condition seems to have attracted notice. Lepine says of his case of abscess of the right frontal lobe: "He was in a state of hebétude. He seemed to comprehend what was said, but could scarcely be got to utter a word. He would sit down when he was told to do so, and when taken up could walk a few steps with assistance."

A very interesting case is reported by Baraduc,* in which there was atrophy of the frontal convolutions in both hemispheres. The patient was an inmate of the Hospice de Ménages for six years. His muscular powers and sensation were unimpaired. He was, however, in a state of complete dementia, marching about restlessly the whole day, picking up what came in his way, mute, and quite oblivious of all the wants of nature, and requiring to be tended like a child. The lesion in this case was purely cortical, atrophic, and dependent on partial obliteration of the arterial supply. The lesion occupied the two anterior lobes, that is to say, the first, second, and third frontal convolutions, and also the internal aspect of the frontal lobes. The ascending frontal, ascending parietal, and paracentral convolutions were intact. The rest of the brain was normal, except in the region of the inferior parietal lobule of the right hemisphere (supramarginal and angular gyrus).

Another case, presenting several interesting features, has been put on record by Dr. Davidson.† A labourer received a severe blow on the head with an iron hook, which smashed and carried away a considerable portion of the frontal bone, exposing and injuring the brain as far back as the coronal suture. The injured portion of the brain, as determined *post mortem*, included, on the right side, the greater part of the superior and middle frontal convolutions; and on the left side, a piece of bone was found firmly adherent to the superior frontal convolution at its middle part, this part being disintegrated to the depth of an inch or so. With the exception of a spasmodic extension of the right arm occasionally, the only symptoms of the cerebral lesion in this case were of a psychical nature. Though the man seemed to understand what was said to him and did what he was told, "every action he performed left the impression on the mind of the observer that it was purely automatic" or machine-like.

Marked mental deficiency has been frequently noted in connection with arrested development, or atrophy, of the frontal lobes, without any objective symptoms as regards motility or sensibility. One good instance of this has been described and figured by Cruveilhier. This was a case of a girl aged 15, who had remained in a complete state of idiocy from birth. The prefrontal regions or anterior two-thirds of the frontal lobes in this case were completely wanting. But, indeed, the frequent association of idiocy with such defect of the frontal lobes is a generally recognised fact.

Whatever opinion we may form as to the positive indications of disease of the prefrontal lobes, I think it is abundantly manifest, from the cases I have cited from among many, that, in the total absence of affections of motility or sensibility, whether in connection with sudden or slowly progressive lesions of these regions, we cannot attach objective motor or sensory functions to them. With such evidence before us, to say nothing of the facts of experimental physiology, we cannot regard cases in which, with lesions in the prefrontal lobes, sensation or motion has been affected, as other than cases of co-existence or multiple lesions, whether organic or functional. Between lesions of the prefrontal lobes and such symptoms, we have no grounds for assuming even indirect causal relationship, unless they can be shown to be of very frequent, if not constant, occurrence. Such relationship we all admit in the case of tumours, which, as we know, influence regions at a distance from the actual seat of disease; or in the case of diseases spreading backwards, such as encephalitis or meningitis.

It is chiefly on the indirect or accessory symptoms that we at present rely for our diagnosis of lesions in the frontal regions. We may obtain indications from the history of some traumatic lesion, or from the proximity of some such affection as disease of the nasal fossæ; or we may have uncertain signs of pain localised in the frontal region; or there may be disturbances of the sense of smell. But, in the absence of all these—and they may be absent—the question is: whether there are any symptoms directly indicating disease of the prefrontal lobes? Even if we have to admit that such symptoms cannot be definitely specified, yet it will not have been in vain if experimental physiology has succeeded in bringing into prominence certain facts to which attention should be more particularly paid in future.

