depends on the state of the spinal cord, disease of which is proved by the presence of the change in sensibility of the skin, of which the patient was unaware, and which corresponds in greatest intensity to the region in which the lesion must lie which causes the wasting of the muscles. The remarkable size of those that are not wasted is explained by the patient's history in the rather distant past. At the time when the growth of all structures is most active her muscular system underwent a long course of systematic exercise, very unusual in degree, of which the remains are still distinct.

It seems strange that a girl with this congenital defect in the spinal cord should have been disposed to undertake such remarkable feats of muscular power without any family inducement to cultivate agility and energy. But her defect in the spinal cord is always chiefly in the posterior and medial parts, in the sensory regions of the cord. The change in the motor region is the result of a later extension, and it rarely occurs in early life. We may, perhaps, conceive that the motor processes, which so dimly affect consciousness, have not the normal afferent check from the sensory processes which should influence them. Of this the subject is quite unaware. Restraint may be effective before sensibility is subjectively lessened; we are often determined by influences which do not enter our consciousness. Some years ago a rather distinguished student was working here who was a really great cyclist. He had won many of the best cycle races in the country. Soon afterwards he came to me about some symptoms he felt in his hands, and on examining him I found such extensive loss of sensibility to pain as could only be explained by syringomyelia. I had to advise him to give up all severe exertion, including the races to which he was devoted. We must remember that the central motor nervous system represents the muscles, and all prolonged muscular effort has an influence on the spinal cord similar to that which it has on the muscles, and this disturbance of the circulation, and accumulation of the products of fatigue, resulting from severe exertion, must be of a nature to increase any morbid processes, the extent and progressive tendency of which we cannot safely estimate. I do not know what has become of him. But the history of this woman seems to show that severe exertion is unwise for such a sufferer. Hence it is very important to be familiar with the early symptoms of the malady, and to discover its existence, so that the life of the patient may be wisely regulated. The fact that a sufferer can generally feel well a touch, although pain is perceived dimly or not at all, explains the common ignorance of the malady, in spite of the frequency with which its presence is indicated by spontaneous pain. From this the patient whose case we have been considering was entirely free. It is often also accompanied by a sense of coldness, without any objective indication of the temperature which is complained of. These subjective sensations seem due to the irritation of the conducting fibres within the cord which are in process of destruction, and the pain may cease when sensibility is lost.

But tactile sensation is often impaired. It is very little affected in this patient, only in the front of the right thigh. Sensibility to temperature is lessened in the regions indicated in the diagram by oblique lines. Often the loss is almost as extensive as that to pain. The sensitiveness to pressure is often also lost, and that of the deeper structures may be impaired as well as that of the skin, although often not in corresponding degree. The cavities may extend higher up, into the medulla and pons (syringo-bulbi this is termed), and impair some of the cranial nerves, especially the sensory part of the fifth. The dissociated analgesia of this affection may remind you of the common loss in tabes, in which the perception of pain is so commonly lost and that of touch so rarely. When the analgesia involves the deeper structures an arthropathy may occur in syringomyelia, very similar to that of tabes. But this is most common in syringomyelia in the arms and in tabes in the legs. Other collateral consequences of sensory defect are also found which I cannot now even mention. I have brought the case before you briefly to illustrate the diagnostic difficulty, and to impress on your mind the fact that we must always beware of the significance of a superficial similarity, and remember that the resemblance may be due to very different causes, and may almost cease, on careful scrutiny.

Remarks ON ANTISPASMODICS AND THE CURE OF SPASMS.

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For the relief of spasm and the many distressing sensations which may be grouped under that head many kinds of treatment may be adopted. In the case of general convulsions and some forms of local spasmodic contraction we may act upon the nervous system generally, and make use of means which reduce its sensitiveness to morbid impressions. For this purpose we turn to the narcotics—opium, chloral, belladonna, the bromides, etc. But these remedies should never be used indiscriminately or without due consideration of the nature of the attack and the presence of a removable cause. They may form the main treatment of the case, or may be employed with the object of reducing general nervous excitement while special means are being used for the relief of local distress.

