antedated the appearance of the pigmentation, but as in my case, according to the patient's statement, that drug had only been taken for a week prior to my seeing him, there seems little reason to attribute the discoloration to its use, more especially since Rolleston³ has lately recorded a case in which arsenic had not been taken, and in which there was inky pigmentation along the lower lip and patches on the inner aspect of both cheeks. The only other reference to the condition which I can find is by Lazarus⁴ in Nothnagel's *Encyclopaedia*; he states that he has seen one case in which there were present on the tip and back of the tongue and on the mucous membranes of the cheeks circumscribed reddish-brown, mahogany-like discolorations of punctate to dime size, which were undoubtedly the sites of hyperaesthesia, and probably the result of haemorrhages.

The symptom is possibly not so rare as these few observations would seem to suggest, but if so it is all the more necessary that the possibility of its presence should be recognized.

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The Morison Lectures

ON

EPILEPSY.

DELIVERED BEFORE THE ROYAL COLLEGE OF PHYSICIANS
OF EDINBURGH.

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LECTURE III.—TREATMENT OF EPILEPSY.

The treatment of so multiform and persistent a malady as epilepsy requires to be considered from several points of view. What might be called the hygienic and disciplinary treatment was more seriously carried out in the days before the introduction of the bromide salts than at the present time.

Celsus,¹ who gives a very meagre account of the disease, has some suitable remarks to make upon the general handling of a case of epilepsy. He gives some useful hints upon diet and general hygiene, with special reference to exercise. He says:

The diet ought to be of the middle kind, for the case requires strength, and crudities are to be guarded against. He should avoid undue exposure, wine, venery, and all business. The body may be gently rubbed in the morning. Then let him take a walk as long and as straight as possible; after the walk let him be rubbed in a tepid place, not less than 200 times; let him eat a little, and then rest.

The French physicians of the early part of the nineteenth century used a large assortment of drugs, and, on the whole, obtained good results, but they also submitted their patients to dietetic formulae and general discipline.

Let me quote the method of treatment prescribed by an English physician during the years immediately preceding the introduction of the bromides in the treatment of epilepsy. Sir Edward Sieveking,² in his work on Epilepsy published in 1858, writes:

If I were to formularize the prevailing mode of treatment which I myself adopt, I should say it consisted in local derivation and counter-irritation directed against cerebral congestion, and in general roborants or tonics. The selection of the special mode in which the latter indication has to be carried out necessarily depends upon the results of the inquiries into the condition of the individual organs.

The great prevalence in epilepsy of headache, either as an habitual affection, as a precursor to the attack, or as a sequel, accompanied by other symptoms indicating a congestion of the head, suggests attacking the head by more or less severe counter-irritants. . . . I am also satisfied that in some of our cases the apparent cure was mainly due to the application of setons.

The air the patient breathes, the water he drinks, and his ablutions, his daily occupation and habits, his amusements,

his food and beverage, his clothing, his mental and moral history, and his prospects in life should be inquired into in order to determine whether, or in how far, one or more of those elements require modification.

Since the introduction of the bromides by Sir Charles Locock³ in 1857 most epileptics at some period in the course of their malady have probably been treated by these drugs. The universal prescribing of the bromides during the past half-century, with more or less success in subduing the convulsions, has to a large extent deprived the patients of the advantages which may be obtained from the hygienic, dietetic, and disciplinary lines of treatment.

As the physical and mental development of epileptics varies as much as in conditions of health, it is obvious that lines of treatment suitable for the physically robust and mentally capable may be detrimental to the physically frail, and impossible in the dementia of the confirmed disease. We have, therefore, in every case of epilepsy to treat the individual and not solely the disease.

1. It is well known that epilepsy may undergo spontaneous cure even after the convulsions have lasted for a number of years.

2. There is a considerable percentage of epileptics in whom the disease is characterized by the infrequent occurrence of fits and the absence of any obvious mental impairment. These cases constitute a favourable type of epilepsy, and may be treated medicinally and dietetically on the lines which will presently be laid down.

3. In a large number of cases the disease would seem to be excited in predisposed persons by reflex irritation of the peripheral organs. I would especially call attention to the value of a careful examination of (a) the nose, for foreign bodies or adenoid growths in children, and nasal polypi in adults. (b) Of the eyes, for errors of refraction (which are particularly frequent in epileptics), and their correction by suitable glasses. (c) Caries of the teeth requires the necessary attention, and I have frequently observed great improvement in the fits after the adjustment of suitable artificial means of mastication. (d) All disorders of the stomach and intestines—dyspepsia, constipation, and worms—should be carefully attended to. Epileptics, being notoriously big eaters, require great care in the regulation of their meals and should be encouraged to fully masticate their food. (e) Local disease of the pelvic organs in women requires attention, but too much stress ought not to be placed upon those disorders even in predisposed persons, although their treatment by suitable remedies should be carried out.

4. There are many cases of epilepsy in the early stages of which treatment in an institution may be either impossible or inadvisable. Under those circumstances the patient ought to be placed under the care of a capable and properly trained nurse-attendant. The satisfactory carrying out of this instruction will often eventuate in most gratifying results.