Touching the effects of removal of the prefrontal lobes in monkeys, I may be allowed to quote from myself: "Removal or destruction by the cautery of the antero-frontal lobes is not followed by any definite physiological results. The animals retain their appetites and instincts, and are capable of exhibiting emotional feeling. The sensory faculties,

sight, hearing, touch, taste, and smell, remain unimpaired. The powers of voluntary motion are retained in their integrity, and there is little to indicate the presence of such an extensive lesion, or a removal of so large a part of the brain. And yet, notwithstanding this apparent absence of physiological symptoms, I could perceive a very decided alteration in the animals' character and behaviour, though it is difficult to state in precise terms the nature of the change. The animals operated on were selected on account of their intelligent character. After the operation, though they might seem to one who had not compared their present with their past fairly up to the average of monkey intelligence, they had undergone a considerable psychological alteration. Instead of, as before, being actively interested in their surroundings, and curiously prying into all that came within the field of their observation, they remained apathetic or dull, or dozed off to sleep, responding only to the sensations or impressions of the moment, or varying their listlessness with restless and purposeless wanderings to and fro. While not actually deprived of intelligence, they had lost, to all appearance, the faculty of attentive and intelligent observation."

I have elsewhere attempted some explanation of the faculty of attention—the basis of the higher intellectual operations—and its relation to the anatomical substrata of the prefrontal lobes; but I will not enter further on these speculations at present. I would, however, call your attention to the psychical characters in some of the cases of disease and injury of the frontal lobes to which I have referred (*e.g.*, the American "Crowbar" case, Baraduc's, Selwyn's, Lepine's, Davidson's), as, in many respects, similar to those seen in monkeys after removal of the prefrontal lobes. I may also adduce the observation of Dr. Crichton Browne on General Paralysis of the Insane,† tending to show that the earlier symptoms, *inter alia* "general restlessness and unsteadiness of mind, with impairment of attention, alternating with apathy and drowsiness" (page 223), coincide with the morbid changes occurring at this stage, more particularly in the frontal regions.

ON SOME POINTS IN THE CLINICAL HISTORY OF CHOREA.‡

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THE object of the following paper is to call attention to, and illustrate by cases, some points in the common or occasional clinical history of Chorea, which have hitherto received little notice. The points specially considered are four: the electrical condition of nerve and muscle in chorea; the proportion between the choreiform movements in their relation to the will; the distribution of hemichorea; and the relation, occasionally to be observed, between chorea and certain convulsive disorders. The patients whose cases are narrated, except when it is stated otherwise, were under my care at the National Hospital for the Paralysed and Epileptic.

I.—THE IRRITABILITY OF NERVE AND MUSCLE IN CHOREA.

Observation on this point can only be made, with accuracy, on patients with hemichorea, in whom the irritability of the unaffected side can be taken as a standard for comparison. An examination of such cases shows that, a few weeks after the onset of the affection, there is to be observed, in most, though not in all, cases, a distinct increase in the irritability of both nerve and muscle on the affected side, the increase existing to both faradisation and to the voltaic current. The difference varied in the cases examined, from one to three centimètres of the secondary coil of Stöhrer's larger induction apparatus, and from two to five cells of the Stöhrer or Leclanché voltaic battery. The change was always in the same direction to both faradisation and the voltaic current. The increase in irritability was found to subside with the subsidence of the chorea. The following cases illustrate the alteration.

CASE I. *Hemichorea: Increased Irritability of the Muscles of the affected Arm.*—A healthy-looking lad, aged 14, noticed slight unsteadiness of the right arm the day after some severe rowing, he having had an attack of severe general chorea two years previously. A fortnight after the onset of this second attack, there were slight occasional choreic movements of the right arm, varied by an occasional sudden start, and there was also slight inco-ordination on movement. There was no cardiac murmur. The electrical irritability of the muscles of the two arms was carefully compared, and was found to be greater in the right

* Soc. Anat., March 1876; *Le Progrès Méd.*, Aug. 19th, 1876, p. 598.

† *Lancet*, March 19th, 1877, p. 342.

* *Functions of the Brain*, p. 230.

† *West Riding Reports*, vol vi, p. 170.

‡ Read in the Section of Medicine at the Annual Meeting of the British Medical Association in Manchester, August 1877.

