measures to bring it to an end. In the absence of direct evidence, no explanation can be more than conjectural or of other than doubtful value. With the observed facts, however, it is different. They are in no degree uncertain, but are as I have described them.

The treatment consists in removing the cause, and, judging from the close relation which exists between the degree of nasal obstruction and the frequency and severity of the attacks, I believe this cause is to be found in the naso-pharynx. In the mild cases where the catarrh is not apparently the cause of much discomfort, a few drops of a resorcin solution, one or two grains to the ounce of normal saline, instilled into the nostrils several times a day as the infant lies on his nurse's lap, will soon put a stop to the crowing. But in bad cases, where nasal obstruction appears to be complete, and the spasms are obstinate and prolonged, the naso-pharynx must be scraped before local remedies can be expected to bring about any material improvement. To be of service, however, the operation must be performed early, and not be postponed until the child is becoming exhausted by the continually recurring seizures. Half a grain to a grain of chloral given sufficiently often to keep up a sedative influence upon the patient is useful, especially for its value in controlling the oesophageal spasm when nourishment has to be given by mechanical means.

In cases where the spasm of the gullet almost puts a stop to the taking of food the patient for days together may have to be fed by means of a tube passed into the stomach. The operation must be conducted, if necessary, under an anaesthetic; but it may happen, especially if chloral is being given, that the passage of the tube excites no spasm, although an attempt to swallow a mouthful of milk brings it on at once.

If the child be seen during a seizure, the tongue should be hooked forwards by a finger passed into the throat or grasped with the tongue forceps and traction made upon it so as to excite a return of respiration. Little shocks are useful, such as applying a cold wet towel to the face, slipping the hands into cold water, holding a bottle of smelling salts under the patient's nose, or using friction to the lips with a dry cloth. If our efforts to restore respiration meet with no immediate response, we should make use at once of artificial respiration and persevere with it for some time, even although the child continue to lie limp and inanimate, as if he were dead. Insufflation was successful in an obstinate case of arrested breathing from anaesthesia reported by Dr. F. W. Hewitt in his well-known treatise.

REMARKS ON THE VALUE OF RHYTHMICAL EXERCISES IN THE TREATMENT OF SPASMODIC NEUROSES.*

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In all our dealings with the nervous system we cannot afford to forget the important part played by *habit*. Whether it be in the regulation of our own lives, or in the endeavour to restore regular action to the muscles of our patients, the law of habit must not be ignored.

What we call habit is based upon the physiological law that the more a nerve path is used the more easily does it transmit nerve impulses, or the more any particular nerve mechanism is used, within the limits of its power of nutrition, the more easily does it work in the future.

I need not say anything as to the power of habit over the higher faculties of the nervous system; we all know too well the tyranny of bad habits and the satisfactory results of good training of our nervous mechanism. But I shall in this paper deal with some ways in which recognition of this law may aid us in our dealings with disordered functions of the nervous system. Not only must we remember the power of habit in connexion with the spasmodic affections with which I am mainly dealing in this paper, but habit has also bearings upon our treatment of paralysis due to cerebral disease, and a few words upon this may well clear the way for the main subject of this paper. For instance, we shall make a mistake if we tell a patient to try and use a paralysed limb when as yet there is no return of muscular power

in it, and, if there be any hysterical element in the case, the mistake may be a very serious one indeed. For every time the patient tries to use a limb which he cannot use, he does something else—probably using muscles adjacent to those paralysed—and thus establishes a habit of directing his nerve impulses along some other path than the right one. If there be any hysterical element in the case, this may produce so well-worn a track in a wrong direction that when the damage has been repaired any effort which the patient may make to open up the newly restored track may prove ineffective, because the nerve impulse simply travels along the well-worn but ineffective nerve path, and the paralysis in this way may become permanent so far as the patient's unaided efforts are concerned. In such a case of paralysis, therefore, we must reckon with this law of habit, and tell the patient not to try and use the limb, or, in a case of aphasia, not to speak till the power begins to come back.

SPASM.