5. Epileptics suffer notoriously from lowered vitality and sluggish circulation in the extremities. For those warm baths, spinal douches and massage are desirable. The use of the hot bath is most necessary, not only for the ordinary ablutionary purposes, but to promote skin excretion, which is regarded by some writers as being of a toxic nature. Under all circumstances a certain amount of daily exercise in the open air is necessary; walking, running, tennis, golf, croquet, and football, may all be indulged in freely. It is scarcely necessary to point out that such exercises as bicycling, rowing, swimming, and riding, are to be avoided.

6. An out-of-door life is usually regarded as the most suitable for an epileptic, but this entirely depends upon the physical vigour of the patient; hence farming or market-gardening should only be recommended to those of a robust constitution, while for the frail epileptic, drawing, modelling, book-keeping, and such semi-sedentary forms of work are quite suitable. On the other hand, there are many who are able to continue their professional work or business without difficulty, and with advantage to themselves, and with benefit to their disease.

7. I do not think it right that those subject to even infrequent epileptic seizures should be sent to school along with normally healthy boys and girls. It is neither fair to the epileptic nor agreeable to his or her companions. In all cases private education is to be recom-

mended. In cases with marked mental impairment special methods of teaching ought to be adopted, of which the Sloyd system is one of the best.

8. If the disease develops during a period of mental strain preceding an examination complete abstinence of work should be temporarily enforced; but when the type of the disease has revealed itself education should be resumed on the lines already laid down.

9. The marriage of epileptics should be discouraged. There is a popular belief that if an epileptic girl is married the disease will thereby be cured. I have met with isolated instances of this, but in the majority of cases pregnancy and the puerperium are especially prone to increase fits, or, at the best, to exert no change at all upon them.

It is now necessary to enter with some detail into the medicinal and dietetic remedies commonly adopted in the treatment of epilepsy. In the first place, I wish to emphasize the importance of separately considering the treatment of recent epilepsy from that of the confirmed disease.

THE BROMIDES.

There is no single specific remedy in the treatment of epilepsy, although the alkaline salts of bromine come nearest to this definition. But the influence of the bromides upon epileptic convulsions is variable and uncertain.

I. Bromide medication may arrest the seizures immediately, or within a short period of their administration, temporarily or permanently. In this division most of the curable types of epilepsy are found—cases characterized by an absence of mental impairment and with fits recurring only at long intervals. If any given case is capable of arrest, a satisfactory response will be apparent within a comparatively short period of commencement of the bromide treatment. In 86 cases, in which the fits were arrested for periods varying from two and a half to twenty-two years, rather more than 50 per cent. yielded to treatment within the first twelve months of regular bromide administration. (Out of 366 cases of epilepsy, 86, or 23.5 per cent., belonged to this class.)

II. The bromides may induce a lessening in the severity and frequency of the seizures. This is the common temporary result of bromide treatment, and is what may be confidently expected in the majority of cases in the early stages of the disease. Sometimes the change is effected by the arrest of the major seizures, the minor continuing; or the bromides may change the time-incidence of fits from the waking to the sleeping hours, or vice versa. (In the series of 366 cases of epilepsy in which bromide medication was continued over long periods, 105, or 28.7 per cent., belonged to this class.)

III. The bromides may exert no influence at all upon the disease, or may even augment the frequency or severity of the seizures. (In the series already quoted, 175, or 47.8 per cent., remained unimproved, and became confirmed epileptics.) These numerical facts may be given in the form of a table showing the general results of treatment by the bromide salts in 366 cases of epilepsy.

TABLE.

Cases of arrest ...	...	86, or 23.5 per cent.
Cases showing improvement ...	...	105, or 28.7 "
Confirmed cases ...	...	175, or 47.8 "
		366, or 100 "

These statistics are in general harmony with the observations of other writers on the subject; they demonstrate clearly how large a percentage of epileptics derive no benefit from bromide treatment. This is within the knowledge and personal experience of most physicians who have had to treat even small numbers of epileptic patients. A further conclusion drawn from the study of these figures is that, under the influence of the salts of bromine, a considerable number of cases of epilepsy are temporarily "cured," or materially improved. It is, however, within the experience of most observers that no complete record can be obtained of the total number of cases which are relieved by these means, as, more especially amongst hospital patients, there is a tendency, once the fits have been temporarily arrested, for the patient to cease attendance. Notwithstanding the unfavourable results of treatment in many cases, it would be an error to say that bromides are useless in the treatment

of epilepsy. If 50 per cent. of the cases derive benefit from the administration of these drugs, then all cases, especially of recent onset, should be given the benefit of the drug for a time. It is not the bromide salts as a remedy, but the method of their administration, which is harmful, and to this attention will be directed immediately.

The physiological action of the bromide salts consists in lessening the irritability of the central nervous system, and in exerting a subduing effect upon reflex activity and cerebral function. The potash salts of bromine also induce a slowing of the pulse and the action of the heart. In medium doses (30 to 60 grains) the bromides produce muscular fatigue, a slowing of the mental processes, dulling of the sexual function, and of the skin sensibility. In large doses (150 to 225 grains) the speech becomes slurred, there is abolition of the palatal and pharyngeal reflexes, while frontal headache and a limitation of the power of thought soon ensue. Salivation, lowering of the body temperature and of the pulse-rate, catarrh of the stomach and of the respiratory mucous membranes, are general bodily symptoms resulting from continual use of large doses of the bromides. It is therefore obvious that the prolonged and injudicious use of the bromides may give rise to toxic symptoms known as "bromism." This condition is characterized by a blunting of the intellectual faculties, impairment of the memory, and the production of a dull and apathetic state. The speech is slow, the tongue tremulous, the saliva may flow from the mouth, the gait is staggering, and the movements of the limbs feeble and infirm. The mucous membranes suffer so that the palatal sensibility may be abolished, and nausea, flatulence, and diarrhoea supervene. The action of the heart is slow and feeble, the respiration shallow and imperfect, and the extremities blue and cold. An eruption of acne frequently covers the skin of the face and neck.

