LETHARGIC ENCEPHALITIS

The Glasgow Epidemic of 1923

Its Incidence and Consequences, from the point of view of Public Health

(Miss) ASHIE MAIN, M.A., M.B.Ch.B., D.P.H. (Glas. Univ.)

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Introduction.

A new and strange disease, occurring in epidemic form and profoundly affecting the central nervous system, has, for a full decade, continued to puzzle and evade inquirers throughout various parts of the world. Epidemic encephalitis appeared in Austria in 1917, and in the following year in France and in England. Since then, a great many attempts have been made to obtain data of a previous epidemic of a similar kind, but, in all the history of medicine, nothing has ever been found to compare to this devastating disease in the peculiar character of its manifold phenomena. No disease has been fraught with so many difficulties, particularly directed to the neurologist, as lethargic encephalitis.

Epidemic encephalitis made its appearance in Glasgow in 1918, although it was only in 1919, that its prevalence was such as to lead to its recognition. It recurred annually till 1924, and, during this period, the change in the clinical features from year to year suggested that it had passed through an evolutionary phase. While ocular symptoms were probably the features most common to all epidemics, prolonged lethargy and somnolence characterized the earlier cases; choreiform and myoclonic movements were more prevalent in 1920 and in 1921, while, in 1924, there appeared for the first time a considerable proportion of cases with spinal signs and symptoms, which simulated acute attacks of insular sclerosis.

When the epidemic of 1923 began, the medical profession in Glasgow was well prepared for its diagnosis. Doctors were supplied by the Medical Officer of Health with a memorandum, in which were set forth the manifestations of the disease, which had been noted in the previous epidemics. Provision was made for notification and for hospital treatment, and, in this way, it was possible to form a fairly accurate estimate of the extent and character of the outbreak.

The following study is concerned with the cases of the 1923 epidemic, and with these only in a general and limited sense. An attempt is made to present a general view of the course of the disease, according as it terminated in early recovery in some cases, in apparent convalescence in others, or as, in the majority, it followed a protracted course along diverging lines in the form of characteristic sequelae. To obtain the purpose of the review, it has been necessary to confine the description of the sequelae to outlines of the main neurological and psychological features. So varied were the phenomena as a whole, and so fleeting many of the most prominent pathological signs, that it is expedient, in describing the general course of the disease as an epidemic, to confine attention to the hall-marks, in which its identity is disclosed.

The data employed in the analysis have been obtained from several sources.

The original list of all the cases, notified to the Medical Officer of Health, and accepted after observation as possible cases of acute encephalitis, was used as a basis. Along with this list, I have had the notes from hospital records, as well as the private notes belonging to Dr. Ivy Mackenzie, referring to the initial illness (Table A).

A year after the epidemic, Dr. Mackenzie examined all the cases, and I have used the results of his observations as a basis of the review of the condition of the cases in the Spring of 1924. In the construction of this review, I have gone over all the earlier hospital records, and have supplemented the information in Dr. Mackenzie's records by further data, elicited from the patients and their friends (Table B).

This reconstructive review of the position, as it was in 1924, has been taken as a basis for the estimate of the later effects, as observed four years later—that is in the Spring of 1928 (Table C).

In the course of the investigation of Spring 1928, all the cases, reported and accepted as suffering from epidemic encephalitis in the Spring of 1923, have been accounted for. All those surviving, with the exception of two, whose relatives were interviewed, have been examined. I am obliged to the superintendents of the various hospitals and asylums, in which the patients have been resident, for access to the records, to Professor Leonard Findlay for notes on children, the course of whose subsequent history has been followed, and to Dr. Ivy Mackenzie for the use of his records, and for his assistance and suggestions in my own examination of the patients, and in the interpretation of the varied courses, which their diseases have followed. In this way, it has been sought to delineate the course of a phase of the epidemic, and so, by observing the character of the scar, which its imprint on the populace has produced, to provide a standard of reference, by which this form of encephalitis may be compared with polio-encephalitis on the one hand, and, on the other, with the type which follows in the wake of influenza.

It is necessary to make a reservation, in claiming for the description a representative character; for, as suggested already, the phase of 1923, while typical for the disease as a whole, differed in some respects from the other annual visitations; it did not bring the profound and prolonged somnolence, as in victims of the earlier phase, and there was an absence, from the series, of cases simulating disseminated sclerosis, such as characterized the phase of 1924. It has, however, the advantage that practically all the cases, which occurred in that period, must be included, and that it has been possible to follow their fate for a period of five years.

Three appendices have been added. Appendix I. in which are given detailed histories of all the seventy cases in the series, examined at one and five years after the initial illness, Appendix II., in which are set forth details of the clinical examination, observed both in the initial stage of the disease and at the time of the examination five years later, with a classification of the cases referable to the present condition, Appendix III., which is a summary of the particulars of these initial symptoms and the finding five years later, a statistical comparison having been made between the initial symptoms and the sequelae.

The following (Table A) comprises all the cases (70) of the original list, which were notified to the Medical Officer of Health in 1923 as possible cases of Encephalitis Lethargica, and includes a summary of the symptoms present during the initial phase of the illness.

TABLE A.

List of names, including a summary of the initial symptoms (1923), and index to present classification with reference to Appendix II.

No.	Name.	Age at onset.	Lethargy.	Insomnia.	Eye Phenomena	Fever.	C.S.F.	Tremors and Twitchings.	Paresis.	Reflexes.	Neuralgias.	Giddiness.	Speech Defect.	Respiratory Disturbance.	Vomiting.	Salivation.	Index to Appendix II. Classification according to present condition.
1	Attwell, David	8	−	+	−	+	+	+	−	+	−	−	−	−	−	−	Perversion of Conduct.
2	Blackwood, John	11	−	+	+	+	−	+	−	−	+	−	−	−	−	−	Died.
3	Blane, Mary	11	+	−	−	+	+	−	+	+	+	+	−	−	−	−	Died.
4	Blue, John	28	+	+	+	−	+	+	+	−	+	+	−	−	−	−	Parkinsonian (A).
5	Boyle, John	24	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Eliminated.
6	Buchanan, Mrs.	33	−	+	−	+	−	+	−	−	+	−	−	−	−	−	Died.
7	Cameron, Donald	47	+	−	+	−	+	+	−	+	−	+	−	−	−	−	Recovery complete.
8	Campbell, Lily	10	−	+	+	+	+	+	+	−	+	−	−	−	−	−	Parkinsonian (A.)
9	Carnegie, John	7	−	+	+	−	−	+	−	−	+	−	+	−	−	−	Recovery incomplete (B.)
10	Cohen, Isaac	19	−	+	+	+	−	−	+	−	+	−	−	−	+	−	Recovery incomplete (C).
11	Crawford, Janet	24	−	+	+	+	−	+	−	−	+	−	−	−	−	−	Parkinsonian (A).
12	Crossan, Eliz.	12	+	−	−	+	+	−	−	−	+	−	−	−	−	−	Recovery incomplete (E).
13	Curran, Sarah	26	+	−	+	−	+	−	−	+	+	+	−	−	−	−	Recovery incomplete (C).
14	Dillon, Agnes (Mrs.)	27	+	−	−	+	−	+	−	−	+	−	−	−	−	−	Recovery incomplete (C).
15	Drummond, Hannah	11	−	+	+	+	+	+	−	−	+	−	+	+	−	−	Recovery incomplete (E).
16	Eadie, Archibald	7	−	+	−	+	−	+	−	+	−	−	+	−	−	−	Parkinsonian (B).
17	Forsyth, Eliz.	7	+	−	+	+	−	+	−	−	−	−	−	−	−	−	Parkinsonian (B).
18	Fraser, Janet	19	+	−	+	−	−	+	−	−	+	−	−	−	−	−	Recovery incomplete (C).
19	Gallacher, Thomas	9	−	+	−	−	−	+	−	−	+	−	−	−	+	−	Perversion of conduct.
20	Gibson, Ninian	13	+	−	−	−	+	−	+	+	+	−	+	−	−	−	Parkinsonian (B).
21	Higgins, Sarah	56	−	+	+	+	−	+	−	−	+	−	−	−	−	−	Died.
22	Hitchcock, Jeanie	16	+	−	+	−	−	−	+	−	+	+	−	−	−	−	Recovery incomplete (C.
23	Houston, Millicent	23	+	−	+	−	−	+	−	+	+	+	−	−	−	−	Recovery incomplete (C).
24	Hutchison, David	23	+	+	+	+	−	+	+	+	−	−	−	−	−	−	Parkinsonian (A).
25	Joyce, George	11	+	−	+	−	+	+	−	+	+	−	+	−	+	−	Parkinsonian (A).
26	Kearny, Mary	1½	−	+	+	−	−	−	−	−	−	−	−	−	−	−	Recovery incomplete (A).
27	Kelly, Jack	8	+	+	−	+	+	+	+	−	−	−	−	−	−	−	Died.
28	Leckie, Sarah	12	+	−	+	+	−	+	−	+	+	+	−	−	+	−	Recovery complete.
29	Lloyd, James	12	+	−	+	+	+	+	+	+	+	−	+	−	+	−	Recovery incomplete (C).
30	M'Alister, Eliz.	15	+	−	+	+	−	−	+	+	+	+	−	−	−	−	Recovery incomplete (C).
31	M'Alpine, Robt.	40	+	+	+	−	−	+	+	−	+	−	−	+	−	−	Parkinsonian (A).
32	M'Carthy, Jane (Mrs. Muir)	19	+	−	−	−	+	−	−	+	+	−	−	−	−	−	Recovery complete.
33	M'Coll, Mary	14	+	−	+	−	−	+	−	−	+	−	−	−	−	−	Recovery incomplete (C).
34	M'Crorie, David	27	−	+	+	+	+	−	−	−	−	−	−	−	+	−	Died.
35	M'Donald, Hay	81	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Eliminated.
36	M'Donald, Margt.	8	+	−	−	+	−	+	−	−	+	−	−	−	−	−	Recovery incomplete (A).
37	M'Ewan, Hugh	13	+	+	+	+	−	+	+	−	+	−	+	−	−	−	Parkinsonian (A).
38	M'Fadden, Joseph	12	−	+	+	−	−	+	−	−	+	−	−	−	−	−	Parkinsonian (A).
39	M'Farlane, Euphemia (Mrs.)	53	+	−	+	+	+	+	+	+	+	−	+	−	−	−	Died.
40	M'Farlane, Malcolm	13	−	+	+	+	+	+	−	−	+	−	−	−	+	−	Died.
41	M'Farlane, Wm.	15	+	−	−	−	+	−	−	−	+	+	−	−	−	−	Recovery complete.
42	M'Guinness, Annie	2	+	−	−	+	+	+	+	−	−	−	−	−	+	−	Recovery complete.
43	M'Lachlan, Mary (Mrs.)	50	+	−	+	+	+	+	−	−	+	+	−	−	−	−	Parkinsonian (A).
44	M'Leod, Helen	22	+	−	−	+	−	−	+	−	+	+	+	−	+	−	Parkinsonian (A).
45	M'Nulty, Mary	20	+	−	+	+	+	+	−	+	−	−	−	−	−	−	Died.
46	M'Pherson, Alex.	9	−	+	+	−	−	+	+	−	+	−	−	−	−	−	Recovery incomplete (C).
47	M'Philmeny, Eliz.	4	+	−	+	+	−	+	−	+	−	−	−	−	−	−	Died.
48	Meikle, James	37	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Eliminated.
49	Miller, Wm.	26	−	+	+	+	−	+	+	+	+	−	+	−	−	−	Recovery incomplete (C).
50	Milne, Wm.	43	+	−	+	+	−	+	+	−	+	−	−	−	−	−	Died.
51	Mitchell, Rose	7	+	−	+	−	+	+	−	+	−	−	+	−	−	−	Died.
52	Nicol, David	13	+	+	+	+	+	+	−	+	+	+	−	−	+	−	Parkinsonian (B).
53	O'Hare, Martha	5	+	−	+	+	−	+	+	+	+	−	−	−	−	−	Died.
54	Paul, Robert	10	+	−	+	−	+	−	+	−	+	−	+	+	−	−	Parkinsonian (B).
55	Reilley, Rose	19	−	+	+	+	−	+	−	−	−	−	−	−	−	−	Died.
56	Riddell, Mrs.	30	+	−	+	−	−	−	+	−	+	+	−	−	+	−	Recovery complete.
57	Robertson, Wm.	19	−	+	+	+	−	+	−	−	−	+	−	−	−	−	Died.
58	Rodger, John	26	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Eliminated.
59	Sandler, Nathan	11	−	+	+	+	−	−	−	−	+	+	−	−	+	−	Parkinsonian (B).
60	Semple, John	5	−	+	−	+	+	+	+	−	−	−	−	−	−	−	Recovery incomplete (B).
61	Sievewright, Eliz. (Mrs.)	48	+	−	+	+	−	+	+	−	+	+	−	−	+	−	Recovery incomplete (C).
62	Silverman, Lewis	23	+	−	+	+	−	+	−	−	+	+	−	−	−	−	Recovery complete.
63	Sinclair, Martha	48	+	−	+	+	−	+	+	−	+	−	−	−	−	−	Died.
64	Smith, Jessie	5	−	+	−	+	−	+	−	−	−	−	+	−	−	−	Parkinsonian (B).
65	Steele, Matthew	43	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Eliminated.
66	Stevenson, Jean	19	+	−	+	−	+	+	−	+	+	−	−	−	−	−	Parkinsonian (B).
67	Taggart, Margt.	5	+	−	+	+	−	+	−	−	+	+	−	−	+	−	Recovery incomplete (D).
68	Trivett, John	20	+	−	+	+	−	+	−	−	+	−	−	−	−	−	Died.
69	Whitehead, Edward	9	+	−	+	−	−	+	−	+	+	−	+	−	−	−	Recovery incomplete (C).
70	Wood, John	37	+	+	+	+	+	+	+	−	+	−	−	−	−	−	Died.

Manifestations of Lethargic Encephalitis.

With the appearance of this unusual disease, the physician had no conception of the gravity of the malady before him; he had not the slightest notion of the varied forms of clinical manifestations that were to present themselves, no idea of how perplexing the diagnosis would in many instances prove to be, and, above all, he had no glimpse, whatever, of the appalling sequelae that were in a multitude of cases to follow in its train. Of all diseases, it is most protean in its phenomena, greatly excelling hysteria in its power of simulation, and in its milder phases frequently being mistaken for it. So atypical has it become in symptomatology, that no longer can the cardinal signs of fever, headache, diplopia and lethargy, be depended upon in reaching an authentic diagnosis. Amongst the expressions of its manysidedness in the primary attack, the most pronounced are fever, insomnia, delirium, maniacal symptoms, lethargy, abnormal muscular movements, myoclonus, choreiform movements, convulsions, vertigo, headache, neuralgic pains, ocular and facial palsies, diplopia, ptosis, nystagmus, disorders of respiratory mechanism, apoplectiform attacks, skin eruptions, early Parkinsonism or katatonia. As to the later manifestations, the syndromes are legion, and all kinds can be established, depending on localization of the process in the central nervous system. Among the many complications, which appear at varying times after the initial attack, are disorders of sleep, Parkinsonism, perversion of conduct, pyschotic and nervous disturbances, respiratory and circulatory derangements, ocular disorders, and endocrinal symptoms.

Re-grouping of Cases.

The enquiry was begun with a provisional acceptance of the diagnosis of encephalitis lethargica in the whole series, as reported to the Medical Officer of Health. The observations, which have been made for this thesis, have suggested a revision of diagnosis in some instances, and the conclusions have reference only to such cases, as may now reasonably be regarded as belonging to this particular category of disease.

The course of the illness, as exemplified in the various sequelae, is epitomised in the following tables, where the series is grouped according to the more prominent manifestation of disorder. In Table B, the grouping represents the state of the patients in March, 1924; this is one year after the initial attack. In Table C, the grouping represents their state in March, 1928; this is five years later.

TABLE B.

A constructive review of the condition of the patients in the Spring of 1924.

Group I. Recovery Complete.	Group II. Recovery Incomplete.	Group III. Perversion of Conduct.	Group IV. Parkinsonians.	Group V. Died.
1. Blue, John (29) 2. Cameron, Donald (48) 3. Dillon, Agnes (Mrs.) (28) 4. Leckie, Sarah (13) 5. M'Carthy, Jane (Mrs. Muir) (20) 6. M'Guinness, Annie (3) 7. MacLachlan, Mrs. (51) 8. Silverman, Lewis (24)	*Class A.—Mental Retardation.* 1. M'Donald, Margt. (9) *Class B.—Mental Instability.* 1. Carnegie, John (8) 2. Eadie, Arch. (8) 3. Gallacher, Thos. (10) 4. Sandler, Nathan (12) 5. Smith, Jessie (6) *Class C.—Nervous Instability.* 1. Cohen, Isaac (20) 2. Crawford, Jane (25) 3. Curran, Sarah (27) 4. Fraser, Janet (20) 5. Hitchcock, Jeanie (17) 6. Houston, Millicent (24) 7. Kearney, Mary (2½) 8. Lloyd, James (13) 9. M'Alister, Eliz. (16) 10. M'Alpine, Robt. (41) 11. M'Coll, Mary (15) 12. M'Fadden, Joseph (13½) 13. M'Farlane, Wm. (16) 14. M'Pherson, Alex. (10) 15. Miller, Wm. (27) 16. Riddell, Mrs. (31) 17. Semple, John (6) 18. Sievewright, Mrs. (49) 19. Whitehead, Edward (10) *Class D.—Physical Defect.* (Not Parkinsonism) 1. Crossan, Eliz. (13) 2. Taggart, Margt. (6) *Class E.—Physical Defect + Mental Instability.* Nil	1. Attwell, David (9) 2. Forsyth, Eliz. (8) 3. Nicol, David (14)	*Class A.—Normal Mentality.* 1. Campbell, Lily (11) 2. Gibson, Ninian (14) 3. Hutchison, David (24) 4. Joyce, George (12) 5. M'Ewan, Hugh (14) 6. M'Leod, Helen (23) 7. Stevenson, Jean (20) *Class B.—Abnormal Mentality.* 1. Drummond, Hannah (12) 2. Paul, Robt. (11)	1. Blackwood, John (11) 2. Blane, Mary (11) 3. Buchanan, Mrs. (33) 4. Higgins, Sarah (56) 5. Kelly, Jack (8) 6. M'Crorie, David (27) 7. Macfarlane, Mrs. E. (53) 8. Macfarlane, Malcolm (13) 9. M'Nulty, Mary (20) 10. M'Philmeny, Eliz. (4) 11. Milne, Wm. (43) 12. Mitchell, Rose (7) 13. O'Hare, Martha (5) 14. Reilly, Rose (19) 15. Robertson, Wm. (19) 16. Sinclair, Martha (48) 17. Trivett, John (20) 18. Wood, John (37)

Italic numeral= Case number.
Arabic numeral= Age at 1924.

