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[REPRINT FROM TRANSACTIONS OF ILLINOIS STATE MEDICAL SOCIETY, 1891.]

EPILEPSY.

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Since the time of Hippocrates epilepsy has been the subject of much speculation, and in the earlier centuries of medicine a mysticism. The progress of scientific medicine has now, however, uprooted these absurd and unreasonable conjectures, and placed it upon a sound and rational basis, the theory that it is dependent upon cerebral irritation being indisputable. But the definition of the disease is yet in dispute. Gowers,[1] Jackson[2] and others hold that the essential phenomena of epilepsy lies in the nervous discharge or simple liberation of energy of nerve elements—the convulsion, while Christian[3] and other eminent authorities hold that the convulsion is not the pathognomonic sign of epilepsy, but the essential sign of the disease is in the loss of consciousness. We will not enter into the discussion of the present physiological theories of epilepsy, but give the following for our definition of the disease, believing it will cover all the essential phenomena recognized in an epileptic attack, viz.: We may define it as a chronic convulsive disease, characterized by almost invariable loss of consciousness, and special form of spasm, tonic or continuous, clonic or intermitting.

Etiology.—The chief etiological factor is that of heredity, which we recognize as a biological law, through whose agency nature seeks to eliminate defects and to bring back species

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(1) Nervous Diseases. (2) Lumleian Lectures, 1890.
(3) Journal of Mental Science, January, 1891.

from accidental errors to the normal type. Nowhere, perhaps, can one be so impressed with the extent of this great law, with its conflict of opposites, than in the study of neuropathology. The difficulties of the investigation of heredity are many, and in the study of all diseases it is true that results obtained fall short of actual facts. The transmission may be direct or indirect—indirect as when one or more generations escape and the disease appears in the descendents. The tendency may be even more indirectly hereditary, as in cases where the patient's antecedents had a proclivity to nervous disease, declaring itself as hysteria, alcoholism, insanity, neuralgia or other nervous affections, while the interchangeableness of neuroses is shown by the appearance of epilepsy in the patient. The direct transmission of epilepsy is frequent. It is incomparably the most frequent of neurotic diseases, producing epilepsy in the offspring.

Phthisis transmits a diathesis predisposing to epilepsy, insanity, imbecility and general nervous diseases. In the family history of epileptics phthisis is found very frequently. Gowers found such history in 39 per cent. of his cases, but thinks this not very large or conclusive as to the probability of phthisis producing epilepsy. He says this proportion is due merely to the great frequency of consumption in the community. Echeverria and Savage believe there is more than a casual relation between the two diseases. Kerlin has very conclusively shown that phthisis has an influence in producing idiocy and imbecility with associated epilepsy, which is astonishing. Over 50 per cent. of cases studied by him show a family history of consumption. Of the 16 per cent. who were epileptic the existence of phthisis in the antecedents was shown in every case. My experience, both among the feeble-minded and insane who have epilepsy, has convinced me that there exists a strong relationship between the degenerate type produced by epilepsy and the enfeebled constitutions of the phthisical. Of the exciting causes of cases oc-

curring early in life, to infantile convulsions can be attributed the most. The tendency to convulsions in the child is closely associated with the epileptic diathesis, and in many cases accidental convulsions are the commencement of a life-long epilepsy. (Wood.)[4] Infantile convulsions, says Jacobi,[5] dependent upon difficult dentition, are not as frequent as is supposed. Other authorities, among them Sir William Jener, give the opinion that almost all convulsions associated with dentition are really due to irritability of the nervous system, which accompanies the constitutional condition of retarded development, which we call rachitis. Rachitis is a much more prevalent affection than is usually considered in the higher as well as in the lower walks of life, although more frequently seen in the latter.[6] Rachitis is preventable to a certain degree, hence this cause leading to convulsions can be removed. This fact suggests the thought that a considerable number of cases of epilepsy are really within the range of preventable diseases.

Epilepsy is sometimes the result of excessive mental excitement or mental strain. It follows in the train of acute fevers in children; also in infectious diseases, especially syphilis. It may also originate from some reflex cause, such as phimosis, muscular error in eye strain, especially if patient is a young adult, and a tuberculous ancestry, intestinal worms, disturbances of sexual organs and intestines. Traumatism may occasion epilepsy by producing molecular changes in the central nervous system. Occasionally we find cases where the fits are due to imitation. I had such a case some two years ago. A boy aged 19 (neurotic history.) His uncle, an epileptic, lived with the boy's parents. The constant, almost daily, occurrence of fits in this man gave the boy much uneasiness, he thinking he was destined to become an

(4) Nervous Diseases and their Diagnosis. (5) Keating Cyclopedia of the Diseases of Children.