Dosage.

Bromide treatment should be commenced at the earliest possible time after the onset of the fits, as there is a greater prospect of arrest or improvement during the first five than during the second five years of the disease, although arrest of the seizures may occur after a duration of twenty years. The administration of the bromides should be continued for a period the duration of which is to be determined by the study of each case separately, but should not be less than two years. The dose usually given is, I think, too large. If benefit does not follow a daily dose of from 45 to 90 grains of one or a combination of the bromide salts, some other remedy or method of treatment should be sought for and applied. Dr. Clouston long ago pointed out that no lessening in the number of fits occurred when the daily dose of bromide exceeded 75 grains.⁴

The large doses sometimes prescribed—from 100 to 150 grains daily—although no doubt suppressing the seizures for a time, induce other and more serious phenomena—namely, those of bromism, already described. Moreover, the bromides have an accumulative action. Laudenhimer⁵ has shown that an epileptic taking 10 grams (150 grains) of bromide salt daily for eight days only excreted a total of 35 grams, or less than half the quantity ingested during that period. He also showed that no results followed its administration until an equilibrium was established between the intake and the output. This occurs on saturation of the body, and requires about 30 grains of bromide to be given daily for three or four weeks. It is also largely dependent upon the amount of sodium chloride taken in food.

Methods of Administration.

Most physicians have their own methods of prescribing the bromides in epilepsy. As already mentioned, large doses are not necessary, nor are they effectual, but both the amount of the dose and the frequency and time of administration should be gauged by a study of individual cases. When I come to speak of the dietetic treatment in epilepsy reference will be made to the deletion of salt, in the form of sodium chloride, from the dietary. This is an important modification in the treatment of epilepsy, as much smaller doses of the bromide may be prescribed. The potassium, sodium, strontium and ammonium salts are the most usually administered. Each is of value, but the sodium salt is the most efficacious. If the bromides

are prescribed in combination the dose should not exceed 60 grains in the twenty-four hours. The bromide of strontium is less useful, but may be given in smaller doses, or in combination with one of the other salts.

Combinations of the bromide salts with other remedies which may have some influence either upon the nervous or circulatory systems, have been from time to time recommended, and are found useful in some cases. A combination of the bromides and digitalis has been found very satisfactory in cases of low arterial tension, irregular action of the heart, or failing compensation with valvular disease. Chloral hydrate may be added with great advantage in cases of prolonged serial epilepsy, or of the status epilepticus. The bromides and the glycerophosphates form a valuable combination in weak or debilitated cases, more especially in young women with anaemia or neurasthenic symptoms. Bechterew recommends the conjunction of the bromides with *adonis vernalis*, and sometimes with codein. A combination of a bromide salt with borax has been of service where the bromides or borax, separately, have been of little use.

*Bromide, Picrotoxin, and the Arseniate of Antimony.*⁶

Of the combinations of the bromides with other remedies I have found Gélinau's formula the most useful and satisfactory. It is prescribed in the form of *dragées* containing 1 gram of the potassium bromide, $\frac{1}{2}$ mg. of picrotoxin, and $\frac{1}{2}$ mg. of antimony arseniate. It has been used extensively in France, but does not seem to have been adopted to any extent in Britain. I have been in the habit of prescribing it during the past two years in those cases of epilepsy in which the pure salts of bromine are either not well borne or have been proved to be ineffective. In large doses picrotoxin is a producer of convulsions, leading to spasms of a tetanic character, with death in coma. In small doses it is theoretically supposed to lessen the tendency to cerebral vaso-constriction, which is believed by some writers to be a fundamental factor in the causation of epileptic fits. I have used the *dragées* in all forms of epilepsy with considerable success. My experience is that they are:

1. A more successful remedy in most cases than a single bromide salt.
2. Less likely to lead to troublesome symptoms—that is, acne or bromism.
3. More easy of administration, being especially convenient when it is desired either to augment or diminish the dose.

The method of prescribing them is simple—one *dragée* is taken either during or immediately after a meal, thrice daily for a week, an additional *dragée* being added weekly until the patient is taking four, five, or six per diem. I have found six *dragées* a day usually sufficient to hold the fits in check, although, according to Gélinau, as many as ten or twelve daily may be taken. My experience of the remedy has not been sufficiently long to say definitely whether it is better in all cases than bromide alone, but with two or three exceptions it has been of great service in diminishing or even arresting fits in cases in which the bromides alone have been of no use.

TREATMENT BY DRUGS OTHER THAN THE BROMIDES.

