PART II.—REVIEWS.

Epilepsy, its symptoms, treatment, and relation to other Convulsive Diseases. By J. Russell Reynolds, M. D. Lond., &c., &c. pp. 360. London: Churchill, 1862.

Dr. Russell Reynolds has already given to the profession several valuable contributions in connection with diseases of the nervous system. In the work the title of which is given above he confines himself to the subject of epilepsy, and its relations to convulsive diseases generally, but more especially to convulsions of chronic character. Although his work relates to simple epilepsy, which is not so often met with in lunatic asylums, it is not the less valuable on that account, but rather the contrary. It will at once strike many of the habitual readers of this Journal that the cases described differ notably from those met with in the asylum. The one set of cases may throw a light on the other by their very contrast, and on this account the book will be of the greater value to our own specialty. In the following sketch of its contents, selection will be made chiefly from those portions of the author's treatise which have the above tendency, but it must be stated *in limine* that there is no part which does not deserve a careful study, and the whole, for the records of facts alone, will be of great value as a work of reference on the subject. All that can be attempted here is to give an outline map of the regions explored. This may give a general idea of the whole work, but those who would profit fully by Dr. Reynolds's researches should read the work for themselves.

"Disease," Dr. Reynolds remarks, "is the sum total of modifications of function and structure present at a given time; the measure of disease is the degree in which it hinders a man from performing any or all of the functions of manhood. The importance of any given disease is in direct relation to that of the kind of activity which it limits or prevents. The classification of disease is unsatisfactory more or less with regard to all diseases, but especially with nervous diseases. The three elements on which classification is based are organ, function, nature of morbid change. In the author's work, 'On Diagnosis of Diseases of the Brain and Spinal Cord,' &c. p. 48, he has given the reasons for preferring the classification of diseases into groups approaching more nearly to a natural system."

"Chronic convulsive diseases are a very definitive group; they are, with few exceptions, readily recognised as such; and I propose

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in the following work to treat of them all, pointing out wherein they differ and wherein they agree, and advancing, by the discovery of the conditions upon which they depend, to a knowledge of the treatment which is appropriate to each."

Vital actions, he proceeds to observe, are dependent upon or are correlated with some physical change in the living organism, though the process may be too fine for our instruments of research. Some symptoms of disease are modified vital actions, others are physical or chemical. The vital are of two kinds, negative or positive. The negative consist in the negation of the vital property, as paralysis, anæsthesia, and depend on some rough or coarser lesion, as the pressure of a tumour. The positive consist in the excess or alteration of the vital properties, and are dependent on interstitial change, as spasm, pain, convulsion, and the like.

"It is no objection to this general proposition that frequently, post mortem, we can discover no organic change in the brain or spinal cord, for convulsions belong to the secondary category of symptoms, and depend on modifications of nutrition.

"We may find a tumour in the brain, or tubercular deposit in its meninges; we may find disease of the kidneys, or such general derangement of the organs as scrofula or rickets can produce; but wherever we may find these easily discovered physical changes they are not the immediate causes of convulsion, for convulsion is a modified vital act of muscularity and nervous force, and its proximate cause is in the nutritive condition of the nervous centres."

The following corollary gives dogmatically the physiological and pathological basis on which the author proceeds to discuss this part of his subject—

(1) Convulsions are modifications of vital actions, and (2) depend on nutrition-changes in the nervous centres; (3) the immediate and proximate cause of convulsion is the same when the convulsion is the same; (4) the proximate cause is an abnormal *increase* in the nutrition-changes of the nervous centres; (5) the remote causes are such as induce an abnormal increase in the nutrition-changes.

These remote causes it is the object of diagnosis to discover, and their removal the aim of the treatment.

A.—The nutrition-change may be idiopathic or primary, a *morbus per se*, the sole deviation from healthy structure being the change in question. Dr. Reynolds argues that this conclusion is warrantable from experience and the admitted laws of pathology. It may be congenital or arise from conditions operating after birth. The sole deviation from healthy structure being the intimate nutrition-change, the tendency to which is innate or acquired; the only variation from normal function, the convulsion. There is no greater difficulty in understanding this condition, he argues, than in comprehending a tubercular or a carcinomatous diathesis.

"For, prior to the development of either tubercle or cancer as a deposit or growth, we assume the existence of a tendency which will eventually reveal itself; and this is all that we assume with regard to convulsion."

