botany and geology, field sports, especially fishing—these are some of the most obvious resources for the completion of the cure and after-cure; and the taste for their pursuit as hobbies after a return to the ordinary routine of life and work is one of the most effectual prophylactics against a recurrence of the disorder which led up to their acquirement.

In several cases where protracted muscular effort was badly borne I have known the much-abused motor car form a therapeutic agent of the greatest value. An old school friend of my own, who enjoyed and still enjoys a leading practice at the Bar, has recovered from a condition of seemingly hopeless neurasthenia with insomnia by the acquisition, on my advice, of a small car, on which he habitually makes his circuit. In cardiac neurasthenia and in some cases of neurasthenia with persistent insomnia I have found the exhilarating effect of motoring to be most beneficial, particularly if the neurasthenic will consent to act as his own chauffeur.

I have attempted to describe nothing new; and, gentlemen, this brief and incomplete summary of some of the means at our disposal and the method of applying them must be like a beaten track to many of you who are more familiar with their employment than myself.

In medical practice few modes of treatment are permanent; they have their fashions and their decline;

Windy ways of mortal men
That, like dust, are lifted up
And are lightly laid again.

But in all sound treatment the principles that underlie these methods are permanent, and are in relation with the causes and the natural cure of disease.

LARYNGISMUS STRIDULUS IN NEW-BORN INFANTS.

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THE association between laryngismus stridulus and rickets has been insisted upon so often that the spasmodic attack is usually regarded as being merely a complication of the rickety state. Indeed, it is commonly assumed that the complaint is one which occurs only in rickety subjects; and few practitioners seem to be aware that a laryngeal disturbance similar in kind to, if not actually identical with, the spasm so familiar to us in the rickety child may not only arise quite independently of that disease, but may affect healthy-looking infants of a few weeks old. Even when associated with rickets, the connexion is probably a purely accidental one. I believe the spasmodic seizure to be an essentially reflex act which occurs only as the result of a definite local stimulus seated usually in the naso-pharynx; and I believe it to be allied with rickets in so many cases merely because the nervous system in that disorder is in a state of heightened nervous susceptibility so that it responds with exceptional activity to every peripheral irritation.

I have met with a number of cases—all in well-to-do families—of laryngismus attacking healthy young infants within the first month of life. Three very severe examples have come under my notice quite recently. In these and in all other cases that I have seen, without exception, I have remarked one common feature, namely, that they were all suffering from extreme nasal obstruction due to adenoid overgrowth and post-nasal catarrh. Some children are born with an excess of adenoid tissue in the naso-pharynx. This in itself is probably a matter of little moment, but when, as usually happens, a catarrh of the mucous membrane is set up, the consequent irritation may be considerable. The swelling and copious secretion practically close the nasal passages to the entrance of air, and the mucus being carried down into the stomach in large quantity upsets the digestion and makes feeding difficult. It is no doubt to the presence of this acrid mucus that the digestive disturbance which has so often been remarked upon as complicating the attacks of laryngismus is to be attributed. In a certain proportion of cases the irritation thus excited in the post-nasal fossa is reflected to the muscles about the glottis and gives rise to the spasm of the larynx. That this does

not follow in all cases depends, probably, upon the relative nervous irritability of the individual infant. The patient often comes of a family marked by strong neurotic tendencies, or is hampered by a special instability of the respiratory centre. In a bad case the whole breathing apparatus seems to be thrown out of gear, and it is a curious peculiarity of the seizures at this early age that the body often remains perfectly limp without an attempt at inspiration or any sign of muscular movement either in the chest or abdomen. The closure of the glottis seems to be the consequence of a spasmodic action of the vocal cords; but it occasionally happens, especially in cases where the body is rigid with signs of carpo-pedal contraction, that the muscles at the root of the tongue are concerned in the seizure—the stylo-glossi and palato-glossi, which drag the tongue backwards until it presses like a ball-valve upon the laryngeal opening. This, however, in some cases appears to be due not to a purely morbid spasm, but, as Clover originally pointed out, to an arrested movement of deglutition, the tongue remaining fixed at the roof of the mouth in the position into which it was drawn in preparation for the act of swallowing. In these cases the finger can be passed only with difficulty between the tongue and the palate.