In the days before the introduction of the salts of bromine in the treatment of epilepsy, many remedies were used, sometimes with marked success, as may be seen from the satisfactory results obtained by Herpin, Reynolds, and others. On account of the not infrequent failure of the bromides to arrest or even to ameliorate epileptic attacks, it will be found necessary to prescribe some other medicinal remedy, and a large number have been from time to time advocated and employed. Perhaps the drug most frequently used as a substitute for, or as an adjuvant to, the bromides, more particularly in England, is *borax* (sodium biborate). Introduced by Gowers many years ago as an antispasmodic, it has met with considerable favour in cases where the bromides have been of little service. Unless in combination with a salt of bromine, I have not found it of particular use. It may be given in doses of from 10 to 30 grains thrice daily, but is apt to induce troublesome gastro-intestinal symptoms. If continued over long periods, it may lead to cutaneous eruptions of a psoriasis-like character.

Belladonna was the chief anti-epileptic remedy of the pre-bromide days, and is still used in some cases with

marked benefit when the bromides or other remedies have proved unsuccessful. It formed the chief remedy of Trousseau, Hufeland, Herpin, Reynolds, and others, and in the hands of the first named was mainly used in those cases complicated with nocturnal incontinence of urine. A combination of bromide and belladonna may be found useful in cases of otherwise intractable combined seizure types. It may be prescribed either in the liquid form, as the tincture, in doses of 5 or 10 minims, or in the form of a pill made of the extract or pulvis belladonnae. The zinc salts (oxide, valerianate, and lactate) are old established, and were occasionally successful remedies in the hands of the French physicians. Opium, as a remedy for epilepsy, dates from classical times. It is now only used in the opium bromide method recommended by Flechsig.⁷ My experience of the treatment has not been such as to encourage further trial. Strychnine has been recommended from time to time, and used with considerable success by some physicians. In doses of gr. $\frac{1}{8}$ daily, it may be continued over considerable periods. Its *modus operandi* is probably merely as a nerve tonic, although it may have some influence in strengthening the tone of the vasomotor centres. Strychnine finds its most useful application in the treatment of nocturnal epilepsy, especially when there is reason to suppose that the blood pressure is materially lowered. Monobromate of camphor, eosinate of sodium, chlorotone, and numerous other remedies have been tried, but without any special benefit. I have seen no particular advantage obtained by the use of bromipin, bromaline, and bromocarpine.

The Calcium Salts.

Recent examinations into the coagulation of the blood in epileptics have led to the suggestion that the salts of calcium may be of use in arresting or diminishing the frequency of epileptic seizures. As already shown, however, considerable discrepancy exists as to whether the blood in epilepsy coagulates more readily during a fit period. A more rapid coagulability during the four-and-twenty hours preceding a major seizure or serial attacks has been demonstrated (to my mind conclusively) by Dr. John Turner⁸; on the other hand, the observations of C. Besta⁹ showed a diminished rate of coagulation, the fits apparently exerting no influence upon this. Donath¹⁰ prescribed chloride of calcium to a limited number of epileptics without materially affecting the number of the fits. I have myself prescribed the lactate of calcium in 10 grain doses in combination with bromide of potassium in a few cases with very satisfactory results, and Dr. Littlejohn¹¹ reports a case in which calcium lactate alone was prescribed with much benefit. It would therefore appear that the salts of calcium, which physiologically increase the coagulation of the blood, are worthy of further study in the treatment of epilepsy. It is not unlikely that the special type of the disease most suitable for treatment by these salts has yet to be defined, as it is obvious that all fits are not associated with increased blood coagulation.

DURATION OF TREATMENT.

The question as to how long bromide or any other form of medicinal treatment should be maintained is not one upon which any rigid statement can be made. Some authorities maintain that treatment should be continuous for a period of at least two years after the last seizure, but our experience at the Queen Square Hospital points to a much longer period as necessary. Epileptics attend there for many years after the arrest of the fits, as they find that stopping the bromide, even for a short time, conduces to a return of giddiness or of "sensations" reminding them of their previous attacks. If nine years' freedom from fits is to be a gauge of a "cure" of epilepsy, then withdrawing the bromide under a period of five years in those in whom the fits are arrested would be injudicious. On the other hand, many persons in whom the disease has been arrested after a year or two of bromide treatment remain free from attacks without the aid of any medicinal remedy. The important practical point in this connexion is that those patients who take bromide well and in whom the fits are thereby kept in subjection ought to persevere with the remedy, and not to stop it. It is just when the fits have been satisfactorily controlled that further treatment is of most use. The withdrawal of medicinal treatment in those in whom the fits have been

arrested should be carried out gradually. Under no circumstances should bromides be withdrawn suddenly after their prolonged use.

MISCELLANEOUS METHODS OF TREATMENT.

It may be useful to refer to some of them in this place, as a case which has resisted one form of treatment may react for a time satisfactorily to another. It should, on the other hand, not be forgotten, what is a well-recognized axiom in the management of epilepsy, that cases of this disease may respond favourably for a time to each and every change of treatment, medicinal or other, and even when active treatment is stopped. As the disease is characterized by spontaneous remissions in the frequency and severity of the seizures, a favourable result may occur, not on account of, but in spite of, therapeutic or other measures.

Of all the recent systems, that which seemed likely to be of most use was the introduction of the organic extracts in the treatment of this disease; but further experience with these preparations has been on the whole disappointing.

