and palate; or again mild Parkinsonian signs or involuntary movements, such as tremor or facial tic, may be seen.

Recognition of this group of cases is important, not only from the point of view of the symptomatology of the disease as a whole, but also for their differentiation from psychogenic disorders, with which they are frequently confounded. In the literature occasional reference has been made to this clinical form of encephalitis lethargica as a " myasthenic " variety of the disease—a term which, in my opinion, should not be used; for between it and myasthenia gravis there are many essential clinical distinctions and complete pathological divergence.

The gaps in this brief outline of the clinical features of chronic encephalitis lethargica will be filled in by subsequent speakers. Our knowledge of the symptomatology of the disease, if yet imperfect, is steadily growing, but it must be admitted that in regard to prognosis and treatment we are at present profoundly ignorant. With nine years' experience now behind us, and a wealth of material at our disposal, much could be done by systematic investigation, especially at large hospitals, to throw more light on the nature of the disease in its various manifestations.

References.—(1) Babinski and Klebs, *Soc. de Neur.*, July 6th, 1922.—(2) Buzzard and Greenfield, *Brain*, 1919, xliii, p. 305.—(3) Duncan, *ibid.*, 1924, xlvii, p. 76.—(4) Froment and Delore, *Rev. Neur.*, No. 1, January, 1926.—(5) Lévy, *Les Manifestations Tradives de L'Encéphalite Épidémique*, Paris, Gaston Doin.—(6) Turner and Critchley, *Brain*, 1925, xlviii, p. 72.—(7) Wimmer, *Chronic Epidemic Encephalitis*, London, Heinemann.

(For discussion, *vide* p. 737.)

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*The Mental Aspects of Epidemic Encephalitis.** By Robert Macnab Marshall, M.D.Glasg., Assistant Physician, Victoria Infirmary, Glasgow.

My view of the nature of this disease coincides with that of Dr. Mackenzie. The disease encephalitis lethargica may be defined as an infection the toxic products of which have an affinity for the grey matter of the central nervous system, and so give rise to any of the syndromes of disease of that tissue or to any combination of such syndromes, and which runs a fickle course that may end in recovery, death, or the production of characteristic sequelæ.

In seeking to make a helpful contribution to a discussion of this protean disease it seems best not to try to give an epitome of the

* Being one of the opening papers of a discussion at the Annual Meeting held at Edinburgh, July 21, 1927 (conjointly with the Sections of Mental Diseases and Neurology of the British Medical Association meeting).

disease, but to choose certain topics suitable for discussion. It is proposed, therefore, in what follows to deal briefly with the following points:

(1) The clinical importance of the course that the disease runs.
(2) The incidence of the characteristic sequelæ of the disease.
(3) The mental state of the restless, naughty child.
(4) The clinical affinities of the Parkinsonian syndrome.

(1) *The Clinical Importance of the Course that Encephalitis runs.*

The chief end of the clinician's work on this disease appears to be to cut out of its protean manifestations various types, and to arrange them in a scheme of classification. Little or no success, however, has attended his efforts in this direction. Of the many schemes of classification of the clinical varieties of epidemic encephalitis that have been drawn up in almost every European tongue, no one has met, or is likely to meet, with general acceptation. This general failure to make good in their taxonomic labours has been attributed by the clinicians themselves to the way in which well-defined types of nervous disorder succeed each other in the course of the disease. It is not uncommon, they have pointed out, to see epidemic encephalitis begin as a neuralgia, and then pass through a series of states akin to chorea, lethargy and acute mental confusion, each succeeding state blending with its neighbours in a way that eludes their powers of definition. But this failure to define clear-cut types of the disease is hardly a matter for regret, for while the fickle course that the disease runs may render the work of the taxonomist impossible, it is, in itself, a most valuable subject of clinical study. In this respect its chief value lies in the fact that a study of the course that the disease runs clinically brings the observer into touch with the morbid process responsible for the production of the clinical types that are the taxonomist's preoccupation. In so far as the clinical varieties that the taxonomist defines are static, there is nothing specific about them. There is nothing specific, for example, about the ophthalmoplegia of epidemic encephalitis, even although paralysis of accommodation is commonly met with in that condition. It only regains its specific character when it is reviewed in the light of its clinical history, and demonstrated to be an incident in the course of the disease that runs a kaleidoscopic course.

While an epidemic of encephalitis lethargica is raging, the diagnosis in the great majority of cases offers no real difficulty. It is another matter, however, when it is a question of recognizing a sporadic case of the disease. In these circumstances the difficulties

of a differential diagnosis between epidemic encephalitis and the other forms of non-purulent encephalitis may be insurmountable. The same remark applies to the difficulties that arise on meeting an unusual form of chorea, ophthalmoplegia, or lethargy. In all these instances, however, the fact that the condition has occurred in the progress of a malady that has run a fickle course, in which divers symptoms of nervous disease have put in an evanescent appearance, goes a long way to establish the nature of the disease process at work.

