg on the 25th. He had gone down into the garden, and there felt premonitory symptoms—viz., as if a cord were tied tightly round his toes. This lasted till he got up into the ward again, when the attack came on in the usual way.—July 1st. There had been no attack since June 25th.—July 4th. He remained well, and went out soon afterwards.

CASE V.—A., female, aged 10, was seen on November 4th, 1871. Her mother was one of a family who had all had nervous symptoms. She had suffered a good deal from neuralgia herself. The patient did not walk until she was three years old. When much younger, she used to be very passionate, but now was very placid and sweet-tempered. She had had measles, it was said, three times; the second time badly. Last November, she and all her sisters had chicken-pox so severely that it was like small-pox; one child was pitted on the abdomen, and was quite delirious. Her mental power was weak; she had learned to read with much difficulty, but could not learn to write. As her memory and mind seemed to improve, her body, her mother said, appeared to become weaker. Four and a half years ago, she had a very bad sore-throat; and, on being taken out of bed in the night, was found unable to stand; both legs seemed to give way. This weakness of legs lasted about three weeks, and then she quite got the use of her legs again. This occurred in 1867. In the following June, it was noticed that she dragged her left leg, especially when tired; this continued until April 17th, 1871, and then she lost the use of it completely. She was suddenly seized with severe pain about the left iliac fossa while in the street, and had to be carried home. Her feet were then very cold. This attack was attributed to an overloaded state of bowels. She regained the use of her leg again the same day; the pain lasted two or three hours, but occurred again now and then less severely. She went to Ramsgate; was very well while there; was able to run about, and made no complaint. When she came back in the early part of July, she was very well indeed, but soon afterwards had a slight attack of feverishness and pain in the abdomen. On August 7th, she was taken with fever; she was so red that it was thought to be scarlatina; but the medical man called it summer-fever. The weather was then very hot. About this time, she complained of her head, and was slightly delirious, but did not complain of her leg until the fever left her; and then she was just as now, only that she complained of more constant pain in her left knee. When seen on June 4th, she was quite unable to walk by herself on her feet, but could get along quite fast on her knees. If a finger were given to her, or her chin held up, she could walk, shuffling her feet along the ground, and with her trunk bowed forward at right angles from the hips on her legs. If her trunk were raised erect, the left leg was drawn up, and the thigh flexed on the pelvis. The joints all seemed mobile; when lying in bed, she moved her limbs freely. An aunt was hypermetropic, and so was she; she wore spectacles by order of an ophthalmic surgeon. At one time she had a squint, which got better, and returned when she had fever. There was some fulness at the inner and upper part of the left thigh, but no psoas abscess; nor did I find any in the abdomen. There was some tenderness of the lumbar spines. I ordered, first, five grains of citrate of iron and quinine with five minims of tincture of nuxvomica in water three times a day; cod-liver oil, water dash-baths, and frictions of the back and leg with an ounce of compound camphor liniment and three ounces of soap liniment.—December 7th. The report was that she carried herself a little better, but was rather more excitable, never uniform, either depressed and drooping or shrieking with excitement. The head was apt to ache. She slept very lightly. She came out of the bath delightfully warm; ate meat well. She was ordered succus conii, half a drachm to a drachm three times a day. The liniment was continued; the mixture omitted. In eleven days there was some improvement; she had less headache, stooped less, and was less excited. By February 12th, she was wonderfully better, almost upright, but leaning a little to the left. She ran about the house without any assistance, went up and down stairs, and took her usual walks when the weather was fine. The dose of conium had been increased to a drachm and a half. She was less irritable and excitable. On May 30th, she was reported to be becoming quite stout and strong; she could walk nearly four miles without fatigue. Her appetite was very good; but the cod-oil did not agree during hot weather. When not taking the oil, she became very confined and obstinate, and then she screamed and talked excitedly in her sleep. Her spirits were generally good; but at times she had attacks of excitement, succeeded by crying.—January 11th, 1873. She was upright; could walk and run fairly well. As long as she took the conium, her bowels were open, and she was free from headache; but, when she left it off, constipation and headache ensued. I saw her last in May 1880; she had grown very tall, but was weak in mind and body.