"Further, there is nothing in the nature of convulsive phenomena which, *per se*, necessitates the supposition of anything beyond a mere modification of the ordinary healthy processes; in other words, there is nothing for which these processes will not account. There is muscular contraction on the one hand, and loss of consciousness on the other; but that these are quite compatible with healthy structure is shown by their forming part of the daily life-processes of all."

B.—The nutrition-change may be secondary to other changes in the organism, and be the result of such condition. Dr. Reynolds considers that such cases should be included in one general group of eccentric convulsions. The rationale of eccentric convulsion he gives in the following words. In obedience to an impulse from without, the centripetal nerve affects *a change in the nutrition* of the centre, or of that organ which is common to it and to a motor nerve.

Eccentric convulsions may occur in three ways:

"There are, then, different combinations which may be placed in the same general category of eccentric convulsions:—1st. Those in whom the organic condition, which is the immediate cause of convulsions, may be, without special predisposition on the part of the individual, induced suddenly by an eccentric irritation. 2nd. Those in whom that condition is produced by the joint operation of a pre-existing organic tendency and an external disturbance. And 3rd. Those in whom the organic condition is, without special proclivity to disturbance in the individual constitution, gradually brought about by the prolonged influence of an eccentric irritant."

C.—The nutrition-change may be general, and be a part of a systemic or morbid tendency, the nervous centres being involved with the other organs and tissues. Dr. Reynolds tabulates this class of causes thus:

"Diathetic, or cachectic convulsions; from—

"General nutrition-changes:

"Healthy in kind, but morbid in degree; puberty, &c.

"Morbid in kind and degree; tuberculosis, scrofulosis.

"Toxæmiæ, arising from—

"Retained excreta; urinæmic convulsions, 'renal epilepsy.'

"Metamorphosed plasma; pneumonic convulsions, rheumatic, &c.

"Poison introduced from without; 'syphilitic epilepsy,' lead, variola, &c."

"When convulsions occur in a well-marked instance of any one

of the cachexiæ, it may be that they are primary, or idiopathic; it may be that they are secondary, or dependent on eccentric irritation; and further, they may be symptomatic, or produced by the irritation of the nervous centres, as in tubercular meningitis. But over and above these three modes of production, there are numerous cases which require another explanation: viz., this, that the convulsions are the direct expression of the cachexia which is present; the nervous centres being involved in that general nutrition-change which is the essential element of the cachexia itself."

D.—The fourth group of convulsive diseases Dr. Reynolds calls convulsions from centric disease. An intra-cranial tumour, or any other structural change, may set up that peculiar interstitial or molecular change which is the immediate cause of the convulsion; the tumour, or some other cerebral lesion, being the remote, not the proximate, cause of the convulsion; these causes, then, act eccentrically, though situated centrically in an anatomical point of view.

Such is a general review of the causes of chronic convulsion.

"In this volume," writes Dr. Reynolds, "I propose treating only of epilepsy proper, viz., of that form of idiopathic convulsions to which I believe alone this name of epilepsy ought to be applied." In confining himself to the one section of the list of convulsive diseases, or to that which he calls epilepsy proper, the question naturally arises how such are to be distinguished and separated from the rest. This the author gives in the following words from his preface:

"I have analysed eighty-eight cases of simple and idiopathic epilepsy, this being the number of examples of that disease with regard to which I have been able to record accurate information. In them I could trace no evidence of any other affection, and to them I could apply no other name than epilepsy."

It is, then, by the process of exclusion by which the separation is to be made, and it must depend, therefore, somewhat on the amount of acumen brought to bear on the phenomena where these boundary lines are to be fixed.

"Epilepsy," says Dr. Reynolds, p. 30, "cannot be defined by any anatomical change, for no structural condition has been hitherto found with sufficient frequency to be regarded as an essential element with production." Nor can it be "defined by one symptom which is peculiar to it, and pathognomonic of its presence."