TABLE C.

A reconstructive review of the condition of the patients in the Spring of 1928.

Group I. Recovery Complete.	Group II. Recovery Incomplete.	Group III. Perversion of Conduct.	Group IV. Parkinsonians.	Group V. Died.
1. Cameron, Donald (52) 2. Leckie, Sarah (17) 3. M'Carthy, Jane (Mrs. Muir) (24) 4. Macfarlane, Wm. (20) 5. M'Guinness, Annie (7) 6. Riddell, Mrs. (35) 7. Silverman, Lewis (28)	*Class A.—Mental Retardation.* 1. Kearney, Mary (6½) 2. M'Donald, Margt. (13) *Class B.—Mental Instability.* 1. Carnegie, John (12) 2. Semple, John (10) *Class C.—Nervous Instability.* 1. Cohen, Isaac (24) 2. Curran, Sarah (31) 3. Dillon, Agnes (Mrs.) (32) 4. Fraser, Janet (24) 5. Hitchcock, Jeanie (21) 6. Houston, Millicent (28) 7. Lloyd, James (17) 8. M'Alister, Eliz. (20) 9. M'Coll, Mary (19) 10. M'Pherson, Alex. (14) 11. Miller, Wm. (31) 12. Sievewright, Mrs. (53) 13. Whitehead, Edward (14) *Class D.—Physical Defect.* (Not Parkinsonism) 1. Taggart, Margt. (10) *Class E.—Physical Defect + Mental Instability.* 1. Crossan, Eliz. (17) 2. Drummond, Hannah (16)	1. Attwell, David (13) 2. Gallacher, Thos. (14)	*Class A.—Normal Mentality.* 1. Blue, John (33) 2. Campbell, Lily (15) 3. Crawford, Jane (29) 4. Hutchison, David (28) 5. Joyce, George (16) 6. M'Alpine, Robt. (45) *7. M'Ewan, Hugh (17) 8. M'Fadden, Joseph (17) 9. MacLachlan, Mrs. (55) 10. M'Leod, Helen (27) *Class B.—Abnormal Mentality.* 1. Eadie, Arch. (12) *2. Forsyth, Eliz. (12) 3. Gibson, Ninian (18) 4. Nicol, David (18) 5. Paul, Robt. (15) 6. Sandler, Nathan (16) *7. Smith, Jessie (9) 8. Stevenson, Jean (24) * Died. (Forsyth died since examination).	1. Forsyth, Eliz. (12) 2. M'Ewan, Hugh (17) 3. Smith, Jessie (9)

Italic numeral = Case number.
Arabic numeral = Age at 1928.

An attempt is made to describe the course of the disease, by transferring the cases from one group to another, according as the state has been found to have undergone change. Thus the groups represent, 1, Recovery Complete; 2, Recovery Incomplete; 3, Perversion of Conduct; 4, Parkinsonians; 5, Died.

The method of re-grouping may be indicated by reference to the cases under the heading of Recovery Complete. In 1924, there were eight such cases in this group. In 1928, it was found necessary to transfer three of these to other groups, whereas examination of the rest of the series suggest the transfer of the other cases, who had not recovered at 1924, into the recovered group of 1928.

The results at the end of the first and fifth years' observations have been divided, as above mentioned, into 5 groups, and in each review the grouping corresponds.

GROUP I. RECOVERY COMPLETE.—The cases in this group are those, who have apparently regained their normal health and have resumed their occupation, showing so far no residual signs of their previous illness.

GROUP II. RECOVERY INCOMPLETE.—In this group are those, who have been left with some defect, but where the complication does not take the form of the more pronounced and characteristic states of Perversion of Conduct and Parkinsonism following the disease.

GROUP III. PERVERSION OF CONDUCT.—This group is composed of children, who have become abnormal in conduct and have undergone a complete change of character, showing signs of moral imbecility.

GROUP IV. PARKINSONIANS.—In this group are those, who have, as a complication, developed Parkinsonism during or after the initial attack.

GROUP V. DIED.—This group comprises the cases, which have proved fatal up to 1928.

GROUP I. RECOVERY COMPLETE.—It is impossible to state a definite period of time, when freedom from the danger of epidemic encephalitis can be regarded as permanent. Recovery, or apparent recovery, from the acute attack does not ensure that the patient will be wholly free from further trouble, and in this series it is found that one patient, after an apparent recovery of $4\frac{1}{2}$ years, developed Parkinsonian symptoms. There is, however, no evidence of a relapse, nor recrudescence, nor extension of an infective process in the nervous system; but, rather, is there evidence of the appearance of new phenomena, which may present themselves months, or even years, after the acute symptoms of the initial attack have disappeared, and which would seem to be due to a break-down of a mechanism, damaged in the acute stage of the disease. The presumption is, that a complicated nervous system, although injured by disease, may survive the effects of impairment for a considerable time without showing disorder of function, and subsequently break down under strain. Such an assumption is in perfect accord with what is known to occur in heart disease.

In considering the recovered groups of 1924 and 1928 jointly, three types of cases are included.

(*a*) Those who have made an uninterrupted and complete recovery.

(*b*) Those who have now recovered from complications, which were still present a year after the initial attack.

(*c*) Those who, after an initial recovery, have developed complications after a year.

In the re-examination of the cases in 1928, it is found that, of the original 8 cases recovered in the first review, there are only five, who now remain recovered (Cameron, Leckie, M'Carthy, M'Guinness, and Silverman). Owing to the development of further symptoms after an initial recovery, it has been found necessary to transfer 3 cases, presumed to have been recovered in 1924, to other groups, two of these having developed Parkinsonism (Blue and Maclachlan), and the third (Dillon) having become neurasthenic after pregnancy. There have been added to the recovered list, from the first review, 2 cases (Macfarlane and Riddell), both of these patients having recovered from complications, which were still present a year after the initial illness, so that there are now altogether 7 cases in this group.

Of those 5 cases, who have now made a complete and uninterrupted recovery, the first case (Cameron) is a man of middle age, who showed symptoms at the onset of fever, drowsiness, diplopia, twitchings, and giddiness. His illness lasted for six weeks, during which time he was very nervous, although, while in hospital, he was suspected of exaggerating his symptoms. He is at present quite well, and has resumed his occupation of fireman on board an Atlantic liner.

The second case is that of a girl (Leckie), whose illness lasted for three weeks, and was characterized by drowsiness, pains all over the body, giddiness, vomiting, and diplopia, symptoms as of influenza. The girl made a rapid recovery, and was able to return to school shortly after leaving hospital.

The next case (M'Carthy) is that of a woman, whose illness was of four weeks duration, with symptoms of drowsiness, lymphocytosis (30), increased pressure, and no diplopia. The patient was sufficiently recovered to return to service two months after her discharge from hospital. She married six months later, and has had one child. Owing to a contracted pelvis, Caesarean Section was performed at the birth. The child is healthy, and the mother made a good recovery. She remains well and fit for her household duties.

In the fourth case (M'Guinness), the initial illness was acute and subsided after eight weeks. The primary symptoms were lethargy, twitchings, lymphocytosis, increased pressure, marked Kernig's sign. Temp. 103° F. P. 130. R. 48. The lungs were clear to percussion, R. M. more harsh over left apex than right. The child made a gradual recovery, and was dismissed well from hospital. She has been at school since the age of 5, and is at present quite strong. Meningismus might be suspected in this case.

The fifth case (Silverman), had mild symptoms in the initial stage, and altogether the illness lasted for two weeks. A few days before his admission to hospital, the patient had a fall from his cycle, and the illness commenced with drowsiness, diplopia, slight nystagmus,

giddiness, and twitchings. In the initial stage, he took a succession of fainting turns, after which he wept readily, and was confused in his ideas. After a few days of drowsiness, he rapidly recovered, and later was dismissed from hospital well.

Of those two cases, who have now made a complete recovery from symptoms, which were still present a year after the acute attack, the first (Macfarlane) had in the initial stage an illness lasting for four weeks, with symptoms of lethargy, headache, giddiness, lymphocytosis, but no diplopia. After his discharge from hospital, he had some weakness of the lower limbs, and, for more than a year, salivation was excessive. This condition has now cleared up, and he is at present quite fit.

The other recovered case is a married woman (Riddell), in whom the onset was gradual, with drowsiness, headache, squint, giddiness, and vomiting. There was no fever and no diplopia, and the illness lasted for six weeks. She complained of giddiness and nystagmus for more than a year after leaving hospital, but later these symptoms disappeared and she is now well.

Of the three cases, who, after an apparent recovery, developed complications after the first review, two have become Parkinsonians.

The first case (Blue), a police constable, developed Parkinsonism about $4\frac{1}{2}$ years after the primary attack. His illness lasted for four months in the initial stage, and was characterized by pain in the right side of the neck, diplopia, nausea, giddiness, and lethargy, with intervals of delirium. He was able to resume his duties six weeks after leaving hospital, although for a few months he complained of pain in the right arm. He made a good recovery, and married 2 years after his illness; he has two children, both of whom are healthy. Some months ago, tremors of the left arm were felt, and since then Parkinsonian symptoms have gradually developed. He has become stolid in appearance, speaks hurriedly in a thick monotonous voice, and there is excessive salivation. When walking, he has a forward bend, and when sitting, there is a tendency to droop from the waist. There is also a suspicion of stiffness in the left arm, and the eyesight is weak. His condition is such, that it is doubtful if he will be able to continue his duties for any length of time.

The other patient, who developed Parkinsonism (MacLachlan), made an apparent recovery from her initial illness. She sustained a shock $3\frac{1}{2}$ years after the onset, and, from that time forward, Parkinsonism has steadily progressed.

In the remaining case (Dillon), pregnancy was responsible for the development of nervous symptoms after an apparent recovery from the primary illness. This patient, a married woman, had an illness of three months' duration, with symptoms of delirium, restlessness, twitchings, and pyrexia. She made an apparent recovery, and at the end of the first year was seemingly well. A few months after the birth of a child, she became emotional, irritable, and quick-tempered. She now suffers from violent headaches, accompanied by tremors and her eyesight has become weak.

After following out and investigating these recovered cases, it seems very doubtful from the course of the illness and the subsequent recoveries, if all of the seven recovered cases

were true encephalitis. Owing to the occurrence of these cases during an epidemic, and to the difficulty of diagnosis in the early stages of the disease, and also to the fact that, in the 1923 epidemic, medical practitioners were circularised regarding encephalitis, and were consequently on the "qui vive" for this "new disease," many may have been overhasty in the diagnosing and notifying of cases.

GROUP II. RECOVERY INCOMPLETE.—This is the largest of the 5 groups, and has been sub-divided into 5 classes.

Class A. Mental Retardation.
Class B. Mental Instability.
Class C. Nervous Instability.
Class D. Physical Defect. (Not Parkinsonism).
Class E. Physical Defect + Mental Instability.

Class A. Mental Retardation.—This class is comprised of those cases, showing signs of mental backwardness. In only two of the cases in this series is there mental retardation, and both of these are children, this process having become evident in one child at the age of 9 years and in the other at the age of 6 years.

On re-examining this class in 1928, it is found that the original one case (M'Donald) still remains from the first review; another case (Kearney) has now been added, having been transferred from the Nervous Instability Class, as it is evident, on interrogation, that her mental processes are much slower than those of the average child of her years.

In the first case (M'Donald), the child was acutely ill at the onset, being fevered, restless, delirious, and later lethargic. From the time of her illness, a complete change of disposition was noted. From being bright and lively, she became dull and apathetic, and, on her return to school six months later, she made little headway, and found great difficulty with her lessons. She lacked concentration, and her memory was not good. There has been no improvement in the child's condition within the last 4 years. At present, she is backward and dull, and shows signs of irritability and temper. Excessive salivation and respiratory disturbance (snoring) have been in evidence for about $3\frac{1}{2}$ years.

The other case (Kearney), which has now been added, was a young child of eighteen months at the time of her illness. She had initial symptoms of irritability, restlessness, wakefulness by night, and drowsiness by day. Nervous symptoms persisted for more than a year, but gradually wore off. She went to school at the age of 5, but made very slow progress. She still finds great difficulty in coping with her school work, and lately was held back a class.

Class B. Mental Instability.—This class is composed of those cases, showing signs of abnormal mental excitability, without perversion of conduct or mental retardation. This milder and less distinct upset of conduct, involving a change in disposition, may be the only sign of incomplete recovery.

At present, only one case (Carnegie) out of the original 5 remains in this class. It has been necessary to transfer 4 cases to other groups, and to add one case from another class. Of the 4 cases, who have been transferred, 3 cases (Eadie, Smith, and Sandler) have become

abnormal Parkinsonians, one of whom died (Smith), and the 4th case (Gallacher) has become perverted in conduct. The case (Semple), who has been added, showed nervous symptoms at the time of the first review, and was then in the Nervous Instability Class.

In investigating the series, it is found that this class comprises children, who are boys with one exception. In the first review, the children varied in age from 6 to 12 years, and all uniformly showed, from the time of their illness, symptoms of marked restlessness with excitability, especially at night-time. In two cases (Gallacher and Eadie), since transferred, the behaviour disorder assumed a more severe form, and, from the time of the acute attack, they showed extreme emotionalism, turning night into day, whistling and singing, tossing and burrowing in bed, tearing the bed-clothes, until they were utterly spent and became drowsy by day.

The following 2 cases illustrate the present condition of this class, showing the effect of encephalitis upon the development of the disposition of the child. Here, the intelligence is good, there is no lack of moral ideas, but mental instability is evident.

In the first case (Carnegie), the child had an illness of three months duration with, in the initial stage, symptoms of insomnia, restlessness, twitchings, delirium, and strabismus. At the time of leaving hospital, he suffered from fleeting apprehensions of emotional instability with great restlessness. Two months later, he returned to school, but was nervous and fearful. He refused to leave the class-room at play-time, and informed his teacher he was afraid of someone going to do him harm. One day, when out walking with his mother, he suddenly ran ahead, always glancing backwards with a look of terror on his face; when at last she managed to get hold of him, he said " there is someone chasing me, trying to do something to me." This abnormal condition lasted for over a year. Since his illness, he has become extremely restless and emotional, showing marked eccentricities of conduct, and his disposition has changed completely. Prior to his illness, he was shy and reticent, but now he will talk to anyone he meets; when in school, he addresses his teacher in the middle of a lesson, and occasionally rises and walks round the class-room. In acquiring abstract knowledge, he has made average progress. He is neither malicious nor vicious, but is affectionate and thoughtful in the home.

The second case (Semple), also shows peculiarities of conduct. His initial illness was characterized by delirium, restlessness, twitchings, and drowsiness, and lasted for six weeks. Following the illness, a definite change of conduct was observed; from being shy and aloof, he became bold and obtrusive, and would brook no interference. He was quick-tempered, restless, and slept badly, and was unable to attend school for eight months. Since his return to school, his progress has been quite good, but the teacher complains he is difficult and quarrelsome, and at times forgets himself and where he is. On one occasion, during a lesson, he suddenly left his seat, walked to the window and exclaimed, " This is a fine day, Miss Smith." Under any emotional stress, such as a fit of temper, salivation becomes excessive. His habits are good, and he is quite intelligent.

The following case (Sandler), a boy, at present 16 years of age, now transferred to the Parkinsonian group—Abnormal Mentality—is interesting, on account of his having frequent

lapses of memory. The boy showed a decided change of disposition from the time of his illness, becoming emotional, childish, and shunning his contemporaries. He repeatedly went for long walks, and afterwards had no recollection of his wanderings. On one occasion, he took a walk without his boots.

Class C. Nervous Instability.—This class embraces all those cases, showing in a varying degree a residuum of nervous disturbances, including insomnia, drowsiness, irritability, tremor, headache, and weak eyesight.

Of the initial 19 cases of the first review, 12 cases remain in this class (Cohen, Curran, Fraser, Hitchcock, Houston, Lloyd, Miller, M'Alister, M'Coll, M'Pherson, Sievewright, and Whitehead). Six cases have been transferred to other groups, and one case has now been added to the list, so that at the present time the class numbers 13. Of the six cases transferred, 3 cases have become Parkinsonians (M'Fadden, M'Alpine, and Crawford), 2 cases have made a complete recovery (M'Farlane and Riddell), and one case (Semple) is now mentally unstable. The case (Dillon), who has been added, is from the recovered group, nervous symptoms having developed after pregnancy.

The majority in this class are adults, and it can be seen that complete recovery is the exception rather than the rule. Of those patients, who have sufficiently recovered to allow them to return to work, all show residual signs of their previous illness, and complain of various forms of psychic and physical disturbances. After the acute attack of encephalitis has passed, it is common in this class to find a persisting insomnia, which in some cases lasted for months, and in a few cases for years, although, as a rule, the insomnia gradually disappeared within or shortly after the first year. Twelve cases in this class suffered from nocturnal insomnia after the acute stage, and, in all cases but two, this troublesome condition cleared up at times varying from six months to two years. In these two cases (Houston and M'Alpine), insomnia still persists as a residuum.

Drowsiness is also found to occur as a late effect, but it is not a common sequel as is insomnia, having appeared only in 4 cases in this class, in two of whom it is still evident (Fraser and Hitchcock), the other two having got rid of it within the first few months (Curran and M'Alister).

Of the 19 cases in this class, at the time of the first review, irritability occurred in 12 cases, weak eyesight in 4 cases, headache in 3 cases, and tremors were absent. Ten cases had excessive salivation, and one had in addition respiratory disturbance (hyperpnoea). Of the 13 cases at present in this class, irritability occurs in 10 cases, weak eyesight occurs in 8 cases, headache in 5 cases, and tremors in 3 cases. Eight cases have excessive salivation, and two have also respiratory disturbance (clearing of throat and yawning).

From the above findings it can be seen, that nervous symptoms, with the exception of insomnia, have increased during the five years.

