no doubt this is the reason why the condition has not been generally recognized. The operation which I have done has been planned to expose completely the anterior margin of the glenoid cavity.

A small pillow or sandbag is placed beneath the scapula, so as to keep it forwards. The arm lies on the table by the patient's side, and it is rotated inwards, so as to relax the pectoralis major muscle. The incision extends from the upper border of the clavicle above the coracoid process downwards and outwards for about five inches. The deltoid and pectoralis major muscles are separated, and the coracoid process and the three muscles attached to it (pectoralis minor, biceps, and coraco-brachialis) are defined. Perthes, who used a similar incision in operating upon fractures of the glenoid, divided the pectoralis major, but I have not found this step necessary. The coracoid process is next divided with an osteotome or bone forceps, and drawn downwards with the three muscles attached to it. Lastly, the tendon of the subscapularis is divided close to its insertion, and this muscle is retracted inwards.

The damaged area is now fully exposed. Internally one sees the neck of the scapula with the fibro-cartilaginous glenoid ligament lying upon it. This ligament has usually been torn up a little way from the glenoid margin, so that it appears as a free edge lying upon bare bone. External to this is the glenoid cavity with the head of the humerus in contact with it. Running from above downwards over the joint cleft is usually to be seen a band of fibrous tissue which represents the free edge of the capsule which has been torn from the glenoid ligament. It appears as a band because immediately external to it is the not inconsiderable and perhaps enlarged opening of the subscapularis bursa. Lastly, external to this is the fibrous capsule of the joint covering the greater part of the head of the humerus. The mechanism of the recurrent dislocation can now be easily demonstrated, for on taking hold of the arm and pushing its upper end forwards, the head of the humerus can be made to pass freely over the anterior edge of the glenoid cavity.

To anyone who has seen this typical lesion exposed at operation it must be obvious that the only rational treatment is to reattach the fibrous capsule to the glenoid ligament whence it has been torn. It is clear that a plication or similar operation performed on some distant part of the capsule can only have the effect of drawing the detached edge outwards and further away from the glenoid margin. No doubt, if the capsule is sufficiently diminished in size, it may prevent displacement of the head of the humerus notwithstanding the defect at the glenoid margin, but this is at the expense of free movement in the joint. It should be remembered that the capsule of the shoulder-joint is normally a lax, and not a tense, structure.

It is exceedingly difficult to believe that operations of the Clairmont-Ehrlich type can have any influence in preventing recurrent dislocation, except by limiting the normal movements of the joint. Even if one could think that the transplanted strip of muscle acted in the way it is supposed to do, it is not clear how this would prevent the dislocation, for the displacement does not take place downwards, but forwards.

In my cases the joint defect has been repaired by interrupted sutures of silkworm gut passed between the free edge of the capsule and the glenoid ligament. It is well to freshen the bone on the neck of the scapula, so that the glenoid ligament may adhere to it. Having repaired the joint defect, the divided subscapularis tendon is reunited, the detached portion of the coracoid process is sutured in place, and the wound is closed. After the operation the arm is kept at rest for four weeks, and then active and passive movements are begun and persisted in until the movements of the joint are normal.

Two of my cases were epileptic, and both the others sustained the original injury at football. One case—a powerful epileptic—had some limitation of abduction two months after operation, and he has not been seen since. This relatively poor result was due to his neglect of after-treatment. The others recovered full movement at the shoulder-joint, and in none of them has the dislocation recurred.

TREATMENT OF MIGRAINE BY CALCIUM LACTATE.*

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MIGRAINE, passing under many names and treated by a host of different remedies, is a condition of surpassing interest on scientific grounds alone. To practising physicians the condition is of similar importance for three reasons: (1) Migraine is a very common ill; although referred to by those who have never suffered from it as a minor malady, yet in reality it accounts for an enormous amount of wretchedness and impaired efficiency. (2) Migraine appears to attack with great frequency the professional classes in general and medical men and women in particular. In the literature splendid accounts of the condition have been supplied by doctors who were themselves sufferers, and in my series of twenty cases eight were members of the medical profession or medical students. (3) The old treatment of migraine, as evidenced by the long list of so-called remedies, is not satisfactory. More recently fresh conceptions and new drugs have been tried with some success, and the results obtained with one of these remedies is the justification for this communication.