In certain forms of local spasm we may make use of remedies which are known to have a special sedative action upon the disturbed part, such as grindelia in spasm of the respiratory tract; belladonna, chlorotone, and codeina in intestinal cramps; valerian and asafoetida in the mysterious functional nervous derangements which are massed together under the head of "hysteria."

Again, we may seek to produce a tonic effect upon the system as a whole by the use of strychnine and nuxvomica, ergot of rye, sulphate and valerianate of zinc, quinine, arsenic, the stronger preparations of iron, and drugs of similar action. These, however, are of little value during an actual paroxysm, but exert their influence gradually by reducing the general nervous irritability, so that the system becomes less intolerant of morbid stimuli, and ceases to respond with such petulant activity to disturbing influences. Their action in this respect is deliberate, and rarely of more than passing value, unless persevered with for weeks or even months at a stretch.

The above may be said to include the special classes of drugs which are generally understood by the term "antispasmodic"; but they do not embrace the whole subject of the cure of spasm. The best and only satisfactory kind of antispasmodic treatment is that which strikes at the root of the evil and suppresses the irritant to which the disturbance is due. In many persons, especially in children and young women, the source of the ill is often a deranged condition of the digestive organs, and when this is remedied the spasm ceases. General and partial convulsions, tetany, and many kinds of tonic and clonic spasm, both general and local, may be induced directly by peripheral and especially by gastro-intestinal irritation. Children, with their immature and impressionable nervous systems, are curiously amenable to these influences, and in some such subjects any form of irritation seated at any part of the body may be capable by reflex mechanism of setting up automatic and irresistible contraction in voluntary or involuntary muscles. The tendency to such morbid response to stimuli is greatly enhanced by a lowered state of the general health. In the case of tetany, for example, the disorder rarely attacks a healthy sturdy subject, but is met with almost invariably in children whose nutrition is temporarily at fault, either from natural delicacy or domestic mismanagement. The spasmodic contractions of this complaint seem to be the consequence, more or less direct, of toxic absorption from the alimentary canal. A poison is generated which shows a special preference for the motor fibres and ganglion cells of the anterior horn of the spinal cord; and, in cases of long standing, atrophy and sclerosis have been noted in these cells, combined with some thinning of fibres. More than this, however, is required to explain the mechanism of tetany, for autointoxication is common in children of all ages, while tetany is only an occasional consequence of gastric dilatation and decomposition of food. It seems

probable that auto-intoxication heightens the natural irritability of the nervous system, and prepares it to respond with exceptional briskness to reflex stimuli, but that the actual attack, like the convulsions of rickets, is the direct consequence of reflex mechanism, and cannot occur without it.

In the management of such a case the true antispasmodic treatment consists in putting a stop to the digestive derangement which is the cause of the symptom. We clear away fermenting food from the bowels by a full dose of rhubarb and soda, arrest excessive intestinal secretion, and by a careful diet, in which a judicious restriction of milk and other fermentable elements in the food takes a foremost place, seek to restrain the formation of toxins in the alimentary canal. These measures may have to be reinforced afterwards by tonic treatment and the use of the accepted antispasmodics in order to invigorate the nervous system and allay its irritability; but these remedies have little value at the beginning of the treatment, and begin to be useful only when the disturbed digestive functions have been attended to and brought into a healthy state.

But it is not only tetany which can be set up by the irritation of gastro-intestinal disturbance. In neurotic subjects—especially in neurotic children—general convulsions and even modified muscular contractions, which bear a close resemblance to those which are characteristic of the so-called "*petit mal*," may be induced by irritation arising from this source. It is far from uncommon to find the instability of the nervous system, which may be called a normal state in the infant, persisting in growing boys and girls to the age of 10 or 12 years. As a consequence, confused and purposeless muscular contractions and convulsive movements, such as are familiar enough in the rickety infant, may be met with at an age which suggests a graver view of the attacks than a truer conception of their real nature would be able to support. These cases are often called "epilepsy," and even treated as such with long courses of bromides. It is not for the first time that I venture to protest against the practice of lumping together all cases of convulsions in the growing child under this one misleading designation. I maintain that so long as the seizures occur only in the course of a digestive disturbance, or are accompanied by a rise of temperature, or happen in a child who is suffering from any form of peripheral irritation, or, indeed, in one who is not, to all appearance, in his normal state of health, we are entitled, whatever may be the age of the child, to indulge a hope that the seizures will cease when the cause has been removed and adequate measures have been taken to prevent its return. The term "epilepsy" cannot fitly be applied to such avoidable attacks as these, but should be confined to cases where the patient seems to be well, with nerves normally at rest and no sign discernible to lead to a suspicion of the onset of any such untoward visitation.