COMMENTS.—The above cases are all essentially similar. They were all certainly functional, not dependent on any gross lesion, probably not on any demonstrable. In Cases II, III, and IV, there were distinct indications of the presence of rheumatism; in the two others, these were wanting. In Case V, there was positive evidence of the nervous system being in a very unsound state, weak and unstable, the infirmity being undoubtedly hereditary. In Case I, the patient

was affirmed to be very liable to fits; but, as none occurred while she was under my observation, and scarce any during her stay in the hospital on a former occasion, it is not very clear what their character was. Probably they were more hysterical than epileptic, yet not without some affinity to the latter. The occurrence of spasmodic paraplegia as the sequel of a fit is more after the manner of epilepsy than of hysteria, or it may be compared to the occurrence of chorea from a fright. The spasm in all but one—viz., IV—was continuous; in the latter, the attacks were paroxysmal, and of brief duration. The cause of the disorder in the cases with rheumatoid affection was probably the unknown virus or *materies morbi* which usually excites articular inflammation, but may, as is well known, specially affect the brain or some other nerve-centre. In these, then, the derangement was toxic. In Case v, it seems to have resulted simply from the instability of the nervous system, without any special excitant. Just as the weak brain occasionally fell into paroxysms of excitement—loss of control—so it was, but more persistently, with the spinal motor centre of the psoas and iliacus muscles.

The essential morbid state in all these, and in a multitude of similar instances, is *superexcitability*—a condition which, I have often stated, depends, not on excess in the force-generating faculty of the motor cells, but in impairment of the faculty whereby the evolution of force, the liberation of energy, is regulated. It is clear that motor centres must possess these two faculties; otherwise, as long as the cells were supplied with fresh blood, they would go on sending forth impulses, and muscular repose would be impossible. The condition of spasm is, therefore, a mode of paralysis; and the affinity between the two states has long been recognised. In some of these states, both faculties may be impaired, and force continuously evolved, but in small quantity. This occurs in senile and alcohol tremor, and in many cases of chorea. In other conditions, the generation of force may be very active, as well as its liberation; and it may be quite impossible to arrest the movements by any ordinary exertion of strength. When this is the case, the therapy may need to be modified correspondingly.

The remedies likely to avail in such cases as those above narrated seem to depend rather on the severity and persistence of the spasm, and on the state of the general system, than on the nature of the exciting cause. The spasm ceased under the continued administration of iron, quinine, nux vomica, in Case IV; under full doses of assafoetida in Case II; under valerian, cinchona, with iron, in Case III; and under simple non-stimulating sedatives, nitro-glycerine, and conium, in Case I and Case v. The varying *quality* of spasm is not easy to appreciate accurately; but it is very important to do so, for on this the treatment very largely depends. One case of tetanus may require poisonous doses of aconite or tobacco; another will yield to chloral; and a third, perhaps, to alcohol.

I have scarcely touched the question whether the disorder in Case I was hysterical, meaning thereby that it was not purely physical. Probably, it was so to a certain extent, yet not so much as to render physical agents useless. I can hardly doubt that the nitro-glycerine acted beneficially, and I advise you to try it when you meet with similar instances. As it relaxes vaso-motor nerve-organs, it may similarly affect musculo-motor.

WORCESTER.—For the past year, Dr. Strange has to report a lower death-rate (20.0 per 1,000) than has been recorded in Worcester since the "present sanitary conditions" have been in force. Of the total number of deaths (712), diarrhoea was credited with 74, consumption with 69, other diseases of the lungs with 110, and heart-disease with 49. The ratio of infantile deaths was about 170 per 1,000 births. A large proportion of these deaths were of infants who died before attaining the age of even three months. More than a half (112) so died last year. This number is excessive, and to be deplored; but it is some small satisfaction to find that it is now much less than in former years. The work of the removal of nuisances continues with satisfactory speed, and improvements are noted in the water-supply and in house-drainage. The condition of cottage property, however, should still receive the attention of the medical officer. The hospital for infectious diseases received eight patients during the year—all of them cases that could not have been treated at home without danger to the rest of the inmates. The public mortuary and *post mortem* room attached are reported as being also of great use in the same direction. Dr. Strange adds to his report an interesting retrospect of the past seven years, showing a very large amount of good work accomplished by the authority. Six years ago, there were 441 houses containing more than one family in each; this overcrowding has been removed. There were then 108 houses without any supply of town's water; now every house in the city has a proper supply of good water. At least two-thirds of the open privies have been abolished, and an average of about 750 nuisances have been removed every year.

