

to be an accidental coincidence. In the first place, relapses or recrudescences are very common before the fever has subsided and the appetite returned; secondly, they occur later in cases where it is quite certain that the proper regimen has been strictly observed; lastly, errors of diet during convalescence from typhoid are, I believe, the rule, and not the exception—certainly this is the case among the uneducated classes, who are seldom willing to put any restraint upon their appetites. Even in hospital practice, where care is taken to exclude improper articles of food, every one must be aware how often this regulation is evaded, and all kinds of indigestible viands are smuggled in. When the poor are treated at their own homes, as a rule, directly the appetite returns they begin to gratify it with whatever most takes their fancy; yet it is very doubtful whether relapses are more frequent under these circumstances.

Some time ago, I had under my care, in the Middlesex Hospital, a boy about fourteen years of age, who passed through a very severe attack of typhoid, and whose appetite returned before the temperature became normal. He continued, of course, to be restricted to liquid food. He complained to his mother, who remonstrated with me. I endeavoured to explain to her the danger of beginning solid food too soon. She replied that she would rather see her boy die of fever than of starvation. She accordingly took him home, stuffed him with solid food, and he recovered rapidly—much sooner, I have no doubt, than if he had remained in the hospital on a restricted diet.

In fact, this error of diet, *i.e.*, the early resumption of solid food, is in most cases beneficial. After an attack of typhoid, a large amount of tissue has to be built up. The return of the appetite shows that the digestive and assimilating powers are again active; and, the more food the patient eats, the sooner will this be effected. Hence, by continuing to restrict the diet, we retard convalescence. We are, of course, unable to act upon this view; as we know that, in a certain number of cases, the intestinal ulcers are in such a state that the passage over them of any irritating particles might easily produce an extension of the ulceration, and so cause perforation; and, as we have no certain means of distinguishing between those cases where the ulcers are granulating and not likely to be injuriously affected by solid food, and those where they are in an irritable or an atonic state, we are compelled to restrict the diet of all cases for a time, the evil of somewhat retarding convalescence being of trifling importance when compared with the risk of causing perforation. I believe, then, that errors of diet, though they may cause a spurious relapse by increasing the local mischief, are incapable of re-infecting the blood with the typhoid poison, and so producing a true relapse.

Assuming the causes of the relapse to be the reinfection of the blood by a fresh absorption of the typhoid poison, there is every reason to believe that this takes place from the mesenteric glands and the glands of the ileum, in which there can be little doubt but that the poison is deposited. This reabsorption probably takes place in all cases; but generally the system is protected by having just gone through an attack. In some cases, however, it is probable that the zymotic process has not been complete, and then a relapse takes place; and it is remarkable that, when the fever is prevented from running its usual course by persistently reducing the temperature, the frequency of relapses is nearly doubled.

In scarlatina we have an exact parallel to the relapses of typhoid, though they occur much less frequently. During the past year, four cases of relapse in scarlatina occurred in the London Fever Hospital, at varying times, from five or six days to a fortnight, from the commencement of the primary attack, sometimes after an apyretic interval, sometimes before defervescence had taken place; and, as occasionally takes place in typhoid, the second rash has been more intense than the primary. As in typhoid, it is of course necessary to distinguish these true relapses with a recurrence of the eruption from the very frequent spurious relapses due to absorption of septic poisons from the throat or glands. In scarlatina, as in typhoid, there is very commonly infiltration of the lymphatic glands; and in all probability the relapse here also is due to reabsorption of the poison contained in them.

Syphilis also presents a close analogy. Here also we have reason to believe that the poison remains deposited in the lymphatic glands, and relapses are due to reabsorption from these; the great difference from the acute infectious fevers consisting in the fact that in syphilis the glands remain chronically enlarged, and hence relapses may occur after long intervals; whereas in typhoid and scarlatina the process runs a rapid course, and after the lapse of a few weeks the glands return to their normal condition, and the poison is entirely eliminated from the system. In those fevers, as typhus, where there is no affection of the glands, relapses are hardly ever met with.