(2) *The Incidence of the Sequelæ in Encephalitis Lethargica.*

It is usual for an interval to elapse between the subsidence of a disease and the appearance of its sequelæ. This is far from being the rule, however, in epidemic encephalitis. Not infrequently it happens that a syndrome that has played a more or less prominent part in the acute phase of the disease persists after this phase has apparently subsided. Tics, disorders of the respiratory rhythm and psychomotor excitement frequently behave in this way. Although it is usual for an interval of anything up to four years to elapse before the appearance of the Parkinsonian syndrome, it also may follow hard upon, if not actually arise out of, the acute phase of the disease. On the strength of these considerations the appropriateness of the term "sequelæ" for such manifestations of epidemic encephalitis has been called in question, and the term "residua" used in place of it. But the facts of the case are not so unique as to warrant this change in terminology. Scarlatinal nephritis is commonly regarded as a sequela of scarlet fever because an interval of a fortnight elapses between the subsidence of the fever and the appearance of the nephritis. But nephritis may also appear as a symptom of scarlet fever, and persist after the fever has subsided; yet no one has ever suggested on that account that scarlatinal nephritis should not be spoken of as a sequela of scarlet fever. The term "residua" may play quite a useful *rôle* as a label for the nervous syndromes that arise out of the acute phase of epidemic encephalitis, and follow a subacute or chronic course of their own, but it can never displace the term "sequelæ" for those syndromes which appear some time after the subsidence of the acute phase of the disease.

Age appears to play an important part in the incidence of the residua and sequelæ of epidemic encephalitis. Psychomotor excitement, with or without nocturnal wakefulness and somnolence by day, tics, choreiform movements, and disorders of the respiratory rhythm, show a preference for the early years of life. On the

other hand, the Parkinsonian syndrome, the well-defined states of mental disorder—mania, melancholia and confusion—and the residual paralyses are the appanages of youth and adult life.

Sex does not appear to influence the incidence of the sequelæ; but there is some evidence to show that, although pregnancy does not play the part it was at one time thought to do in modifying the course of epidemic encephalitis in women, it influences the incidence of the Parkinsonian syndrome.

An attempt has been made to show that the severity of the acute attack influences the incidence of the sequelæ. This is largely the work of observers who have been in a position to follow the after-history of patients whom they have treated during the acute phase. It is, however, a very common experience in a neurological clinic or in a mental clinic for school-children, to be unable to get a history of an acute attack of the disease in patients who show the sequelæ of the disease in their most characteristic forms. This fact has led many observers to connect the incidence of the sequelæ with the way in which the acute illness and the convalescence have been managed. These observers hold that the great desideratum is rest to the mind and body, and advocate six months of this for mild cases, and a year for severe cases.

There is much evidence to show that the nature of the sequelæ vary from epidemic to epidemic. Thus the Parkinsonian syndrome was a common sequela of the 1919 epidemic, and was practically unknown in that of 1918. On the other hand, psychomotor restlessness with nocturnal wakefulness was a common sequela of the epidemic of 1920–21, and athetoid movements of the epidemic of 1923–24.

(3) *The Mental State of the Restless, Naughty Child.*

A great deal of attention has been paid to the restless, naughty child because of the social and educational problems that he raises, and much that has been written about him is wide of the mark. The moral aspect of his behaviour has been emphasized, naturally enough, as it is his apparent disregard of all moral considerations that makes him impossible at home, at school, or in the sick ward; and many have professed to see in this an absence, a numbing, or a perversion of his moral sense. Strangely enough, very little has been said about the *maniacal* character of his misbehaviour, although it has more affinity with that of the maniac than with that of the delinquent, hebephrenic, or that *rara avis*, the moral imbecile. There is nothing cunning or underhand about the misdemeanours of the restless, naughty child. Unlike the delinquent, he does not

choose a convenient season in which to commit his misdeeds; he carries them out in the public eye. He acts on the spur of the moment, and his offences are quite devoid of *malice prepense.* On the other hand, he does not show the stolidity of the hebephrenic or the moral imbecile. He is accessible to an appeal to his better self and is not insensible to correction. Most of the outrageous incidents in which he figures arise from injudicious handling. He commits some venial offence. Everything turns on the way in which he is corrected. If he is taken the right way the matter ends in tears, but if his anger or resentment are aroused he throws the first thing that comes to his hand at the head of his censor, or indulges in all sorts of threats or abuse of him. But whichever mental state is aroused is of short duration and soon gives place to another. In short there is any amount of instability, but little or no evidence of moral depravity, in the misbehaviour of the restless, naughty child.

If the mental state of these children be looked at as a whole, the instability that is so striking a feature of their misbehaviour is seen to be confined to no particular faculty of their minds. All their mental processes are unduly mutable. Their ideas, their moods, and the impulses of their wills are all easily induced, and, failing to develop properly, are readily supplanted by others. In consequence of this these children become the slaves of their environment. They no longer behave according to the principles instilled into them by their upbringing, but obey the whim of the moment. They become pert and forward, inclined to talk to whomever they meet, and to handle whatever catches their eye. Incidental and non-essential ideas, aroused by habit of speech or similarity of sound, break into their talk, giving it a smack of precocity. On the other hand, their restlessness is far from aimless; it is really a press of occupation. They are always busy about something, and so long as their activities can be confined to useful channels they work well under supervision.