This law of habit is of still greater importance when we have to deal with excess of movement instead of paralysis, and in spasmodic neuroses such as spasmodic wry-neck, habit must play an all-important part. The frequent repetition of the movements cannot but lead to an increasing difficulty of restraint by voluntary effort, and hope of cure must lie in our power of breaking the habit. In any case of recurring spasm of this nature we cannot be sure how much is organic and how much is functional until we have eliminated this factor of habit. Even in such a disease as paralysis agitans the movement can be materially lessened and the strength restored by counteracting the morbid habit of tremor.

In the usual treatment of spasmodic torticollis this is attempted by removing a piece of the nerve supplying the affected muscles, and thus giving them rest for a time. But I think a more rational way of neutralizing the habit factor in these cases is to induce another habit of movement of such a nature as to counteract the morbid one. To attain this end a new habit must be established, not only in the case of the individual muscles directly or indirectly concerned in the spasm, by means of rhythmical exercises very frequently repeated, but also in the case of the groups of muscles which have acquired a morbid habit of combined movement. Therefore another aim in our treatment must be to break up this combination and get the affected muscles into the habit of rhythmical movements in which they are associated with healthy groups of muscles. These movements must be kept up continuously for some days, or in some cases for some weeks, the whole of the energy of the muscles being each day expended on the exercises, thus leaving but little energy for the production of the spasmodic movements.

TREATMENT OF SPASMODIC TORTICOLLIS.

From what I have said it will be evident that each case must be treated individually, and exercises must be given which are best calculated to break up the morbid combinations and induce the habit of new associated movements. Nevertheless, broad lines of treatment can be laid down for each class of case. Thus, in spasmodic torticollis the muscles concerned are those of the neck and shoulders; and, as our object is to give regular rhythmical exercises, it is evident that our first aim must be to control the irregular spasmodic movements and prevent their interference with the treatment. In the slighter cases this can be done by steadying the head by the patient's own hands during the exercises, but in more severe cases it must be done by some one strong enough to prevent these irregular movements. This is easily done if the patient be seated in a chair and the head be grasped firmly by some one standing behind it. An essential point in the treatment is that the movements should be rhythmically repeated, and always at the same rate. I have found that a rate of two seconds per movement, or four seconds for each combined movement to and fro, is more efficacious than a more rapid or a slower rate. Each movement should be repeated over and over again continuously for several minutes. The movement, however, must not be a passive one, but must be performed by the patient's own muscles, the assistant's hands merely following its movements with a view to ensuring regularity and the prevention of any jerking of the head.

* Read before the Birmingham Branch of the British Medical Association, January, 1907.

In the exercises special attention must be given to the movements whereby the sterno-mastoid most involved is exercised in a condition of full extension. Thus, if during the spasm the chin be drawn down to the right shoulder, much time should be given to an exercise where, with the head held back, the chin is made to travel from the middle line as far as possible up and to the left. Another specially useful movement is where the chin is raised to the right, then lowered to nearly touch the sternum, and then raised to the left, and so on.

But no one exercise must, as I have said, be relied on. All the neck muscles must be exercised, and also combined movements of the neck, shoulder, and arm muscles must be practised. It will, moreover, be found best to adopt some regular routine of movements, such, for example, as the following: First, simple elevation and depression of the chin with the face looking straight-forward, then with it looking to the right, then to the left. Then rotation of the head to one side with the chin low, then with it higher, then with the chin as high as possible. Then a similar series with the chin rotated to the other side. Then a series of movements combining rotation and elevation in various ways, such as the first two movements referred to; also combined movements of arm, shoulder, and neck. After a week or more of steady work the tendency to spasm will probably have been so far overcome that the head can now be steadied by the patient's own hands placed on each side of the head, and therefore any other assistance dispensed with.

An important point of the treatment is, as I have said, that day by day for days or weeks the muscular mechanism must be kept so constantly tired by various rhythmical exercises that there is no energy left for the irregular spasmodic jerkings.

TRADE SPASM.

The same rule holds good for such conditions as trade spasm of various kinds, and I feel sure that the rhythmical exercise cure will prove of far more value than the rest cure.