It appears probable that the fundamental cause of migraine is an anaphylactic shock. How this shock is manifested, and indeed in what particular part of the brain the manifestation occurs, is not known. The accurate, subjective localization of the headache and the external phenomena associated with the superficial temporal artery suggest the area of the brain underlying the squamous portion of the temporal bone as the probable site of the lesion; the occasional aphasia and even rarer hemiplegia met with in migraine point to the motor cortex. On the other hand, the visual phenomena, which are so common, can only be explained by referring the disturbance to the occipital cortex, and the vomiting is possibly associated with the medulla. It has been suggested that the pituitary gland may undergo temporary enlargement and thus cause symptoms, but the type of hemianopsia met with in migraine is opposed to this view. It would appear, therefore, that no single cerebral area can be held responsible for the various phenomena of the disease.

The undoubted relation between eye-strain and migraine is difficult to explain upon an anaphylactic basis unless it be that a brain already sensitized will react unduly to any stimuli and among them impulses connected with the ocular apparatus. On the other hand, the equally well known connexion between migraine and other nervous disorders, such as epilepsy, can best be explained on an anaphylactic basis; these conditions also are considered by many to have a similar origin. On this assumption it is not exactly correct to say that migraine is hereditary, but rather that a liability of the nervous system to become sensitized and react to certain stimuli in themselves innocuous may be transmitted. Migraine in the parents may be represented by asthma or angio-neurotic oedema in the children.

It is remarkable that organic disease, especially perhaps that of the cerebral vessels, is not more often associated with migraine, for temporary aphasias and hemiplegia are comparatively common in the former (Case v).

Of the symptoms occurring in the attack those connected with vision come first in point of time and in importance, since they may be the sole manifestation. A sudden general dimming of vision is a very common prelude, followed by scotomata, coloured dazzling spectra, and hemianopsia. These constitute the aura of an attack and, as might be expected, they are often associated with vertigo. In a short time follows the headache, which is usually localized very accurately to one temple and practically always to one side of the head. The least movement or any temporary increase in intracranial tension, as by coughing, is accompanied by

* Based upon a note read before the Liverpool Medical Institution on January 4th, 1923.

agonizing pain. Nausea, terminating in retching and vomiting, completes the painful picture. The whole attack may last only a few hours or be prolonged for a day or two. All the stages of the typical migraine attack just described may not be present in any given case. The ocular symptoms alone, or the headache alone, frequently occur, and even nausea and vomiting may be the sole manifestation of an attack (Case III). In the last eventuality grave mistakes in diagnosis may be made.

It will be plain from the formidable list of drugs used in combating migraine how unsatisfactory our treatment is. Following upon accustomed lines the treatment of a paroxysmal malady is best discussed under the headings: (1) measures used between attacks, and (2) measures used during attacks.

Measures Used Between Attacks.

Under this heading prominence must be given to the importance of correcting refractive errors. There are grounds for supposing that slight errors, which are sometimes regarded by oculists as negligible, may be more potent as migraine producers than are the obvious ones, in which owing to their magnitude the ocular mechanism appears to give up the unequal contest of correction.

Under this heading, too, must be considered methods for desensitizing the nervous system so that it can no longer respond to anaphylactic toxins after its migrainous habit. A full account of such measures has been given by Pagniez.¹ Good results are described from repeated small doses of horse serum and crotaline and from taking peptone on an empty stomach. I have had no experience with these remedies, but judging by the poor results of this line of treatment in epilepsy. I am not encouraged to pursue them.

Treatment During Attacks.

This heading is more comprehensive. A strenuous brain worker cannot go to bed in a darkened room with cold towels round the head and all the other paraphernalia of the luxurious sick-room. If modern medicine can offer nothing better than this to a man whose living depends upon working many hours every day at high pressure then the subject of migraine might well be excluded from practical textbooks. Fortunately the picture is not so gloomy as this, for one of the following two lines of treatment offers a reasonable hope of success. The first is the use of sedative drugs, and of these two are particularly helpful. Phenacetin in the hands of Byrom Bramwell has proved a potent weapon.