Dr. R. S. HUDSON of Redruth has been admitted, after examination, a Fellow of the Royal College of Surgeons of Ireland.

THE GULSTONIAN LECTURES ON EPILEPSY.

Delivered before the Royal College of Physicians of London.

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LECTURE III.*

THE treatment of epilepsy is a subject on which numerical analysis gives little help. A large number of cases are under observation too short a time to enable the effect of remedies to be fairly estimated; and, of the cases in which benefit is derived, we have no means of ascertaining how many relapse when treatment is discontinued. My notes of the result of treatment in this series of cases extend to 562 cases only. In the remainder, either the period of observation was too short for a just conclusion to be drawn, or, in the press of out-patient work, the influence of remedies was not noted with sufficient precision. The effect of treatment is more likely to be recorded when it is distinct and considerable, than when it is slight. Hence the following figures have no relative value. Of the 562 cases, the attacks ceased while the treatment was maintained in 241; doubtless many of these relapsed when treatment was discontinued, but in a few I have been able to ascertain that the patients remained free from fits even for years after they ceased to take medicine. In 266 cases, improvement short of arrest was obtained; the fits being reduced in many to $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, and even $\frac{1}{10}$ of their former frequency. In 55 cases, little improvement was obtained by any method of treatment.

Time forbids me to enter at any length on the details of treatment, and I can do little more than mention the remedies which in this series of cases were of most distinct service. The subject of possible modes of action it is better to leave almost untouched. It may be doubted whether a rational therapeutics of epilepsy is yet possible. At any rate, up to the present time, remedies used empirically have been of most service.

Although the results show that we must not only rely exclusively upon bromides in our treatment of epilepsy, they show also, as might be expected, that on these our chief trust must still be placed. Of the arrests of fits, 66 per cent., and of the improvements short of arrest, 62 per cent., were due to bromides given alone. Of the three alkaline salts of bromine, that of potassium deserves, I think, as it has popularly received, the first place. I have made a careful comparison between the salts of sodium and of potassium in a series of about fifty cases, substituting the one for the other. In a few cases, the sodic salt appeared to do better; in the great majority, it was distinctly less useful. Bromide of ammonium possesses slightly more power than bromide of potassium; but this is not greater than the larger quantity of bromine which it contains will account for.

The period after its administration at which the maximum effect of a dose of a bromide is obtained varies, I believe, with the dose. The larger the dose, the longer is the maximum effect deferred; the smaller the dose, the sooner does it occur, and the sooner is its action over. When small doses are employed in cases in which attacks occur at regular times, they should not therefore be given more than two or three hours before the attack is expected. This is contrary to some opinions which have been expressed; but I have several times known attacks arrested, when a dose was given about two or three hours before the fit was expected, which were not arrested when the same dose was given twelve hours earlier.

The effect of bromide upon fits appears to be for a time cumulative, just as is, indeed, its action in causing bromism. Attacks may continue under its administration for a time, and yet ultimately cease without any increase in the dose. On the other hand, still later, tolerance or rather indifference may be established, and attacks which have been for a time arrested may ultimately recur.

Drugs which increase reflex action, such as strychnia, are now believed to do so by lessening the resistance in the nerve-centres involved. Bromide diminishes reflex action, antagonises strychnia, and it is probable that it does so by increasing the resistance in the centres. If the view above expressed be correct, that the morbid state in epilepsy is essentially an instability of the resistance in the cells, it is also

* Concluded from page 504 of last number.

probable that bromide of potassium acts by increasing the stability of this resistance.

Bromide is commonly administered in a continuous course, in such moderate doses as will just suffice to keep the fits in check. Given thus, it needs to be given frequently. I have more than once observed that a daily quantity which, given in two doses, did not quite arrest the fits, arrested them completely when given in three doses. If, therefore, the greater convenience of unfrequent doses—one or two daily—be preferred, a somewhat larger quantity must be given.