Within the last twelve months I have had a most severe case of spasm under my care in the General Hospital, a case which might almost be dignified by the term paramyoclonus multiplex, for the spasm was one involving most of the muscles of the body. The attacks were so violent and uncontrollable that it was hardly safe to approach near the patient for fear of being knocked down by a sudden jerk of his body, for he was a big powerful man, a navvy by occupation. The patient was aged 56, though he looked less. The history of the past few years is as follows: He had an alarming fall seven or eight years ago; a year afterwards he had a little trembling of the limbs, and this got decidedly worse twelve months later after suffering from sewer gas poisoning. From this time onward—namely, for the last five years, he has suffered more or less from attacks of trembling, worse, as a rule, in the winter than in the summer.

He has during this time never been entirely free, but has been able to work from time to time. About twelve months ago his power of speaking began to be interfered with, and sometimes he was unable to speak for a minute or two. Of late the spasm has got worse, and during the last six weeks the attacks have been so severe as to prevent him from walking at all. He was admitted to hospital November 14th, 1905.

He suffered from two types of chronic contractions: First, a simple coarse tremor (four or five per second) involving the arms, especially the left, the trunk, muscles, and the left leg. The tremor was not increased by movement. Secondly, combined movements, whereby the left arm would be suddenly thrown out with force from the side, either alone or accompanied by a lurching movement of the body. If he were sitting with his feet on the ground, he would sometimes be suddenly half raised from his seat and jerked along towards the right, because the left leg was the most affected. He was quite unable to walk because of the occurrence of the spasms and the weakness of his legs. The movements were so sudden and so strong that it was dangerous to be near him. These jerky movements of the limbs were often repeated two or three times in quick succession. The head also was often jerked to one side or the other simultaneously with the other movements. When spoken to he was sometimes prevented from answering for some seconds by spasm of the throat or neck muscles. There was slight want of mental clearness at night, with occasional wandering and delusions, but this may in part have been due to the full doses of bromide he was given. For the first few days there were slight single jerky movements of the limbs during sleep, but these soon ceased. Rest and bromides decidedly lessened the severity of the spasm, but no satisfactory progress was made until he was ordered exercises some fortnight or so after admission. He was given a Sandow exerciser which he used while sitting in bed, as he could not stand. He used the exerciser with great regularity from 9 a.m.

until 9 p.m., resting only at meal times and for an interval of ten or fifteen minutes every hour or so. After a week the severe spasms were entirely checked, and there was only slight tremor, which was checked in a few minutes by resuming the exercises. By January 10th, after six weeks' exercises, he could stand and walk a little, and was quite free from both tremors and jerkings. From this time onwards he used to do his exercises standing up as a rule, and continued free from tremor.

The genuineness of the complaint and his desire to be cured were evidenced by the diligence with which he continued to carry out the exercises unceasingly all day.

On February 6th he was discharged completely cured.

On careful analysis of his movements there seemed good ground for considering this to be only an aggravated case of trade spasm. The man was by occupation a navvy, and the movements of the body and arms to left and right were suggestive of those recurring where a man throws a shovelful of soil up over his shoulder to left or right. This theory of his illness was confirmed by the after-history, for after he left the hospital completely cured, poverty not only prevented him from continuing his exercises, but also forced him to return to his digging, with the result that in a few months he returned with the spasm nearly as bad as ever. A few weeks of continuous exercising speedily checked this, and he was again cured.

Although it is now many years since I first treated spasmodic torticollis by exercises, it is, I am ashamed to say, only months and not years since I saw the applicability of the same treatment to trade spasm, otherwise I am sure I should have been able to refer to at least one other completely successful case. As it is, I can only speak of him as a case I failed to cure. I refer to a most interesting case of severe general spasm of the body and limbs, with jerking of the head.

The man was a professional pigeon shooter employed outside the ring at pigeon-shooting matches to kill the birds which escaped the guns of the amateurs. For this purpose very heavy charges of powder and shot were needed, as well as very straight shooting. The strain of constant employment of this sort was too much for him, and he developed spasms of the arms, neck, and body; but the interesting point about his case was that he was free from all tremor only in one attitude, and that was the attitude of pointing a gun and looking along the barrels. He was treated by the rest cure, and was getting on very well, when he became tired of the treatment and left the hospital—to return a few weeks later much worse again and much less amenable to treatment. He scarcely improved at all during his second stay, and soon left dissatisfied. Another interesting point about his case was that when alone and quiet he could keep the spasms away by writing, and he used to fill many notebooks with writing with this end in view.