In many cases the spasmodic movement is not confined to the larynx, but involves the gullet as well. This most interesting and important complication I have only seen in cases such as I am describing where the complaint affects children in the earliest infancy. If it ever occurs in older children, an instance has never come under my observation. The oesophageal spasm may be met with in every variety of seizure, whether the muscular system generally be rigid or limp, and is often so obstinate that it assumes the chief prominence in the mind of the mother, whose sole anxiety seems to be lest her baby should be starved. I have recently seen three cases of this kind. In one of these—a baby girl, 6 weeks old, the subject of extreme nasal obstruction—the child had suffered since the third day after birth from spasm affecting both the larynx and gullet. The patient at first could take only $1\frac{1}{2}$ oz. of milk in the twenty-four hours. One dessertspoonful was the largest quantity which could be borne at one time without exciting a spasm, and this was trickled cautiously into the mouth from a spoon. If more were given it set up a spasm at once, not only in the gullet but often also in the glottis as well. That laryngismus in these cases often follows an attempt to swallow may be explained by the fact that during deglutition the vocal cords are closely approximated, as appears from an experiment made by Dr. Mount Bleyer reported by Dr. William Gay; and it is conceivable that the movement of adduction may pass into spasm as readily as the movement of swallowing provokes a tonic contraction of the gullet. The arrest of breathing may also be induced, as was mentioned above, by an incomplete act of deglutition, which fixes the tongue backwards in such a way as to prevent the passage of air into the glottis. The oesophageal spasm can occur independently of the laryngeal convulsion, and seems, like the latter, to be an essential part of the disturbance, so that the gullet may contract and remain rigidly closed for a time without any concurrent interruption of the respiratory movement. If a very pronounced symptom, the difficulty of swallowing may be attributed to a supposed congenital malformation; but the irregularity with which the spasms occur should dispel this suspicion, for in most cases there are times when food can be taken in small quantities without much difficulty; also the co-existence of laryngeal spasm is an indication of the utmost value as pointing to the cause of the oesophageal difficulty. I think laryngismus is always present in these cases—at any rate, I have never yet seen the gullet suffer alone, although the two passages are not necessarily affected at the same time.

I have said that in all the cases which have occurred in my own experience there have been pronounced signs of nasal obstruction and naso-pharyngeal catarrh, and that I believe the irritation thus induced to be the exciting cause of the seizures. That this is so is made highly probable by the fact which I have noticed with no little interest—namely, that in its frequency and intensity the laryngeal spasm is found to vary in exact correspondence with the degree of nasal discomfort shown by the patient. I may cite, as one example amongst many, the following case:

I saw several times recently, with Dr. John Gay, a well-nourished little girl, 6 weeks old, who, at the age of 3 weeks, caught a cold on the chest and began to cough. A few days later she showed unmistakable signs of severe post-nasal catarrh, and at the end of the week the attacks of laryngismus began. The spasm at first was set up by the cough, but soon it was also induced by an attempt to take food. When given a little milk the child seemed unable to swallow it, and after a few seconds was seized with a spasm of the larynx. In these attacks there was no crow, or, as far as one could tell, any attempt at inspiration. The chest merely ceased to move, and the face grew darker and darker as inspiration was delayed. The child remained quite limp, without any stiffening of the body or sign of tetany. After a few seconds the spasm passed off, the chest re-expanded, and the child began to cry. The seizures recurred very frequently during the following days, being repeated between twenty and thirty times in the twenty-four hours, and as the child could not swallow, whether a laryngeal spasm was present or not, food had to be administered by means of a stomach tube introduced through the mouth, for the nasal obstruction was such that the tube could not be passed through the nose. The child was taking a grain of chloral every four hours, and, owing no doubt to the sedative effect of the drug, which caused some drowsiness, the passage of the tube excited no spasm, although any attempt to swallow still induced it at once. The patient was also ordered drops consisting of 1 grain of cocaine, 1 drachm of the 1 in 1,000 solution of adrenalin chloride, and 1 grain of resorcin in $\frac{1}{2}$ oz. of normal saline solution. Of this four drops were instilled into the nostril every four hours. All this time the post-nasal catarrh had continued, and the difficulty of nasal breathing was shown by the frequent occurrence of little snorts or half snores whenever the child tried to draw in air through the nose. For a day or two there was a great improvement in this respect, and it was noticeable that during this period of amendment the spasms also underwent such a favourable change, both as to frequency and severity, that hopes began to be entertained of their speedy cessation. Unfortunately, in spite of extreme care, the post-nasal catarrh soon grew worse again, and at the same time the seizures returned as often and as severely as before.

The duration of the illness was three weeks. The power of swallowing was never regained, and the laryngeal troubles continued until the end. Dr. Gay was indefatigable in his efforts to preserve the life of the patient, but, in spite of all his skill and resource, the infant sank very suddenly. During the last ten days of life the temperature had been raised to 101°-103°, but there was no sign of pulmonary inflammation or other discoverable complication to which the febrile state could be referred. This case was one of exceptional obstinacy, and I cannot recall one which showed so little response to remedial measures. As a rule, the spasms can be decidedly influenced by sedative remedies and local antiseptic treatment.

In another case the child also suffered from conjoined laryngismus and oesophageal spasm.

