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Some Certainties in the Therapeutics of Epilepsy.

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THE ancients regarded epilepsy with a horror which plainly affected their views of its therapeutics. They had no specifics in the line of drugs, but recommended the most violent counter-irritation, bleedings, purging, starvation, and such heroic mental remedies as a draught of blood fresh from a dying gladiator. On the part of the Hippocratic school and its later followers, Celsus, Galen, and Aretæus, there was a great deal of wise insistence upon "a soft diet free from crudities," and regular exercise. But we learn nothing more than this from the medical fathers regarding the therapeutics of epilepsy.

The views of various physicians of eminence for the one hundred and fifty years previous to the introduction of bromides are most interesting, and not without practical value.

Great frugality and great exercise cure epilepsy, said

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Boerhaave. Tissot thought that cases of centric epilepsy which valerian would not cure were incurable. Dr. Benjamin Rush recommended sugar of lead. Schroeder van der Kolk was an ardent advocate of counter-irritation and scarifications. Graves cured several patients with *Cotyledon umbilicus*. Sir Thomas Watson said that in ordinary forms of epilepsy he would expect more from turpentine than any other single remedy. Herpin professed to have cured over half of forty-eight cases with oxide of zinc; but he subsequently pinned his faith more strongly to *Selinum palustre*. Skoda stated that the best remedy against epilepsy was belladonna, and Trousseau appears to have had greater faith in it than any other drug. Marshall Hall believed in the efficacy of small doses of strychnine, and, for certain forms of epilepsy, advocated tracheotomy. All early writers insist strongly upon the importance of diet, exercise, and baths, the opinions being that epileptics should live on a spare diet composed of soft and easily digestible food.

No more instructive chapter could be written than one giving a record of the changes and contradictions of opinion during the two thousand years in which medical experiences have been recorded regarding remedies for epilepsy. Thus, for a thousand years doctors gave hellebore for this disease; then it was found that it did no good! But of late years we have arrived at more certainty, because, although we do not know much more about the disease, yet we have learned to weigh evidence more carefully, and to exclude sources of error in forming opinions. These sources of error are:

1. The fact that, in some cases of epilepsy occurring in those quite young, or in adults, the attacks cease spontaneously, either entirely or for a very long time.
2. In epilepsies beginning before or during the time of puberty there is often a tendency for the attacks to lessen or cease after the nineteenth or twentieth year.

3. Some cases of epilepsy, so called, are really cases of hysteroid convulsion or hysteria.

4. Almost any new drug or change in treatment will lessen the number of attacks for a time.

5. Reflex epileptoid convulsions are cured in a very great variety of ways, depending upon the kind of irritation.

Bearing these sources of error in mind, we can still say that, despite many contradictions and much conflicting evidence, there are a few certainties regarding the therapeutics of epilepsy. One of these is that we can dispense with a long list of the remedies still popularly associated with epileptic therapeutics—*e. g.*, salts of copper, lead, and silver, turpentine, nitro-glycerin, ergot, conium, *Cocculus indicus*, chloral, curare, indigo, oxygen, tartar emetic, galium, *Cannabis indica*, and a host of ancient and odoriferous vegetable remedies, and we can limit our drug therapeutics to bromides, belladonna, zinc, digitalis, strychnine, valerian, amyl nitrite, and cod-liver oil. To this we may add counter-irritation, diet, exercise, hygiene, and, in traumatic cases, surgical measures.

We can limit this still further and say that the successful treatment of essential epilepsy is based mainly upon the following:

First and foremost, dietetic and hygienic measures.

Second, bromides.

Third, belladonna.

Fourth, zinc.

Fifth, habit-breaking drugs and measures.

If one may be permitted to be aphoristic on subjects like this, I would express my views regarding the therapeutics of epilepsy as follows:

I. Diet, exercise, and proper hygienic treatment, including baths, rank above all other single therapeutic measures.

If I had to choose between them and bromides even, I would select the former. On the whole, I fear that the reign of bromides has made the condition of epileptics more miserable than it was before, and has done our patients an actual harm. At the best, not more than five or ten per cent. of epileptics can be cured, while the majority are reduced by bromides to a state of physical enfeeblement and distressing mental hebetude. Besides, physicians now fly to the bromides, and, trusting to them, neglect the searching inquiry into the exciting cause, or the careful direction of the patient's habits, which are so essential.