(6) M. J. Lewis, M. D., Cyclopedia of Diseases of Children. Keating.

epileptic. Ultimately he did have several fits, always following those of his uncle, until he became quite depressed, melancholy, and when he came under my care cataleptic symptoms were pronounced. The case eventually resulted in catalepsy when he was free from the association of his uncle. He made a good recovery, and is now well and stronger. Perhaps this case may properly be called contagious epilepsy, such as is related by Dr. Emil Arnson, of St. Petersburg, in May, 1891, number of American Journal of Nervous and Mental Diseases—a case where there were two girls, sisters, servants, of a highly hysterical type. Previous to attack of first girl the sisters had had a violent quarrel, which was followed by a typical epileptic seizure in one of them, the other sister being present and attending during the attack. Several hours later Dr. Arnson was called to see the second girl and found her in a condition identical with that of her sister's seizure in the morning.

Symptoms.—Brown-Sequard gives great importance to the recognition of the prodromata in epilepsy, the frequency of which is much greater than is generally known. The importance of knowing these warnings lies in our ability to otfen abort or mitigate the attack. The warnings of an approaching attack are quiet marked in many cases, consisting of disturbances of character, great irritability being especially noticeable. Mental disturbance, such as melancholia, with fear of impending danger. A state of intense restlessness, followed by a feeling of well-being, elation, etc., I have noticed in several cases. One case, now under observation, becomes quite joyous—sings, etc., almost incessantly until a spasm cuts short his hilarity and changes his condition into one of maniacal furor.

Preceding attacks among the insane we notice hallucinations of sight and hearing and other sensorial disturbances. One of my patients says he hears a noise like a

steam-boat whistle blowing, also at times the sweet notes of a bird singing. Marked aura is experienced by several of my cases; one has a sensation of an ascending flood of warm water. Another, now dead, had spasms commencing in the fingers of the left hand, which continued rapidly up the left arm until it reached his throat, when a sensation of choking was experienced. He was often able to abort the attack by briskly rubbing his arm. Another case has the epigastric aurae, there being intense pain located in the epigastrium, which is followed by slight and frequent attacks of petit mal, and then comes the general convulsions. Psychical aura are frequent. I have seen several cases, one recently, the patient sent for me, saying he was going to die. I found him sitting up in bed afraid to lie down, saying as sure as his head touched the pillow he knew he would die. He was highly excited and begged me to give him something that would sustain life, at least until daylight came. That night he had several hard fits, and in the morning when I again saw him, he was feeling quite well. During the interparoxysmal period he is rational, but preceding an epileptic attack he invariably has the fear of impending danger. Warnings are not given in all cases, some are stricken without the slightest knowledge of an approaching attack.

Frequently I have seen them engaged in amusements or work suddenly fall, seized by a spasm. I was once examining a boy for color blindness, he was selecting the various shades of a color; he had reached for a skein of yarn when he was stricken, he fell to the floor, had a short but severe convulsion and then immediately arose, picked up this very skein of yarn for which he was reaching, and handed it to me, seemingly unconscious of having had the fit.

The paroxysmal period is characteristic in most all cases of true epilepsy, namely, loss of consciousness with more or less muscular spasm. Where the symptoms are few and simple we distinguish it by the name of minor epilepsy or

petit mal. The loss of consciousness in such a case is very brief and the muscular spasm is confined to the face, tongue, throat, eyes and neck. Pallor of the face is sometimes the only manifestation of the disease. If seized while standing the patient does not fall; if in conversation he may stop, appear confused, and then go on with his talk. Predominance of mental implication may prevail, and instead of any marked spasm, the patient may perform some queer act, as for instance run or jump. This perhaps is more marked in epileptic children than in the adult. Kerlin in his paper on "Epileptic change and its appearance among feeble minded children" mentions several such cases. Wood maintains that convulsive symptoms and unconsciousness may both be absent. There is no uniform and regular appearance of the symptoms and results of epilepsy. Hughlings Jackson therefore says there is, scientifically speaking, no entity to be called epilepsy. In the Lumleian Lectures for 1890, he views as epileptic, only those convulsions which arise in the highest exclusively cerebral level—that is the prefrontal lobe, where its highest motor centers are alone affected in true epilepsy. To the other convulsions arising from the Rolandic zone and ganglia of corpus striatum, he gives the name of epileptiform convulsions. We are inclined to believe with Christian that it matters not what muscles may be affected or the extent and intensity of the convulsions, it will not be epilepsy unless at the same time there is loss of consciousness. In grand mal the intensity of the convulsions varies according to the number of centers secondarily affected. In grand mal there may or may not be an aura—patient will fall if standing, and in many cases utter the peculiar epileptic cry. Face becomes intensely pale, pupils dilate, there is conjugate deviation of the eyes. Tonic spasms usually more marked on one side than the other. Respiration is impeded. Cyanosis prevails—jaws firmly set, the tongue may be bitten—fingers firmly flexed and extremities are distorted—Veins of head