In one case of this class (Sievewright), it is interesting to note a sequela, simulating the acute attack 4 years after the initial illness. The patient was suddenly stricken down with severe headache, vomiting, and loss of power of the lower limbs, symptoms similar to those

in the initial attack. For ten days she remained in a lethargic condition, after which these symptoms gradually disappeared. At present, she suffers from irritability, headache, and weak eyesight.

Class D. Physical Defect.—This class is made up of those cases, suffering from physical disabilities without signs of Parkinsonism.

There were originally 2 cases in this class, and of these 2 cases, one now remains (Taggart), while the other has been transferred to the Physical Defect+Mental Instability Class. The latter case (Crossan), who, after her illness, became abnormally fat, has, since the first review, become mentally unstable in addition to this physical defect. She is extremely emotional, violent tempered, and shows unaccountable aversions to people, especially to men.

The remaining case (Taggart), is unique and of unusual interest, being the only case in the series with severe physical disability without Parkinsonism or mental disturbance. This case, a girl aged 5, showed initial symptoms of fever, vomiting, headache, delirium, restlessness, drowsiness, twitching of the facial muscles, and strabismus. The child was very drowsy during the first few weeks of her illness, but was dismissed well from hospital six weeks after the primary attack. She remained at home for the next few months, and then resumed school. At that time, she complained of pain in the right leg, which gradually increased. Two years ago, she was sent to a special school owing to her physical condition. The child tired very easily, and the mother then noticed a slight wasting of the right leg. This wasting became more pronounced, later the foot dropped and, consequently, walking became difficult.

At present the right leg is about half an inch shorter than the left, the muscles are atrophied, and the foot is dropped and turns inward. She flings her foot when walking. She complains a good deal of pain in the leg and stiffness and numbness on awakening in the morning; during the winter, she suffers from chilblains on the soles of both feet. She is troubled with frontal headaches, and, when in bed, the head perspires freely. She sighs and yawns frequently; her eyesight is weak, and for the last three months she has worn spectacles. There is no excessive salivation, although this was slightly present after leaving hospital. She is quite intelligent, is well up to the average at school, and is equable in temper. On examination, the knee jerks were elicited on both sides, the right somewhat brisk, and the temperature of the right foot was lower than that of the left; otherwise physical examination was negative.

Class E. Physical Defect+Mental Instability.—This class is composed of those suffering from physical disability, with in addition mental instability, but without signs of Parkinsonism.

At the time of the first review, there were no cases in this class, but, at present, there are two, the first case (Crossan), having been transferred from the Physical Defective Class and the second case (Drummond), having been transferred from the Abnormal Parkinsonian Class. The latter case is of considerable interest owing to its simulation of other conditions.

This patient, a girl, was 11 years of age at the time of the initial illness. The onset commenced with severe pain in the right arm and the right side of the back. The following day, she complained of severe abdominal pain, which persisted for seven days, and, during that time, the child was extremely constipated. She became fevered, restless, delirious, and drowsy, and was admitted to the surgical ward, diagnosed as a case of appendicitis. Fortunately, owing to the presence of myoclonic movements of the abdominal wall, she was saved from an unnecessary operation. The child remained in hospital for six months, and, at the time of her dismissal, her speech was slurred, and there was ptosis of both eyelids present. A year later, she suffered from nocturnal insomnia, and, owing to severe pain in the left leg, was unable to attend school. At this time Parkinsonism seemed to develop. There was a tendency, when sitting, to adopt a markedly crouching attitude, and, when standing or walking, there was a decided stoop. The arms were held stiffly, and the eyes had a staring expression, winking seldom with slight bilateral ptosis of the eyelids. The face was somewhat masked, and increased salivation was present. There was continuous twitching of both arms, the right arm especially being affected. Hyperpnoea was also evident, and had been present since the onset. Abdominal pain still persisted, and, regularly after meals, there was vomiting without nausea. After her illness, her teeth dropped out, one by one.

Within the last 3 years, improvement has been gradual; abdominal pain and vomiting have disappeared, salivation has become normal, and twitchings of the arms have ceased, and, at the present time, there is no sign of Parkinsonism. In appearance, she is ruddy and healthy, but is of stunted growth. The head and entire trunk are bent toward the left, with spasm of the spinal and occipital muscles. There is considerable lordosis and scoliosis, with a convexity to the right; the chest wall shows marked deformity (pigeon chest). Pain-in the back of the legs has lately worn off. She becomes easily exhausted, and has not yet menstruated. A complete change of character has taken place; since her illness, she has become mentally unstable, and is precocious, sly, impulsive, and quarrelsome. As in this case Parkinsonian symptoms, which appeared a year after the onset, subsequently disappeared, on retrospection it seems doubtful if this was a true Parkinsonian state.

GROUP III. PERVERSION OF CONDUCT.—This group, though small, is not without interest, and is composed of children, in age ranging from 8 to 14 years, who show as sequelae personality changes and moral delinquency.

In the review of 1924, there were 3 cases in this group, but, at the time of the present review, only one of that number remains. Two cases (Nicol and Forsyth), have developed Parkinsonism in addition to conduct perversion, and have been transferred to the Abnormal Parkinsonian Class. One case (Gallacher) has been added to this group, a boy, who, previously being mentally unstable, has since become perverted in conduct.

The behaviour syndrome, as found in the post-encephalitic child free from severe neurologic symptoms, has some special features. In this group of children, encephalitis is followed by more or less severe conduct changes, although no such transformation has been observed in the adults of the series, in whom are mostly found physical conditions and psychotic changes.

This change of personality and character in the child is due to the fact, that the nervous system has been attacked during the formative period of development. The personality of the child is transformed by the virus of the disease, so that the ill-effects following such an infection are disastrous and far-reaching. In some cases, disorders of conduct have been such, that these young people have been brought into conflict with the law and ultimately consigned to mental institutions. These children are impulsive, destructive, and violent; they lie, steal, beg, swear, and show erotic and sexual tendencies. They are not feeble-minded in the technical sense, although mentally defective in respect of morals. Their intelligence is good, and this troublesome and dangerous behaviour would seem to be caused by an involvement of the emotional, rather than of the intellectual, tendencies; thus, after the commission of an impulsive act, regret is often immediately expressed (Forsyth and Gallacher).

Unless there are steps taken to provide proper supervision and training of these children, there is the danger, that in the future crime may be rife amongst this community. On the other hand, these young people, under right conditions, might be so trained, that there would be a surprising reduction in undesirable behaviour.

The following case well illustrates the characteristics of this group—This case (Gallacher) a boy, 9 years of age at the time of his illness, had severe chorea of 7 days' duration in the initial attack. For over a year, there was extreme restlessness and an inversion of the sleep rhythm with nocturnal excitement and drowsiness during the day. His character, from the time of his illness, changed completely, and, after the first year, he became unmanageable, and was expelled from school owing to bad behaviour. He is now completely beyond control, and it is most difficult to keep him indoors; if deterred in any way, he threatens to jump out of a three-storey window. He leaves home every day about 7 a.m., returning at a late hour, and spends his time associating with men at the docks. He lies and steals, and, about five months ago, he was taken up by the police for stealing newspapers out of a shop and selling them in the street. After this, he got a job with a milkman, but speedily was dismissed for appropriating the customers' money. He takes violent bouts of temper, and cannot be thwarted in any way. He is constantly hitching up his stockings to the extent of tearing the tops off of them. The boy is highly intelligent, his memory is excellent, and, in spite of his being absent from school for a considerable length of time, he is able to recall all he ever learned. He is bright and attractive in appearance; occasionally he becomes penitent, and seems sorry for his bad behaviour.

Group IV. Parkinsonians.—Parkinsonism is the most common and malignant form of residua, and can manifest itself at any time and at any age, and, once this state has been established, there is little hope of abatement, and remissions, if any, are fleeting. Most of the patients with this form of sequela realise the gravity of their malady, and feel themselves progressively growing worse. The young show no more recuperative power than those more advanced in age.

Parkinsonism has developed in 18 cases of this series, and in 8 of this number conduct changes are also present. Fifteen of these cases are below 30 years of age and 3 are above that age.

The Parkinsonian group is divided into two classes. Class A., Normal Mentality; Class B., Abnormal Mentality. The first class is composed mostly of adults, and the second class mostly of children, the latter having developed Parkinsonism in addition to Perversion of Conduct.

Class A. Parkinsonian: Normal Mentality.—Those in this class show slight deviation from the normal, but those patients are not such, as would, by common consent, be included amongst the mentally afflicted.

Of the 7 cases originally in this class, there are 4 cases still remaining (Campbell, Joyce, Hutchison, and M'Leod). Three cases have now been transferred from this class, 2 of these having become Abnormal Parkinsonians (Stevenson and Gibson), and the third (M'Ewan), having died. Five cases have been added, 2 cases (Blue and MacLachlan), coming from the Recovered Group, having lately developed Parkinsonism after an apparent recovery, and 3 cases (Crawford, M'Alpine, and M'Fadden), having now been transferred from the Nervous Instability Class.

In many of these cases, the early phase of Parkinsonism was first recognised by a tendency to easy fatigue and a reduction of energy, with perhaps a slightly fixed facial expression. Further symptoms gradually developed with stiffness in the neck or in one or more limbs, drooping of the body, tremors of the arms or legs, difficulty and slowness in walking, rising, and sitting, monotony of speech, excessive salivation, and progressive fixity of the facial expression, until the typical Parkinsonian picture was presented. The condition at this stage is sometimes stationary, but later steadily progresses; the rigidity increases, tremor becomes more marked, or is completely suppressed by the rigidity, saliva increases, and eventually the patient can no longer feed himself. At the end, emaciation is extreme, and, bed-ridden and helpless, he lies in a fixed position, staring into space.

All of these patients display some disturbance in the psychic sphere, although the intellect is usually spared. To their physical disabilities is added a marked emotionalism, causing them to become a burden to themselves and to those around them. Some are hysterical, being readily exhilarated or depressed, alternately laughing and crying—from tears to laughter and from laughter to tears. Some are neurasthenic, being timorous, fearful, and tired, unable to create new thoughts or new ideas; they linger in bed most part of the day, and arise only to sit about listless and unoccupied. Others are worried, anxious, and harassed, showing an anxiety as to the ultimate issue of their trouble.

Among the group of Parkinsonians with normal mentality, only two patients (Blue and MacLachlan) are at present able to carry on their usual occupation, although, probably before very long, these patients will require to discontinue owing to their increasing incapacity.

The following case of Parkinsonism, accompanied by neuralgias, is of special interest, being of rare occurrence. This patient (M'Leod), a young woman, 22 years of age, had, in the initial phase, symptoms of drowsiness, delirium, vomiting, severe pain in the back of the head and neck, also pain in the feet and legs. She remained in hospital for three months, and during that time signs of Parkinsonism became evident; the face was mask-like and katatonia was

present. After leaving hospital, Parkinsonism gradually developed, although the neuralgic pains greatly lessened. She carried on a part-time job for about 2½ years, but was forced to discontinue owing to her physical condition. About a year ago, there was a recurrence of severe pain in the back of the head and neck, shoulder blades, soles of feet, also in the joints of the large toes. This painful condition still persists, while Parkinsonism is now firmly established. In this case there is no past history of neuritis nor rheumatism.

In another case (Crawford), a woman, 24 years of age, Parkinsonism manifested itself 4½ years after the initial attack, and, six months after the appearance of this syndrome, there was a sudden outburst of a maniacal nature. Immediately before the primary illness, the patient had a great deal of trouble, owing to the death of her fiancé, and to worry in business. At the beginning, the illness was characterized by insomnia, delirium, headache, and diplopia. She gradually improved, and, after convalescing for a few months, was able to return to business. During the next few years, she felt fairly well, except for a feeling of irritability and depression with occasional headache, until June 1927, when she complained of weakness and shakiness of the right arm and leg. Symptoms increased, and three months later, Parkinsonism was pronounced and she was forced to give up work. In December 1927, there was a sudden attack of acute maniacal delirium, and she was confined to bed for four weeks. This acute condition passed off, but Parkinsonism increased, and at present she presents the typical picture of that syndrome.

Class B. Parkinsonism: Abnormal Mentality.—The criterion of abnormal mentality in these patients is their mode of behaviour, including such aberration as suicidal impulse, necessitating treatment and supervision.

It is observed that all the cases in this class are children with one exception, and, at the time of the first review, 2 cases (Paul and Drummond) were in this class, one of whom still remains. It has been found necessary to transfer the other case (Drummond) to the Physical Defect + Mental Instability Class, as in this case symptoms of Parkinsonism have disappeared, while other physical disabilities have become very evident. Seven cases have now been added to the list, 2 cases (Gibson and Stevenson) from the Normal Parkinsonian Class, 3 cases (Eadie, Smith, and Sandler) from the Mental Instability Class, and 2 cases (Forsyth and Nicol) from the Perversion of Conduct Group, so that altogether there is a total of 8 cases in the class.

Although in the majority of the children showing Parkinsonism, the same physical symptoms characterize the disease as in the adults with this form of sequela, there is, however, a difference in the mental attitude. Mental deterioration is found to take place prior to the development of the Parkinsonian syndrome, and, with the advancement of Parkinsonism, the psycho-motor excitement grows less, until, eventually, there is a cessation of impulsive acts. In all the children of this class, changes occur both in character and behaviour, even to the extent in some cases of utter perversion. Four of the children, coming under this class (Eadie, Forsyth, Paul, and Nicol) exhibit misbehaviour of the lowest order, with a history of explosive conduct, such as outbreaks of violent temper, cruelty, lying, thieving, profanity, destructiveness, and sexual abnormalities. Not all of these symptoms occur in one child, but this enumeration suggests the condition.

The following case (Forsyth) is a typical example of Parkinsonism in a child, with mental deterioration. The illness commenced with fever, drowsiness, hallucinations, tremors, and strabismus. At the time of leaving hospital, six months after the onset, the child was still drowsy and very emotional and querulous. On returning to school, two months later, she was found to be uncontrollable and unresponsive to discipline, so much so, that; after three months, it was necessary to have her removed. She was constantly in trouble, and her habits were of the lowest; she lied, stole, used obscene language, played about with faeces and urine, was violent and showed sexual abnormalities. At times, she seemed conscious of her sad behaviour, and on one occasion after striking a child, prayed, "Oh God, make me better." She was ravenous for food, and, although well fed at home, would enter neighbours' houses and seize anything in the way of food, to the extent of snatching it from people's mouths; at times her thirst was abnormal. She was certified for Woodilee Asylum sixteen months after the initial illness, and on two occasions she managed to escape. About this time Parkinsonism began to develop, and physical deterioration gradually progressed, whilst malbehaviour lessened, until finally there was a cessation of impulsive acts. Since December 1927, she has been confined to bed, a helpless wreck, in the grip of Parkinsonism, and lethargy is pronounced. In this case the family history is not good, the child's father being alcoholic and the mother neuropathic.

The second case (Nicol) is that of a boy, whose misbehaviour includes a long list of misdemeanours and crimes. His illness commenced with headache, sleeplessness, later drowsiness, vomiting, diplopia, fever, twitchings and vertigo. After an illness of five weeks, he was discharged well from hospital. He then returned to school, but his behaviour was so bad, that he was expelled two months later. After the age of 14, he was employed by different tradespeople and was dismissed, time and again, owing to thieving, lying and violent temper. His appetite was ravenous, and he could rarely be satisfied. He was continually in trouble with the police on account of his interfering with young girls; on one occasion he almost strangled a shop-girl, but was deterred through timely intervention. Two years after his illness, he applied and was appointed to a Naval Training Ship at Devonport. He remained there for five months, but, as he was found to be homosexual and generally degraded in conduct, he was certified as mentally unsound. At this time, a tendency to Parkinsonism was observed. When visited in Hartwood Asylum in the Spring of 1928, he was going about and performing his quota of work daily. There was then evidence of the advancement of the Parkinsonian syndrome; the face was expressionless, the gaze fixed, speech difficult, but there was no loss of co-ordinated movements. He was reported to be emotional, irritable, childish and facile, with an underlying astuteness. He requires careful watching on account of homosexual practices. This patient is an illegitimate child, and his parentage is not good. He showed signs of abnormal conduct prior to his illness.

In considering the relation of the onset of Parkinsonism to mental degeneration, it is found, that, in all the children of this class, mental degeneration preceded Parkinsonism, and in only one case, an adult, mental degeneration followed Parkinsonism. All seven children exhibited deterioration within the first few months after the initial illness, and, in

the case of the adult, mental deterioration became evident about seven months ago. This patient, a young woman (Stevenson), has become very depressed owing to her physical condition and to her inability to use her hands. She is constantly wailing, " Oh my hands, my hands," with which she has become obsessed. In August, 1927, she attempted to commit suicide, taking a razor to her throat, and at that time was confined for a short period in a mental institution.

From the study of the asylum cases, the family history has been found to be unfavourable to the patient. In one case (Gibson), the mother is a confirmed drunkard and shows maniacal tendencies; in another case (Forsyth), the mother is neuropathic, having frequent periods of depression, and the father is alcoholic, and was so before he married; in a third case (Nicol), there is also a family taint, the boy being illegitimate, and the father belonging to a low and degraded class. In still another case (Stevenson), the family history shows a neuropathic strain in many members, one uncle being confined to Gartnavel Asylum for the past three years, while other relatives show signs of mental instability. Thus, it would seem that the underlying personality and the hereditary factors play an important part in this expression of the disease, and deterioration in children, traced to heredity, is greatly aggravated by the infection, although it is also produced to a considerable extent in cases with no bad history. Children below the age of 16 are more prone to severe conduct changes, becoming less vulnerable after that age.

An attempt has been made to establish the length of time between the initial attack and the onset of the Parkinsonian syndrome. Although it is often assumed, that a Parkinsonian condition is a late manifestation of epidemic encephalitis, it is found, in the cases under review, that it can also occur immediately after the initial attack, or even during that time as a complication. In some cases, after the recession of the acute phase, it was observed that a definite normal interval intervened, which varied from a few months up to five years, while, in a few cases, the development of symptoms was so gradual and so insidious, that it is difficult to fix an exact time of onset.

There are altogether 18 cases, showing Parkinsonism in the series, and the following observations give approximately the time of onset of the syndrome in relation to the acute attack.

Four patients developed Parkinsonism during or immediately after the initial attack (Campbell, Gibson, MacEwan, and M'Leod).

Four patients developed Parkinsonism within the first year of the initial attack (Hutchison, Joyce, Stevenson, and Paul).