All medical experience unites in ascribing benefit to judicious regulation of diet and exercise. The only difference of late years is that we do not now believe epileptics should be starved.

Epileptics should live on a plain, easily digestible diet, containing a preponderance of fat. A special meat diet, or milk diet, or farinaceous diet, is not injurious nor curative. It all depends upon the patient. A meat diet may be best if the patient is lithæmic or has a fermentative dyspepsia. A milk diet is especially useful for children and erythritic women. The meals should be small, and, in cases of voracious appetite, four, five, or six light meals a day should be given. No heavy meal should be taken within four hours of sleeping. Indeed, no heavy meals should ever be taken by epileptics. Special diets have often to be rigidly laid down simply as a matter of discipline, since patients will not follow any general directions. I believe that the urine and digestive functions should be carefully studied, and that thus we shall find indications for selecting the right kind of food.

II. The bromides take the second rank in the treatment of epilepsy.

All bromides act alike in this disease. If one does not

cure, another will not. Occasionally changing and mixing reduces the attacks for a time, and benefits the stomach.

III. The best bromides are those of potassium, sodium, ammonium, and hydrogen (hydrobromic acid); possibly we may add nickel.

Bromide of potassium is the most trustworthy.

Bromide of sodium is more agreeable to the taste, less irritating to the stomach, and milder in its effects, but is eventually just as depressing as other forms.

Bromide of ammonium has a brief stimulant effect on the circulation.

Hydrobromic acid is useful in those cases in which there are indigestion and phosphaturia, and an alkali is contra-indicated. It produces acne less readily than the alkaline bromides.

IV. Bromides should be given in daily doses of $\bar{3}$ j, increased gradually until the attacks are suppressed, or the dose reaches $\bar{3}$ iv to $\bar{3}$ j daily. Few patients can tolerate more than this latter dose. Thorough bromidization should be always tried if necessary to stop the fits, and it may be occasionally repeated. But bromidization is sometimes injurious, even making the disease worse, and it must always be employed with caution.

V. When the fits are suppressed, the bromides should be carefully reduced, but never entirely stopped for at least two years after the last fit.

VI. In most cases, and especially in nocturnal epilepsy, an extra large dose of bromide should be given at night.

VII. It is very important that bromides should be chemically pure, that their use should be continued a very long time, and that their depressing effects should be offset by tonics and all possible roborant measures.

VIII. The best non-specific adjuvants (drugs) to the bromides are potassium iodide (in syphilitic epilepsy), potas-

sium bicarbonate (in lithæmic and rheumatic states), carbonate of ammonium, the hypophosphites, arsenic, iron, and quinine.

IX. The other chief adjuvants to the bromides are diet, exercise, a regular life, hydrotherapy, counter-irritation on the neck, and, in the line of drugs, zinc, belladonna, strychnine, valerian, and the nitrites. Combinations of bromides with the other drugs mentioned will lessen attacks when bromides alone will not.

Other drugs which sometimes help the bromides are digitalis, *Cannabis indica*, ergot, conium, chloral, the salts of copper, picrotoxin, and borax. None of these do any permanent good alone, and their value as adjuvants is not uniform or generally conceded.

X. The best substitutes for the bromides, when these do no good or do harm, are belladonna, zinc, strychnine, glonoin, borax, and alteratives.

XI. Bromides stop the fits in from five to ten per cent. of cases, oftener if given early in the disease, if given to young children, and if given in cases that develop after twenty-one.

Bromides lessen the fits in from eighty to eighty-five per cent. of cases.

Bromides do no good, or do actual harm, as regards frequency of attacks, in from five to ten per cent. of cases. Bromides do no actual good to the patient in a much larger proportion of cases.