When the bromide is thus given continuously, it has not seemed to me desirable to increase the daily dose beyond a drachm or a drachm and a half. If this do not arrest the fits, I have very rarely found that larger doses succeed so well as the combination of bromide with other drugs. But it is, I think, open to question whether this method of administration, using doses only just sufficient to arrest the fits, is the wisest in all cases.

If bromide cure epilepsy, as without doubt it does sometimes, it must be by effecting a nutritive change in the nerve-cells corresponding to its action, whereby they are rendered permanently more stable. That it, or any other drug, does good in epilepsy by influencing the vascular state of the brain, appears to me to be improbable. Even if such were its action, we are only driven back to a similar influence in increasing the stability of the cells of the vaso-motor centre. There are, I think, many grounds for the belief that the change in the nutrition of the cells may be produced more effectually by subjecting the patient for a time to the full influence of bromide, giving doses much larger than are needed to arrest the fits, in the hope of producing more readily a permanent nutritive change. In giving bromide thus, I have preferred large doses at intervals of two or three days, gradually increasing the dose until it is as large as can be well borne, and then diminishing it. The largest single doses which I have given in this way have been doses of one ounce. This, in some patients, produces slight stupor, sometimes reaching its maximum on the second day after the dose. In other cases, it produces very little disturbance beyond headache. From the marked differences which patients present in their tolerance, it is not well to begin this method of treatment with a larger dose than four drachms.

The value of the various combinations of the bromide with other drugs was tested, as far as possible, on an uniform plan. First, bromide was given alone for several months, and the additional drug was added to the same dose of bromide, and the result watched for several months longer. Of the various combinations which are in common use, those with digitalis and belladonna unquestionably deserve, as they have commonly received, the first place. Digitalis is one of the oldest remedies for epilepsy. It was recommended by Parkinson two hundred years ago, and has been perhaps for a still longer time a popular remedy for this disease in certain rural districts in the West of England. I have met with no case in which, given alone, digitalis arrested the fits for more than a few months, but in several cases it effected very distinct improvement. The combination of digitalis and bromide, however, was distinctly more useful than bromide only, in no fewer than sixty-three cases. In more than half of these, thirty-seven cases, the attacks ceased under its use, although they had continued under bromide alone. In the cases in which cardiac disturbance was associated, the combination was almost always superior to bromide alone; but its use is not confined to these cases. Many cases of nocturnal and other forms of epilepsy yielded to the combination, although the attacks had continued under bromide, and this when there was no evidence of cardiac disease. I know of one patient with nocturnal epilepsy who, for two years, under this combination, has not had a single fit, although the attacks occurred every few weeks with bromide only.

In rare cases, belladonna alone will arrest attacks. I have met with only one case in which attacks, which continued on bromide, ceased entirely when belladonna was substituted, and this was a case with hystero-epileptic symptoms. The combination of bromide and belladonna, however, was distinctly better than bromide alone in thirty-five cases, and in fifteen of these arrest of the fits was thus obtained.

Indian hemp was first employed in epilepsy by Dr. Reynolds, and is sometimes of clear value. In one case, the attacks were invariably arrested for many months by its use, recurring only when the patient ceased attendance; but twice, on his resuming attendance, the drug instantly arrested the attacks. When bromide was substituted for the Indian hemp, the attacks at once recurred. Combined with bromide it is also sometimes useful, and seems to exercise most influence over attacks in cases in which there is persistent headache. The same fact has seemed true of the combination with gelsemium.

The use of opium in epilepsy has long been advocated by Dr. Radcliffe, and in some cases it is certainly effective. The combination of bromide and morphia I have rarely found to present special advantages. In the status epilepticus, in which attacks occur with great frequency and

severity, and where bromide, even in large doses, was useless, I have found small hypodermic injections of morphia of great service.

The combination of bromide with aconite and hydrocyanic acid I have also tried, and found in some cases slightly better than bromide only. The addition of iodide to bromide has been lately said to increase its effect. Occasionally this is true, and in four cases of the series the combination was distinctly better than bromide only, but in many other cases it was ineffective. Even in the cases on the subjects of inherited syphilis, it has not appeared of special value.