Two patients developed Parkinsonism within the second year (Forsyth and Smith).

One patient developed Parkinsonism within the third year (Nicol).

One patient developed Parkinsonism within the fourth year (MacLachlan).

Five patients developed Parkinsonism within the fifth year (Blue, Crawford, M'Fadden, Eadie, and Sandler).

One patient developed Parkinsonism within the sixth year. (M'Alpine).

It is, therefore, evident that Parkinsonism is liable to occur at any time and at any age, this phenomenon having appeared in patients varying in age from 6 years (Smith) to 53 years (MacLachlan).

GROUP V. DIED.—This group comprises the cases, which have proved fatal up to 1928.

Apart from the 18 cases, which ended fatally during the first few months of the illness, there are only 3 cases, in which death has been delayed for much longer periods. Within the first year, the earliest death occurred six days after the onset and the latest at five months. Of the 18 deaths, occurring within five months of the onset, one case (Wood) contracted pneumonia seven days before the end. Eleven of these cases were over the age of 16 years, and 7 cases were under that age. Of the 3 deaths, which occurred after the first year, Parkinsonism was found to be the terminating factor. Two of these cases were under the age of 14, and the other case was 18 years of age.

Parkinsonism in the first case (M'Ewan) developed during the initial attack, and lasted for 4 years and 3 months; in the second case (Smith) this sequela developed shortly after the first year, and lasted for 2 years and 9 months; and in the third case (Forsyth) the sequela developed shortly after the first year and lasted for 4 years.

ELIMINATED CASES.—In reviewing the whole series, it has been considered necessary to eliminate 5 cases, as, after these cases have been traced and followed out, there does not appear sufficient ground for including them in the series.

The first case (MacDonald) is that of a man, aged 81, whose initial illness was characterized by drowsiness and hallucinations, the patient imagining he was very poor, and that he had no money for food. He was full of fears, and believed he was being pursued by enemies. There was no defect of speech, nor any signs of paralysis. Towards the end, he was in a state of coma, and died three months after the onset. In considering the course of the disease and the age of this patient, it would seem that this is a case of arterial brain disease, and a post-mortem examination would have been required, before a diagnosis of lethargic encephalitis could be regarded as final.

The second case (Steele) is that of a single man, aged 43. This patient had held a position in West Africa for 24 years previous to his illness. In 1918, he took an apoplectiform seizure, and was invalided home; since then, he has done no work. His illness, in 1923, commenced suddenly with symptoms of headache, vomiting, coma, and right hemiplegia; later there was mental confusion with some difficulty of speech and convergent strabismus. After five weeks in hospital, he made gradual improvement. At present, he leads a fairly active life, reading, walking, and golfing. His memory is very poor, and he is asociable, eschewing company; this he states is due to the fact, that, while in conversation, he frequently forgets what he wishes to say. On examination, it is found that the pupils are equal, and react well to light and on accommodation. Bilateral nystagmus is present, but more pronounced on the right side. The knee jerks are elicited on both sides, right somewhat exaggerated. There is no Babinski sign nor ankle clonus. There is slight tongue tremor, and also tremor of the right hand on extension. It seems very doubtful, whether this is a case of encephalitis

lethargica, but it would require careful observation of the development and course of the illness to determine a positive diagnosis.

The third case (Boyle) is a man, 24 years of age. Restlessness, confusion of mind, and incoherence of speech characterized the onset. The patient was five weeks in hospital, and later was transferred to the asylum. He had served in the war, and had suffered from shell-shock. After the initial phase of the illness, he became childish, incoherent, and completely disorientated. His habits were dirty, and there was a marked degree of dementia. He took seizures of the general paretic character, showed a considerable amount of paresis, and exhibited many of the physical signs of general paralysis of the insane. Wassermann reaction of the blood and C.S.F. was positive. The patient died a year after the initial attack, having been confined to the asylum for eleven months. This is evidently not a case of encephalitis lethargica, and, from the symptoms expressed, a diagnosis of general paralysis would seem justifiable.

The fourth case (Rodger) is of a man, aged 26, whose illness, in the initial stage, showed symptoms of headache, dimness of vision, general pains, and weakness. After leaving hospital, the patient was at home for several weeks; during that time, he developed convergent strabismus, and complained of weakness of the left arm and leg. He returned to hospital for nine months, and, according to the statement of his wife, he was treated at that time by "injections into the arm." From the beginning of his illness, there was a gradual loss of power, both arms and legs ultimately becoming paralysed. Towards the end, he lost the power of speech and became totally blind. He died eighteen months after the onset of his illness. In following the general trend of this case with its ultimate blindness, syphilis would seem a more likely diagnosis than that of encephalitis.

The last case (Meikle) is that of a man, 37 years of age. The initial symptoms were fever, giddiness, drowsiness, and strabismus of the left eye; the speech was slow and slightly slurred, and the facial expression mask-like. The patient was in hospital for a month, during which time, he became steadily worse. Twitching of the arms was present, and katalepsy was easily produced. On examination, the chest was clear to percussion, R.M. vesicular, and no increased V.R. or V.F. Reflexes were equal on both sides, but slightly exaggerated. A fortnight before the end, the patient suddenly took a fit. He died five weeks after the onset. A post-mortem examination was held, and the findings showed a tumour of the lung with metastases in the brain and in the right suprarenal.

Poliomyelitis—Influenzal Encephalitis—Lethargic Encephalitis.

A Comparison and a Contrast.

Fever, headache, vomiting, squint, convulsions, and delirium may constitute, individually or severally, the signal of acute infection, not only of the brain or its membranes, but of such diverse organs as bone, lungs, or kidneys; they may also herald the onset of the more general toxaemias of measles, scarlet fever, or typhus. Acute cerebral signs and symptoms do not, by any means, justify a diagnosis of cerebral disease. It is, as a rule, in the course of the

disease, when the confusion of the incipient attack has abated, that the phenomena, which point to the nature of the infection, begin to reveal themselves.

It is no wonder, then, that, when lethargic encephalitis appeared, the equivocal character of its initial expression should have suggested a relationship with poliomyelitis and cerebral influenza. Poliomyelitis was an endemic form of acute nervous disease, which sometimes became epidemic; it was a disease, with which the public and physicians were familiar; moreover, when it occurred epidemically, the cerebral variety was by no means rare. On the other hand, cerebral influenza was a well recognised expression of that infection, and its incidence at a time, when the disease had become pandemic, was not unexpected.

In these circumstances, it is not surprising that attempts should have been made to correlate the clinical phenomena of the " new disease " with those of other infections, with which doctors were already acquainted, and to recognise in it an aberrant variety of the more familiar infections.

It soon became apparent, however, that the new disease had a way of its own. Despite its resemblance to other cerebral disorders, it followed a course, which, however varied, presented features of distinction, which rendered its recognition a matter of comparative certainty. These features were not necessarily the lethargy or torpor, not in themselves peculiar to the disease; nor yet the chorea and myoclonus, which, in their atypical characters and epidemic incidence, constituted a strange and novel phenomenon; it was rather in the after-math or relic of convalescence, that the derangement revealed its truly original character. The records of medicine contain no reference to acute cerebral disease, followed by such characteristic sequelae, as have been noted and described in the " perversion of conduct " in children and in the " Parkinsonian syndrome " in children and in adults.

There is no difficulty at this time of day, despite the fragmentary and inadequate character of our knowledge of the relation of function to the structure of the nervous system, in recognising the broad outlines, which differentiate lethargic encephalitis, poliomyelitis and influenzal encephalitis from each other; for although, in fulminating forms of each infection, the anatomical degeneration may be diffuse, in average cases the pathological changes are localised more or less to regions characteristic for each infection. Thus, in acute poliomyelitis, inflammation is mostly confined to the anterior cornual cells and involves, as a consequence, the disappearance of the somatic motor fibres to voluntary muscle. In the encephalitis of influenza, the mischief predominates in the superficial grey matter of the cerebral cortex, while, in lethargic encephalitis, the foci of primary reaction lies, as a rule, in the mid-brain, in the hypothalamus, and in the basal nuclei of the cerebrum.

Elementary though such an anatomical conception may appear to be, it provides a key to the characteristic course pursued by each disease, as it emerges from the confusion of the initial derangement. Once the inflammatory and destructive phase has ceased, the organism tends to rehabilitate itself in response to the activity of those nervous structures, that have not been destroyed.

In the case of acute poliomyelitis, the pathological conditions are simple, and are easily correlated with the clinical effects. The loss of anterior motor cells and fibres involves

a very simple organic defect. These cells and these fibres are peripheral, and their disappearance does not prejudice the efficiency of any of the complicated internal mechanisms of neural integration. The defects, which follow the disease, are due exclusively to the paralysis and atrophy of voluntary muscle, and, as the extent of the physiological defect is proportionate to the amount of anterior cornual lesion destroyed, it is not difficult to formulate a prognosis, shortly after the acute illness has passed off.

With the involvement of the cerebral cortex in influenzal encephalitis, it is not surprising to find a clinical picture, in which are portrayed defects and instability of psychic functions. The prolonged convalescence, characterized by loss of memory, asthenia and emotional depression, extending over weeks, months and even years, is the hall-mark of a disease, which, more than any other, carries in its train those signs and symptoms, which commonly come under the designation of toxic neurasthenia. Whereas, in poliomyelitis, recovery consists in the restitution of somatic movements, that have been paralysed through muscular wasting, convalescence from influenzal encephalitis is a process less defined, and consists in the gradual rehabilitation of mental and constitutional strength. While, in the former, the defect is essentially motor and to be met by mechanical therapy, in the latter, the anomalies are mainly visceral and psychic, and subject to therapeutic measures of a more general character. In each case, however, there is a tendency from the commencement, if not to recovery, at least to gradual improvement.

In striking contrast with these, is the encephalitis of the lethargic type; for, however closely it may resemble them in the initial stages, and this is not always so, its later course and the relics of its primary damage claim for it a special place in the taxonomy of disease. The kaleidoscopic character of the clinical picture, as revealed in the foregoing review of the 1923 epidemic, finds no parallel in any other disease, not even in the protean expression of syphilis. The nature of the onset is no index as to what may follow. What appears to be a satisfactory convalescence, may only be a quiescent phase preceding the onset of one of the several sequelae, which terminate in permanent disability. Physical disability, change of character and disorders of nutrition, emerge in a manner, which is bewildering in our present knowledge of the structure and function of the nervous system.

There are, however, biological considerations, which suggest an organic basis for the peculiar features, which distinguish the disease and its sequelae. Poliomyelitis, it has been noted, affects the peripheral motor nerves to voluntary muscle, and involves a comparatively simple interference with organic unity. The virus of influenza, when it selects the central nervous system, attacks the cerebral cortex and is responsible for psycho-neurotic disorders, related to derangement of the "higher centres" of neural integration. Lethargic encephalitis, while it may be diffuse like the other two forms, has a decided preference for the mid-brain, the hypothalamus and the basal nuclei of the cerebrum. Although the anatomical and physiological relations of the constituent elements of these regions are still obscure, it is well known to biologists, that they are the oldest and most fundamental parts of the nervous system. They contain the main centres of integration for the nervous regulation of both the visceral and somatic functions of the organism. The hypothalamus is the site of closely

allied connections of the nervous mechanisms, that control the organic systems of digestion, circulation, and respiration. Subsidiary centres of respiration and of vasomotor activity have been localised in the medulla, but there is experimental evidence to suggest, that, in the hypothalamus, all the systems, which have to do with nutrition, are connected in a complicated integration. On the other hand, somatic movements, as contrasted with visceral reactions, are regulated and co-ordinated in their automatic activity by a compendium of reflexes, whose nuclear centres lie in the mid-brain and in the base of the cerebrum. These reflexes comprise the controlling and executive mechanism, which mediates between the higher associational centres of the cerebrum and the lower effector mechanisms of the brain-stem and spinal cord, to which the anterior cornual cells are related. On their afferent side, they are related to the eyes and to the vestibular apparatus, and are thus concerned in the adjustment of conjugate deviations of vision in the maintenance of equilibrium and in the automatic control of posture and of rotatory movements of the head and limbs in co-ordinate relation to movements of the axial skeleton.

When it is remembered, that the main lesions of lethargic encephalitis are situated in the mid-brain, basal nuclei and hypothalamus, just in those centres concerned in the preservation of organic harmony as a whole, it is not difficult to appreciate, in a general way, the variety and extent of complications, which this devasting malady carries in its train. It selects just that part of the nervous system, whose functional derangement might seek an expression in the greatest possible varieties of directions, and it is just this conception of a functional derangement, which affords a clue to a rational understanding of what must otherwise appear to be a chaotic series of sequelae.

This conception of a functional nervous derangement, associated with organic destruction of tissue, is well established in British neurology, and dates back to Hughlings Jackson. It implies, in the present contest, that the various sequelae, so far from being related each to the destruction of a particular locus, are the individual expressions of the disorder of a complicated central mechanism, injured and partially destroyed in the initial inflammatory process, and dislocated subsequently by the exhaustion of stress or strain or shock.

In this way, alone, would it appear to be possible to reduce to a common biological basis such heterogenous disorders as excessive salivation, profuse sweatings and respiratory tics on the one hand, and tremors, somatic tics, giddiness and all the phenomena of Parkinsonism on the other. In this way, also, is it possible to understand, that a disease, which commences with diplopia, squint, chorea, spasm, and myoclonus, may develop into a disability, characterized by defective posture and disorders of automatic movement.

Bearing these considerations in mind, it is not surprising that emotional instability should be a feature of the disease. Those reactions, known to the psychologist as emotional, and associated with abnormal excursions of excitement and depression, are supposed to be the expression of exaggerated or diminished activity of the central regulating mechanisms at the base of the brain. It is, in any case, a well recognised fact, that abnormality of movement, somatic and visceral, is the fundamental and palpable evidence of emotional disorder, for which, indeed, the term emotion is literally a verbal symbol.

Retardation, impulse, and automatism, are characteristics of emotional disorder, affected, as it may be, by varying states of abnormal feeling. The retardation of the victim of Parkinsonism, whose intellect is usually unimpaired, is a perfect example of psycho-motor impediment. The impulse of the naughty child exhibits the licence of excitement, in which the will no longer represents the control of rational intelligence or of disciplinary habit. Criminal offences suggest the automatism of epilepsy and of hysteria, while salivatory exaggeration and respiratory tics represent corresponding excesses in the vegetative system.

It is highly probable, that uncontrollable perversion of conduct, confined as it is almost exclusively to children, is to be related to disorder of basal centres. Attacked during the formative period of development, there is an interference with those constructive processes, whereby the instinctive or phylogenetic reactions of the most fundamental parts of the brain come gradually under the influence of the higher cortical centres, concerned with the evolution of rational intelligence. It is a matter of great significance, that, whatever may have been the case in epidemics elsewhere or in other epidemics in Glasgow, mental defect, in the abstract sense of intellectual deterioration, was practically non-existent in the epidemic under review. It is feasible to suggest, that the difference between children and adults, in respect of aberrant behaviour, is to be construed in the light of the difference in the stage of nervous and mental development, at which the disease has occurred. In the case of children, dissolution of neural integration of basal centres has been produced, before the higher faculties have assumed control; in adults, behaviour has already become regulated by precept and habit, so that the licence of instinctive reaction remains under the control of social custom.

The relatively greater frequency in young people of sequelae, involving the endocrine system, is also to be correlated with the incidence of the initial disease in the formative period of life; and these sequelae have been observed in eight of the cases under review, all of whom were children at the time of the onset. Of the varied forms of endocrine disturbances, obesity, menstrual irregularities, amenorrheoa, abnormal appetite, polydipsia, and polyuria are all found to occur.

Obesity, as a residual, is present only in one case (Crossan), that of a girl, aged 12. The initial illness was characterized by lethargy, and this condition still persists. A year after the illness, it was noted, that there was a gradual increase in subcutaneous fat, although, previous to the illness, the patient was inclined to be thin. In 1924, at the age of 13, her weight was 44·9 kilos. and her height was 135 cms. An operation for appendicitis was performed four years later, and at that time several layers of fat were removed from the abdomen. In 1928, at the age of 17, her weight was 73·6 kilos. and her height was 150·4 cms. Her appetite has been normal throughout.

Menstrual disturbances, it has also been noted, have occurred in girls, when they reach the critical age, at which normal menstruation should take place, and this abnormality is present in 3 cases of the series. An example of Parkinsonism in association with this disorder is illustrated by the following case (Campbell), a girl, at present 15½ years of age, whose illness commenced five years ago with sleeplessness, excitability, and twitchings. Parkinsonism developed immediately after the acute phase, and has steadily progressed, until now, when a state of helplessness has been reached. At the age of 14, menstruation took place on two

occasions, but, since then, has not occurred. In the case (Crossan), previously described, a girl at present aged 17, there have been only two periods of menstruation, which happened at the age of 16. The third case (Drummond), a girl, who is now 16 years of age, has failed to menstruate.

In the case of five children (Attwell, Forsyth, Nicol, Paul, and Sandler), diabetes insipidus is very marked and all of these children have a voracious appetite, rarely being satisfied; two cases (Attwell and Forsyth) have in addition abnormal thirst, accompanied by frequency of micturition. One of the most pronounced cases, showing this sequel, is that of a boy (Attwell), now aged 13, who, after his illness, developed an abnormal craving for food, after having full meals at home. He goes begging round doors, and, during the night, arises and devours all he can lay hands on; he drinks an excessive amount of water, and has frequency of micturition.

The assumption, that functional instability of the complicated basal mechanism, induced by partial dissolution of neural integration, explains in a superficial way the sequelae of encephalitis, finds support in the occurrence of such sequelae after knocks, shocks, and blows. This is clearly demonstrated in one case of this series (MacLachlan), a married woman of middle age, who, having made an apparent recovery from the initial illness, was able to resume household duties for $3\frac{1}{2}$ years, when, suddenly, she sustained a shock, news being broken to her, during the night, of the serious illness of her daughter. Immediately after this happening, symptoms of Parkinsonism appeared, and since have steadily developed

[There is satisfactory evidence to show, that in 6 cases of the series (Attwell, Carnegie, Crawford, Forsyth, Stevenson, and Whitehead) a knock, shock, or blow has also acted as a precipitating factor in bringing about the onset of encephalitis, as in all 6 cases the initial symptoms appeared almost immediately after the occurrence of some form of trauma. A history of a fall has been given in other 4 cases (Hutchison, MacLachlan, Paul, and Silverman), and it would seem, that, here, the fall was the direct outcome of a flaring up of the infection, as, shortly after the accident, acute symptoms manifested themselves.]