XII. To prevent bromide acne, arsenic, calcium sulphide, baths, and diuretics are the best measures, or hydrobromic acid may be used.

To prevent bromidization, adopt all possible roborant measures: use salt-water baths and regular physical exercise, give black coffee, caffeine, cocaine, mineral acids, strychnine, bitter tonics, cod-liver oil, or give large doses of the bromides every three days only.

In all cases dilute the bromide preferably with carbonic-acid water or Vichy in the proportion of six ounces of water to a scruple of the drug.

The continuous administration of an alkaline bromide in an alkaline water sometimes affects the bladder, and then the bromide can be given dissolved in hydrobromic acid.

XIII. The remedies that are especially useful in *petit mal* are, after the bromides, belladonna, glonoin (?), *Cannabis indica* (?), cod-liver oil, ergot (?), counter-irritation at the back of the neck, and cold spinal douches.

XIV. For epilepsy in children, besides the bromides it is advisable to employ a milk diet, rest, and oxide of zinc. Belladonna, if tried, should be given cautiously.

XV. For adults and chronic cases, use the bromides, belladonna, iodide of potassium, and ammoniated sulphate of copper. Oxide of zinc is here of less value.

XVI. For nocturnal epilepsy, increase the dose of bromide at night, and add chloral or digitalis. Give also, if needed, strychnine. Raising the head of the bed or making the patient sleep in a chair at night are measures to be tried.

XVII. For hysterical and erythritic cases, with or in place of bromides give a diet of milk and vegetables. Try turpentine, valerian, or zinc. Belladonna is usually contra-indicated.

XVIII. Counter-irritation by means of blisters, issues, and setons at the back of the neck, is a useful adjunct to treatment, especially in *petit mal* and in cases with mental derangement.

XIX. For the status epilepticus, give large enemata of chloral, and use emetics and purges. Venesection is often efficacious, morphine is dangerous, chloroform is only palliative, and nitrite of amyl is of little value.

XX. To prevent impending attacks, the best remedy is

nitrite of amyl, which may be carried in a phial filled with cotton. Inhalation of chloroform or ammonia, the internal administration of ammonia, spirits of lavender, or alcohol, a sternutatory, and pressure on the carotids—all are measures which sometimes stop the attack.

XXI. Alterative and habit-breaking drugs, such as mercury, iodide of potassium, arsenic, antimony, are useful in epilepsy.

XXII. No surgical measures upon ovaries, uterus, testicles, cranium, or elsewhere will cure an established long-standing epilepsy except in rare cases. Such operations, if done, should be undertaken early, before the patient has had an excessive number of fits.

Ligaturing the vertebrae has already killed two patients, and has no standing in the surgical therapeutics of epilepsy.

Oöphorectomy is not indicated in true epilepsy.

Ligaturing the carotids is a measure fallen into disuse.

Trephining in traumatic cases of epilepsy has cured less than one half of patients.

Trephining cures some cases even when there is no depression of bone.

Trephining for epilepsy is an operation which has called out more contributions to medical literature than any other single anti-epileptic measure unless it is the bromides. Sixty-nine reports of one or more cases are indexed in the Surgeon-General's catalogue. The very large majority of the writers report favorable effects, and at least nineteen announce in their title a cure. A study of these reports furnishes no basis for any generalization, however, since the fatal or unsuccessful cases rarely get into print. My own views are based upon the cases of trephining about which I personally know. I believe that the measure is one that should be more widely resorted to, now that opening the cranial cavity has been made so safe and can be done under cocaine with-

out giving a general anæsthetic. That the operation is being done more frequently seems probable from the steadily increasing number of reports of cases. In the decade 1850-1860 there were only two; between 1860 and 1870, seventeen; between 1870 and 1882, twenty-eight.