I consider that the "naughty, restless child" is suffering from psychomotor excitement, and it is similar to that which may occur in the course of an attack of mania of the manic-depressive type.

What the psychologist calls *general intelligence* is not affected by the disorder to any appreciable extent. The recognized mental tests show that the apparent precocity of the restless, naughty child is not accompanied by a high intelligence quotient. On the other hand, it is quite exceptional for one of these children to have an intelligence quotient below 85. Nothing in the nature of a secondary dementia is ever seen, even when the disorder has lasted so long as nine years. All that may be said about them is that

their mental powers do not mature. They are a sort of "Peter Pan"—they never grow up.

(4) *The Clinical Affinities of the Parkinsonian Syndrome.*

This sequela of epidemic encephalitis derives its name from the resemblance it bears to paralysis agitans. Although at the first glance the resemblance appears a close one, it does not stand detailed examination. Even where an undoubted similarity exists between the two conditions there are important points of difference. There is, for example, no doubt about the strong family resemblance between the facies of Parkinsonism and Parkinson's mask, but the former shows none of the deep furrowing of the brow that is so prominent a feature of the latter. Again, there is much in common between the posture and gait that the patients manifest in the two conditions, but the localized distribution of the muscular spasm and the "kinesia paradoxica" that are often seen in Parkinsonism never occur in paralysis agitans. As for tremor, a symptom common to both conditions, it rarely dominates the Parkinsonian syndrome as it does paralysis agitans.

The differences which exist between the two conditions are notable. In the first place there is nothing in paralysis agitans comparable to the metabolic disturbances that often constitute an important part of Parkinsonism. In Parkinson's mask the skin of the face has not the thick, greasy look that it has in the facies of Parkinsonism, and it is never associated with sialorrhœa. Moreover, constitutional changes, such as are seen in the *forme cachectisante* or in the tendency to obesity that patients suffering from Parkinsonism show, are never met with in paralysis agitans.

When cases of Parkinsonism began to appear in Glasgow during 1919 they were often referred to as atypical cases of katatonia. This identification of the characteristic sequela of epidemic encephalitis with katatonia is, in many ways, more just than that implied in the term "Parkinsonian syndrome." So far as its somatic symptoms are concerned, katatonia has more in common with Parkinsonism than paralysis agitans. When well developed the facies of the two conditions are practically identical. Both show the starched look with the smooth forehead, the thick greasy skin, and the saliva dribbling from the half-opened mouth. In both conditions the tongue tends to become small, indented, and the seat of an intrinsic tremor. The posture and gait are likewise very similar, even to the presence in katatonia of a condition in every way comparable to kinesia paradoxica. On the other hand, cataleptic manifestations, which are a common feature in katatonic

rigidity, are sometimes seen in the rigid muscles of Parkinsonism. Here the resemblance breaks down, for while mental changes are common in Parkinsonism, the stolidity and inaccessibilty of the katatonic are never seen; indeed, it may be said that if a Parkinsonian were to become inaccessible, *ipso facto* he would become a katatonic.

(For discussion, *vide* p. 738.)

Spirochætes in the Brain in General Paralysis. By A. R. GRANT, M.D.Aberd., Deputy Medical Superintendent, and H. T. KIRKLAND, M.A., M.B., Ch.B.Glasg., Senior Assistant Medical Officer at the County Mental Hospital, Whittingham, Preston, Lancashire.

FOLLOWING on the momentous discovery of the causative organism of syphilis by Schaudinn and Hoffmann, some eight years later Noguchi, working under the great difficulties of his own method, demonstrated the presence of spirochætes in the brain of a general paralytic.

Since that time, with improved technique in staining, numerous observers, including Jahnel (1), Hauptmann (2), Sioli (11), Hans Hermel (8) in Germany, Lelio Grimaldi (10) in Italy, and Dunlap (3) in America, have made detailed and, in most cases, confirmatory and additional observations on the morphological, biological and pathological characteristics of the *Spirochæta pallida*, as demonstrated in the central nervous system of general paralytics.

However, of recent years little has appeared in the literature on the demonstration of the organism in the central nervous system of general paralytics who have undergone the various forms of treatment, *e.g.*, (1) specific anti-syphilitic therapy by the various arsenical preparations, tryparsamide and salvarsanized serum; (2) non-specific treatment by (*a*) chemical substances as phlogetan and sodium nucleinate, (*b*) derivatives of infectious agents, as tuberculin; and (3) artificial inoculation of intercurrent infectious diseases, *e.g.*, malaria.

Such an investigation would seem to us essential, having a material bearing on the various hypotheses advanced to explain the *rationale* of the treatment by the various therapeutic agents above, in particular (*a*) Hauptmann's view that the favourable action lies in the formation of immune bodies, and the production of phagocytes, which prevent the general toxic process by the absorption of the *Spirochæta pallida*, and (*b*) on the destructive influence of high temperature as such on the organism as outlined