In the foregoing review, an attempt has been made to portray in broad outline the main features of the Glasgow epidemic of encephalitis of 1923. The review is in no sense an intimate neurological study. It is sought, rather, to furnish a general impression of the clinical phenomena, as they first presented themselves, and to follow the picture, as it unfolded itself in the succeeding phases, one year and five years later. In this way, there has been thrown into relief the characteristics, which distinguish it from poliomyelitis and the encephalitis of influenza.

A critical summary of the sequelae reveals and illustrates the hypothesis, that they are to be explained, not on the assumption of a progressive lesion of the nervous system such as general paralysis, but on the assumption of an initial and permanent damage to the complicated neural mechanism of the mid-brain, hypothalamus and basal nuclei. The consequent instability of the mechanism renders it prone to give expression to various forms of disability, depending on ill-defined proclivities, one of which is associated with the age of the patient at the time of the initial attack. However inscrutable its origin, however incalculable its course or obscure the conglomeration of its individual manifestations, there is no difficulty in recognising the scar it leaves on the health of the community.

APPENDIX I.

Detailed histories of the series of seventy cases, examined at one and five years after the initial illness—that is in 1924 and 1928.

CASE 1.—David Attwell.
Age: 8.
Residence: 97 George Street, Whiteinch.
Sickened: 22/3/23.
Admission to Ruchill Hospital: 3/5/23.
Dismissed: 3/10/23.

INITIAL ILLNESS, 1923.

The child was ill for six weeks before admission, drowsy and slightly delirious at times. No pain.

3/5/23. On admission T. 99·2° F., P. 96, R. 24.

4/5/23. Child well nourished and appears comfortable. Answers intelligently. Nervous system: Knee jerks absent; no Babinski; no knee nor ankle clonus; abdominal reflexes, very active. Eyes: Pupils react to light and on accommodation; internal strabismus of left eye since infancy. C.S.F.: About 15 c.c.s. clear fluid, withdrawn under slight pressure; no excess globulin; cell count 20; Fehling's solution reduced.

8/5/23. Child lies quietly during day. When up, walks and runs about normally. Towards evening develops choreiform movements, including twitchings of face. Wakeful most of the night, whistling and singing. Twitchings continue. Towards morning he falls asleep and lies quietly.

19/5/23. Wassermann reaction negative. Still sleepless till early morning, and choreiform movements continue during early part of the night.

6/6/23. Sleep improved; child now sleeping from 11 p.m. onwards.

3/10/23. Dismissed well.

CONDITION IN MARCH, 1924.

The boy never sleeps until 5 or 6 a.m. Very restless most part of the night, whistling and singing. At times listless and drowsy during the day, and refuses to play as he used to do, but prefers to stay indoors, hanging over the fire. Since his illness, has become impulsive and quick-tempered. He is domineering in the home, and has developed destructive and thieving tendencies. On one occasion he consumed 1 lb. of sugar and ¼ lb. of cheese. He has occasional spasms of deep breathing. There is some incontinence, and salivation is increased.

CONDITION IN MARCH, 1928.

The child remained at home for one year after leaving hospital. He was then sent to an M.D. school, where he proved unmanageable, attacking other children violently and being generally mischievous, so was shortly afterwards expelled. He was kept at home for over two years, when he was removed to the Southern General Hospital and was there detained for three months. Once more he returned to an M.D. school, but, six months later, was expelled owing to bad conduct, and since that time has remained at home. He is constantly in trouble, the police tracking him, and can not be kept indoors. He steals, lies, and attacks other children. He has an abnormal thirst and craving for food, and, after having full meals at home, goes out and begs round doors. On one occasion, he arose during the night and devoured his father's lunch, left ready for next day. At the sight of food, saliva increases and breathing becomes heavy. He has been sleeping normally for the past two years, although there is still some incontinence and frequency of micturition. His memory is acute, and he is quite intelligent; in appearance he is slovenly. Twitchings of the legs and arms are still present.

Nervous system—Eyes: Internal strabismus of left eye since birth. Physical examination otherwise nil.

CASE 2.—John Blackwood.
Age: 11.
Residence: 3 Grove Park Street.
Sickened: 10/2/23.
Admission to R.H.S.C.: 17/2/23.
Died: 26/2/23. 16 days' illness.

INITIAL ILLNESS, 1923.

Onset was characterized by fever, loss of appetite, and nystagmus.

22/2/23. Choreiform movements marked with great excitement. Very restless, excited, and attempting to get out of bed. T. 100° F. to 102° F.

26/2/23. Died, unconscious.

CASE 3.—Mary Blane.
Age: 11.
Residence: 33 Florence Street, S.S.
Sickened: 31/1/23.
Admission to Belvidere Hospital: 4/2/23.
Died: 10/2/23. 9 days' illness.

INITIAL ILLNESS, 1923.

Illness commenced on 31/1/23 with dizziness, drowsiness and sore throat. Same night legs became rigid. No pain. No sickness. Right ear discharging for a fortnight.

4/2/23. On admission T. 99·4° F., P. 124, R. 36.

5/2/23. Patient in deep coma, but can be roused by loud questioning. Nervous system: No opisthotonus; no Kernig's sign; no rigidity of neck nor retraction of head; pupils equal, contracted, but react to light; no tenderness can be elicited over either mastoid. No sign of facial nor other palsy; jaw fairly tightly closed; spasticity of arms and legs; no twitching movements; reflexes all increased; tendency to "la poupée" phenomenon; incontinence of urine and faeces. C.S.F.: Crystalline in appearance, but pressure considerably increased. No cells nor organisms found microscopically.

7/2/23. Spasticity more marked. Coma still deep. T. 106° F. Respirations rapid and shallow. Pulse poor.

9/2/23. Patient moribund, coma, pulse imperceptible. Respirations very shallow.

10/2/23. Died.

Post-mortem examination: Brain showed no lesion of any kind and no exudate, but a generalised inflammatory condition. Marked congestion and dilatation of vessels. Extra-dural spinal haemorrhage in thoracic region.

CASE 4.—John Blue.
Age: 28.
Residence: 224 Parliamentary Road.
Sickened: 26/1/23.
Admission to Royal Infirmary: 3/2/23.
Transferred to Ruchill Hospital: 11/4/23.
Dismissed: 28/5/23.

INITIAL ILLNESS, 1923.

Illness commenced on 26/1/23 with pain in right side of neck and loss of power of right arm. Following day, diplopia present. Later less pain, but paresis continued and delirium at times.

3/2/23. Semi-conscious on admission to Royal Infirmary, but could answer simple questions if roused. No nuchal rigidity and no Kernig's sign. Eyes react to light and on accommodation. Right pupil slightly larger than left. Fine twitching of head.

6/2/23. Very noisy during night.

24/2/23. Sleep much improved. Jerking of head to left and twitching of muscles of left side of chest.

20/3/23. Slight ptosis and twitching of head to left.

11/4/23. On admission to Belvidere: T. 97° F., P. 96, R. 22.

12/4/23. Patient comfortable, behaves normally and answers questions intelligently. Heart and lungs nil. On examination, head moved to left side and left side of chest twitched synchronomously with heart beat. Nervous

system: Knee reflexes very active; no Babinski sign, no knee nor ankle clonus. Eyes: Both pupils dilated and sluggishly reactive to light and on accommodation. C.S.F.: Fluid clear, under increased pressure; cell count 10; marked excess of globulin; Fehling's solution not reduced.

19/4/23. Wassermann reaction of blood and C.S.F. negative.

27/4/23. Eyes: Optic discs very pink and edges difficult to define. Marked ptosis of both eyelids.

28/5/23. Dismissed well. Still ptosis of eyelids.

CONDITION IN MARCH, 1924.

The patient remained at home for six weeks after leaving hospital; he then resumed duties as police constable. He was fairly well at that time, symptoms having worn off, unless for pain in the right arm, with which he was troubled for a few months. At present he feels perfectly fit, and is actively engaged in his daily duties.

CONDITION IN MARCH, 1928.

The patient has now been on duty for 4½ years and during that time has felt perfectly well, until a few months ago. Two years after his illness he married and has two children, both healthy. At present he complains of shakiness of the left arm, which has developed during the past few months. He is stolid in appearance, speaks hurriedly in a thick monotonous voice, with difficulty in articulating. Salivation is excessive, and there is obvious dribbling at both sides of the mouth. When standing or walking, the head is bent forward, and when sitting there is a tendency to droop from the waist. Stiffness is not evident to any marked degree, although there is a suspicion of this in the left arm. He is very quick-tempered, sighs frequently, and at times there is some drowsiness. The eyesight is weak and for the past eighteen months he has required to wear spectacles when reading. His appetite is quite good.

Nervous system: Jerks, normal. Tongue: Marked tremor. Eyes: Pupils equal, sluggish reaction to light and on accommodation. Ptosis of left eyelid.

CASE 5.—John Boyle.

Age: 24.
Residence: 257 South Wellington Street.
Sickened: 23/3/23.
Admission to Belvidere Hospital: 30/3/23.
Transferred to Eastern District Hospital: 6/5/23.
Transferred to Southern General Hospital: 15/5/23.
Transferred to Hawkhead Asylum: 23/5/23.
Died: 3/4/24.

INITIAL ILLNESS, 1923.

The patient is alleged to have had an illness in July, 1922, which resulted in a changed mentality and a restless disposition. He suffered from shell-shock during the war.

30/3/23. On admission T. 98·4° F., P. 88. Patient seems comfortable, although inclined to be restless, but not drowsy. On questioning his answers are rambling without sequence and frequently impossible. Nervous system: Right pupil smaller than left, but both react normally to light. Reflexes active but slightly exaggerated.

1/4/23. Very restless. No twitchings. Confusion of speech and mind.

15/4/23. Patient has taken a geat dislike to food, which he throws about. At times he is sullen and morose.

6/5/23. Removed to Eastern District Hospital.

23/5/23. Admission to Hawkhead Asylum.

Medical certificate from Southern General Hospital: Patient very confused and incoherent, and unable to sustain his thought in any one line for any appreciable time. He takes fits of unreasonable crying, is very dirty in his habits, and is content to lie in his soiled clothes in bed. He requires constant supervision.

24/5/23. Patient very childish and extremely confused. Speech is slow and hesitating. He is very incoherent and unable to answer simple questions, and is completely disorientated.

5/6/23. Blood Wassermann: Positive++.

16/6/23. Patient very dirty in his habits and shows a good deal of dementia. Speech is very difficult and hesitating. Physically he shows a fair degree of paresis, and exhibits many of the physical signs of general paralysis.

26/8/23. Patient had two seizures of the general paretic character.

6/10/23. C.S.F. clear, under increased pressure. Wass. reaction+40. Cells 20·5 per c.m.m.

23/2/24. Patient confined to bed. Very noisy, shouting and singing—becoming very emaciated.

3/4/24. Died.

CASE 6. Mrs. Buchanan.
Age: 33.
Residence: 291 Swanston Street, Bridgeton.
Sickened: 16/2/23.
Admission to Eastern District Hospital: 23/2/23.
Admission to Eastern District Hospital (Observation Wards): 23/2/23.
Died: 21/3/23. 5 weeks' illness.

INITIAL ILLNESS—1923.

Illness commenced with a chill on the night of 16/2/23.

23/2/23. On admission T. 101° F. to 103° F.; P. 100 to 130; R. 40 to 50. Pain in right shoulder, restlessness, sleeplessness, and twitching movements of whole body. Headache.

26/2/23. Jerky tremulous movements, more like clonus. Twitching of face. No ocular symptoms. Very delirious and restless. Always recalled with ease.

5/3/23. Gradual cessation of delirium, but still pyrexia. No lethargy. No signs of pneumonia. Bedsores.

21/3/23. Died.

CASE 7.—Donald Cameron.
Age: 47.
Residence: 6 Burns Street, Port Dundas.
Sickened: 9/3/23.
Admission to Belvidere Hospital: 15/4/23.
Dismissed: 23/4/23.

INITIAL ILLNESS—1923.

The patient states he has been feeling ill for about 5 weeks—fevered and nervous. Onset characterized by fever, drowsiness, diplopia, twitching of face and giddiness.

15/4/23. On admission T. 97·4° F., P. 60, R. 18. Patient drowsy, but answers questions intelligently. Nervous system: Knee jerks normal; no ankle nor knee clonus; no Babinski sign; coarse tremor of both hands, increased on action; giddiness present; abdominal reflexes absent. Eyes: Moderately contracted pupils, react to light and on accommodation. Speech normal. No tongue tremor. C.S.F.: 20 c.c.s. clear fluid, withdrawn under slight pressure; no increase of cells; no excess globulin; Fehling's reduced.

19/4/23. Wassermann of blood and C.S.F. negative. Patient rather nervous and complains of blurred vision.

20/4/23. Patient can read all day without any difficulty, although he states "he just sees a word here and there."

23/4/23. Dismissed—well.

CONDITION IN MARCH, 1924.

The patient has had no further trouble since his illness, and has resumed his occupation.

CONDITION IN MARCH, 1928.

The patient is employed as a fireman on board an Atlantic liner and is reported well.

CASE 8.—Lily Campbell.
Age: 10.
Residence: 82 Prince Edward Street, Strathbungo.
Sickened: 21/2/23.
Admission to Belvidere Hospital: 9/3/23.
Dismissed: 29/5/23.

INITIAL ILLNESS—1923.

Illness commenced on 21/2/23 with sleeplessness, nocturnal excitement, singing choruses, reciting all night and working the hands. No paresis. No diplopia. Tendency to drowsiness during the day.

4/3/23. Very drowsy and slight internal squint.

9/3/23. On admission T. 100·6° F., P. 112, R. 28. General condition good and patient inclined to be drowsy, but quite intelligent, and answers questions well. Both arms twitching. Arms and legs spastic. Internal strabismus. Pupils react to light and on accommodation. Reflexes active. No head retraction and no Kernig's sign. C.S.F.: Clear under some pressure. Very constipated. Heart and lungs—nil.

10/3/23. Generalised twitchings.
11/3/23. Twitchings confined to left leg and extensors of toes. Headache (vertex).
28/3/23. Dull facies, lethargic spasticity and katatonia. Arms and legs spastic.
18/4/23. Face still masked.
6/5/23. No twitching of muscles. Slight droop of left shoulder. Gait somewhat ataxic.
29/5/23. Dismissed. I.S.Q.

CONDITION IN MARCH, 1924.

The child goes to sleep on an average about 2 a.m. Twitching of various parts of the body at night. Face has a vacant expression, with often a slow smile. Eyes have a staring look, winking seldom. Voice monotonous. Salivation greatly increased. Right arm stiffer and weaker than left, and held stiffly in walking. Rotatory movements diminished. Very drowsy. Since illness, unduly emotional and very irritable. Intelligence quite good.

CONDITION IN MARCH, 1928.

Insomnia continued for more than a year, the child being unable to sleep until the early hours of the morning. She resumed school 4 months after the illness, and continued there for about 8 months. During school hours she was overcome by drowsiness, so was forced to remain at home. About one month later she began to fall off her chair, becoming generally weaker. Salivation from the beginning of the illness has increased and is at present very marked. Symptoms of Parkinsonism have gradually increased since leaving hospital. She showed signs of weakness of the right arm and leg, gait became shuffling, right leg dragging, and these symptoms steadily progressed. After 2 years she developed tremors of the arms and legs, and the voice disappeared. She has required to be fed for about 2 years, and has become most fractious, having previously been docile. Her memory is exceptionally good. She sleeps normally and her appetite is variable.

In appearance she is very pallid, expression masked, gaze staring, and for the last 5 months the eyes at times involuntarily turn up, remaining so for lengthy periods. She is practically helpless and is mostly in bed. The body is emaciated, there is generalised rigidity and coarse tremor of the arms is present, the right more pronounced; tremor of the legs is less evident. The feet are inverted at the ankle joint, right foot more so. The right hand is bent downwards at the wrist, the thumb and first finger of both hands being held together. The knee and elbow joints are rigid. The arms, bent at elbow, are held in front of the body. When walking (supported), she lurches towards right side, left foot is flat on the ground, the right foot turned in, with toes only touching ground. When sitting, she falls forward. She snores frequently, and at the early stages of the illness she sighed. She menstruated twice at the age of 14 about 18 months ago, but not since then.

Nervous system: Knee jerks. Increased on the right side.
Tongue: Tremor.
Abdominal muscles: Rigid.
Eyes: Pupils equal, sluggish reaction to light and on accommodation. Bilateral ptosis.

CASE 9.—JOHN CARNEGIE.
Age: 7.
Residence: 61 Dale Street, S.S.
Sickened: 16/3/23.
Admission to Victoria Infirmary: 17/3/23.
Dismissed: 8/6/23.

INITIAL ILLNESS—1923.

Two nights before admission, the child was struck on the face with a whip. Next day, the father noticed that the child was restless and twitching the right arm and shoulder. He remained in bed, but showed no inclination to sleep. He became very talkative and the voice was husky. His grandmother states that, during the fortnight previous to admission, he became more jumpy and restless than usual.

17/3/23. Child is healthy looking. Is very restless and excited. Lies in bed and tosses about and turns the head from side to side. Right arm and both legs are generally flexed and he continually partially extends and then flexes them again. The leg is also rotated internally and externally at the hip. He has slight nasal catarrh. The voice is husky, but articulation is normal.

Nervous system: Reflexes—Normal. Eyes: Pupils react to light and on accommodation. No nystagmus nor ptosis, but slight internal strabismus of the right eye. Heart and lungs: Nil.

19/2/23. Complaint of pain in both elbows and lower dorsal region. Fine papular rash on back and buttocks.
24/3/23. Movements of hands, arms and legs not so pronounced. More inclined to be drowsy.
1/4/23. Child has delusions of persecution.
8/6/23. Dismissed, but delusions still present.

CONDITION IN MARCH, 1924.

The child still suffers from sleeplessness and restlessness. He is very emotional and full of fears.

CONDITION IN MARCH, 1928.