I have no doubt that continuous rhythmical exercises with an elastic exerciser would have cured him, and I greatly regret the lost opportunity.

I have had very good results in a severe case of paralysis agitans under the same treatment. The gain in muscular strength and steadiness was most marked while he continued his exercises, but in such a case as this there is not the same need for wearying the muscles as in cases of trade spasm. The exercise need not be so prolonged, and the periods of rest can be longer than in the last-named case. The value of the treatment of paralysis agitans by frequent repeated rhythmical exercises is undoubted, and will prove very serviceable in the future in lessening the spasm in this troublesome disease.

In writer's cramp, also, the same principles must be adopted, and an elastic apparatus constructed for exercising the fingers, and also for finger exercise combined with movements of the whole arm, so as to break the habit of combined movement of the finger and arm muscles as in writing. As all these movements must be even and regular ones, it is of importance that the elastic, whatever its strength, should be yielding enough for one part of the exercise not to require more force than another, as would be the case if a short, strong elastic cord were used. Such an elastic cord as that supplied with the Whiteley exerciser is preferable to a shorter one with less range of movement. The associated exercises must be the reverse of the usual movements of writing. Thus a large elastic rubber ball must be squeezed by the fingers at the same time as the wrist and arm are extended, and for the reverse exercise an elastic ring made up of many strands of thin elastic must be opened out by the fingers whilst the wrist and arm are being flexed. This ring can easily be carried in the pocket, and then during spare minutes by day the fingers can be

exercised, and if, instead of a ball, a metal ring fitted with steel springs be used, this also could be carried about, and the fingers could then be exercised quietly in the coat pockets while walking about town or in trams, etc., as well as having the regular exercises before and after business hours.

In stammering we must give the patient regular exercises of his speech muscles quietly by himself, as Demosthenes is reported to have done, under surroundings different from those which are apt to induce the spasm. In other cases, such as those of spasms of the laryngeal muscles, where exercises are less available, it may be necessary to resort to hypnotic suggestion in order to break the habit, but I have not yet seen such a case myself, and, on general principles, I should not resort to hypnotism unless I had failed to devise curative measures of a less dangerous kind.

In all these cases a careful study of the morbid habit acquired will give us the clue as to the best way of counteracting that habit, and so curing, or, at all events, greatly relieving, our patient.

THE EDUCATIONAL ASPECT OF THE CANCER QUESTION.

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THOUGH all attempts to elucidate the origin of cancer have hitherto ended in disappointment, yet it cannot be contended that effort, whether clinical, pathological, experimental, or, lastly, surgical, has, during the last quarter of a century, been barren of result. It has been devoid, it is true, of any discovery startling enough to arrest the attention of either the medical profession or the public. It has been one of plodding—we may say almost unconscious—progress, and it is only by a retrospect of the past and a contrast with the present that it becomes manifest that a gap exists between our views of cancer and our means of combating this terrible disease then and now. In cancer of the breast, for instance, Sir Benjamin Brodie, after an operative trial of some 600 cases, came to the conclusion that life was rather shortened than prolonged by surgical procedure, and decided never to remove another breast for cancer without explaining to the patient his experience of its results. Benedikt of Breslau, during the last seventeen years of his career as a surgeon, gave up operating in this disease altogether. Sir James Paget, in his *Lectures on Surgical Pathology*, writes:

I will not say that such a thing as cure is impossible, but it is so highly improbable that a hope of this occurring in any single instance cannot be reasonably entertained.

Like statements pervade the writings of all surgeons of the last century, and, wherever are recorded their experiences, the same universal note of despondency is apparent. Cancer of the tongue was removed by methods which in the light of modern knowledge were hopelessly inadequate attempts to eradicate it, and was invariably followed by rapid recurrence. In cancer of the uterus the most that was undertaken was a scraping or cauterizing of the foul and ulcerating surface. Cancer of the stomach and intestine was inoperable.