A female infant of a few weeks old was sent to me by Dr. E. J. P. Olive. The difficulty in swallowing had begun three days after birth. Food could be taken only in small quantities at a time, and any attempt to increase the amount seemed to close up the gullet at once. The attacks of laryngeal spasm also were very frequent and alarming. In this case the completeness of the nasal obstruction was shown by the snuffling and snorting sounds and the retraction of the soft parts of the chest at each inspiration. When the breathing became quieter and the snorting sounds ceased, as happened sometimes when the catarrh temporarily improved, the child would go a whole day without a single spasm, but when the obstruction returned the laryngeal seizures became again as bad as before. With the recollection of Dr. Gay's case still vividly in my mind—for the child's death had occurred only a few days previously—and being impressed with the imminent danger to life in so young an infant if the spasms were not arrested, I advised that the naso-pharynx should be scraped. This was done, but unfortunately the child sank shortly afterwards.

In newborn infants, as in older children, the degree of laryngeal distress varies widely from an occasional crow or croak in mild cases to a severe and prolonged spasm in which breathing completely ceases, the face grows slate-coloured, and the infant seems at the very point of suffocation. I have known a child to lie for several minutes in an absolutely inanimate state, without any attempt to draw his breath, and yet be brought round after what seemed a dreadfully long interval by artificial respiration. This happened several times in both the cases referred to. Sometimes the patient does die in spite of all our efforts to get the lungs to re-expand. In the various examples of this derangement which have come under my notice at this early period of life I have had the opportunity of seeing many of these seizures. They are not always quite the same. The attack has generally come on silently without any preliminary crow (in the bad seizures); then in some cases the child has stiffened himself out with

rigid fingers and incurved thumbs; in others he has lain back in his nurse's arms with perfectly limp muscles and a livid face. The association with tetany is exceptional in the newborn baby, and the connexion with general convulsions is not as common as one would expect to find it at this period of life, although it may occur.

It need not be said that in a bad attack the laryngeal spasm in so young a child is a symptom of the utmost gravity, or that recovery is doubtful in the extreme. If the case be a severe one the infant may die suffocated, but more often he sinks worn out by the frequency and severity of the attacks, or succumbs to pulmonary collapse, owing to weakness of the inspiratory muscles and the difficulty of filling the lungs with air. The occurrence of general convulsions does not, perhaps, appreciably influence the issue, but, if the spasm affect the gullet as well as the larynx, the difficulty of supplying adequate nourishment is a disadvantage which must not be lost sight of in estimating the chances of recovery.

As to the nature of these cases: I have spoken of them throughout as being due to laryngeal spasm, for I believe them to be in the main similar in mechanism to the attacks of laryngismus which are familiar to us in the subjects of rickets. It is true that in early life the seizure often begins quite suddenly without any preliminary crow to indicate what is about to befall, but the same thing may happen in older children, and I have the authority of Dr. F. W. Hewitt for stating that the closure of the glottis which sometimes occurs during the administration of an anaesthetic may come on quite suddenly and without the slightest sound. Many cases are, however, ushered in by stridor, and, if very mild, the attack may be limited to this symptom, so that an occasional crow in the inspiration is the only morbid condition to be observed. That the intake of air is suspended in severe cases is shown by the advancing cyanosis and the cessation of all movement in the chest and abdomen. The inability to swallow, which at this age is often a definite part of the attack, must be due to a spasmodic contraction of the gullet, and it is not unreasonable to accept a similar explanation for the concurrent closure of the glottis. Moreover, the occasional conjunction of the respiratory disturbance with tetany and general convulsions is an additional argument in favour of this view. But while the cases which are associated with other evidence of muscular spasm may be accepted with little hesitation, as being of a similar nature to those occurring in older children, it may not be the same with the class of seizure in which the infant lies back limp and inanimate without any effort to draw his breath. Here the loose, relaxed state of the whole muscular system may seem to disprove the assumption that the glottis is in a state of spasmodic contraction. But this argument is hardly a sound one, and is certainly not of universal application, for spasm in one situation does not necessarily imply spasm elsewhere. Still, some support is lent to the objection by the fact that in these cases the tongue can be hooked forward with perfect ease, showing that there is no spasm of the muscles forming its root, and also that when inspiration is resumed at the end of the attack—as I noticed in two cases in which the seizures occurred in my presence—the breath is drawn silently and without a suspicion of stridor.

I have thought it possible that the cessation of breathing might be due to something more than a mere disturbance of the muscles of the glottis, and might include the whole respiratory apparatus in a temporary arrest of function, so that the diaphragm did not contract, nor the ribs rise, nor the lungs expand, although there was no actual obstruction in the glottis to the entrance of air. Again, it might be argued, from another point of view, that although not shut by spasmodic action there might be a real closure of the glottis by a falling in of the soft parts about the rima. Dr. Marshall Hall long ago showed that this consequence followed experimental exhaustion of the air in the trachea; and Dr. Vivian Poore suggested in 1880 that the laryngeal stridor might be owing to partial blocking from this cause, and not to any spasmodic closure of the laryngeal opening. Either assumption seems plausible, and I give them for what they are worth. Unfortunately, a laryngoscopic examination is out of the question either on account of the brevity of the attack or, in the more prolonged seizures, from the imminent danger to the patient and the necessity of employing active

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.

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