The child returned to school 2 months after leaving hospital, as his mother was unable to keep him at home, owing to his restless condition. He could not sleep at night and had hallucinations, saw motor cars and aeroplanes, sat up in bed, staring ahead and looking vacantly. Very often he got out of bed, and his mother was in constant dread of what he was going to do. . One night he found a packet of cigarettes belonging to his father and smoked five of them partially. After leaving hospital, he was full of fears, always thinking some one was going to do him harm. One day, when out with his mother, he ran ahead, glancing backwards, with a look of terror on his face. When she managed to get hold of him he said, " There is someone chasing me, trying to do something to me." When at school, he was very much afraid of everything; he refused to leave the class-room at the interval and play with the other children, and told his teacher that someone was going to hurt him. At times he would look through the class-room window and talk to the statues in the hall. This abnormal condition lasted for over a year.

Since his illness his disposition has changed completely. Previously he was shy and reticent, and now he is bold and will talk to anyone he meets. He is very emotional and irritable and is continually on the move; he kicks his feet, tears at his jersey and clicks his tongue. In acquiring abstract knowledge, he has made average progress, although often shows eccentricities of conduct; for instance, during a lesson he will suddenly address his teacher, and occasionally rises and takes a walk round the class-room. He is extremely thin and becomes easily exhausted, but eats and sleeps well. His habits are good, and he is generous, kind and thoughtful at home. Eyesight is weak and for the past year he has worn spectacles.

Nervous system: Eyes: Slight strabismus of right eye.

Physical examination otherwise nil.

CASE 10.—Isaac Cohen.

Age: 19.

Residence: At present in Detroit, U.S.A.

Mother's address: (Mrs. Babbin), Warwick Street, S.S.

Sickened: 22/2/23.

Treated at home.

INITIAL ILLNESS—1923.

Onset characterized by headache, sleeplessness, blurred vision and vomiting. T. 101° F.

24/2/23. Diplopia and mild delirium. Still sleepless.

25/2/23. Confused and depressed.

6/3/23. Improved with no mental symptoms. Much exhausted. 3½ weeks' fever.

CONDITION IN MARCH, 1924.

The patient is now in America and stated to be fairly well, although he suffers from headache and neuralgic pains.

CONDITION IN MARCH, 1928.

The patient went to Detroit, U.S.A., at the end of 1923, as the climate in this country did not suit him on account of neuralgic pains. Since going to America, he has married, and his mother states he is at present in fairly good health, although still suffering from headache and neuralgic pains throughout the body.

CASE 11.—Janet Crawford.

Age: 24.

Residence: 34 Woddrop Street.

Sickened: 13/2/23.

Treated at home. 3 months in bed.

INITIAL ILLNESS—1923.

Onset characterized by sleeplessness and abdominal pain, with nervousness and jerking of hands. T. 103° F.

16/2/23. Diplopia. Restless and required sedatives. No drowsiness. Fantastic co-ordinated movements of arms, shoulders, and head, resembling hysterical attitudinising. Talks in a wandering fashion.

28/2/23. Drowsiness present and marked. Restless.

CONDITION IN MARCH, 1924.

A few months after her discharge from hospital, the patient returned to business. At present she is irritable and suffers from headache and weak eyesight; otherwise fairly well.

CONDITION IN MARCH, 1928.

Previous to her illness, the patient had a great deal of worry; her fiancé died and, at the same time, she had trouble on account of being superseded in business. After convalescing for a few months she was able to return to business. During the next few years, she felt fairly well except for a feeling of depression and irritability; at times she complained of headache and weak eyesight. In June, 1927, she felt weakness and shakiness of the right arm and leg. Parkinsonian symptoms increased and by September, 1927, she was forced to give up work. She tired readily, and commenced dragging the right leg. In December, 1927, there was a sudden attack of acute maniacal delirium, and she was confined to bed for 4 weeks. The acute condition passed off, but Parkinsonism increased.

At present her appearance is mask-like; the eyes stare and occasionally turn up for a brief spell. The speech is difficult, slow and monotonous, and salivation is excessive. There is marked tremor of the right arm and leg, with rigidity of the knee joint. When walking, she drags the right leg, the head is bent forward, the right arm is held stiffly out from the side and flexed at the elbow, first finger and thumb touching. Her movements are ponderous and, when in bed, she has difficulty in turning on to the left side. She has become apathetic and depressed, and frets about her inability to work. Her temper is variable, and she weeps easily. She sleeps well, has a good appetite and appears well nourished. About once a week she has a turn of giddiness and requires to lie down. Her eyesight is weak.

Nervous system: Knee jerks. Active. Right increased. Babinski sign present on right side. No knee nor ankle clonus.

Tongue: Marked tremor.

Eyes: Pupils equal, right eye sluggish reaction to light and on accommodation. Ptosis of left eyelid. Twitching of right eyelid.

Right hand grip weaker than that of left.

CASE 12.—Elizabeth Crossan.

Age: 12.
Residence: 36 Milton Street, Cowcaddens.
Sickened: 2/2/23.
Admission to Ruchill Hospital: 16/2/23.
Dismissed: 22/3/23.
Admission to R.H.S.C.: 14/1/24.

INITIAL ILLNESS—1923.

The patient felt very drowsy for a fortnight before admission to hospital. She was difficult to awaken, but on being roused said she was quite well, only sleepy. Her conduct was normal, but her movements very slow. No history of diplopia, nor dimness of vision.

16/2/23. On admission T. 99° F., P. 98, R. 24. Child appears thin and poorly nourished. Colour pale and inclined to be cyanosed. She answers quite intelligently, but seems drowsy. Tongue brown coated. Nervous system: Knee jerks: normal. No Bakinski. No Kernig's sign. Eyes: Normal. Fundi oculi: Normal.

28/2/23. Still very somnolent, but answers questions intelligently. Appetite normal.

12/3/23. Wassermann reaction negative. C.S.F.: Clear. 15 c.c.s. withdrawn under slight pressure. Cell count 30, mainly lymphocytes. No excess globulin.

22/3/23. Dismissed. Occasionally drowsy.

14/1/24. Admitted to R.H.S.C., with drowsiness and obesity. History of acute illness a year ago with drowsiness.
Weight: 44·9 kilos.
Height: 135 cms.
C.S.F.: Negative. Physical examination: Negative.

CONDITION IN MARCH, 1924.

Drowsiness persisted after leaving hospital. Although sleeping well at night, she falls asleep at school. Child at present leads a normal life. Since her illness there has been a gradual increase in the subcutaneous fat, which is now very noticeable, so that the mother has sought medical advice. Previous to the illness, the child was rather thin than otherwise.

CONDITION IN MARCH, 1928.

Shortly after her discharge from hospital the child returned to school, but had to be removed owing to persistent drowsiness. She was admitted to R.H.S.C. on 14/1/24, and remained there for about 2 months. After that time she was kept at home for 3 years. She was then sent by the Parish to Rothesay to train for domestic service. She remained there for 2 months, but owing to her condition was sent to Stobhill Hospital. A week later, she was taken out against medical advice.

In January, 1928, she was suddenly operated on for appendicitis in Glasgow Royal Infirmary, and at that time several layers of fat were removed from the abdomen. Although she sleeps the round of the clock, drowsiness is very persistent during the day. She yawns frequently, and her memory is poor. She is very childish and plays with young children; she is violent tempered, emotional, and weeps without cause. She takes peculiar aversions to people, especially to men, so much so that the mother says, if a man were to speak to her, she would fly at him. There is marked obesity of the arms and legs, and especially of the abdomen, which has thick layers of fat. Appetite has been normal throughout, and there is no increased salivation. She menstruated twice at the age of 16 in Spring, 1927, but has had no menses since.

Nervous system: Jerks. Normal.
Tongue: Slight tremor.
Eyes: Normal.
Height: January, 1924 (age 13)—135 cms.
Weight: January, 1924 (age 13)—44·9 kilos.
Height: March, 1928 (age 17)—150·4 cms.
Weight: March, 1928 (age 17)—73·6 kilos.

CASE 13.—Sarah Curran.
Age: 26.
Residence: 384 Dobbie's Loan.
Sickened: 23/2/23.
Admission to Ruchill Hospital: 9/3/23.
Dismissed: 31/3/23.

INITIAL ILLNESS—1923.

Onset characterized by pain in the head (vertex), drowsiness, twitching movements, and hallucinations. Diplopia (2 days).

9/3/23. On admission T. 98·4° F., P. 120, R. 26. Patient rather poorly nourished. Still drowsy. Mentally clear. Nervous System: Knee jerks very active. No Babinski. No knee nor ankle clonus. Eyes: Pupils dilated and fixed. C.S.F. 20 c.c.s. fluid withdrawn. Clear under slight pressure, cell count 60, mainly lymphocytes. No excess globulin.

14/3/23. Fundi oculi: Discs more pink than normal, but edge clear.
18/3/23. Wassermann Reaction: Negative.
20/3/23. Occasionally falls asleep at odd times.
31/3/23. Dismissed. Well.

CONDITION IN MARCH, 1924.

Feeling of drowsiness passed away 2 or 3 weeks after leaving hospital. At present she suffers from frequent headaches, and has a feeling of giddiness, when stooping. Increased salivation slightly present since illness. She is employed in a chemical work, and seems fairly well.

CONDITION IN MARCH, 1928.

The patient returned to work 3 weeks following her discharge from hospital. Two years later, she was suspended, the work being closed down, and, since then, she has been at home, as she is unable to find work. Drowsiness has worn off and sleep is now normal. For about a year, she has been greatly troubled with dizziness, at present having an attack about once a week—not when stooping. She has occasional headaches, and the eyesight is weak. There is no increased salivation.

Physical examination. Nil.

CASE 14.—Agnes Dillon (Mrs.).
Age: 27.
Residence: 24 Ardholm Street, Shettleston.
Sickened: 19/1/23.
Admission to Eastern District Hospital (Observation Wards): 26/1/23.
Dismissed: 19/4/23.

INITIAL ILLNESS—1923.

Onset characterized by twitching movements, mostly on right side. Later delirium with restlessness.

26/1/23. On admission, patient was fevered, delirious and getting out of bed. Was able to answer questions even at her worst. No ocular symptoms.

3/2/23. Drowsiness and restlessness, intermittent at intervals of 2 or 3 days.

13/3/23. Emotional, cries easily, confused at times.

19/4/23. Dismissed. Well.

CONDITION IN MARCH, 1924.

The patient has been well since her dismissal from hospital, and is at present carrying on her household duties.

CONDITION IN MARCH, 1925.

The patient resumed her household duties about a month after her dismissal from hospital. She became pregnant 3 months later; the birth was normal, at full term, and the child quite healthy. Up to this time, she felt perfectly well, but, after the birth, nervous symptoms developed. At present she is quick-tempered and irritable. She is frequently attacked by violent headaches, accompanied by tremors, and the eyesight is weak. Sleep is normal and her appetite is good.

Physical examination: Nil.

CASE 15.—Hannah Drummond.
Age: 11.
Residence: Luggie Bank Lodge, Kirkintilloch.
Sickened: 23/2/23.
Admission to R.H.S.C.: 6/3/23.
Transferred to Belvidere Hospital: 19/3/23.
Dismissed: 25/9/23.

INITIAL ILLNESS—1923.

Onset characterized by severe pain in right arm and wrist and right side of back. Severe abdominal pain persisted for 7 days and, during this time, the child was very constipated. For 4 days before admission the child was fevered, restless and sleepness at night. Admitted to surgical ward as appendicitis, and transferred to medical ward 3 days later, as no evidence of appendicitis was found. Child complained of generalised pain, and twitching of abdominal muscles was present.

6/3/23. On admission T. 99° F., P. 100, R. 24. Septic sores on face, head and back. Right ear discharging. Child is very restless and screams with pain, but is unable to locate the site. There is constant twitching of abdominal muscles and at times of diaphragm, and this is also present to a lesser extent in muscles of limbs.

7/3/23. Twitchings less marked, but still present. Child very restless and delirious, pulling at bed-clothes and attempting to get out of bed. She is constantly spitting and defaecates on the bed. Hyperpnoea present. Nervous system: Jerks. N.A.D. Pupils react to light but not on accommodation.

19/3/23. C.S.F.: Not under increased pressure. Fehling's reduced. Transferred to Belvidere Hospital.

19/3/23. Admission to Belvidere Hospital. T. 100.6° F., P. 115, R. 30. Septic sores on face and head. Pressure sore on back. Child very restless, muttering in sleep. Twitchings more marked on left side. Very drowsy and roused with difficulty.

1/4/23. Child talks in a slurring fashion, but is able to answer questions. There is some ptosis of eyelids. No nystagmus and no diplopia. Pupils sluggish on accommodation, but react to light. Jerks. N.A.D. No spasticity. Very constipated.

1/6/23. Not much improvement.

25/9/23. Dismissed. Not yet well.

CONDITION IN MARCH, 1924.

The child suffers from nocturnal insomnia. Attended school for one week after her illness, but, owing to pain in left leg, she was unable to continue. When sitting, she tends to adopt a markedly crouching attitude; when standing or walking this tendency is also present. Arms held stiffly, eyes have a somewhat staring look, winking seldom. Slight bilateral ptosis. The face is somewhat masked, and salivation is increased. Continuous twitching of both arms evident, right arm especially affected, also twitching of mouth. At times she suffers from severe pain in left leg. Since her illness she complains of pain in stomach region, which is intermittent, and not related to the taking of food. Regularly after food she vomits, although there is no nausea; this trouble began while in hospital, and has persisted. Hyperpnoea has been evident since illness, and at present very marked. Child looks pale and ill-nourished. She is very emotional and greatly changed in character, having become bad-tempered and impulsive.

CONDITION IN MARCH, 1928.

From the time of her illness the child's teeth dropped out one by one. Within the last 3 years improvement has been gradual; since then, salivation has become normal, twitching of hands and arms has ceased, abdominal pain and vomiting have disappeared. At present there is no sign of Parkinsonism. She is ruddy and healthy in appearance, but is of stunted growth. The head and entire trunk are bent towards the left, with spasm of spinal and occipital muscles. There is a considerable lordosis and scoliosis, with a convexity to the right; the chest wall shows marked deformity (pigeon chest). Pain in the back of the legs has lately worn off. She becomes very easily exhausted, and has not yet menstruated. She suffers from nasal catarrh and spits frequently. Her appetite is fair.

The child's character has undergone a complete transformation. Since her illness she has become mentally unstable and is mischievous, sly, impulsive, quarrelsome, and very precocious. She is constantly in trouble.

CASE 16.—Archibald Eadie.
Age: 7.
Residence: 46 Brown Street.
Sickened: 3/2/23.
Admission to Stobhill Hospital: 7/2/23.
Transferred to Ruchill Hospital: 18/4/23.
Dismissed: 3/10/23.
Re-admitted to Ruchill Hospital: 8/12/23.
Dismissed: 26/5/24.

INITIAL ILLNESS—1923.

Admitted to Stobhill Hospital on 7/2/23, suffering from chorea.

18/4/23. Admission to Ruchill Hospital. Child restless and excited, and is of very nervous disposition. Mentally clear. Voice husky.

20/4/23. Child awake most of the night, showing great excitability. Becomes drowsy during the day. C.S.F.: Fluid clear under normal pressure. Knee reflexes: Increased. Heart and Lungs: Nil.

9/5/23. Child sleeps during the early part of the day, and runs about in the afternoon. Towards evening, he develops choreiform movements, becomes very restless and rarely sleeps before 4 a.m. Choreiform movements disappeared during sleep.

19/5/23. Wassermann Reaction: Negative.

6/6/23. Somewhat improved.

3/10/23. Dismissed. Well.

8/12/23. Readmitted to Ruchill Hospital, complaining of sleeplessness and drowsiness for the past two months.

11/12/23. Child very restless during night, burrowing amongst bed-clothes, excited and shouting. Drowsy during the day.

15/5/24. Still restless and sleepless, and drowsy during the day.

26/5/24. Dismissed.

CONDITIONS IN MARCH, 1924.

The child is at present in Ruchill Hospital. Mother states that the boy had to be removed to hospital, because of restlessness and impulsiveness at night.

CONDITION IN MARCH, 1928.

Following his discharge from Ruchill Hospital for the second time, extreme restlessness continued for 3 months. The child was unable to sleep at night, and turned night into day, becoming drowsy by day. After a few months, he was sent to a special school, where he has since remained. For the last 18 months, he has been sleeping well, although occasionally he walks in his sleep. He has become very emotional and weeps readily. He associates with young

children, and on several occasions he has been in trouble for interfering with little girls. This misconduct has continued for the last two years. At times he is violent towards younger children, striking and kicking them. He has no moral stability and is easily led.

Within the past few months, Parkinsonian symptoms have become evident; the expression is vacant, the eyes staring, and there is obvious dribbling from the mouth. He speaks in a thick monotonous voice with difficulty in articulation. The gait is hurried, and he walks with a forward bend, the arms held stiffly, especially the right one; when standing or sitting, the body droops forward.

The child was circumcised when he was six weeks old.

Nervous system: Knee jerks: Increased.

Abdominal reflexes: Increased.

Tongue: Tremor.

Eyes: Pupils equal, react to light and on accommodation.

CASE 17.—Elizabeth Forsyth.

Age: 7.

Residence: 40 Wellshot Road, Shettleston.

Sickened: 22/1/23.

Admission to Victoria Infirmary: 22/5/23.

Dismissed: 15/7/23.

Admission to Woodilee Asylum: 4/6/24.

Died: 15/6/28.

INITIAL ILLNESS—1923.

Four months prior to admission to hospital, the child had a fright with a dog. Shortly afterwards she became fevered, had tremors, and hallucinations and was very drowsy. At that time, the mother states there was an internal squint of the right eye. Since then, she has slept continuously at home and at school. She has become more emotional and childish than formerly, and is subject to fits of violent temper.

22/5/23. On admission T. 98·4° F., P. 86. Child drowsy and difficult to rouse. Reflexes: Normal. Pupils react to light and on accommodation.

26/5/23. Child tends to be emotional and laughs and cries readily. Her mental development is below that of the average child of 7 years.

15/7/23. Dismissed. I.S.Q.

CONDITION IN MARCH, 1924.

The child is drowsy during the day and falls asleep at any hour, although she sleeps well at night. She lies and steals and is very impulsive. She domineers and is cruel to other children, although at times seems conscious of her bad behaviour. On one occasion, after striking a child, she said, "Oh God, make me better," Salivation is increased. Apart from outbursts of excitement, when she becomes unmanageable, she is rather dull.

CONDITION IN MARCH, 1928.