He writes:²

"I order the patient to take a 20-grain powder of phenacetin as soon as the attack occurs. I tell him, if the first powder does not relieve the headache, to take a second at the end of an hour; and if the second does not cut short the attack to take a third at the end of another hour. I attribute the success which I have had from phenacetin, in a very large number of cases, in which the remedy had been previously given by other practitioners or taken by the patient on his own initiative, to the large doses which I give."

Luminal, as advocated by Wilfred Harris,³ is also worthy of trial. Not more than 3/4 grain three times a day should be taken, and even this dosage may be reduced considerably. Apparently drowsiness is the great objection to the use of this drug.

The second means of attack is the one upon which I wish to lay particular emphasis. For some time I have been using calcium lactate in migraine with success. The only reference to this drug as a cure for headache that I have been able to find in the literature is in a paper by Ross.⁴ Here is reported the cure by calcium lactate of cases in which headache is associated with oedema, anaemia, and lowered coagulability of the blood. Among these cases are two of migraine and these also were relieved by this remedy. Calcium lactate is also popularly supposed to cure the morning headache following an evening's gaiety.

The method of administration in migraine is as follows: At the first sign of the approach of an attack, as evidenced by the ocular aura, 30 grains of calcium lactate must be taken immediately; as there must be no delay, the drug must be constantly carried by sufferers, and for this purpose the tablet form is essential. The tablets must be made by a reliable firm and they must be fresh. I have seen instances in which tablets carried in the pocket for some time gave no effect, while the use of a fresh solution, pro-

cured from a chemist near by, gave speedy relief. It must be clearly understood that no claim is made that calcium lactate as given above cures migraine, merely that it aborts the attack and in many cases prevents the appearance of the headache and vomiting and enables the sufferer to continue at work.

Description of Cases.

CASE I.

Medical woman, aged 35. For the last eleven years has been troubled with migraine—very marked visual phenomena, including hemianopsia, severe headache, but no vomiting. Attacks, in spite of many drugs, lasted about two days. Though the onset was usually associated with fatigue and eye-strain and a strong light appeared to precipitate an attack, there was no refractive error. During the last eight years every attack has been aborted by calcium lactate and the headache stage has in no instance been reached. In no attack since calcium treatment was begun has work been interfered with, while formerly in some instances a day, or even two, were spent in bed. Also the attacks have become more and more infrequent.

CASE II.

Medical man, aged 28. For many years has had headaches of two distinct kinds—the one is true migraine and the other is apparently due to some alimentary toxæmia. The migrainous attacks since taking calcium lactate have been entirely aborted, whereas the other type of headache is absolutely uninfluenced by the drug.

CASE III.

Female clerk, aged 24. For some years has had attacks of vomiting preceded by hemianopsia but no headache. In March, 1921, the patient consulted me for attacks of vomiting which lately had been of daily occurrence; these sometimes were associated with visual auras, but often not. The general condition was naturally very bad and the girl was becoming more and more depressed. Calcium lactate 30 grains was ordered to be taken every night for a few weeks with occasional breaks. The result was quite marvellous: the symptoms disappeared immediately and, owing to the cessation of the attacks, the general health rapidly improved. The doctor reported later that the patient was her old happy self again and quite free from attacks. In this case it would appear that warding off the migraine paroxysms, with their resulting weakening effects, enabled the patient to build up her general condition so that with better health the migraine habit was broken.

CASE IV.

Married woman, aged 53. Consulted me in October, 1922, for paroxysmal headaches from which she had suffered all her life. The three stages of typical migraine were experienced. Apparently refractive errors were present, but the correction of these gave no relief. Calcium lactate was ordered, and shortly afterwards her son, himself a medical man, reported that the first attack of migraine was always completely aborted by the treatment, but that a second one often occurred a few days later and then the drug did not give relief. Accordingly luminal, 3/4 grain twice daily, was ordered, and this combined with the calcium gave very good results. In August this year her son wrote saying that his mother's attacks formerly kept her in bed two days in every week, now the attacks are much slighter and she is able to get up in a few hours after a paroxysm. "My mother never goes away from home without a full supply of tablets and powder."

CASE V.

Married woman, aged 63, first consulted me in September, 1920, for a curious condition of her hands and feet. The appearance was that of a combination of Raynaud's disease and erythromelalgia, and there was acute tenderness added. Though marked arterio-sclerosis was present calcium lactate gave wonderful improvement. In August, 1922, she again consulted me, but this time for typical migraine attacks in which all the stages were represented. Again calcium lactate was successful. There can be little doubt but that the condition of the vessels in this case played a part in the causation of both affections.