and neck stand out like whip cords—carotids throb violently. Tonic spasm then gives way to clonic convulsions, froth tinged with blood oozes through the clenched teeth, muscular vibrations grow less frequent, and end in irregular shock-like jerks. Profuse sweating follows. The contents of rectum and bladder are often voided in this stage, and ejections of semen are occasionally seen in the male.

Clonic spasms last from one-half to two minutes, then follows stupor and stertorous breathing. A gradual return to consciousness is noticed, followed by sleep, which may be from a few minutes to several hours duration. Patients generally feel dazed, have headache, and are decidedly irritable after having had a spasm. The post-paroxysmal period may be marked by psychical changes, such as mania, melancholia or epileptic automatism. Not every form of epilepsy is prone to issue in mental derangement, but it is true that those spasms which are most destructive to mental and sensorial activity are those having the least manifestations of muscular spasm.

Psychical disturbances which are noticed in many cases of epilepsy, sometimes before and sometimes after an attack, vary from slight confusion and obscuring of consciousness to violent hallucinations of all senses; blind reckless fury predominating in these maniacal outbreaks. These attacks may last but a few minutes or several days. Epileptic disturbances are peculiar; I have one case who during the violent outbreak, invariably roughly treats his bible, biting, tearing, and stamping it, saying it says things which are not true. During the inter-paroxysmal period he is an incessant reader of this book. Many epileptics are kleptomaniacs, they steal and hoard up everything they can get hold of. Some three years ago I had an epileptic boy patient who would steal spoons from the table, break off the handles and store them away in a cigar box.

During the inter-paroxysmal period many cases are entirely normal, or the mental faculties are affected but slightly. Bevan Lewis[7] says it is a well recognized fact, that certain forms of epilepsy with frequent fits may last for many years, and the mental faculties remain in the interval between successive seizures perfectly intact. You all, no doubt, can recall such cases in your own practice where your patients have had fits for years with no marked mental impairment. It is most probable that some feebleness of mind will be noticed. A large class of these unfortunate beings have gradual increasing mental aberration, eventually ending in dementia.

None of the insane, unless it is the general paretic, arrive at a more degraded level than the epileptic. A class of epilepsy, named procursive epilepsy, has lately received considerable attention. Bourneville, Ladame and Mairet have given considerable time to the study of this class. The patient does not have an ordinary convulsion, but suddenly runs forward or in a circle. The attacks are brief and are not followed by somnolence or coma. The patient does not fall, as a rule. Ladame says procursive epilepsy may be present for years before merging into ordinary epilepsy; transition from one to the other form may occur. It is not possible to localize the disease anatomically, but no doubt it is of organic cerebral origin. Mairet thinks the organic lesion one of sclerosis, either trophic or hypertrophic. The cerebellum is always affected. I have a male procursive patient under my care whose attacks are characterized first by throwing down his book, then getting up, giving a shrill cry and throwing his hands up, runs forward describing the arc of a circle, then a complete small circle, then again a large arc; when he falls he is slightly somnolent, but soon gets up and resumes his reading. We frequently observe in epileptics the condition called status epilepticus, characterized by a rapid succession of attacks without return of conscious-

(7) Mental Diseases, 1889.

ness during the slight remission. Coma follows; there is absence of reflex except during periods of temporary increase. Continued elevation of temperature, rapid pulse and respiration; temperature ranges from 105 to 107° F., and may continue high even after death. This condition is evidently due to vaso motor paralysis; the heat production still continues while its elimination is inhibited. The researches of Wood, Ott, Radnitz and others have shown the possible existence of a heat centre, which may in status epilepticus become exhausted and the balance of heat forming and heat elimination be disturbed. Rosenthal says it has not yet been proven that this condition could not be due to circulatory changes. Death is due to exhaustion or meningitis.