In the absence of positive, we must be content with negative, knowledge. The author, who is next occupied by a definition for the disease, for the above reason, probably, finds some difficulty in arriving at a formula which will accurately include all the phenomena. His failure satisfactorily to accomplish what he seeks is a proof of the difficulty which besets the questions. He writes:

"Epilepsy may, then, be defined to be *a chronic disease characterised by the occasional and temporary existence of loss of consciousness, with or without evident muscular contraction.*"

The italics are the author's. He will excuse the remark that, with respect to the latter part of the phrase, surely as much may be predicated of anything—of this book; and the definition becomes reduced to "an occasional and temporary loss of consciousness." But, after all, descriptions are more satisfactory than what are termed definitions, and the following is such, and follows the above quotation:

"Epilepsy should be regarded as an idiopathic disease, *i. e.* as a *morbus per se*, distinct from eccentric convulsions, from toxæmic spasms, from the convulsions attendant upon organic lesion of the cerebro-spinal centre, and, in fact, from every other known and appreciable malady."

The cases of epilepsy and epileptiform diseases met with in asylums belong, in much the larger proportion, to the class of symptomatic convulsions from brain disease, &c. But a few only are of the description which forms the subject of Dr. Reynolds's subsequent pages.

"Hasse has, I think," Dr. Reynolds writes, "stated very correctly the relation which central lesions occupy to the disease in question, viz.:—'Es ist also ein Irrthum, das Wesen der Epilepsie in einer gröberen Läsion des Gehirns und seiner Umgebungen zu suchen, eine solche, wenn sie vorhanden ist, wirkt als zufälliges Moment, indem sie, natürlich weit häufiger als entferntere Läsionen jene feinere Veränderung der Hirnsubstanz hierbeiführt, welche der Epilepsie wesentlich zum Grunde liegt.'

"M. Sandras appears to be equally correct when he speaks of central lesions as 'la cause prédisposante de l'état épileptique du cerveau.'"

Dr. Reynolds devotes eighty pages to a critical examination, by the numerical method, of the symptoms of epilepsy proper, dividing them into the paroxysmal and interparoxysmal.

Epileptic patients sent to asylums are selected on account of the existence of mental symptoms; it will be, therefore, especially interesting to know the proportion of epileptic thus affected. Probably imbecility, which is equivalent to incapacity of earning a livelihood or of taking care of themselves, is the proximate cause for the transmission of the epileptic person to a lunatic asylum. Dr. Reynolds found that the memory was normal, or affected only immediately after the fits, in 43 per cent. of his cases, and more or less defective in 56 per cent., but only to a great degree in one sixth of the whole. Apprehension was normal in 62 per cent., defective in 37 per cent. The general conclusions are thus summed up:

"*Conclusions.*—1st. That epilepsy does not necessarily involve any mental change.

"2nd. That considerable intellectual impairment exists in some cases; but that it is the exception, and not the rule.

"3rd. That women suffer more frequently and more severely than men.

"4th. That the commonest failure is loss of memory, and that this, if regarded in all degrees, is more frequent than integrity of that faculty.

"5th. That apprehension is more often found preserved than injured.

"6th. That ulterior mental changes are rare.

"7th. That depression of spirits and timidity are common in the male sex, but not in the female; that excitability of temper is found in both."

Probably, therefore, not more than about 16 per cent. of the whole number of epileptics would be deemed objects for a lunatic asylum, and of these only a twentieth would be paupers. This will afford some notion of the prevalence of epilepsy.

For a detailed examination of all the symptoms the space will not suffice; and this part of the work, which is much occupied by figures, will not admit of any epitomising, but requires a careful examination and study.

We pass to what the author has to say on what he terms the natural history of the disease; or, (1) its prevalence, which has been a little anticipated; (2) its etiology; and (3) the relation between its symptoms, and (4) the mental condition of epileptics, in its several relations. His general conclusions on these points will be read with much interest, and especially that the presence or absence of intellectual failure he found to be independent of hereditary predisposition to the disease, of the age at which it commenced, or the sex; and, lastly, that the duration of epilepsy *per se* is without influence upon the mental condition of epileptics (p. 173). The above is contrary to the generally received notions and the opinion of Esquirol, from whom we have so many of our current notions on the disease in general. The chapter, however, requires to be studied, and the full force of the words "*per se*" must not be lost sight of.

"The general conclusion, therefore, in regard of age at commencement and the duration of the disease, is of much interest in relation to the mental condition of epileptics; for, while on the one hand neither age *per se*, nor duration *per se*, can be shown to determine the presence of intellectual failure, or the degree to which that deterioration may be carried, there is, on the other hand, evidence to show that an early commencement of the disease lessens the probability of mental incapacity, both as regards the fact of its occurrence at all, and also the rapidity with which it will be brought about. A

late commencement of the disease, on the contrary, is more likely, not only to entail intellectual failure, but to develop that condition speedily."