Organotherapy.—The administration of extract of the thyroid gland, or of iodothylin, was at one time strongly advocated, more with a view to counteract the coexistent mental deterioration than as a subduer of convulsions. In a number of cases of confirmed epilepsy, in which preparations of the thyroid gland were given over considerable periods, no appreciable diminution was detected in the frequency of the seizures, and in only a limited number of cases, and for brief periods, was there any lessening of the coexistent dementia. My experience is that thyroid medication tends rather to increase the number of fits, and to produce at times irritability and want of control. Preparations of the thymus gland act injuriously in epileptics by increasing the number of the seizures. Cerebrin has not been found to be of any value.

Serotherapy.—The treatment of epilepsy by the injections of blood serum, either from another epileptic or by reinjection of the blood serum into the same epileptic, was introduced by Ceni,¹² who believed that a soluble epileptogenous poison existed in the blood serum in quantities varying with the severity of the disease. Ceni's view differed from that held by most supporters of the autotoxic theory of convulsions in that the amount of poison circulating in the blood did not change in the different stages of the disease. As the result of a number of observations, Ceni concluded that there exists in the blood of epileptics a soluble latent biochemical substance, an autocytotoxin, which has an influence over the elaboration of epileptogenic toxic agents, and produces its results after repeated injections. The records of these observations show that in some cases a beneficial, and in others an unfavourable, result followed the injection of the blood serum of epileptics into other epileptics. The practical utility of this method in the treatment of epileptic fits has not, even in the hands of its originator, proved sufficiently satisfactory as to render its application general; while later investigations, more particularly those of Sala and Rossi,¹³ Gerharz,¹⁴ and others, failed to confirm Ceni's results or to establish any benefit at all from the injection of the blood serum of epileptics into others subject to epilepsy.

TREATMENT OF THE FITS.

To Arrest the Fit.

The first consideration may be given to the question as to whether it is possible to arrest an attack once the warning has commenced. Many methods have been suggested for this purpose, some of which are of old standing and date from the time of Galen. The attacks in which abortive measures are likely to be successful are those commencing with a peripheral aura. The common method of encircling the wrist, for example, with a ligature or tape, and making traction upon it as soon as the aura is felt in the hand, is well known. As great force is sometimes required to arrest the attack, a strap is preferable to a tape or ligature. Sometimes the patient alone is unable to produce sufficient compression, and requires the assistance of a second person. A circular blister was suggested by Buzzard,¹⁵ in order to induce a more permanent effect, sometimes with advantage.

Forced extension or movement in the direction opposite to the warning sensation may be efficacious when com-

pression alone is unsatisfactory. According to Herpin,¹⁶ the most effectual means of arresting such attacks is a combination of circular compression and forced movement in the opposite direction. Friction, or rubbing the extremity of the limb where the sensation starts, has also been of use; and I have known a patient to bite the finger in which the aura commenced, sometimes with a successful issue.

Abortive means are less satisfactory in cases with a visceral aura. Strong pressure by the hands over the epigastrium is resorted to by some epileptics, while others prefer to drink cold water; swallowing a few drops of ether has also occasionally resulted in arresting an attack. Inhalations of ammonia have been used successfully. Other patients refer to a method of auto suggestion, bringing to bear a strong determination to overcome the attack—a method which undoubtedly has been followed by success in some cases.

The inhalation of nitrite of amyl is a method of arrest more especially valuable in fits with cephalic warning, and particularly in those with olfactory sensations (Gowers). Pierce Clark has insisted upon this remedy as a satisfactory means of aborting fits.

Status Epilepticus.

It has been shown that a gradually increasing number of seizures is the usual sign of the onset of the status epilepticus or of prolonged serial outbursts. With this warning the dose of bromide should be increased even up to double the quantity, and chloral (10 to 15 grains) should be added, and the mixture repeated every four hours. Clark recommends the addition of a solution of morphine to the draught.

Should the fits be recurring with great frequency and severity, no remedy is of greater benefit than the inhalation of chloroform given up to complete anaesthesia. On the other hand, in less severe types of status, or in serial epilepsy, a combination of a bromide salt (gr. xx) and chloral hydrate (gr. x) may be repeated frequently (about every two or three hours) for a time with benefit, especially in the latter condition.

The bromides given alone are of little avail, but within recent years their hypodermic administration in sterile solutions of not more than 10 per cent. (Clark) has been recommended. These may be repeated until 60 or 100 gr. have been injected.

Injection of the bromides by means of *lumbar puncture*¹⁷ has also been advised, in sterile solutions of 30 gr. to the ounce, 10 or 15 c.cm. of the cerebro-spinal fluid being withdrawn before 10 c.cm. of the bromide solution are injected. The hydrobromate of hyoscine has also been used occasionally with success (gr. $\frac{1}{16}$ to $\frac{1}{8}$) hypodermically).

In the post-convulsive, stuporous stage of status epilepticus the treatment is that of acute dementia—strychnine, digitalis, and alcohol, if there is much cardiac debility. Abundance of nutritious food and careful nursing are essential features in the general management of this period.

Acute Dementia.