During the past year I have seen four such cases prove fatal. In one the temperature reached $107\frac{2}{5}$ and remained high for several hours after death.

Epileptics as a rule are religiously inclined, and many spend their time reading the bible, and are otherwise religiously devout. You are, perhaps, aware that the religious history of the world has been influenced by this disease greatly. Mohamedanism owes its popularity and great influence to it.[8] It was epilepsy which held before Mohamed's eyes and made to sound in his ears the hallucination which led him to believe that he had a message from God.

Political history has also been influenced by epilepsy. The career of Napoleon the Great, whose dogged persistence, brute-like cruelty and lack of human justice no doubt had epilepsy for a basis. In reading the history of his memorable campaigns, in which the word impossible never entered, Talleyrand in his memoirs and others speak of his spasms, his madness, his distorted judgment. At the famous battle of Waterloo, during a critical period in its progress, not a word of command or advice could be obtained from him, for he sat mute, somnolent and utterly regardless of his surround-

(8) Blot on the Brain.—*Ireland.*

ings, and it was only by his forcible removal from the battle-field by one of his generals that his life was saved. What would have been the political aspect of Europe to-day had it not been for Napoleon's epilepsy?

Diagnosis.—To find out in all cases whether the patient has epilepsy or not is by means an easy task. In those mild forms attended with complicated symptoms it requires considerable time and observation to render a diagnosis. It is important especially to alienists that this form be recognized. From a medico-legal standpoint it is well to watch closely for those cases of simulated attacks which are rare but yet do occur.

Hystero-epilepsy is differentiated from true epilepsy, first, by a partial retention of consciousness; second, by the violent hysterical manifestions, such as distortion, peculiar changes of position, etc. I have a case of hystero-epilepsy under my care who only has fits in the presence of others, and then has from three to six following in quick succession. He is nervous, excitable, and at times apathetic. True epilepsy is easily and readily recognized by the loss of consciousness and more or less muscular spasm.

Pathology.—Epilepsy is a disease of the brain, but what part of the organ is affected or the nature of the lesion which produces the disease we do not know; there being no permanent lesion there is no definite pathology. Starr regards the gross changes as described by Alexander, Meynert and others as not the direct cause of the disease, and says it is inconsistent with our clinical knowledge of the disease to seek for visible pathological changes. We find grave organic lesions, such as tumors, abscess, meningitis, sclerosis, brain softening, etc., in the post-mortem examinations of epileptics, such lesions having been diagnosed before death, but their connection with the epilepsy being doubtful. They are all capable of producing it. In idiopathic epilepsy there are no pathological changes. Jackson's explanation of such an attack is a

chemical one, being explained as follows: Phosphorous is a striking constituent of nervous matter. It is a triad—in the abnormal nutritive process producing unstable nervous matter the phosphorous is replaced by nitrogen, which is much more explosive, the replacement occurring in different degrees, as evidenced by epilepsy major and minor. The change is a change of quality not quantity.

Brown Sequard asserts that in epilepsy, as in natural sleep, it is beyond doubt that cerebral anaemia is not the cause of the loss of consciousness, but that it is extremely probable that the cessation of the activity of the brain in sleep, either hypnotic or normal, in petit mal, in a well-developed epileptic convulsion, certain cases of syncope in asphyxia and in poisoning depends upon an inhibitory action upon the base of the encephalon and cervical marrow without the quantity of blood being diminished in the brain. He has shown this inhibitory action by experiment upon dogs and other mammals.[9]

Prognosis.—Inherited epilepsy is rarely if ever cured. The longer the disease has lasted the greater improbability of its recovery. When the attacks can be directly traced to peripheral irritation, and this can be removed, the case is more hopeful. Mental impairment indicates permanency of the disease. Epilepsy itself is a rare cause of death.

Treatment.—All we can do generally in the treatment of this disease is to render less frequent and less severe the attacks. The removal of peripheral irritation, as before stated, makes the case more hopeful, but statistics are not encouraging as to complete recovery, probably due to the establishment of the epileptic habit, which is due to the adjacent brain centers having become irritable and unstable.