After her dismissal from hospital, the child remained at home for 2 months, and was then sent to a special school. There she was kept only for 3 months, as she was found to be absolutely uncontrollable and unresponsive to discipline She was constantly causing trouble, attacking her playmates, telling lies and stealing—a peculiarity being that she gave away what she stole. Her habits were of the lowest; she played about with faeces and urine, used obscene language, and showed erotic tendencies. Her appetite was perverted; she was ravenous for food, and, although well fed at home, would enter neighbours' houses and seize anything in the way of food, to the extent of snatching it from peoples' mouths. Her thirst was abnormal and there was frequency of micturition.

About a year after she came out of hospital, she was sent to Eastern District Hospital (Observation Wards) and, two days later, was certified for Woodilee Asylum. After being kept there for six months, she was allowed home on trial, but was found impossible to deal with; she assaulted her mother with a ladle and bit her father. She was sent back to the asylum a month later, and, after her return, she made an escape on two occasions. At the time of her admission to Woodilee Asylum on 4/6/24, there was evidence of the development of Parkinsonism, which has since steadily increased.

She has been confined to bed since December, 1927, being completely helpless and requiring to be fed. Her speech and memory have gone, and her condition is typically Parkinsonian—face expressionless, eyes staring and turning upwards for long periods, salivation excessive, spasticity and contractures of extremities started, contractures not fixed; the feet are turned in, the hands slightly so. General tremor is marked, and there are choreiform movements of hands and face. Emaciation is extreme, and her appearance is cachectic. There is a cessation of impulsive acts, and lethargy is pronounced. This patient has an unfavourable family history; the father is alcoholic, and was so, before he married, and the mother is neuropathic, being subject to frequent periods of depression.

15/6/28. Patient died. Towards the end, contractures of the extremities became fixed.

CASE 18.—Janet Fraser.
Age: 19.
Residence: 47 Helen Street, Govan.
Sickened: 23/2/23.
Treated at home.

INITIAL ILLNESS—1923.

Onset characterized by drowsiness, headache and double vision. Diplopia lasted for 3 days.
9/3/23. General shiverings.
16/3/23. Still drowsy and very apathetic.

CONDITION IN MARCH, 1924.

Lethargy gradually grew less, although, at present, the patient very often becomes drowsy during the day, even after a good night's rest. The father states she has become very quick-tempered since her illness.

CONDITION IN MARCH, 1928.

A few months after her illness, the patient was able to resume her household duties, and later went to service; at present she is employed in a jam factory. The lethargic condition is still occasionally present. She sleeps well at night, although sometimes talks during sleep. At times she complains of frontal headache and blurring of vision. Her temper is fitful, and, during any excitement, she shakes violently, salivation then becoming increased.
Nervous system: Tongue—Slight tremor. Otherwise physical examination nil.

CASE 19.—Thomas Gallacher.
Age: 9.
Residence: 180 Castlebank Street, Partick.
Sickened: 24/1/23.
Admission to R.H..S.C.: 31/1/23.
Dismissed: 31/3/23.

INITIAL ILLNESS—1923.

Onset characterized by vomiting, headache, restlessness, and nocturnal insomnia.
31/1/23. Severe chorea of 7 days' duration. Jerking of arms and legs and twitching of the facial muscles. No fever. Child sleepless and excited by night, and drowsy during the day.
3/2/23. Chorea ceased. Physical examination: Nil.

CONDITION IN MARCH, 1924.

The boy suffers from extreme restlessness during the night, with drowsiness by day. In the night-time, he whistles and sings, tears the bed-clothes, gets up out of bed, strikes his brothers, and generally becomes unmanageable. This condition is worse some nights than others. He often expresses regret for his bad behaviour. At school he often falls asleep; he spits a great deal both day and night, and has occasional spasms of deep breathing. There is an increase of salivation. Bilateral ptosis present. He appears very intelligent.

CONDITION IN MARCH, 1928.

The boy remained at home for 4 months after his discharge from hospital. His condition was such, that he had to be removed to the Southern General Hospital, where he was detained for 2 months. After that time, he returned to school, but a month later was expelled owing to bad behaviour, and since then he has not been at school. He is of very stunted growth, not having grown since his illness. His appetite is capricious. Salivation is increased; he spits frequently, yawns often, and, if thwarted in any way, takes violent fits of temper. He can not be kept indoors, and, if deterred, he threatens to jump out of a three-storey window. He leaves home every morning about 7 o'clock, returning at a late hour, and spends his time associating with men at the docks. He lies and steals, and, about five months ago, he was taken up by the police for stealing newspapers out of a shop and selling them on the street. After this, he got a job with a milkman, but promptly was dismissed, as he appropriated the customers' money. He is constantly twitching his mouth and shoulders, and clicks his feet when walking. He is continually hitching up his stockings, to the extent of tearing the tops off them. Sleep is now normal.

In appearance he is bright and attractive, and in intelligence he is well above the average. Although absent from school for an extended period, he remembers all he ever learned.

Nervous system: Jerks: Normal. Eyes: Slight bilateral ptosis. Slight internal strabismus of the left eye.

CASE 20.—Ninian Gibson.
Age: 13.
Residence: 1 Hope Street, Anderston.
Sickened: 21/2/23.
Treated at home.
Later admitted to Ruchill Hospital: 5/10/23.
Dismissed: 26/12/23.

INITIAL ILLNESS—1923.

The patient was in the Western Infirmary with "stomach" trouble for 2 weeks. The mother states the boy was lively, but became "stupid-looking." He was very restless at night-time, and had hallucinations. No diplopia. No twitchings. He was very drowsy and fell asleep while performing any small task. He refused to go out of doors and hung about the house.

5/10/23. Admission to Ruchill Hospital. Child has been ill since February last. Very stupid and slow in his movements.

6/10/23. Patient very lethargic, both in speech and action, but answers sensibly, although after a long pause. Sleeps most of the day and all night quite quietly. Feeds himself, although slowly. No choreiform movements. Nervous system: Knee jerks, sluggishly present. No knee nor ankle clonus. No Babinski sign. Abdominal reflexes: Present. Pupils moderately contracted and react to light and on accommodation. C.S.F.: Clear fluid, under normal pressure. Cell count: Normal. No excess globulin. Fehling's reduced.

26/12/23. Dismissed. Condition chronic.

CONDITION IN MARCH, 1924.

The patient is at present in Stobhill Hospital. Parkinsonian type of gait. Certain amount of rigidity of limbs. Face mask-like, and has the typical slow smile of the post-encephalitic. He shows abnormal lethargy, dropping off to sleep very easily and frequently. No initiative. Complete loss of concentration, attention wandering readily. Increased salivation. Nervous system: Knee jerks increased. Babinski sign on right, left doubtful. Abdominal wall very rigid.

CONDITION IN MARCH, 1928.

The patient was visited in Kirklands Asylum, Bothwell, and the information has been supplemented by a statement of the boy's mother.

The boy received treatment at home for the first few months of his illness, during which time he attended a school clinic. He was sent to Ruchill Hospital on 5/10/23, where he remained for 2½ months. A year after his illness, he was sent to Stobhill Hospital, remaining there for 9 weeks, and was then transferred to the Southern General Hospital, where he was kept for 8 weeks. After this, he was at home for about 3 years, and during this time Parkinsonian symptoms increased. He became a general nuisance to the neighbourhood, and was again removed to the Southern General Hospital in August, 1927. Early in March, 1928, he was transferred to Kirklands Asylum.

Medical Certificate: Southern General Hospital.—"Patient is very restless, noisy, confused, and incoherent. He refuses to answer questions. During the night he keeps the whole ward awake and struck the night nurse without warning or provocation."

When the patient was examined at the Asylum, he presented the typical Parkinsonian syndrome. When walking, the head is held forward, the gait is festinant, the arms are flexed and held stiffly, first finger and thumb in apposition; when standing he falls backward. He appears apathetic and lacks initiative. The expression is mask-like, and there is constant salivation. Speech is thick and gutteral and the eyes turn up for an extended period. He is very emaciated and anaemic, and the face has a deadly pallor. He is up and about part of each day, although from choice he would lie in bed.

The patient has a peculiar cast of head—the forehead low and narrow and the bridge of the nose undefined. The family history is not good, the mother being a confirmed drunkard.

Nervous system: Knee jerks increased. No Babinski. No ankle clonus.

Abdominal reflexes: Increased.

Eyes: Pupils equal, react to light and on accommodation.

Tongue: Slight tremor.

CASE 21—Sarah Higgins.
Age : 56.
Residence : c/o Thomson, 7 Plantation Street.
Sickened : 28/2/23.
Treated at home.
Died : 7/3/23. 7 days' illness.

INITIAL ILLNESS—1923.

Onset characterized by headache, sleeplessness and diplopia.
2/3/23. Twitching of facial muscles—later delirium with twitching of arms.
6/3/23. Internal strabismus of right eye. Can be roused, but only momentarily. Drowsiness marked. Hyperpyrexia. T. 106° F. before death.
7/3/23. Died.

CASE 22.—Jeanie Hitchcock.
Age : 16.
Residence : 435 St. Vincent Street.
Sickened : 28/1/23.
Treated at home.

INITIAL ILLNESS—1923.

Onset characterized by drowsiness, vertigo, and diplopia. Facial expression mask-like for about 3 weeks. Frontal headache. Bilateral ptosis. Right pupil sluggish reaction to light. In bed for 2 weeks.

CONDITION IN MARCH, 1924.

History of asthenopia for about 3 months, after the acute symptoms had passed off. Patient more excitable and quick-tempered since illness. Excessive salivation, especially at night time. Sleeps well and is now working.

CONDITION IN MARCH, 1928.

The patient received treatment at home, and was confined to bed for about 2 weeks. She convalesced for 2 months, and since then she has been more or less constantly employed as a shop assistant. She sleeps well at night, but drowsiness still persists during the day, and salivation is excessive. At times she becomes very excited, is quick tempered and her eyesight is weak.
Nervous system : Eyes : Pupils equal, react to light and on accommodation. Jerks : Normal.

CASE 23.—Milicent Houston.
Age : 23.
Residence : 31 Morgan Street, S.E.
Sickened : 14/3/23.
Admission to Belvidere Hospital : 20/3/23.
Dismissed : 16/6/23.

INITIAL ILLNESS—1923.

Onset characterized by drowsiness, vomiting, frontal headache, vertigo, twitching of left arm. Eleven years ago patient was struck by a stone on left side of forehead. She suffered from Jacksonian epilepsy, and a year later an operation was performed (trephining of the skull). She made a good recovery.
20/3/23. On admission T. 98·2° F., P. 82, R. 24. Patient very drowsy, easily roused, answers questions fairly well. Slight spasticity of limbs. Nervous system : Knee jerks very active. No Babinski sign. No ankle clonus.
21/3/23. Twitching of right arm. C.S.F. : Clear fluid, under normal pressure.
27/3/23. Twitchings still present. Nystagmus and double vision.
30/3/23. Joint pains, chiefly ankles and wrists, but no apparent swelling.
22/4/23. Improved, less drowsy. Twitching of right hand marked. Mentally clear. Speech normal.
16/6/23. Dismissed well.

CONDITION IN MARCH, 1924.

The patient is troubled with drowsiness during the day, even after a good night's rest. Twitchings of face, arms and legs occur during sleep. She complains of stiffness on left side of face and slight weakness of right arm. Headache has been troublesome for the past month.

CONDITION IN MARCH, 1928.

Following her discharge from hospital, the patient suffered from loss of memory and was unable to name her friends; this condition gradually cleared up. For more than a year she suffered from drowsiness by day and by night. Later she became very restless at night and was unable to sleep. About 3 years ago, sleeplessness became acute, and for 6 weeks she was unable to sleep night or day. Since then she has suffered from nocturnal insomnia, with a resultant state of drowsiness and exhaustion during the day. She still complains of weakness of the right arm, and is extremely constipated.

Physical examination: Nil.

CASE 24.—David Hutchison.
Age: 23.
Residence: 45 Pleasance Street, Pollokshaws.
Sickened: 2/3/23.
Admission to Victoria Infirmary: 12/3/23.
Dismissed: 11/4/23.

INITIAL ILLNESS.

At the onset patient was sleepless for 3 nights, with delirium and muscular twitchings. Later drowsiness and diplopia. He had an attack of hiccough on second day of illness.

12/3/23. On admission T. 99·8° F., P. 82, R. 20. Patient very drowsy, but answers questions intelligently. Muscular twitchings present. Nervous system: No ocular palsy. Nystagmus present. Left pupil slightly larger than right. Both pupils react to light and on accommodation. Face expressionless. Knee reflexes: Diminished. No Babinski sign. No ankle clonus. Abdominal reflexes: Increased.

11/4/23. Patient made a good recovery. Complains of blurred vision when reading.

CONDITION IN MARCH, 1924.

The patient suffers from nocturnal insomnia. The face is expressionless, and he complains of stiffness and pain of the left side of face. Eyes tend to stare, voice is monotonous, salivation excessive, arms and legs somewhat weak and stiff. He walks stiffly with a slight forward bend. Rotatory movements are diminished. Left side of body is more affected than right. He is unduly emotional, weeping readily, and is becoming discouraged. His condition renders him partially unfit for work, although that is light.

CONDITION IN MARCH, 1928.

Two days before his illness, the patient fell while cycling, but was able to walk home. Six months after his discharge from hospital he resumed work, but was able to continue only for 18 months owing to disabilities, although his duties were not arduous. He has gone steadily downhill since then, and is very depressed. He is mostly in bed and requires to be fed. In appearance he is pallid, and lacks expression; eyes staring, salivation excessive, speech toneless and difficult. His memory is good and he is quite intelligent. Both arms are rigid and there is a coarse tremor of the left arm and leg. When standing he has a forward bend, and occasionally is forced to take a backward step to retain his balance. When walking he adopts a short shuffling step, and, on attempting to sit, flops completely, and has great difficulty in rising; in bed, he is unable to turn. For the last two years, the eyes at times forcibly turn up. The jaw muscles have become stiff during the last six months, and an effort is required to open the mouth. He suffers from extreme restlessness and insomnia, and diplopia has been present for 3 years.

Nervous system: Knee jerks increased. Ankle clonus, right side, but not sustained. Abdominal muscles rigid.

Eyes: Pupils equal, sluggish reaction to light and on accommodation. Internal strabismus of left eye.

Tongue: Tremor marked.

CASE 25.—George Joyce.
Age : 11.
Residence : c/o Imrie, 100 M'Lellan Street, Plantation.
Sickened : 22/2/23.
Admission to Shieldhall Hospital : 5/3/23.
Dismissed : 21/5/23.

INITIAL ILLNESS—1923.

Onset characterized by headache and vomiting. On following day diplopia, squint, and drowsiness.

24/2/23. T. 100° F. Slight ptosis and marked drowsiness.

2/3/23. Frontal headache, pain in epigastric region, and vomiting. Internal strabismus of left eye.

5/3/23. On admission to hospital T. 98° F., P. 88, R. 18. Drowsy but answers intelligently. Eyes: Right pupil larger than left. React very sluggishly to accommodation but normally to light. Internal strabismus of left eye. Slight bilateral ptosis. No diplopia. No nystagmus. Knee reflexes normal. No Babinski sign. Abdominal reflexes very active. Speech: Some slurring. C.S.F.: 20 c.c.s. withdrawn, under increased pressure. 20 cells per c.m.m. Clear. No excess globulin.

13/3/23. Strabismus less marked. Less drowsy.

27/3/23. Wassermann reaction of C.S.F. negative. No strabismus.

6/4/23. Ptosis more marked. Slightly drowsy.

21/5/23. Dismissed well.

CONDITION IN MARCH, 1924.

The patient has suffered from night restlessness since leaving hospital. He talks and sings most part of the night, and is very drowsy at school. The face is expressionless, the eyes stare without winking, and speech is monotonous He complains at times of stiffness of right side of face and slight pain of right arm and leg. He spits frequently and has excessive salivation.

CONDITION IN MARCH, 1928.

The boy resumed school after leaving hospital, and attended until he was 13½ years of age. Parkinsonian symptoms manifested themselves shortly after leaving hospital and later rapidly developed. For the past two years he has been confined to bed, for 18 months he has required to be fed, and for a year he has lost the power of speech. He is sleepless and fearful at night, and suffers from severe occipital headaches. The face is mask-like and drawn to the right side. The gaze is fixed, eyes turn upwards for an extended period. Fine tremor of arms and legs is present, which has developed during the last 2 years. Rigidity is generalised, and the body is extremely emaciated. He is unable to stand unless supported; toes only are placed on the ground, and he falls forward. The arms are held in front of the body, first finger and thumb in apposition. Salivation is excessive and he sighs constantly. His memory is acute.

Nervous system: Knee jerks, left increased. Ankle clonus both sides, not sustained. Abdominal muscles rigid.

Eyes: Pupils equal, slight internal strabismus of left eye. Sluggish reaction to light and on accommodation. Tremor of eyelids.

Tongue: Marked tremor. Left side ulcerated.

CASE 26.—Mary Kearney.
Age: 18 months.
Residence: 25 Washington Street, Anderston.
Sickened: 17/2/23.
Admission to R.H.S.C.: 27/2/23.

INITIAL ILLNESS—1923.

Ten days before admission child was very cross and sleepless at night, sitting up in bed, talking and playing with her toys. From then until admission, she was sleepless by night and drowsy by day. On admission to hospital, temperature normal, paralysis of accommodation present, otherwise physical examination nil. During her residence, child slept all day and remained awake all night. C.S.F.: Negative.

CONDITION IN MARCH, 1924.

The child has improved since leaving hospital, but shows nervous symptoms. The arms and legs "work" at night before going to sleep, and she has become very irritable.

CONDITION IN MARCH, 1928.

The child was sent to school at the age of 5. She was very difficult to awaken in the morning, and the teacher reported her drowsy at school. She has made slower progress than the average child of her years, and about a month ago was held back a class. At times she shows signs of temper, although there are no outward evidences of nervousness.

CASE 27.—Jack Kelly.
Age: 8.
Residence: 65 Ayr Street, Springburn.
Sickened: 12/2/23.
Admission to Ruchill Hospital: 16/2/23.
Died: 22/2/23. 10 days' illness.

INITIAL ILLNESS—1923.

Onset characterized by fever, delirium, convulsions, with retention of urine. Constipated.

16/2/23. On admission T. 100° F., P. 116, R. 28. Child semi-conscious, does not answer questions, lies with knees drawn up and head flexed. There is no nuchal rigidity. Kernig's sign doubtfully present. No Babinski sign. Pupils equal. React to light. C.S.F.: Cell count 30.