Zinc unquestionably deserves some of the repute it has enjoyed for more than a hundred years as an antiepileptic. Of the cases of this series in which it was employed, it was distinctly useful in ten, but in only three did the attacks cease. In three other cases, attacks which continued under bromide ceased under bromide and zinc; and in a fourth, they ceased under zinc, digitalis, and bromide. The oxide of zinc was the form commonly employed. Its nauseating influence constitutes a serious drawback to its use, as toleration is difficult to establish, and I have rarely succeeded in giving more than twenty grains a-day. Bromide of zinc has seemed of small value, and is borne badly. The addition of arsenic to bromide in no case produced any marked effect on the attacks. It was used in a large number of cases on account of the readiness with which, it was found, the bromide rash could be prevented by its use.

Bromide of camphor, highly praised by Bourneville, was tried in a considerable number of cases, but without any good results. Turpentine has been recommended by Dr. Radcliffe, and I have seen it produce very striking benefit, but only in cases of hystero-epilepsy.

The use of iron in epilepsy has been discountenanced by high authorities, on grounds which are not altogether beyond question. In rare cases, it increased the frequency of attacks; in the majority of cases in which it was used, it was borne without any ill result; in many, the addition of iron to bromide was attended with a marked and permanent improvement, and in some cases iron alone arrested the fits. The series includes four cases which ceased under iron only, and eight others in which iron alone was distinctly better than bromide, and nineteen cases in which the addition of iron to bromide exercised a marked influence. In no fewer than eleven cases, attacks, which persisted on bromide, ceased on the addition of iron, and remained absent as long as the treatment was continued.

In several inveterate cases of epilepsy, in which bromide had no effect, I have tried borax. In some cases it did no good, but in twelve its value was most distinct. I may mention one or two. In one, fits which had continued on bromide and on zinc ceased entirely on borax for three months, and then only recurred when the medicine was discontinued. In another case, the fits continued (about one weekly) during three months' treatment on bromide and on belladonna. Borax was then substituted, the fits at once ceased, and for five months the patient had not a single fit; then he had one in each of the two following months; the dose of borax was increased, and up to the present time (eight months later) no other attack has occurred. In a third case, one or two attacks occurred once a fortnight on bromide. Borax was substituted, and for five months the patient had not a single fit. The doses given have been ten or fifteen grains, twice or three times a day. It produces in some patients gastro-intestinal disturbance, and, rarely, a form of dysenteric diarrhoea. By others it is well borne, and one of my patients has taken forty-five grains a day for twelve months without the slightest inconvenience, and says that no medicine has ever done him so much good. In cases in which bromide fails, borax certainly deserves a trial.

The use of cocculus Indicus in epilepsy, recommended by Dujardin-Beaumetz, has lately attracted attention in consequence of the recommendation of Planat. I have tried the alkaloid picrotoxine in a few instances, but in only one case has it appeared to do good. My own experience of its use has, however, been small; and I am very much indebted to my colleague, Dr. Ramskill, for permitting me to mention some interesting results which he has obtained by the hypodermic injection of picrotoxine. His experience of its effect on the fits when given through the skin is nearly the same as my own of its employment by the mouth. In seven cases in which it was injected, in daily doses of from one to four *milligrammes*, no beneficial result was obtained; in most cases, indeed, the attacks were rather more frequent and severe. Of course, we are not justified in assuming that the effect of picrotoxine and of the cocculus Indicus itself are identical. A very interesting fact has, however, been ascertained by Dr. Ramskill, viz., that picrotoxine in larger doses of from fifteen to eighteen *milligrammes* will almost invariably produce a fit in twenty or thirty minutes. In one patient, for instance (according to the notes of Mr. Broster, who carried out the experiments), the dose was daily increased, and, when more than five *milligrammes* were injected, a sensation of giddiness followed, similar