There are other forms of functional nervous derangement which may arise from digestive trouble and acid fermentation in the bowels. The fantastic muscular twitchings which go by the name of "tics" and "habit spasms" usually owe their origin to this cause. These movements by their persistency occasion much distress to parents, and are often the despair of the medical attendant, especially if he follow the prevailing method of attempting to control them by the use of nerve tonics and anti-spasmodics. Under such treatment they are, no doubt, intractable enough; but if the spasms are accepted as a significant sign of intestinal disorder, and treated by proper measures for its relief, no special difficulty is found in keeping them in check. Antacid and stomachic remedies, combined with a rigid diet from which sweets and fruit are carefully excluded, and starch allowed only in the form of bread and toast, soon give rise to a surprising change. Not only do the movements cease, but the general nervous unrest disappears; and there is a welcome return to a normal state of physical and mental tranquillity, which a recurrence of the morbid stimulus is no longer able to disturb. Early treatment on these lines is, however, of great importance, for if the movements have been allowed to continue for months unchecked until the habit has become confirmed, more difficulty is found in bringing them to an end. Still, even in these cases, diet and the administration of arsenic in good doses, combined with alkalis in a bitter infusion, will often produce very

encouraging results, especially if the patient can be induced by hopes of reward to bring his own power of self-control to our help. Punishments are useless.

Head shaking, again, and rhythmical rotatory movements of the head combined with nystagmus (the spasmus nutans of infancy) are also commonly due to digestive troubles in a neurotic subject. The milder attacks often yield readily to a dose or two of rhubarb and magnesia, especially if it be combined with a restriction in the quantity of the fermentable element of the food. But in the severer forms of the complaint special tonic treatment will always be required in addition. When the digestive functions are working satisfactorily, iron should be given, and if the child be over 12 months old, a meal of pounded mutton or chicken should be included in his dietary. Spasmus nutans is, of course, a different thing from the "nodding convulsion" (eclampsia nutans). The latter is only seen in epileptic idiots, and is incurable.

Although it is the digestive tract which is most frequently at fault in cases of reflex spasm, it is not the only source from which the evil influence may spring. Any irritant, wherever situated, even a mild one if sufficiently prolonged or often renewed, may lead in a suitable subject to some such morbid response. A common example of this is seen in the nervous commotion which is excited in some children by post-nasal irritation due to adenoid vegetations. The growths themselves are probably concerned in the disturbance only indirectly. Alone they excite little irritation unless very numerous, but by their presence they render the naso-pharyngeal mucous membrane morbidly susceptible, so that it readily becomes the seat of a troublesome catarrh which exerts a curiously teasing influence upon the nervous system. General convulsions sometimes, and laryngeal spasm commonly, owe their origin to this source of worry. The more I see of laryngeal spasm, either in the form of laryngismus stridulus or stridulous laryngitis, the more convinced I become that in these cases the source of the irritation is the naso-pharynx. To me catarrhal croup has come to mean adenoids, and to suggest at once treatment by measures directed to the suppression of a post-nasal catarrh. The same thing may be said of simple laryngeal spasm without catarrh (laryngismus stridulus). Children who are attacked by these dangerous seizures are almost always sufferers from adenoid vegetations and post-nasal irritation. They are also often the subjects of rickets, but this is not always the case. It is a mistake to assume, as is commonly done by writers upon this subject, that laryngismus is a complication peculiar to the rickety state. No doubt in that phase of malnutrition there is a special irritability of the nervous system which so heightens its response to disturbing influences that the morbid rejoinder can be provoked by a comparatively moderate impression. But the occurrence or not of spasm depends less upon the constitutional state of the child than upon the nature and strength of the irritant. If the provocation be adequate, spasm may be induced in a neurotic subject at any period of infancy and childhood in rickety and non-rickety subjects alike. Repeated observation has convinced me that morbid contraction of the laryngeal muscles occurs almost solely amongst the sufferers from adenoids, and is to be ascribed directly to naso-pharyngeal irritation. Some time ago I recorded several cases of laryngismus affecting newborn infants, in whom the frequent spasms involved the gullet as well as the larynx, so that swallowing became almost impossible. All these infants were suffering from adenoid overgrowth and severe catarrhal obstruction of the nasal passages; and it was interesting to note that the force and frequency of the attacks varied in exact proportion to the greater or less intensity of the naso-pharyngeal distress. In cases such as these, then, as in tetany, the true antispasmodic treatment consists in measures which allay the local uneasiness and put a stop to the nervous commotion by removing the cause which has brought it about.