The next question which Dr. Reynolds discusses is whether the presence or absence of motorial phenomena exerts any influence on the mental condition of the epileptic; and he concludes, from the analysis of his cases, that the influence either way is very trifling, but that motorial phenomena are not unfavorable, but rather the reverse, to the mental condition. He also finds the mind is not influenced by the state of the general health of the patient nor by the number of attacks, but that the frequency of the epileptic fits is one condition which favours the mental failure. And with respect to the severity of the attack, his evidence is not sufficient to determine its influence. The author next examines the kind of the seizure and occurrence of the "*petit mal*," the general *résumé* of which is in the following words:

"That neither one of the following elements—kind of attack, frequency of either form, rate of frequency, nor duration in years—is, either by itself or in combination with the other elements mentioned, sufficient to determine the mental condition of the patient; for the two cases agreed precisely in all these respects, and yet in the one there was no trace of mental deterioration discoverable, whilst in the other the failure had been carried to the worst degree.

"Again, we learn also that such a high rate of frequency as eleven hundred attacks in the year may exist for seventeen years without producing intellectual change, whereas so low a rate as seventy-two in the year may damage the mental condition most seriously, and that in five years."

Lastly, Dr. Reynolds concludes that the failure of intellect of the epileptic bears no relation to the circumstance of the disease having arisen through "psychical disturbance."

We pass now to the author's views on the pathology.

"Pathological anatomy has shown three things:—1. That there is scarcely any morbid condition which may not be found sometimes in the bodies of epileptics. 2. That no structural change is constantly found at all periods of the disease. 3. That some lesions are of more common occurrence than others. While this method, therefore, fails to demonstrate the seat of the disease, it furnishes proof that many lesions have no causal relation to its phenomena, and it affords presumptive evidence that other changes may be most duly regarded as its effects."

The method which Dr. Reynolds considers has been more productive of results is the deductive. He gives a cursory survey of the opinions advanced on the theory of genesis of epilepsy by Georget, Prochaska, Marshall Hall, and finishes his remarks by these words:—"Schroeder van der Kolk has gone still further, and has argued with

great force, 'that the starting-point of the various convulsive movements in epilepsy must be sought in the medulla oblongata.'

"To this conclusion the mind has been conducted by a series of eliminations carried on by the accumulation of physiological facts and principles. The two essential elements of a convulsive paroxysm being involuntary muscular contraction and loss of consciousness, some organ has been sought whence changes common to the two classes of phenomena should originate. The researches of Marshall Hall proved that convulsive movements were due, not to the cerebrum, but to the spinal centre; Weber demonstrated that, while galvanization of the spinal cord produced tetanic spasms, a similar irritation of the medulla oblongata induced spasmodic phenomena in a clonic form; and Dr. Todd showed that epileptiform convulsions arose from galvanization of the mesocephalon and tubercula quadrigemina. These results have all been confirmed by Dr. Brown-Séquard, who has shown that epileptiform convulsions occurred in his guinea-pigs after removal of all the encephalon except the pons Varolii and medulla oblongata. Similar results have been obtained by Kussmaul and Tenner."

The two phenomena, loss of consciousness and convulsion, being the condition or state produced, and the medulla oblongata the organ through which they are produced, the question arises, what is the immediate operating cause? Dr. Reynolds argues that the former phenomenon, loss of consciousness, is a simple negative or arrest of function of the brain proper, as proved by the fact that the same effect results from the removal of the cerebral hemispheres, and that the latter phenomenon, the convulsion, can be artificially induced by direct action exerted on the medulla or upper part of the spinal axis; that the effect, the phenomena produced, is not one of structural but merely functional kind, and the whole a modification of normal action. That the change in the medulla or cerebral hemisphere is not an alteration of structure, is shown by the condition of the patient in the interparoxysmal period, who, in many cases, presents no deviation from health or healthy function.

The phenomena do not differ from normal function in kind, but in degree only. Is the alteration through the effect of increased or diminished action of the organ involved?

"If there is such a thing as 'action' on the part of the medulla oblongata or the spinal cord, the facts appear to me to warrant no other conclusion than that, during the onset of the epileptic paroxysms there is 'over-action' of these centres, and that such over-action is their proximate cause."