(affected) arm than in the other. A similar difference was observed to both faradisation and the voltaic current. The irritability was equal in the biceps, the difference being in the forearm and hand muscles. On the right side, for instance, the extensor communis digitorum contracted to ten cells of a Stöhrer's battery, while on the left side fourteen cells were required to produce the slightest contraction. A month later, the same difference was still present: the common extensor contracted to one centimetre less of the secondary coil of Stöhrer's larger induction apparatus, and to six cells less of the voltaic battery.

CASE II. Right Hemichorea: Increased Irritability of Muscles of the Right Arm, subsiding with the Chorea: Subsequently Left-sided Chorea, with Increased Irritability in Muscles and Nerves of the Left Arm.—A child nine years of age had, when seen, suffered from unilateral chorea for two months; the movements being first noticed a fortnight after a fall out of a window. There were slight choreic movements and inco-ordination, in the right arm only. On testing the muscles, it was found that the irritability to faradisation, in both flexors and extensors of the forearm, was distinctly greater on the affected side. Three weeks later, the movements had almost ceased, and, a fortnight later, had quite ceased; and on again testing the muscles, no difference could be found between them of the two sides: the increased irritability had subsided. Two months later, the child reappeared with slight left-sided chorea of a week's duration. Very distinct choreic movements were present in the left arm. No distinct alteration could be discovered in the electrical irritability of the muscles or of the nerves, even as high as the brachial plexus. A fortnight later, the child was again examined. The chorea was still well marked on the left side, and absent or almost absent on the right. Both muscles and nerves of the left arm now presented a very distinct increase in their irritability. The flexor communis digitorum contracted to three centimetres less of the secondary induction coil, and to four cells of the voltaic battery less than the right. The left extensor communis digitorum contracted to the same strength of the induced current, but to two cells less of the voltaic battery, than the right. The same increased irritability was found in the median nerve, the left acting to two centimetres less of the secondary coil and four cells of the voltaic battery less than the right.

CASE III. Hemichorea: Increased Irritability in Muscle and Nerve on the affected Side, subsiding with the Chorea.—A man, aged 25, came under treatment with characteristic choreic movements, limited to the left arm, spontaneous, and interfering with voluntary movements. In all the muscles compared (flexor and extensor of wrist, and abductor indicis) the irritability was greater on the affected than on the healthy side; about two centimetres less of the secondary coil of Stöhrer's apparatus being required. The left ulnar nerve was one centimetre more irritable than the other. The muscles presented the same difference in their irritability to the voltaic current as to the faradic; and in the nerves the difference to voltaism was still greater, the right responding to twelve cells and the left to eight cells. Three weeks later, the arm was almost well. Electrical examination then showed a slight excess in the irritability of the muscles of the affected side, although the difference was less than before. It could not be noticed in the extensor of the forearm, but was distinct in the flexors and in the ulnar nerve. A month later, all spontaneous movement had disappeared, and with it all increase in irritability. The ulnar nerve, indeed, seemed a little less irritable than on the unaffected side.

In another case, described below (Case v), in illustration of another important point, the same increase was observed.

The existence of this change in the irritability of the muscles in hemichorea, in which the movements were characteristic, justifies the inference that it exists in cases of general chorea. The observation is not a new one. It has been made by Rosenthal and Benedikt; but I am not aware that their statements have been previously confirmed in this country. The same observers have asserted that a marked deviation from Pflüger's law is to be observed in chorea, a greatly increased sensitiveness to the cathodal opening contraction being observed. I have not been able to detect so profound a deviation from the usual order; but I have observed the anodal opening contraction occur, not only earlier than the anodal closure, but so much earlier than normal that it occurred almost as soon as the cathodal closure contraction.