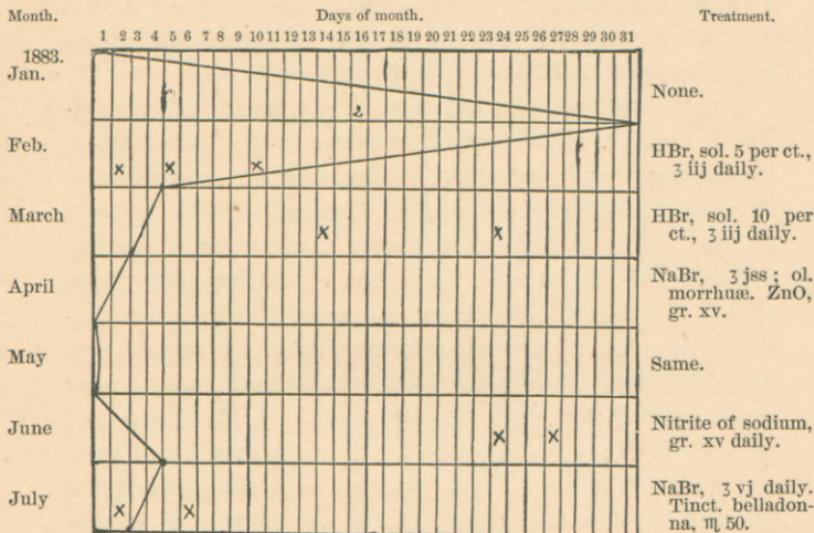
In instructive contradiction to this is the record with regard to certain other surgical measures, such as arteriotomy, tracheotomy, and castration. I know of no recommendation of arteriotomy since that of Péraire in 1847. Reports on the utility of tracheotomy were made by nine persons between 1850 and 1860; since then we hear nothing from it. Cauterization of the larynx is confined to the same decade. Ligature of the carotids was tried by several previous to 1850. During the subsequent decade reports were made upon it by Mott, Stephen Smith, J. R. Wood, and several others; but since then nothing has been heard from the operation as a remedy for epilepsy until Alexander called attention to it a few years ago for the purpose of recommending as a substitute ligature of the vertebrae.

It is by a similar study of the survival of the fittest (by which no pun is intended) that one is able to drop from the list of anti-epileptic drugs such once-vaunted remedies as galium, lead, chloroform, indigo, alisma plantago, selinum, antimony, cocculus indicus, *Sedum acre*, quinine, hydrocyanate of iron, scutellaria, morphine, cantharides, mistletoe, asafœtida, leaving as remedies of certain or occasional value those which have been already mentioned.

In my own personal experience of somewhat over eighty cases I have been much helped in reaching definite conclusions by studying records kept in a diagrammatic way on sheets arranged for the purpose. The following will show the arrangement of these record charts. No one can realize until he has accumulated a number how instructive they are to their possessor:

RECORD-CHART FOR CASES OF EPILEPSY.

L. M., female, 17, s. Essential epilepsy, grand mal, petit mal, and epileptic automatism.
No organic disease.



The line ends each month at the number of attacks which the patient had during that month. If there are more than thirty-one, it is indicated by figures. The days on which the attack occurred are also indicated by a figure. Only part of the record is here given.

I give below a few special modes of treatment advocated by physicians of experience in the treatment of epilepsy. It should be remembered, however, that epilepsy, least of all diseases, can be treated in a routine way.

SPECIAL MODES OF TREATMENT.

The *zinc treatment* of Herpin was as follows: Give gr. $ij\frac{1}{2}$ of zinc oxide ter in die, increase the dose by gr. $\frac{3}{4}$ every week until gr. xj are taken t. i. d. Keep this up for at least three months. It appears that Herpin subsequently used to

add or alternate with ammonio-sulphate of copper or selenium.

The *belladonna treatment* of Trousseau :

℞ Ext. belladon. fol., }
Pulv. belladon. fol., } āā gr. $\frac{1}{6}$. M.

Sig. One A. M. and P. M. for one month.

Then increase the dose by one pill daily each month until twenty pills are taken night and morning. The treatment must be continued for a year.