These measures consist in applying remedies locally to the naso-pharyngeal mucous membrane. This is done most easily in young children by dropping medicated fluids into the nostrils and allowing them to trickle down into the pharynx. One of the best of these is resorcin dissolved in normal saline solution (2 to 5 grains to the ounce). Of this a few drops may be instilled into the nostrils several times a day as the child lies on his back.

If the spasms are violent and repeated the local treatment must be reinforced by the internal use of special antispasmodics. In the case of the larynx, the best of these, beyond all comparison, is the liquid extract of grindelia—a drug which has a very decided sedative action upon spasm of all muscles connected with the respiratory apparatus. It may be given in doses of ten to thirty drops, in water flavoured with the liquid extract of liquorice and well sweetened with glycerine, every four hours. In the case of young patients grindelia is an antispasmodic of the utmost value. In asthma, in whooping-cough towards the end of the spasmodic stage, and indeed in all varieties of respiratory spasm, we may turn to grindelia with full confidence in its beneficial effect.

Another instance of reflex spasm is seen in the rigidity of the muscles of the neck which not infrequently occurs in cases of acute otitis. The child lies in a state of seeming stupor, but is not entirely unconscious and shows no sign of pain. He holds his head stiffly and slightly retracted, and whimpers if it is moved, especially if an attempt is made to bend it forward. The stiffness ceases at once when the purulent contents of the tympanum are allowed to escape by puncture or rupture of the membrane.

The above are the most prominent and persistent varieties of reflex spasm, the only rational treatment of which consists in measures which produce a direct impression upon the source of the nervous trouble. Other minor examples of spasmodic muscular contraction of similar mechanism are met with in daily practice. The severe nocturnal cramps in the limbs which are a common subject of complaint by the habitual dyspeptic are due to acidity, and can be put a stop to by an alkaline draught taken at bedtime. Acid collections in the caecum and the small intestine near by may set up cramp in the bowel by causing spasmodic contraction of its muscular coat, and so penning up flatus and preventing it passing away. The painful over-distension which is apt to ensue can be satisfactorily relieved by the administration of the insoluble alkalis, such as the heavy carbonate of magnesia, combined with a quarter or a third of a grain of codeine given several times in the day. Codeina is a valuable sedative in all forms of abdominal pain, and has the advantage over opium of interfering little with the regular action of the bowels. Under certain conditions, however, belladonna is to be preferred. Spasmodic contraction of the muscular coat of the intestine may induce an obstinate form of constipation which sometimes amounts to impaction of the bowel, and resists the action of strong aperients given again and again. In most cases of this kind the difficulty can be overcome by repeated doses of the green extract of belladonna, giving a $\frac{1}{4}$ grain every three hours until the pupils begin to dilate. This, the first sign that the system is beginning to respond to the remedy, is followed quickly by relaxation of the intestinal spasm and copious relief.