What is the significance of the increased irritability in nerve and muscle which may be assumed to exist in many, probably in most, cases of chorea, which have lasted for a certain time? I do not think that it can be regarded as a local change, consequent on the overaction of the nerves and muscles of the affected limb; for the overaction in some of the cases was far too slight to account for such an effect. The increase in irritability is to be regarded as the expression of a change in the nutrition of the nerve-fibre; and we have learned to regard the nutrition of the nerve-fibres as depending on the grey matter of the cord, probably on the nerve-cells of the anterior cornua, with which

they are connected, and of which they are in effect the processes. Indeed, it is probably not too much to assert that, in testing the irritability of the motor-nerves, the nutrition of which is unaffected by any local cause, we are really testing the state of nutrition of the motor nerve-cells of the spinal cord. The increased irritability is, therefore, the indication of a change in the nutrition of those nerve-cells, similar to that which is expressed by the granular and other changes lately found by Mr. Sankey and myself in these cells in the chorea of the dog.* The change in their nutrition is no doubt the result of an irritation propagated down the cord upon them from the changed encephalic centre, and is similar to that which occurs in some cases of hemiplegia, from an irritative lesion in the corpus striatum; and it is an instance, if slight yet distinct, of the way in which "functional" disturbance is attended with nutritive change.

II.—ON THE RELATION OF THE MUSCULAR DISTURBANCE IN CHOREA TO VOLUNTARY MOVEMENTS.

Two elements may be, and commonly are, distinguished in the choreic disorder of movement: first, the spontaneous movements; and secondly, what may be termed the inco-ordination of voluntary movement. The latter term is a convenient one, but its accuracy may be questioned; since it may be urged that the so-called inco-ordination is simply the result of the inability of the will to quell the spontaneous spasm during voluntary movement. I believe, however, that an inco-ordination may often be recognised over and above the spontaneous spasm. But a distinction of the two elements is sufficient for the statement of the point to which I wish to call attention, which is that this inco-ordination of voluntary movement and the spontaneous spasm, although frequently proportioned, bear no necessary relation to one another, either when compared in different cases or even in different periods of the same case. In illustration, I may cite the following cases.

CASE IV. Chorea of One Month's Duration: Spontaneous Movements slight: Inco-ordination great.—A boy aged 6 had suffered from chorea for a month, when he came under observation. The attack began gradually without assignable cause. The affection of the two sides was equal, and consisted in very slight spontaneous movements of arms, head, and legs—so slight as almost to escape notice. On trying to execute any movement, the inco-ordination was extreme. If he tried to grasp an object, the fingers were twisted about and the hand thrown about in a wild manner. There was no cardiac murmur.

CASE V. Repeated attacks of Chorea, following Acute Rheumatism: Much Spontaneous Movement; Little or no Inco-ordination; Increased Irritability in Muscles.—M. W., a girl aged 18, in October 1875, came under treatment for her fourth attack of chorea. At 14, she had had an attack of acute rheumatism, in which her heart was affected. At 15, she had a severe attack of chorea, which commenced a fortnight after a fright (being knocked down by a horse). She had a second attack at 17; a third attack at 17½, which commenced the day after a severe fright at a thunderstorm. The fourth commenced a week after she had been startled by an unseen person. In every attack, the affection was general, but the left side was the more severely affected. In the last, the spontaneous spasm was constant and great, but there was very little inco-ordination of movement; she could hold an object placed in her hand quite steadily. She had a loud mitral systolic murmur. This patient came under treatment again a year later with a fifth attack, limited to the left arm. In this the spontaneous movements were distinct, though not extensive; but there was no inco-ordination of voluntary movements. In all the muscles of the affected arm, the irritability was increased to both faradisation and the voltaic current, the increase of the former amounting to two centimetres of the secondary coil.

CASE VI. Second Attack of Chorea: much Spontaneous Spasm: no Inco-ordination.—Lydia B., aged 18. Second attack of chorea. She had never suffered from rheumatic fever, but her father had died from it. The first attack had commenced two years previously without assignable cause, lasted six months, and affected the right side only. The second attack commenced three months before she came under treatment; for three weeks the right hand only was affected, then the left also became affected, and for several weeks the left side was worse. At the commencement of the attack, speech was much interfered with. At first, the chorea was worse in the morning and better in the evening. When seen, the mind was unaffected, face free from movement, the arms were the seat of considerable chorea; twitching and fidgetty movements constant. There was, however, scarcely any inco-ordination of voluntary movement. She could pick up an object, as a pen, without any difficulty, and hold it out at arm's length for a quarter of a

* *Medico-Chirurgical Transactions.*

minute with perfect steadiness. The legs were free from movement. There was no cardiac murmur.