Where focal epilepsy exists and operation is undertaken, the complete excision of the focal irritation is important, but even this may not cause cessation of the fits, for in these

(9) Archives de Physiologie, January, 1891.

cases also the epileptiform habit may have become established. The correction of eye strain as a source of peripheral irritation has received considerable attention from Ranney, Stevens and others with more or less success. In gynecological practice, removal of ovaries has been done for the same reason. I have a case in mind where ovariotomy was performed, with cessation of fits following, as is the result after almost any surgical operation, but in due time the fits recurred with increased frequency and severity. Our treatment must be a general one, hygienic and dietary, with much attention to having the digestion good and bowels regular. Regarding hygienic care, it is advisable to give them as much open air exercise as possible, and if children, allow them to play and enjoy themselves. While engaged in play or in attendance upon an amusement, epileptic children rarely if ever have an attack. The diet of epileptics should be nutritious but not too stimulating. Epileptics should as far as possible be free from care and responsibility.

Medically, every form of drug in therapeutics has been used at one time or another. Now, however, we have learned that the most successful anti-epileptic drug is that which gives steadiness to the nervous system by lessening its activity, and so diminishing the tendency to give forth discharges of high tension. The bromide answers such a need better than any other drug. Fothergill says they have changed the entire aspect of epilepsy. The bromide of potassium is most used, but other preparations are highly serviceable, especially bromide of sodium in cases subject to digestive disturbances, the bromide of camphor in associated vertigo. For general usage, the bromide of potassium is the best preparation. It may be given for years without any serious effects. The only contra-indications being pulmonary tuberculosis, severe cutaneous lesions or grave disturbances of nutrition.

Involvement of intelligence or emaciation are not indications for its withdrawal.[10] Because of its transient influence it should be given often; that is, at least three times a day. In children it is well to commence with five grains and increase gradually until sufficient is being given to control the paroxysms. It is well to bear in mind the fact that if small doses have no effect larger ones will be of no avail, and bromism may result. Seguin recommends that we should aim to keep the patient at the point of bromism, avoiding toxic effects. I am not an advocate of this method, for when we give enough of the bromide to control spasm, that is all that is necessary, and why should we saturate the patient with the drug when it is not necessary.

I have had fair success with biborate of soda in the treatment of a number of cases of epilepsy, where bromide of potassium has failed. One case, who formerly had from one to six severe convulsions a day, followed by homicidal tendencies, has by the use of biborate of soda improved greatly. He has not had a spasm for six months. He receives thirty grains three times a day. Another case, a boy aged 13, with nocturnal spasms, has on ten grains three times a day, gained greatly physically, and has not had a spasm for over a month. In several cases I have had to discontinue the use of this drug owing to its producing gastric disturbances, nausea and vomiting, and in one case decided vertigo. Emaciation spoken of by Risien and Russel resulted in the first case mentioned; but when I combined syr. hypophosphites he rapidly regained flesh and is now as heavy as before. Stewart recommends combination of bromide of potassium with biborate of soda when nocturnal and diurnal spasms occur; the biborate of soda being peculiarly adapted to nocturnal spasms. Where migraine is associated I combine Cannabis Indica with the anti-epileptic remedy. Where heart lesion or feebleness of circulation, give digitalis. If tonic treatment is in-

(10) Medical Record, Jan., 1890.

dicated, which is in almost every case, iron, cod liver oil, hypophosphites, etc., should be given. To arrest paroxysms inhalation of chloroform or amyl nitrate should be used. And in the condition of status epilepticus chloral hydrate per rectum, in doses of not less than forty grains, is indicated. Antipyrine, antifebrine, nitro-glycerine and numerous other remedies have been tried alone or associated with the bromides. None however have given much satisfaction except in special cases, when some of them have by some unexplained manner had almost specific action. I recall one case treated wholly for several months with the Elix-Pyrophosphate of Iron. Where acne results it is well to combine arsenic with the bromides. In cases of syphilitic origin the anti-syphilitic treatment should be pushed. Epilepsy due to hereditary syphilis is oftentimes worse when such treatment is pursued. I had such a case and I finally was compelled to discontinue the use of iodide of potassium and other treatment because the healing up of the ulcers always caused increased spasms. He had to have a vent, so to speak, for the elimination of syphilitic poison. In traumatic epilepsy trephining is justifiable and recommended in all cases. The operation as now performed is free from danger, and the patient should at least have the chance for recovery which it may give. It should be done early and before organic changes and the epileptic habit are established. Carious teeth in epileptics should be removed. The observations of Brubaker[11] show that they are the source of irritation in many cases.

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(11) Therapeutic Gazette, January, 1888.