In every case, then, of spasmodic contractions, either of voluntary or involuntary muscle, especially in such as occur in children, before resorting for their relief to nerve tonics and antispasmodics, we should search carefully for some sufficient signs of local trouble to which the nerve disturbance may be referred. In young people, especially in rickety infants and rapidly-growing boys and girls, our first thought should always be of reflex mechanism, and it is only when a fruitless examination has shown our suspicions to be unfounded that we can venture to lay this explanation of the symptoms aside. We are then obliged to fall back upon plain antispasmodic treatment. But even in this case every attempt should be made to keep the nervous system at rest by avoidance of undue excitement, attention to the regularity of the bowels, and in the matter of diet a careful moderation, not only in red meats, but in acid and acid-making articles of food.

The kind of antispasmodic treatment to be employed is of importance. In the case of true epileptic attacks, excessive dosing with large quantities of bromide is, I believe, a plan of treatment which is better avoided. By such means, no doubt, we may lessen the frequency of the seizures for a time, but sedatives alone have little power to put an end to them altogether. These remedies are best used as aids to the action of nerve tonics; as a means of quieting undue nervous excitement, while the more slowly acting drugs are given time to produce their bracing effect. Of the latter I rely chiefly upon ergotine given in conjunc-

tion with strychnine. To be effectual the dose of ergotine must be pushed, and this may be done without fear of ill consequences; indeed, little effect can be expected until a good dose is reached. Beginning with 3 gr. every four hours given in conjunction with $\frac{3}{4}$ grain of strychnine, the dose may be increased gradually to 10 grains, and every evening at bedtime a draught containing 20 grains or more of bromide of sodium may be given with infusion of senna and aromatics. In the case of children the most satisfactory results often follow this method of treatment, especially if it be combined with a free country life in a healthy situation. The seaside, or, at any rate, the neighbourhood of the sea is to be preferred. It is wise to occupy the child's mind with light employments which interest and amuse; and if he can share these with young people of his own age, who may be trusted not to irritate or excite him, it will be distinctly to his advantage.

Another example of universal spasm which has to be treated with general nervine sedatives is chorea. In the management of this complaint it would be difficult to name a sedative which has not been employed with more or less success. I have obtained very striking results in obstinate cases with ergotine prescribed in large doses in conjunction with strychnine in the same way as recommended for epilepsy. Recently I have been giving chloretone in doses of 3 to 5 grains three times a day and have been well satisfied with the results. The remedy is one which decomposes very quickly and should, therefore, never be prescribed in combination with another drug. It is best given in "cachet" or dissolved in water sweetened with glycerine. A dose of 5 grains three times a day often causes some drowsiness. If this be so, the dose should be reduced to 2 or 3 grains after the first twenty-four hours.

But cases, such as the above, in which we are forced to rely solely upon the action of pure antispasmodic and tonic remedies for the control of the morbid phenomena form—in early life at any rate—but a small proportion of the examples of muscular spasm which are being continually brought under our notice. As a rule in the young the phenomena are purely reflex, the impulse being derived from irritative action at some point of the periphery. In all such cases the employment of general sedatives must be made subservient to the more pressing needs of local medication; but these remedies are still useful as aids to the treatment to reduce the general nervous susceptibility while special local measures are being employed to put an end to the primary cause of the nervous distress.

A Clinical Lecture

ON

AMAUROTIC FAMILY IDIOCY.

DELIVERED AT THE HOSPITAL FOR SICK CHILDREN,
GREAT ORMOND STREET.

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AMAUROTIC family idiocy is such a rare disease that it may seem hardly suitable for a lecture such as this, but I have chosen it because I happen to have met with four cases in recent years, and have one of them to show to-day; and also another of them, minutely investigated after death by Dr. Gordon Holmes and Mr. Herbert Parsons, stands as one of the most complete cases on record, for it was studied by recent neurological methods. This disease is, too, a very remarkable one, and, though you may never meet with a case, a short time given to its study can hardly fail to direct one's thoughts to some interesting points in the study of medicine.

I think, to begin with, it is interesting to trace the gradual recognition of the disease, because this illustrates how the specialist may sometimes point out to the general physician some fact in medicine which has been previously overlooked—just as the general physician may sometimes throw an entirely new light upon a subject which at first sight would seem to be quite a special one. In 1881 Mr. Warren Tay directed attention to peculiar macular