CASE VII. Chorea: Three Attacks: much Spontaneous Movement, but no Inco-ordination.—Mary Y., aged 12, a healthy-looking child, had a first attack of chorea when nine years of age, which commenced three days after a fright. The attack lasted only a few weeks. A loud systolic apex murmur was present. She had never had rheumatic fever. A second attack of chorea occurred nine months later, and also lasted a few weeks. She continued free from the affection for two years, and then came again under observation with a third attack. In this there was much spontaneous fidgety spasm in both hands, but hardly a trace of inco-ordination. She could pick up a small object from the table quite steadily. The mitral murmur continued loud: heard both at the apex and at the angle of the scapula.

CASE VIII. Variation in proportion of Spasm and Inco-ordination at different periods of Attack.—A little girl aged 12, when first seen at University College Hospital, had slight chorea, of a week's duration, and confined to the left arm. There were very slight spontaneous movements, characteristic in form. There was great inco-ordination, out of all proportion to the spasm, so that it was with difficulty that she could pick up an object. The grasp of the left hand was distinctly weaker than that of the right. A week later, there was much more clonic (choreic) spasm, marked in both foot and hand. The inco-ordination, however, was much slighter; she could pick a very small piece of paper from the table without any difficulty. There was no murmur at the apex or base of the heart, but just within the apex was a long systolic murmur: heard in a very limited area, not conducted. A month later, she was nearly well, and the murmur could only be heard with an occasional beat of the heart.

These cases prove, I think, the assertion that, in chorea, inco-ordination of voluntary movement bears no relation to the spontaneous spasm, but varies independently. It is clear that this variation must depend on one of two causes; either the power of the will to overcome the spontaneous spasm is subject to variations altogether irrespective of the degree of that spasm; or else there is, as I believe, an inco-ordination to be recognised which varies independently of the spontaneous movements. I believe that it will be found that, when such a disproportion exists, the inco-ordination is in excess of the spontaneous spasm early in an attack, and the spontaneous spasm is in excess of the inco-ordination late in an attack and during relapses.

The independent variation in these two elements in chorea suggest that they may depend on an affection of distinct and separate regions of the nerve-centres. It is not easy to conceive that so considerable a variation as was noted in some of the above cases, can be due to a variation in the affection of one region.

[To be continued.]

ON THE GENERAL UTILITY OF SPONGES AS SURGICAL DRESSINGS, AND ON TEREBENE AS A SURGICAL AGENT.

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I FULLY recognise the value of the antiseptic treatment as taught by Mr. Lister. A method of treatment which enables us to open important cavities and make deep incisions, for diagnostic and other purposes, without danger, constitutes an epoch in surgery as great as the introduction of lithotomy, amputation, or anaesthesia.

Sometimes, however, unavoidable circumstances prevent our using antiseptic precautions. The operating surgeon is frequently called upon to perform even important operations with but little assistance. He may be called upon, especially in country districts, to remove (say) the breast with only three pairs of hands in the room, one pair being confined to the management of anaesthesia.

There are certain localities also, as the face and the mucous outlets and their vicinity, where functional exigencies prevent the adoption of a treatment which, although of inestimable value, involves much detail, complicated apparatus, the isolation of large surfaces, and long periods of non-interference.

For the last few years, I have used sponges as dressings after many operations and injuries. At one time, there was a great dread of sponges, even for operative purposes—a dread which was tersely expressed thus: "Whenever and wherever you see a sponge, throw it into the fire." The introduction of more efficient antiseptic fluids has

changed all this. In reality a sponge conveys, renews, or maintains antisepticity with signal convenience and efficiency. A soft, cleansed, moist antiseptic and sufficiently large sponge may be put over, or occasionally even within, the parts which have been recently injured or operated upon with benefits so marked as to deserve printed commendation. Such a dressing apparently secures all the conditions which favour the healing process; and all that we can do is to control conditions. We have no surgical charms, royal touch, or prayers which are able to heal.