CASE VI.

Married woman, aged 29; seen in September, 1921. For the last year had suffered from weekly attacks of pain behind the eyes lasting for hours. There was no headache nor vomiting. No errors of refraction were present. A tentative diagnosis of migraine was made and calcium lactate was tried. Two months later the report was "quite cured."

CASE VII.

Woman, aged 22 (medical student). When 14 years of age suffered from eye-strain which was relieved by glasses. While reading for the final examination this summer headaches became so bad that even using the eyes for a few minutes for reading was impossible. Oculists were consulted and various remedies tried, but without success. She consulted me as to the advisability of trying calcium lactate. I agreed to this as an experiment. In a précis of her case she reported later, "Calcium lactate grains 30 whenever the headache started was then tried and found to relieve it in about three hours, the effect lasting one and a half to two days." She has now resumed hard work. This patient also suffers from chilblains, but on this condition the drug has no effect.

In neither of the last two cases could a diagnosis of migraine be made and yet the result of treatment was very satisfactory.

CASE VIII.

Medical man, aged 33. Occasional attacks of migraine for some years with marked visual phenomena and headache but no vomiting. In 1922 there were five attacks within a short period and in four of these absolute and immediate relief was obtained after taking calcium lactate. In the fifth attack no supply of the drug could be obtained and the consequent headache lasted for more than twenty-four hours. After this an error of refraction was corrected and the attacks ceased.

CASE IX.

Medical man, aged 26. Typical migraine attacks unaccompanied by vomiting since February, 1923. I ordered calcium lactate in the usual dose. He reports (October, 1923) that he has experienced eighteen attacks, of which fifteen were aborted by the treatment and no headache resulted. In two of the remaining three attacks no calcium lactate was taken and in the third the dose was taken too late, with the result that headache followed in each instance.

CASE X.

For notes of this case I am indebted to Dr. E. I. Claxton of Bootle. Woman, aged 47. This patient had had recurrent headaches, showing all the typical events of the migraine syndrome, since she was 7 years of age. At first the attacks were at monthly intervals, but since reaching the age of 30 they have become more frequent. In November, 1922, luminal was exhibited, but this drug, even in small and widely separated doses, made the patient so drowsy that its use had to be discontinued. Speaking of this patient the doctor wrote in a letter received in September of this year: "After hearing your note read at the Liverpool Medical Institution on January 4th, 1923, I put her on a 30-grain dose of calcium lactate, which must be taken within half an hour of the appearance of the visual symptoms. This aborts the attack; the only time it failed was when she neglected taking the dose within the prescribed half-hour." He adds: "I feel convinced that this drug is the only one that has given relief to a patient who has been a life-long sufferer from migraine." It is only fair to add that in a verbal communication Dr. Claxton has since informed me that quite recently the patient has vomited on one or two occasions.

Dr. J. Flanagan of Bootle reports that he has tried my method of treatment in three typical migraine cases occurring in women during the last nine months. The attacks were aborted in all.

No object is to be gained by multiplying such examples; suffice it to say that, in my series of 20, 16 patients stated that their attacks have been aborted by the calcium lactate treatment. Of the remaining 4, 2 were apparently cured by general remedies and consequently had no need to try calcium, and 2 experienced no relief. Of these two apparent failures one is a medical man whose case is complicated by a gunshot wound of the skull, and in his attacks he experiences great pain in the region of the scar; the other is the wife of a friend whom I have only treated by proxy, and possibly she may not be suffering from true migraine at all.

It is not right that definite conclusions should be drawn from such a small series of cases. Nevertheless, I have taken the opportunity of publishing my results in order that this treatment may be tried on a wider scale and its efficiency proved.

REFERENCES.

¹ *Presse Médicale*, January 15th, 1921. ² *Clinical Studies*, vol. 1, p. 52. ³ *BRITISH MEDICAL JOURNAL*, October 28th, 1922, p. 786. ⁴ *Lancet*, January 20th, 1906.