During the after-stage of exhaustion following upon ordinary seizures no special treatment is necessary, as the stage passes into that of sleep, from which the patient spontaneously recovers. In the acute dementias following serial or status outbursts, on the other hand, great care and attention is required, the patient having to be nursed as one suffering from acute illness. It is during this stage that death may occur, a circumstance which is as frequently attributable to want of attention as to the clinical condition. During the few days of stupor abundant and nourishing liquid diet, in the form of milk, eggs, and custards, should be frequently given. If the patient is unable to swallow, nourishment should be administered in the form of nutrient enemata. Hypodermic injections of strychnine (liq. strych. m. v, or strych. sulph. gr. $\frac{1}{16}$) may require to be frequently administered.

If necessary, alcohol may be given in considerable doses, and the action of the heart steadied and maintained by digitalis or strophanthus. Later on, during the delusional stage, general attention and care is all that is usually needed, while later tonics may be prescribed with advantage.

Acute Mania.

As already described, this form of excitement, whether occurring as a post-paroxysmal phenomenon or as a psychological equivalent, is characterized by the suddenness of its onset, the intensity and violence of its manifestations, and the shortness of its duration, extending usually over a few hours. All that is therefore required lies in protecting the patient, and those attending him, from the effects of the violence and excitement. For this purpose resort may be had to several attendants, or, if a drug be considered advisable, I know of none more safe to administer, or more speedy, certain, and satisfactory in its action, than the hydrobromate of hyoscyne in doses of $\frac{7}{8}$ to $\frac{5}{16}$ grain, injected hypodermically. One injection is usually sufficient to induce quiet and repose for a period of several hours.

DIETETIC TREATMENT.

In all cases of recent epilepsy, whatever may be the medicinal treatment adopted, some modification of the diet from that of a person in normal health is desirable.

In the treatment of this disease the primary object is to keep the dose of the bromide salts as small as possible, because, owing to the protracted nature of the malady, a prolonged course of bromide medication is necessary, particularly in those cases in which treatment is most effective. Therefore, any dietetic modification which will permit of this being accomplished is of advantage.

As already pointed out in the first lecture, many causes have been assigned as the immediate excitant of epileptic seizures, but the only certain factor is the unstable condition and proneness to "discharge" of the cortical nerve cells in predisposed persons. In any attempt to formulate the principle which ought to guide the physician in considering the dietetic treatment, there ought to be kept in mind that nervous energy has its source chiefly in the albuminous and nitrogenized principles of foodstuffs.

Merson¹⁸ treated a number of epileptics upon farinaceous and nitrogenous diet alternately over a stated period, and noted the number of the seizures. The results of the treatment were not such as to justify the conclusion that either kind of diet possessed any decided advantage over the other in the treatment of epilepsy. The experience of Alt¹⁹ upon the several forms of diet in epilepsy led him to the conclusion that a diet without meat was the more satisfactory, but that neither a milk diet alone nor a vegetable diet was as beneficial as their combination. It was an old speculation of Hughlings Jackson that the part played by salts and minerals should be investigated in their relation to the building up of structure and the development of function. As the chlorides and the bromides were strikingly homologous in their chemical and physical properties, he suggested that the efficacy of the bromide salts might be due to their replacing with greater energy the more common chloride salts in the blood and tissues of the body. The practical application of this suggestion, however, was not carried out in the treatment of epilepsy until Toulouse and Richet²⁰ recommended a diet in which the total daily quantity of sodium chloride was limited to one or two grams. It was thought that by diminishing the quantity of the ingested chlorides, mainly in the form of sodium chloride, or common salt, the bromides might be administered in smaller doses, and the risks of bromidism thereby lessened. Hoppe²¹ has shown that one-third of the chlorine of the blood serum has to be replaced by an equivalent amount of bromine before any therapeutic result is obtained. When more than this is replaced, bromide intoxication may occur. When less chloride is ingested, saturation takes place sooner. It has been shown that with a diet free from salt saturation takes place in from three to four days. This method of "salt starvation" in the treatment of epilepsy has been extensively tested, with varying results.

In some cases "salt starvation" has proved a useful adjuvant to bromide medication, while in others little benefit has resulted. Other observers have shown that the dietary is of especial value in cases requiring large doses of the bromides, and in those which show a ready tendency to bromide intoxication. My own experience of the method has been such that, when used in combination with a purin-free dietary, very substantial benefit is derived, and relatively small doses of the bromides may be prescribed. A "purin-free" diet is made up of those foodstuffs in which the "purin" or alloxur bodies are

absent, or present only in such small quantities as to be negligible.

Purin bodies exist in all forms of meat extract, in both the white and the red meats, commonly used as food. They are present in large quantities in such substances as sweetbread, liver, and beef steak. They are not present in milk, eggs, bread, butter, cheese, the farinacea, most fruits, some vegetables, and honey. They exist to only a moderate degree in most forms of fish, peas, beans, lentils, tea, coffee, and oatmeal. I append a dietary which will be found of use to those desirous of giving the treatment a trial.

Diet Table.

Milk (fresh, soured, butter-milk, or whey).
Eggs (boiled, poached, scrambled, or raw).
White bread and butter, cheese, macaroni, rice, tapioca, semolina, vermicelli.
Suet puddings with currants, jam and treacle, apple dumplings.
Pastries, pancakes, jellies, tea-cakes.
All vegetables.
All fruit.
Of beverages, weak infusion of China tea is the best.