to that with which the attacks commenced. The same effect followed larger injections, and, when the dose reached eighteen *milligrammes*, a severe attack occurred thirty minutes later, and an attack always followed the injection of this dose. In another patient, a similar progressive increase of the dose was followed by giddiness and headache when eight *milligrammes* were injected. When the dose of fifteen *milligrammes* was reached, a severe epileptic fit followed. Next day, a second dose of fifteen *milligrammes* did not cause a fit; but eighteen *milligrammes*, two days later, caused a fit in half an hour. After a week's intermission, twenty-four *milligrammes* were injected, and a severe fit occurred in twenty-five minutes. In a third patient, a fit occurred after one injection of eight *milligrammes*, but ten *milligrammes* next day caused no fit. Fifteen *milligrammes*, however, were followed by a fit in thirty minutes, and a second injection of the same dose the following day caused a fit in fifteen minutes. Seventeen *milligrammes* next day caused a fit in thirty minutes. In a fourth patient, a single dose of eighteen *milligrammes* caused, in ten minutes, giddiness and slight dazzling before the eyes, and in thirty minutes there occurred the usual aura of an attack: a sensation of something creeping up the right arm to the top of the head, and numbness and twitching in the right thigh, but no fit followed, although the patient was stupid and dull for a time, just as after a fit.

Among other drugs which I have tried and found useless, I may mention benzoate of soda and nitro-glycerine. In hystero-epilepsy, bromides, sometimes useful, fail entirely much more frequently than in simple epilepsy; and the combinations with digitalis and belladonna are also less frequently useful. Iron, especially guarded by aloes, is often of the highest value, quite apart from the existence of anæmia, and, next to it, valerianate of zinc, morphia, and turpentine.

High authorities have urged on different grounds that the diet of epileptics should contain little or no animal food. In a few observations which I have made by keeping a patient under unaltered medicinal treatment for alternate periods, on a diet with and without animal food, I could observe no difference in the attacks, except that in one patient they were slightly more frequent in the periods when animal food was excluded, and in one patient, hystero-epileptic attacks on ordinary diet became, when meat was excluded, severe epileptic fits, and again became hystero-epileptic when animal food was restored.

In pure epilepsy, the only treatment needed during the attacks is such care as shall secure the patient, as far as possible, from injury. It is very different with the attacks of hystero-epilepsy, which, from their character, severity, and long duration, often furnish the attendants with a task of no small difficulty, and which can, almost always, be cut short by appropriate treatment. The patients often hurt themselves during the attacks, and some control is absolutely necessary. But, as already stated, restraint tends to increase the violence, and makes the paroxysm last longer. Hence considerable judgment is often required, so to adjust control as to be efficient and not too much. I have seen these patients put within padded partitions and left alone, but I have never myself found this necessary.

The slighter attacks can be arrested by closing the mouth and nose with a towel for thirty seconds, after Dr. Hare's method. The profound effect on the respiratory centre, and the related higher centres, caused by the anoxæmia, seems to arrest the convulsive action. Cold water over the head is often successful if applied freely; in severe attacks, a moderate quantity only excites redoubled violence, while a second gallon is often more effectual than the first. This has the disadvantage of drenching the patient's head, and often giving cold. When the mouth is open during the attacks, a small quantity of water poured into it is often effectual. A much more convenient and more effectual remedy than water, however, is strong faradisation to the skin; applied almost anywhere, it will commonly quickly stop the attack. Of ovarian compression I spoke in the last lecture. In this country, it is rare that ovarian pressure will arrest an attack. In some cases, all these means fail, even when thoroughly used, and I have known such attacks go on, in spite of skilled treatment, for several hours. Chloroform is of little use; its administration is a matter of extreme difficulty, often impossibility, and the attack is commonly renewed when the influence of the anæsthetic passes off. The remarkable effect of nausea in relaxing spasm led me some years ago to try the effect of injections of apomorphia, and I have found in it an unfailing means of arresting the attacks. After the injection of a twelfth of a grain, in four minutes with certainty all spasm ceases, and normal consciousness is restored; in six minutes, the patient will get up and go to the sink; in eight minutes, will vomit, and afterwards, except for slight nausea, is well. A twentieth of a grain has the same action, but is rather longer in its operation. Moreover, I have found that the treatment is, so far as the hystero-epileptic symptoms are concerned, curative as well as palliative, for the attacks in many cases ceased after a few paroxysms had been thus cut short.