THE NATURE AND TREATMENT OF SPRUE.*

BY

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VARIOUS theories of the causation and modes of treatment of sprue have been advanced, but hitherto treatment has been almost entirely empirical. The method I wish to bring forward has at least the merit of a rational basis. The best way in which I can briefly place before you the line of reasoning on which the theory first originated is to relate the history of a patient a consideration of whose symptoms and progress formed the basis of the theory.

The patient in question contracted the disease in China in 1920. The usual symptoms were present: the loss of weight was rapid, sometimes 3 lb. in a week, and the mouth symptoms were very severe. On more than one occasion there were over thirty aphthae in the mouth, so that the taking even of milk was painful. These spots are spoken of as aphthae, but they differ from what we usually recognize under this term. After a bout of "acidity"—burning pain

in the stomach with acid rising into the oesophagus—there would ensue in twenty-four hours or so a crop of four or five very tender spots on the tongue, the fraenum, or the level of the second molar, or on the gums and cheek. There was nothing visible at this early stage, but in a few hours small red patches would develop which in another twenty-four to thirty-six hours would break through or become abraded and intensely painful little ulcers would appear.

Another symptom not mentioned in the books, but very marked in this case, and in many others whom I have questioned, was cramps, or rather carpo-pedal spasms. Tetany is spoken of, but the former is, in my opinion, much more common. During the night the patient frequently had to spring out of bed and pace the floor to relieve these cramps of the legs and feet; when writing, cramps of the hands would come on, so that the penning of more than a brief letter became impossible.

He suffered many things of many physicians. He took nearly all the yellow santolin there was in the colony; he was given autogenous vaccines (*Streptococcus salivarius* and others), emetine injections, was dieted with milk at one time, with the Salisbury method at another, with a diabolical preparation to which sprue itself is, in my opinion, preferable—namely, liver soup—at a third. Finally, he was sent on a voyage to Canada with the idea that a "spell of cold weather would drive out the sprue."

After some months, during which he became progressively worse, he managed to crawl with aid on to a vessel for England, and arrived in March, 1922. He was taken into hospital the following day, fortunately under the care of one who had for years been studying the disease both at home and in its endemic centres abroad. Confinement to bed and a milk diet for some weeks led to considerable improvement, and the patient went to the country to convalesce. Any attempt, however, at passing on to even decent invalid food led to more sore mouth, more flatulence, acidity, large stools, loss of weight—in fact, to a return of the typical symptoms. Two relapses occurred during the ensuing nine months, and the patient was invalidated from the service in consequence. At each of the relapses the cramps returned as badly as ever.

I now began to ponder whether it was not possible to trace to some common origin these various symptoms. Dyspepsia and large pale, pasty motions are amongst the earliest manifestations. The stools show a relative excess of fatty acids and a relatively large excretion of calcium. The urine also in some cases contains more calcium than normal. The flatulence, acidity and diarrhoea, the aphthae, languor, and loss of weight, might all arise from states of intestinal intoxication. Next came to mind the peculiar association of carpo-pedal spasms with calcium deficiency, the correlation possibly of these with the diarrhoea and intestinal toxins, referring them to the group of organs which have been credited with the control of both these conditions—the parathyroids. These are believed to have a twofold function—namely, the regulation of calcium metabolism and of detoxication, in particular of the poisons of intestinal origin. In addition to this, but as subsidiary and not acting in all cases, is the condition of hyperchlorhydria. If this is present we may have as a result an excessive production of secretin by the action of the acid of the gastric juice upon the prosecretin of the mucous membrane of the duodenum. Excess of secretin leads to stimulation of the pancreas with an increased splitting up of fats, so that the normal ratio of neutral fats to fatty acids is diminished, as I have detailed in a former paper. This, however, is but a side issue, and does not come into play in all cases, for in sprue the gastric contents may show hyperchlorhydria, normal acidity, or hypochlorhydria.

Here was enough to start on. Examination of the blood revealed the fact that the total calcium was little, if at all, diminished, except in later stages or in very severe cases, nor was the coagulation time prolonged. The inference, therefore, was that in spite of the loss of calcium in the excreta sufficient was being absorbed to maintain the normal total calcium in the blood.

Calcium, according to the researches of Vines and Grove, is present in the blood in two forms—the ionic or free, and the combined or coagulative. Seeing that the latter was

* Read at a meeting of the Section of Tropical Medicine and Parasitology of the Royal Society of Medicine (see page 1157).