I have used this diet, or a modification of it, containing, according to the needs of individual cases, a small portion of white fish, either once daily or three times a week, for several years, in conjunction with the bromides or Gélinau's *dragées*. The results have been such that I am led to advise it in all cases of recent epilepsy.

1. In cases in which the bromides alone have been of little or no use, the adoption of the purin-free, saltless diet has at once led to material improvement.
2. By its aid the dose of the bromides has been largely reduced, and it is in cases refractory to relief by bromides that some physicians increase the salts to such an extent that bromism is brought about and maintained.
3. If properly supervised, the symptoms of bromism need never appear.
4. If the patient shows any signs of loss of weight, the addition of cream or cod-liver oil is usually sufficient. If not sufficient, it is advisable to permit fish, or even a little lamb or mutton.

CONFIRMED EPILEPSY.

In cases of confirmed epilepsy with mental deterioration the use of the bromides is of relatively little value. According to Féré, the bromides are only of use when the dose is so large as to produce toxic effects. Their continued administration in these cases does, however, produce a diminution in the number, and perhaps in the severity, of the seizures. With a view to test the efficiency or otherwise of a 30-grain dose of bromide salt administered every evening to a number of confirmed epileptics in an institution, the dose was stopped for one month, and the total number of fits with or without bromide was compared. During this period the fits were increased in frequency by about one-third (278 to 402).

It was long ago pointed out by Esquirol that any change of treatment was temporarily beneficial. Bringing epileptics under the generally favourable hygienic surroundings of a hospital will often conduce to material temporary improvement without the aid of any medicinal remedies. As with medicinal treatment so with dietetic modifications: I have not seen any material benefit obtained in cases of confirmed epilepsy by aid of the salt-free or purin-free diets. The majority of the cases feel better when on the purin-free diet, but there is no marked improvement in the frequency or severity of the seizures, except perhaps in those cases in which the fits occur in series. These observations would bear out what has been constantly noted in the treatment of epilepsy—namely, that in the confirmed disease with mental impairment little, if any, benefit is derived from treatment, either medicinal or dietetic. In other words, those cases in which the disease has become established upon an organic foundation require to be lodged preferably in an institution for epileptics, where they may be prescribed (1) regular and congenial employment, (2) a judicious alternation of work and play, and (3) a suitably arranged and simple mode of life, with avoidance of excitement and abstinence from alcoholic liquors.

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¹⁰ Donath, *Epilepsia*, 1909. ¹¹ Littlejohn, *Lancet*, 1909, i, p. 1382. ¹² Ceni, *Riv. Sperimentale di Freniatria*, 1901, p. 344; and *Neurol. Centralbl.*, 1903, p. 388. ¹³ Sala and Rossi, *Neurol. Centralbl.*, 1903, p. 852. ¹⁴ Gerharz, *Neurol. Centralbl.*, 1904, p. 835. ¹⁵ Buzzard, *Brain*, vol. iii, p. 554. ¹⁶ Herpin, *Accès incomplet*, 1867, p. 29. ¹⁷ Morton, *Trans. Nat. Society. U.S.A.*, vol. iii, p. 42. ¹⁸ Merson, *West Riding Asylum Reports*, 1875, vol. v. ¹⁹ Alt, *Zeitschr. f. klin. Med.*, vol. liii. ²⁰ Toulouse and Richet, *Acad. des Sciences*, 20, xi. ²¹ Hoppe, *Neurol. Centralbl.*, 1906, p. 993.

Memoranda :

MEDICAL, SURGICAL, OBSTETRICAL.

SEVERE TRAUMATIC ANTE-PARTUM HAEMORRHAGE.

THE case of *ante-partum* haemorrhage published by Drs. Purslow and Branson¹ reminds me of one which occurred in my practice a few years ago. Not having the notes at hand I can only give my recollections.

I was called late one evening to a house in the bazar where a woman was said to be bleeding to death. I found the patient, who was almost at full term, lying on the floor in a pool of blood, blanched, and with a very small pulse. I checked the bleeding by hot vaginal douching preparatory to examination, but as the haemorrhage showed no tendency to recur, I then devoted my attention to restoration of the patient. I also ascertained that she was not in labour, as I had been led to suppose, but that she had fallen on to a brass cooking vessel, and haemorrhage had commenced immediately. Further examination revealed a small deep wound at the base of the clitoris. The pulse, which had become imperceptible, having been restored, and no further haemorrhage having occurred, I decided to allow the patient to recover further before treating the wound. I therefore left directions that I should be called at once if any bleeding occurred. As the house was near the hospital I considered this fairly safe. I prepared sutures, etc., expecting to be called up during the night. The next morning I was hastily summoned, as bleeding had recurred. The patient's condition had improved, and I was able to control the bleeding by one or two catgut sutures. My examination of the parts was not very complete owing to deficiencies of light and other drawbacks, and I cannot say whether the vessels were varicose. I did not see the patient again, although she remained for some days under treatment. I was told that she was delivered of a healthy child about a fortnight later. In this case, although the bleeding was profuse, the child was apparently unharmed. Possibly the treatment by injection of saline solution into the cellular tissues, which was carried out soon after the haemorrhage occurred, was instrumental in saving the child.

Nasik, India. E. N. LEA-WILSON, L.R.C.P. and S. Edin.

NOURISHMENT IN ACUTE DISEASES.