I regret that, in this survey of some points in the clinical history of these diseases, it has been necessary to omit all reference to many facts regarding symptoms, diagnosis, and prognosis, which are presented by the series of cases analysed. I am conscious that, as it is, in the details I have introduced, I have made a large demand upon your patience. But it is only by ascertaining the facts of these diseases that we can hope to learn their nature, or to find the guidance in our efforts at prevention or at cure.

Whatever may have been the nature of the demoniacal possessions of old, few who have watched an epileptic fit can doubt that they have their representatives among us still. The old power of casting them out has gone from the earth; and it is only by the study of their origin and history, and careful experiment in their treatment, that we can hope to regain over them such power as may still be possible to man. And the present generation has witnessed an advance in the treatment of these diseases, equalled in perhaps no other branch of therapeutics. Thanks to the influence of one drug, the use of which in epilepsy is due wholly to Fellows of this College, hundreds of epileptics have been cured, and thousands are leading useful lives who would otherwise have been incapacitated by the disease. Although the condition of many sufferers is still gloomy enough, it is not without hope, and to them also, we may surely trust, the progress of the recent past is the dawn of a brighter day.

ABSTRACT REPORT OF LECTURES ON THE COMPARATIVE ANATOMY OF MAN.

Delivered at the Royal College of Surgeons of England.

BY W. H. FLOWER, LL.D., F.R.S.,

Conservator of the Museum, and Hunterian Professor of Comparative Anatomy in the College.

LECTURE II.—THE AMERICAN RACES.

TO-DAY we begin to consider the characters of the American races. By these we mean those people who inhabited America before its discovery by Columbus—a people which are now rapidly disappearing. There is great difference of opinion regarding them, and two extreme views have been held as to their unity or diversity. It has been said, on the one hand, that "when you have seen one Indian, you have seen all"; and, on the other, that as much difference can be found in the native Americans as among the inhabitants of the Old World. Both statements are exaggerations, the truth lying between the two; the probability being that they are of one race, which has become split up into several subraces; or that, if they be of diverse origin, the several elements have become so blended that no sharp lines of demarcation can now be found. A great difficulty in studying the cranial conformation of the Americans arises from the wide-spread practice of deforming the head artificially in infancy, so that it is difficult to ascertain the natural form of the cranium. This habit prevailed extensively, but not uniformly, throughout all the western parts of the continent, from Vancouver's Island down to the Southern parts of Peru. It also occurred, though less generally, in the southern part of what is now the United States, and in the West India Islands. The Spaniards tried to eradicate the practice, and it was forbidden to the Peruvians in 1585 by the Synod of Lima, and again with severer penalties in 1752. In British Columbia, it has only recently fallen into disuse. The custom is, or we may almost say was, not confined to America. Hippocrates and various other writers of his age speak of the *macrocephalic* people who dwelt on the eastern shores of the Black Sea, and who purposely altered the form of their children's heads. Heads thus deformed have been found in ancient tombs in the Caucasus, especially near Tiflis, in the Crimea, and, though less numerous, at various places along the course of the Danube, and extending as far as the south of France. These have been assigned to Avars, Huns, or Tartars, but more probably belong to the Cimmerians, who originally inhabited the region where the deformed heads are now found most abundantly, and spread westwards over Europe some centuries before the Christian era. The custom, though in a modified degree, is scarcely yet extinct in the south of France; there it is produced by binding the head tightly. This is not done to produce deformity, but simply as an old custom. Similar deformities of the head, occurring usually from simple occipital flattening, are to be found in many parts of Asia and Polynesia, though quite unknown in