Gowers's method consists in giving the bromides in single doses at intervals of from two to five days, these single doses being gradually increased. Thus the patient takes ʒj on the first day, ʒjss. on the third day, ʒij on the sixth day, ʒiij on the ninth day, ʒiv on the fourteenth day, and so on until the maximum dose of about ʒj is reached, when the drug is decreased in the same way.

I have found this a very good method if during the intervals tonics and adjuvant measures are employed.

The *method of Meynert*, in many cases, is to give fifteen grains of bromide of potassium three times daily, and increase the dose by fifteen grains every time a fit occurs until they are suppressed.

A *mixed treatment* like the following is recommended by Ball and Handfield Jones :

1. ℞ Ammon. bromid., }
Sodii bromid., } āā ʒijss. ;
Infus. valerianæ..... ʒx. M.

Sig. ʒij daily, increasing until ʒijss. of the bromides are taken daily.

2. At the same time take a pill :

℞ Ext. belladonnæ gr. $\frac{1}{3}$;
Zinci oxid. gr. iij. M.

Sig. One, morning and night.

3. A drastic purge weekly.

An *acid mixture* for epileptics, which I have found efficient in two cases which resisted other forms of medicine was :

℞ Acid. hydrobromic. dil., 10 per cent. ʒ j ;
 Atropinæ hydrobromat. gr. $\frac{1}{20}$;
 Zinci citrat. gr. iv. M.

Sig. Take this t. i. d., and gradually double the dose.

A mixture alleged to be very efficient is :

℞ Potass. bromid. gr. xv ;
 Sodii arsenit gr. $\frac{1}{20}$;
 Picrotoxin gr. $\frac{1}{80}$. M.

Gradually increase.

In illustration of the evidence collected from other writers I submit a record, showing the opinions expressed *pro* and *con* regarding three drugs : belladonna, zinc, and ammonio-sulphate of copper. I have similar tables showing the state of opinion regarding most of the remaining drugs used in epilepsy, but it is not necessary to publish them. It goes without saying that certainties in the therapeutics of epilepsy can not be obtained by a single observer, and that no one would be justified in dogmatizing upon his own experience alone. Art is long, but life is not so short as Hippocrates found it, since the physician of to-day has the recorded experiences of over two thousand years upon which to work.

THE VALUE OF BELLADONNA AND ATROPINE IN EPILEPSY.—*Recommended* in the seventeenth century by Munch ; in the eighteenth century by Theden, Stoll, Hufeland ; since then by Bretonneau, Demme (2 cures in 8 cases), Sroeter, Steiner, Niemeyer, Ball, Handfield Jones ; Skoda : the surest anti-epileptic ; Trousseau cured 40 out of 150 cases ; Calovi, 1 cure reported ; Crosio, 1 cure reported ; Kroon cured 1, improved 15, out of 34 ; Brown-Séguard, Gowers, Echeverria, Hamilton, Putzel, Köllner, Leidesdorf, Le Coste, 1 cure reported.

Adverse Views.—I have found belladonna of no value (Hammond). Of doubtful benefit given alone (James Russell). Of very doubtful value (Radcliffe). Lessens attacks, but not curative (Reynolds).

OXIDE OF ZINC.—*Recommended* by Brachet, Richter, J. Frank, Loebenstein; Herpin cured 28 out of 48; Steiner, Watson; Sch. Van der Kolk: in large doses, sometimes curative; Reynolds: a useful drug; Kroon, in 20 cases, cured 3, improved 11; Nothnagel got good results in young patients; Gowers: useful in hysteroid epilepsy, and as a synergist to bromides; Hammond: decidedly useful in form of bromide; James Russell: decided benefit in 6 out of 20.

Adverse Views.—Of doubtful value; its prolonged use causes tabes sicca (Radcliffe). J. Moreau gave it in nine cases with no benefit.

AMMONIATED SULPHATE OF COPPER.—Nothnagel: may be beneficial, especially in adults; Herpin: very useful; Brown-Séguard: it ranks high among anti-epileptics.

Adverse Views.—The salts of copper are useless (Reynolds). Of not much use (Radcliffe). Of no benefit (Gowers).

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