THE wail, "If he does not take any food he will soon lose all his strength," is so often heard from persons in attendance on the sick, that one is tempted to ask if we are on the right lines in almost forcing food on people suffering from acute complaints, or whether it would be better to leave them to Nature—that is, to wait until food is asked for. It is quite a common experience to find a patient out of bed for the first time for not more than a quarter of an hour quite depressed, and sometimes in tears, because of the unexpected weakness, and this after a great deal more nutriment has been taken than often happens when in normal health. Physiologically we do not draw our strength from our food; surely the whole of that goes to make good the loss of waste tissue which is always going on in the human economy, dead tissue is constantly being thrown off, and new cells are born and go to make good this loss; hence the popular saying that "we have a new body every seven years." This, I believe, is true, with this exception: that the body is being renewed every day so slowly we are not cognizant of the change, whereas popular rumour credits the transformation with more expeditious methods.

Where, then, does our strength come from? In my opinion, we get this from the exercise we do: a postman's legs are well developed and strong because of the work they do; so with the blacksmith's arms. Of what avail, then, the nutriment in all its

varied, alluring, and advertised forms if we do not get any strength from its ingestion? None, I say, except to build up the burnt-out tissues the result of an acute attack of, say, pneumonia; but with a temperature of 104° F., furred, foul tongue, anorexia, constipation, loading up of the bowels with accumulated waste and innumerable micro-organisms of infinite variety and infection, surely it were better to wait for convalescence, with its rested and recuperated stomach, its bowels cleared of accumulations, and a rested mind free from the terrors of delirium. What, then, should be our policy, if not one of feeding? Watch the pulse, and improve this by increasing the blood pressure by means of copious draughts of hot water or saline injections by the rectum, or both, and we shall not need to fear collapse or heart failure.

Darwen.

F. G. HAWORTH, M.B., D.P.H.

British Medical Association.

CLINICAL AND SCIENTIFIC PROCEEDINGS.

YORKSHIRE BRANCH.

Wakefield, Wednesday, March 16th, 1910.

Dr. GODFREY, President, in the Chair.

Vaccine Therapy.

DR. McLEOD VEITCH (Harrogate) read a paper entitled, *Some Remarks on Vaccine Therapy with Reference to Cases*. The object of the paper was to show that vaccine therapy, since its introduction, had made very great progress, and whereas, in the first instance, its application had been almost entirely limited to the treatment of staphylococcal infections, it was now applicable in almost every variety of bacterial infection. In support of this statement, a number of cases which had been personally treated by means of vaccine inoculations were cited. These cases comprised:

(1) Case of staphylococcal infection of three years' duration: Four inoculations given; duration of treatment, three weeks; result, cure; no recurrence after one year. (2) Case of well marked pustular acne vulgaris: Six inoculations given; duration of treatment, two months; result, cure; no relapse one year later. (3) Case of lupus erythematosus complicated by mild acne vulgaris: Four inoculations of acne vaccine and six of tubercle vaccine given; duration of treatment, four months; result, cure; no recurrence eight months later. (4) Case of genito-urinary tuberculosis complicated by bacilluria: Twelve doses of tubercle vaccine and seven of bacillary vaccine given; duration of treatment, four months; result, gain of 2 st. in weight, all subjective symptoms disappeared, urine became quite clear and free from pus, no tubercle bacilli discoverable, other bacilli also disappeared; one year later, no recurrence. (5) Case of acute gonorrhoea: Three inoculations of gonococcal vaccine given; duration of treatment six weeks; result, complete cure; there was no gleet after cessation of treatment, although with two previous attacks the same patient had been troubled with gleet for some months after cessation of ordinary injection treatment. (6) Case of bacilluria due to *B. coli* infection of bladder: Three inoculations of *B. coli* vaccine given at ten-day intervals; result, complete cure. (7) Case of subacute rheumatic fever: Attack had persisted for several months, with frequent relapses; before inoculation had been confined to bed practically entirely for five weeks; all the joints affected at different times; no improvement, in spite of vigorous treatment with salicylates and aspirin; vaccine of *Micrococcus rheumaticus* and polyvalent *Streptococcus* used in this case; after the first inoculation the temperature fell to normal, and never again rose; all acute symptoms had disappeared after the second inoculation; subsequently other three inoculations were given for various chronic rheumatic pains which had persisted, and after the last of these inoculations the patient was perfectly well and free from all pain; has remained so for four months. Several other cases of chronic rheumatism were mentioned in which equally satisfactory results were obtained by treatment with a similar vaccine; also a case of sciatica was referred to. (8) Case of acute neuritis of upper arm: One dose of mixed *Micrococcus rheumaticus* and *Streptococcus* vaccine given; result, pain had entirely disappeared at the end of one week; in previous attacks pain had invariably persisted for several weeks. (9) Case of pneumococcal infection, bronchopneumonia, and pericarditis following influenza: Pneumococcal vaccine injected, with almost immediate result; temperature fell to normal in twenty-four hours, and lung and pericardial conditions cleared up within a week; subsequently there was a relapse, and pericardial friction and temperature again developed; a second inoculation of the same vaccine was given, and in twenty-four hours the temperature was normal, friction had completely disappeared, and the patient made a rapid and uninterrupted recovery.

¹ BRITISH MEDICAL JOURNAL, February 5th, 1910, p. 319.