The author points out that there may be two conditions which may conduce to the same end and produce increase of action. The impressionability of the organ acted upon may be increased, or the excitant may be in excess, the former of which Dr. Reynolds

believes to be the state in epilepsy, and he quotes the authority of Dr. Brown-Séquard, who agrees with him in this respect.

"The nature of the morbid change in epileptics is an exaggeration in degree of the functional activity of the medulla oblongata and upper part of the spinal axis."

But how is this over-action brought about? In the first place, Dr. Reynolds believes that the condition may be idiopathic—a *morbus per se*.

"Increased activity of the reflective centre may then exist by itself, be developed primarily, just as a similar kind of change may occur in other organs; and this in consequence of hereditary predisposition, congenital disposition, or subsequent morbid change. There is no reason why the organ at fault in this malady should not change primarily as well as any other organ, or as well as the whole congeries of organs which constitute the body. Deviation from health must commence somewhere, and in true epilepsy there is defect of evidence to show that it has commenced, or even after many years exists, elsewhere than in the part referred to."

The disease may be transmitted hereditarily. "It may be the result of intense (functional) disturbance from violent external impression." This may be mental or bodily. It may be induced by a general cachectic condition, affecting the medulla with the rest of the body; or the nervous centres may be affected by the above changes, which involve the whole organism; or, though not morbid in kind, as dentition, puberty, and pregnancy—

"Augmented activity in the nutritive processes of the medulla oblongata and spinalis is the prime and essential fact in epilepsy; it needs the addition of but an 'exciting cause' to set in motion the whole train of phenomena which constitute the attack."

"The last mode in which the medulla oblongata and the upper part of the spinal axis may become so affected as to produce epilepsy is by the operation of morbid, accidental, or experimental lesion in some portion of the nervous system. That cerebral or spinal tumour, chronic inflammation of the meninges, softening of the brain, neuromata, &c., &c., might occasion convulsions of epileptiform character, has long been known; but it has been frequently urged in this work that these cases are to be distinguished, in the majority of instances, from true epilepsy. Their clinical history differs either altogether, except in the mere existence and general form of the attack; or in part, there being, perhaps, true epilepsy, but, over and above this, the phenomena of structural disease."

"But lesions may be found outside the centre of reflection, and yet within the nervous centres, such as tumours within the cranium, &c. When so situated, they may induce epileptiform seizures in one of two modes: either by their irritant effect upon afferent nerves, such as those in the meninges; or by the extension of vascular

activity from them, as its centre, into the contiguous medulla oblongata."

There is another fact, which is an important circumstance in this disease, and, indeed, in the phenomena of the causation of all diseases, and which does not appear yet ever to have been brought out so fully or placed so high in the rank of operating causes as it deserves to be, viz., the reaction that occurs often between cause and effect, and which may be illustrated in various ways; for instance, thus a person becomes lame from a fall, and, being lame, he is liable to other falls; so the fall produces the lameness, and lameness falls. A person gets an attack of bronchitis, which produces an irritative cough; the cough increases the irritation in the bronchus.

"Of great interest," says Dr. Reynolds, "is the further fact established by Brown-Séquard, viz., that with the change in the centre parts there is also an alteration in the condition of some centripetal nerves, or of their peripheric expansion. The paroxysms are induced by irritation of the latter, and sometimes cured by its cauterization." "And Van der Kolk suggests what is probably the true relation of these groups of phenomena, viz., that the constant nervous irritation," caused by mechanical peripheral injuries "gradually affects in the same manner the medulla oblongata." Again, at p. 154, Dr. Reynolds writes—

"The nine cases placed in the list were illustrations of confirmed epilepsy, the attacks having been first occasioned, and subsequently reproduced, by eccentric irritation; or, such having been the case at one period of their history, the attacks at a later period occurred without any demonstrable eccentric irritation."

The next division of Dr. Reynolds's work is on the relation of the several symptoms of the disease to the primary cause, or primary fact, which he examines in detail. The chapter of the diagnosis follows, of which it can be only here said that it deserves attentive study. The author appends a copious bibliography, and the value of the book is greatly enhanced by an admirable table of contents and index, the former of which alone is a valuable survey of the whole subject.

We have extended this review to some length, but not to greater than the importance of the subject, but especially the learning and ability displayed in the author's work, demands. The analysis may, it is hoped, afford a general view of the author's opinions; but the detail and filling in of the picture should be examined in the book itself by every one having epileptic patients under his charge.

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