ON THE FUNGOID ORIGIN OF DIPHTHERIA.

By MICHAEL W. TAYLOR, M.D. Edin., Penrith.

THERE is no part of the history of diphtheria more undefined, and on which conclusions are more at variance, than its etiology, and a knowledge of the conditions which favour its origin and dissemination. The object of the following paper is to record the particulars of a small isolated outbreak, and to exemplify the influence of dampness in a dwelling as the exciting cause, and to show a probability that the growth of certain fungi, associated with that dampness, may have had some connection with the disease. I may premise that this communication is not the result of any official public sanitary service, but of clinical observation in practice.

CASE 1.—A little girl, E., aged 8½, of slight frame, fair delicate skin, and nervo-sanguineous temperament, had never had any illness except a slight attack of measles in 1879. She had been in the habit of attending a day-school with her two sisters, but they had been at home during the vacation for the last ten days. It could not be said that she had manifested any premonitory symptoms.

On August 1st, she was quite well when she rose in the morning; on the afternoon of that day, she complained of headache, giddiness, lassitude; and at night she was sleepless, and calling out in a delirious manner. I saw her on the morning of August 2nd, and found her feverish and excited, complaining of headache and sore-throat. Pulse 120; temperature 103°, with quick respiration; nothing particular in the chest-sounds. The tonsils, the faucial arches, and the velum palati presented a diffused redness of a deep tint. The tongue was coated white, soft, and moist. A suspicion of commencing scarlatina was excited, but no rash was visible on the skin. At 9 P.M., the pulse was 112, temperature 102°. There were some mental unconsciousness, and somewhat drowsy aspect; increased vascularity of the throat and pharynx, and decided swelling of the right tonsil; and also considerable tumidity and tenderness of the lymphatic glands under the maxilla on the same side of the neck.

August 3rd, at 10 A.M. Pulse 100; temperature 99°. She had had rather a better night, and answered questions sensibly. There was no rash on the skin, but, on examining the throat, it was seen that the portion which yesterday was red, was now covered with a film of semi-transparent whitish membrane, with branching filaments, involving the surface of the right tonsil and uvula, and extending across the velum partially on the left tonsil. Thus exudation was coherent to the surface of the mucous membrane, but it was easily detached. Pain of the throat was not much complained of, but some difficulty was experienced in swallowing. At 10 P.M., there was abatement of the feverish symptoms, but some anxiety depicted on the face.

August 4th, 10 A.M. Pulse 96; temperature 98.5°. White patches had become more opaque and thicker, but might be brushed off in shreds, leaving a red, tender, but smooth, non-ulcerated surface. There were infiltration and swelling of the mucous structure. Both tonsils were now implicated, but the left side least so. The glands above and under the jaw were engorged and painful on both sides. Breathing was noisy and rather snoring, but not of a hissing character. 9 P.M. Pulse 94; temperature 98°. There was no extension of membranous exudation to the larynx, and the chest-sounds were free from *râles*, but the breathing was noisy from the swelling of the throat, and the affection of the arches and velum. The countenance was rather turgid, and the eyes were watery and suffused; there was some degree of torpor and somnolence.

August 5th. Pulse 94; temperature 98.4°. She swallowed rather better, and the breathing was rather less noisy. The whole membrane, which had extended continuously over each tonsil and the pillars of the fauces, was seen to be breaking away, and becoming detached here and there; this process was assisted by brushing. The uvula, which had been clothed with a thin white pellicle, was observed to be nearly clear of this material, leaving the surface rosy red, and the whole organ cedematous and pendulous.

August 7th. Pulse 84. The uvula was still long, and infiltrated with puffy swelling. The white patches had all worn off, except on the left side, where there were two or three specks; the rest was clear of membrane. There was a little pain in swallowing; none at other times.

August 8th. This morning there appeared on the surface of the skin of the left forearm and left thigh, three or four deep purplish crimson stripes, like vibices, four or five inches long and two inches in breadth. The patient was hot and restless all night, with some fever and delirium, and frequent complaints of feeling a lump in the throat. The