Melancholy enough as is the picture in our treatment of cancer at the present time, it must be admitted that it forms a forcible contrast with that just portrayed. Cure in a certain proportion of cases in all regions of the body where it occurs, in the sense that the patient lives on from year to year and oftentimes reaches the normal span of life without any manifestation of recurrence; and a considerably greater prolongation of life than formerly in a certain other large proportion of cases constitute the improvement in the prospect of the present sufferer from cancer, if he applies in time to render surgical interference at all hopeful. Again, while formerly, owing to its invariable recurrence after removal, the weight of professional opinion pronounced the disease to be primarily a blood dyscrasia, of which the tumour was the local manifestation, few are not now convinced that, however the soil may be prepared in the individual, the disease itself is primarily a local one. All recent evidence—clinical, microscopical, and experimental—points to this conclusion, and it seems to be verified in practice by its non-recurrence after local

removal in a certain proportion of cases. The paths of its embolic lymphatic dissemination have in many regions been accurately defined, and in the breast its lymphatic permeation along the planes of the deep fascia has been recently conclusively demonstrated. On clinical grounds there is ample reason for the supposition that in other regions a similar insidious centrifugal spread occurs. Improved microscopes and improved microscopists have shed light on its distinctive microscopical characters, and are able to furnish a more accurate and earlier diagnosis. Clinical determination, on which formerly chief reliance was placed, by signs which are now known to be those of advanced and usually hopeless cancer, has been superseded by expert microscopical examination. There is no longer any reasonable argument in favour of saturating a patient having a suspicious ulcer on the tongue for weeks with iodide of potassium, to see whether it will disappear, because he happens to give a history of previous syphilis. It is not necessary to labour examples further. Wherever we turn, it is manifest that, in all departments of research into this disease as well as in the science of its treatment, there has been advance, though falling short of the grand discovery of its cause, and indicating thereby the lines on which we should seek its prevention or cure.

In so far as concerns the subject matter of this paper, our present knowledge, it would seem, justifies us in making the following categorical statements in reference to cancer:

1. That for all practical purposes it is a disease confined to the last half of life.

2. That, while not denying there may be unknown hereditary or acquired constitutional conditions favourable to its existence and growth, the development of the disease is primarily local.

3. That its further development consists in an insidious centrifugal spread from its original local site, both by lymphatic permeation and by embolism along the channels of lymph and blood vessels.

4. That usually this centrifugal extension takes place early in the disease, but that this factor is inconstant for different varieties of cancer as well as for individual cases of the same variety.

5. That early cancer has no symptoms.

6. That early cancer has no clinical signs or naked-eye appearances by which it can certainly be distinguished.

7. That the symptoms and clinical signs usually recognized as characteristic of cancer, such, for instance, as pain, wasting, fixity, lymphatic enlargement, etc., are those of advanced cancer only, and are worthless from the point of the essential condition of its successful treatment, early diagnosis.

8. That the microscopical finding is the only reliable means of diagnosis.

9. That in a certain proportion of cases the disease does not recur after removal by modern methods, and that in those in which it does recur there is generally a longer period of immunity than formerly.

10. That such freedom from recurrence is presumably due to the local operation having been successful in eradicating every cancer cell, or, in default of this, that the natural powers of the patient are capable of destroying any which have escaped removal.

11. That recurrences are due to failure in eradicating every cancer cell, and that the natural powers of the patient are insufficient to deal with those which have been left behind; in other words, that every recurrence is owing to omission on the part of the surgeon to overtake the centrifugally-spreading disease.

If the truth of the above statements be admitted—and they do not, I think, go further than we are reasonably warranted in doing—the possible means of improvement in the treatment of cancer, within the limits of our present knowledge of it, are only two. It is certain, in the first place, that its paths of extension will be still more accurately defined, as has recently been done by Cheate in cancer of the tongue and Handley in cancer of the breast. But it is evident that not much further progress in dealing surgically with cancer will accrue from this source, and for the following reason: It has already been largely discounted by the wide local removals which constitute the radical operation, having for their object the reaching into healthy tissues in every direction beyond the disease, irrespective of our know-