A sponge exerts a soft, uniform, diffused, elastic, and measurable pressure. Slight pressure will keep a wound clean; moderate pressure keeps up efficient drainage of all deep-seated fluids, and renders the ordinary drainage-tube, as a rule, unnecessary. The drainage (and pressure) of a sponge is diffused and complete; the drainage of a tube is local and incomplete. In many cases, where I have used a tube with a superjacent sponge, I have found, on removing the first sponge after some days, all the parts healed, except the locality of the tube. In similar cases, where the tube has not been used, the healing has been complete. There is one structure which, in my experience, strongly resents the presence of an India-rubber tube passed through its substance: it is the female breast, multiple abscesses arising in the vicinity of its tract.

Moderate sponge-pressure also keeps the deep parts in apposition, and thus promotes the deeper solid union—a greater virtue no dressing can possess. A little more, though not at all severe, pressure arrests hæmorrhage from all except the larger vessels; even the latter might, if necessary, be held in check for a considerable time. In operations and injuries, where hæmorrhage is free and from many and not large vessels, as in wounds of the palm, indeed in any operation or injury involving the hands and feet, the advantages of a sponge and bandage are clearly seen. In operations on the breast, especially where axillary glands require removal, I look on a big sponge as my best friend. In some cases such as these, a bit of sponge put inside the wound (Mr. Lister's writings first suggested this to me), the margins being drawn together, or a large sponge placed thereon, instantly stops all bleeding. Here I should change the first dressing, as soon as the probability of primary and reactionary hæmorrhage had passed away, so that deep union might not be hindered. There is probably some physical peculiarity in sponge which tends to arrest hæmorrhage, independently of mere pressure. Protracted pressure with lint or cotton, sufficient to arrest hæmorrhage, would cause sloughing; it is not so with sponge-pressure. Sponge "bites" the skin, and thus keeps the superficial parts in place, while its elastic pressure keeps the deep parts together. I will now merely hint at some other of its qualities. Sponge may be kept very wet or slightly damp, hot or cold, small or large, by merely altering the character and the amount of the fluids which may be applied to it; all this is possible without removing the sponge. The lotion may be nearly boiling, or it may be constantly iced. Fluid may be applied with any frequency; it may be medicated with any approved agent. Lotions which give deposits, as those containing lead, are not so suitable, as they harden the sponge—a condition which can rarely, if ever, be necessary. If the sponge-dressing require to be prolonged more than a few days, the lotion must not be of a character or a strength to unduly irritate the skin.

Turkey sponge is better for smaller wounds and operations; in larger lesions, the honeycomb is more manageable. Sponge-dressings may be removed frequently, or, which is much more important, very unfrequently. The softness and bulk of damp sponge protect from movement, friction, blows, or other injury. Sponges take any shape, may be adapted to any surface, or cut to any size. Two or more (stitched together or not) may be used when one is not large enough or only small ones are available.

It is well to have separate suitably shaped and prepared sponges for dressing; but, if this be overlooked or be inconvenient, the operation-sponges may be used. Sponges which have been used, if completely cleaned and disinfected, are even better than new ones.

How long should we continue the sponge-dressing? Not long; until all danger of urinary and recurrent bleeding has ceased; until deep union is fairly established and there is little fear of the separation of parts; until (which is much the same thing) the discharges have become slight and the wound is mainly superficial. All these results I very frequently find on removing the first dressing, which has remained some days—three, four, six, eight, or ten.

In amputations of the limbs, sponges, one or two, may be readily made to cover the incisions, support the deep parts, check hæmorrhage, drain, and act as splints. In removal of the breast and tumours generally, the sponge-dressing has special advantages. The sponge should be large; say, in a woman of medium size, ten or eleven inches long, five or six wide, and four or five thick. It should be placed