18/2/23. No convulsions since admission. Condition very much improved. Patient answers intelligently, and seems very bright.

19/2/23. Patient delirious and wakeful during night. Very confused.

21/2/23. General twitchings. Patient restless and confused.

22/2/23. Died.

CASE 28.—Sarah Leckie.
Age: 12.
Residence: 7 Cleghorn Street, Hamiltonhill.
Sickened: 12/3/23.
Admission to Ruchill Hospital: 16/3/23.
Dismissed: 6/4/23.

INITIAL ILLNESS—1923.

Onset characterized by drowsiness, pains all over the body, giddiness, diplopia—symptoms as of influenza.

16/3/23. On admission T. 99° F., P. 96, R. 24. Child drowsy. Complains of headache and diplopia.

17/3/23. Diplopia passed off. Patient much brighter. Nervous system: Knee jerks absent. No Babinski sign. No ankle clonus. No nuchal rigidity. Eyes: Pupils react to light and on accommodation.

20/3/23. Child very bright.

6/4/23. Dismissed. Well.

CONDITION IN MARCH, 1924.

The patient has been quite well since leaving hospital.

CONDITION IN MARCH, 1928.

Shortly after her discharge from hospital, the patient returned to school until the age of 14. Since then she has been constantly employed, and at present works in a store. She sleeps and eats normally, and feels quite well.

Physical examination: Nil.

CASE 29.—James Lloyd.
Age: 12.
Residence: 17 Tamworth Street, Bridgeton.
Sickened: 4/3/23.
Admission to Belvidere Hospital: 8/3/23.
Dismissed: 4/6/23.

INITIAL ILLNESS—1923.

Onset characterized by headache, diplopia, drowsiness and constipation.

8/3/23. On admission T. 100·4° F., P. 120, R. 26. Drowsy, but can be roused, and answers questions intelligently. Headache and diplopia. Face mask-like. Katatonia present. Twitching of right hand. Internal strabismus. Speech slurred. Reflexes: Active. Some incontinence. C.S.F.: Pressure slightly increased.

29/3/23. Condition improved. Blurred vision.

4/6/23. Dismissed. Well.

CONDITION IN MARCH, 1924.

Since his illness, the boy has become cross and ill-tempered and domineers his younger brothers and sisters. For some months after leaving hospital, he had spasms of deep breathing. He sleeps well, although at times starts in his sleep, and has muscular twitchings. Salivation is increased.

CONDITION IN MARCH, 1928.

The boy remained at home for 4 weeks after his dismissal from hospital. He then returned to school, and attended until he reached the age of 14; there were no adverse reports as to his behaviour at school. He has now been working for 3 years, and at present is employed by a cobbler, who, on being interviewed, states that the boy is quite trustworthy, although dour and quick-tempered. He sleeps well, but occasionally talks during sleep. There is increased salivation under any emotional stress. He yawns often and the eyesight is weak.

Physical examination: Nil.

CASE 30.—Elizabeth M'Alister.
Age: 15.
Residence: 18 Carbeth Street, Possilpark.
Sickened: 16/2/23.
Admission to Ruchill Hospital: 23/2/23.
Dismissed: 31/3/23.

INITIAL ILLNESS—1923.

Onset characterized by drowsiness and pain at back of neck. Squint (present from childhood) became more evident. No diplopia, but blurred vision for several days before admission.

23/2/23. On admission T. 99·8° F., P. 104, R. 20. Patient very drowsy. Mentally clear. Complains of pain at back of neck and also in right arm. Eyes: Pupils react to light and on accommodation. Knee reflexes absent. Abdominal reflexes absent. No Babinski and no Kernig's sign. Slight nuchal rigidity.

24/2/23. C.S.F.: Clear, no increase of cells.

28/2/23. Improved. Still drowsy. Complains of pain in neck.

17/3/23. Still drowsy. Some giddiness.

31/3/23. Dismissed well.

CONDITION IN MARCH, 1924.

The patient is fairly well, although irritable at times. There is some increase of salivation and her eyesight is weak.

CONDITION IN MARCH, 1928.

The patient remained at home for a year, following her discharge from hospital. During this time drowsiness wore off, and pain disappeared from the right arm. Since then, she has worked in a factory until a year ago, when she was suspended owing to slackness of trade. Her temper is inequable, and salivation at night becomes slightly increased. She sleeps well, but complains of numbness in arms and hands on awakening in the morning. There is some dimness of vision, and strabismus of left eye (present since childhood) has become more marked. She is thin in appearance but her appetite is good. She is continually making a sound—clearing her throat.

Nervous system: Left internal strabismus. Left pupil > right. Sluggish reaction to light and on accommodation. Jerks: Normal.

CASE 31.—Robert M'Alpine.
Age : 40.
Residence : 39 Havelock Street.
Sickened : 24/2/23.
Treated at home : 3 months' illness.

INITIAL ILLNESS—1923.

Onset characterized by drowsiness, lassitude, yawning, and weakness of the right arm.

24/2/23. Condition acute. No fever. Sleeplessness. Diplopia.

10/3/23. General convulsions. Coma for 30 minutes.

11/3/23. General convulsions. Coma for 25 minutes.

12/3/23. General convulsions. Coma for 20 minutes. These convulsions began in the right arm, and later the whole body was involved. Between the convulsions, the patient had violent, rhythmic twitchings of the right arm from the shoulder, with extreme contraction of the pectorals on the right side. Head jerked to right side by sterno-mastoid.

19/3/23. Severe intra-abdominal pain, with violent dragging sensation in the caecal region, commencing over hepatic flexure of colon.

24/3/23. Intention tremor. Weakness of the right arm and hand. Eyes and knee jerks normal. Twitching of pronators of right hand. Memory poor since illness.

CONDITION IN MARCH, 1924.

The patient is wakeful at night and drowsy during the day. Paresis of right arm is present, and his eyesight is weak. Patient resumed his studies 6 months after illness, but feels himself less vigorous than formerly. No increased salivation.

CONDITION IN MARCH, 1928.

The patient has suffered from nocturnal insomnia since his illness. Owing to this condition, he is at present unable to pursue his medical studies, although after his illness he passed his 3rd and 4th professional examinations, but failed to pass his final, for which he sat three times. There is some weakness of the right arm, and he finds difficulty in writing. His eyesight is weak and lately he has required to wear spectacles. His memory for current events has become poor, and he eschews company for the reason, that, when in conversation, he suddenly forgets what he wishes to say.

Nrevous system : Knee jerks slightly increased. No ankle clonus. No Babinski.

Eyes : Sluggish reaction to light and on accommodation.

30/6/28. The patient was re-visited, and was found to have developed symptoms of Parkonsonism since examination in March, 1928. The face has become masked, and the gaze slightly fixed. The voice is toneless and movement is slower, the left arm held stiffly with first finger and thumb in apposition. He finds difficulty in accomplishing the finer movements.

Nervous system : Knee jerks increased.

Eyes : Sluggish reaction to light and on accommodation.

Tongue : Tremor.

Hands on extension : Tremor.

CASE 32.—Jane M'Carthy (Mrs. Muir).
Age : 19.
Residence : 236 Garngad Hill.
Sickened : 5/3/23.
Admission to Ruchill Hospital : 10/3/23.
Dismissed : 6/4/23.

INITIAL ILLNESS—1923.

The patient had a whitlow incised on 5/3/23, and that evening fainted, and felt sick and drowsy. No diplopia. No strabismus. No twitchings and nc pain.

10/3/23. On admission T. 98° F., P. 64, R. 16. Patient very drowsy, but was able to answer questions sensibly. Nervous system: Knee jerks active. No Babinski. No knee nor ankle clonus. Eyes: Pupils moderately contracted, and react to light and on accommodation. C.S.F.: 40 c.c.s., withdrawn, clear, under slight pressure. Cell count 30, mainly lymphocytes. No excess globulin.

12/3/23. Patient less drowsy and easily wakened. Wassermann reaction: Negative.

20/3/23. No drowsiness. Mentally clear.

6/4/23. Dismissed well.

CONDITION IN MARCH, 1924.

The patient was restless and sleepless for a week after dismissal from hospital. At present she is quite well and fit for duty.

CONDITION IN MARCH, 1928.

The patient went to service 2 months after leaving hospital. Six months later she married, remaining in service for a further period of 9 months. Prior to the birth of her child, she was admitted to the Maternity Hospital, where a Caesarean Section was performed owing to contracture of the pelvis. The mother made a good recovery, and the child is healthy. Patient is at present quite well, and fit for her houshold duties.

Physical examination: Sabre tibiae. Otherwise nil.

CASE 33.—Mary M'Coll.
Age: 14.
Residence: 23B St. Andrew's Square.
Sickened: 28/1/23.
Admitted to Royal Infirmary: 10/2/23.

INITIAL ILLNESS—1923.

Onset characterized by diplopia, ptosis, headache, drowsiness, and twitching of the arms.

10/2/23. Drowsy, but answers questions sensibly. Pupils dilated. Sluggish reaction to light and on accommodation. Jerks normal. No nuchal rigidity. No Kernig's sign.

20/3/23. Patient less drowsy.

17/4/23. Dismissed well.

CONDITION IN MARCH, 1924.

It is early morning before the girl is able to sleep. She has become quick-tempered and impulsive since her illness. Salivation is excessive. She is unduly emotional and cries on the slightest provocation. Her intelligence is good.

CONDITION IN MARCH, 1928.

The girl returned to school shortly after leaving hospital, where she remained until she was 15 years of age. She has been at work most of the time since then, and at present is employed in a tailor's business. Since her illness, she has become very emotional and irritable, and occasionally there is an increase of salivation. She sleeps well and her appetite is good.

Physical examination: Nil.

CASE 34.—David M'Crorie.
Age: 27.
Residence: Bellahouston Hospital.
Sickened: 16/3/23.
Admission to Belvidere Hospital: 23/3/23.
Died: 26/3/23. 10 day's illness.

INITIAL ILLNESS—1923.

The patient has been ill for a week.

23/3/23. On admission T. 100·6° F., P. 110, R. 30. Patient noisy and restless. Insomnia and delirium.

24/3/23. Still noisy and restless. Mentally confused. Pupils unequal and dilated. C.S.F.: Clear under increased pressure.

25/3/23. Vomiting.

26/3/23. Died.

Post-mortem examination: Brain shows typical inflammatory changes of lethargic encephalitis—perivascular infiltration with lymphocytes.

CASE 35.—Hay M'Donald.
Age: 81.
Residence: 36 Nairn Street, Yorkhill.
Sickened: 1/2/23.
Treated at home.
Died: 13/5/23.

INITIAL ILLNESS—1923.

Onset characterized by drowsiness and hallucinations.

STATEMENT OF RELATIVES—MARCH, 1928.

Until the beginning of illness, the patient was in good health, taking an interest in all that went on around. Suddenly he was overcome by drowsiness, and during the day had the greatest difficulty in keeping awake, falling asleep even at meal-hours. He was full of fears and hallucinations, and imagined he was very poor, and had no money for food. At times he became terror-stricken, thinking he was being pursued by enemies. There was a lack of facial expression, but no defect of speech nor any signs of paralysis. A month before the end, he was confined to bed, and during the last four days he was in a comatose condition.

CASE 36.—Margaret M'Donald.
Age: 8.
Residence: 20 Scott Street, Bridgeton.
Sickened: 5/2/23.
Admission to Belvidere Hospital: 8/2/23.
Dismissed: 7/4/23.

INITIAL ILLNESS—1923.

Onset characterized by drowsiness, delirium and hallucinations. Rash on neck and arms. Very constipated.

8/2/23. On admission T. 100·4° F., P. 114, R. 28. Child lethargic, but answers questions slowly. Dazed facies. Twitching of muscles of legs and left side of body. Choreiform movements.

26/3/23. Child brighter. Some incontinence.

7/4/23. Dismissed well.

CONDITION IN MARCH, 1924.

From being a bright and lively child, she has become at home and at school relatively dull and backward. She is very drowsy, and during the day, has difficulty in keeping awake. She is childish, somewhat emotional, and weeps readily. There is some incontinence.

CONDITION IN MARCH, 1928.

The child returned to school six months from the time of her illness. Her disposition has changed completely; from being bright and lively, she has become lethargic and apathetic, and drowsiness persists. She has great difficulty with her lessons, has no power of concentration, and has fallen behind at school. Her memory is very poor, and, if sent on an errand, can not remember what it is. She is rather emotional, and occasionally bad-tempered. In appearance she is thin, although her appetite is quite good. There is still some incontinence, and she snores frequently. For 3½ years excess of salivation has been present.

Physical examination: Nil.

CASE 37.—Hugh M'Ewan.
Age: 13.
Residence: 23 East Vermont Street, Kinning Park.
Sickened: 16/2/23.
Admission to Victoria Infirmary: 19/2/23.
Dismissed: 5/6/23.
Died: 19/6/27.

INITIAL ILLNESS—1923.

Onset characterized by pain in right shoulder, twitching of right eyelid, and rigid side of face. Jerky opening of mouth with protrusion of tongue, and contortions of facial muscles. Later the voice was hoarse, and he became delirious with hallucinations, tearing at bed-clothes, singing and shouting.

19/2/23. On admission T. 101° F., P. 120, R. 36. Patient sleepless, excited and confused, and requires to be restrained. Jerky movements of body.

21/2/23. Internal squint of left eye and diplopia. Excitement less marked.

26/2/23. Nystagmus to right. Patient now lethargic. Katatonia in upper and lower limbs. Face masked.

18/3/23. Bilateral ptosis. Right pupil larger than left. Both pupils react to light but not on accommodation.

5/6/23. Dismissed. I.S.Q.

CONDITION IN MARCH, 1924.

The patient holds himself rigidly, and rotatory movement is diminished. Face is mask-like, left side slightly more affected. When walking, left arm is held stiffly, and when standing he stoops forward, the arms are slightly flexed and carried towards front of body. Salivation is increased, voice is monotonous, and bilateral ptosis is present. There is tremor of left arm on attempting to do anything, and he is unable to wash or dress himself. He sleeps well, and his appetite is good.

STATEMENT OF RELATIVES—MARCH, 1928.

The patient remained at home until February, 1925, during which time Parkinsonian symptoms definitely increased. He was re-admitted to Victoria Infirmary, where he received treatment for 6 weeks. In October, 1926, he was admitted to Stobhill Hospital, and there remained until he died—June, 1927. For two years before the end, the patient was almost helpless; he was bed-ridden, and required to be fed from the time of his admission to Stobhill. Parkinsonian symptoms were typical, face mask-like, salivation excessive, generalized rigidity, tremors throughout body, and extreme emaciation. Bilateral ptosis was present throughout the illness, and, six months prior to his death, he lost the power of speech. Insomnia persisted until the end.

CASE 38.—Joseph M'Fadden.
Age: 12.
Residence: 38 Vulcan Street, Springburn.
Sickened: 4/2/23.
Treated at home. Illness of 4 weeks.

INITIAL ILLNESS—1923.

Onset characterized by insomnia, squint and diplopia

5/2/23.- Headache (occipital). Twitching of left side of face and left arm. Very restless, with hallucinations, turning night into day. This condition continued throughout initial illness.

CONDITION IN MARCH, 1924.

The patient has never been to school since his illness. He spends sleepless nights, and drowsiness follows during the day. There is slight increase of salivation. Left arm and head twitch occasionally, and patient is more impulsive since his illness. He occasionally complains of weakness in the legs.

CONDITION IN MARCH, 1928.

The patient did not return to school after his illness, owing to nocturnal insomnia and restlessness, which continued for 2 years. After this, sleep became normal and twitchings disappeared; as he was unable to find work, he has remained at home since. Within the last year symptoms of Parkinsonism have manifested themselves; the face is expressionless, the gaze fixed, the voice toneless and speech thick; salivation is excessive. Fine tremors of arms and legs are evident, and become increased on action. His movements are ponderous; when walking he stoops forward, and holds the left arm stiffly, first finger and thumb in apposition. At times, he feels as if he were being drawn to the right side and requires to make a strong effort to resist. He occasionally takes a step backwards when standing, and, when sitting, sometimes sways from side to side. He becomes readily exhausted, and suffers from weakness of the legs. Under stress of any kind, the right side of his face is drawn to the left. His memory for current events has become poor. He is irritable, emotional, and weeps without cause. He is quite intelligent, is able to attend to himself, and goes errands for his mother. A year ago the patient had a severe attack of chicken-pox.

Nervous system: Knee jerks active, right increased.

Eyes: Pupils equal, sluggish reaction to light and on accommodation.

Hands: Tremor of left hand on extension.

Tongue: Tremor.

CASE 39.—Euphemia Macfarlane.

Age : 53.
Residence : 3 Shaw Street, Govan.
Sickened : 13/3/23.
Admission to Ruchill Hospital : 10/4/23.
Died : 12/4/23. 30 days' illness.

INITIAL ILLNESS—1923.

Onset characterized by headache, drowsiness, and restlessness. No pain.

10/4/23. On admission T. 98·4° F., P. 100, R. 24. Face expressionless. Roused with difficulty. Very restless. Speech incoherent. Bilateral ptosis. No ocular palsies. Choreiform twitchings of angles of mouth and twitchings of lower limbs. Nuchal rigidity and Kernig's sign present. Knee jerks increased. No Babinski. No ankle clonus. C.S.F. : Clear, under marked pressure.

11/4/23. Very restless.

12/4/23. Died.

CASE 40.—Malcolm Macfarlane.

Age : 13.
Residence : 7 Monteith Street.
Sickened : 15/1/23.
Admission to Belvidere Hospital : 28/2/23.
Died : 7/6/23. 5 months' illness.

INITIAL ILLNESS—1923.

Onset characterized by pain in left arm and left hip. Two weeks later, delirium, vomiting, restlessness, with insomnia. Marked jerky and twitching movements, body going into extreme states of extension and flexion.

28/2/23. On admission T. 100° F., P. 124, R. 28. Excited and nervous, but answers questions intelligently. Choreiform movements of legs and arms. No nuchal rigidity. No Kernig's sign. Reflexes normal. Nystagmus present. Slight retention of urine.

3/3/23. C.S.F. under pressure, not quite clear. Internal strabismus. No diplopia.

7/6/23. Died.

CASE 41.—Wm. Macfarlane.

Age : 15.
Residence : 3 Copeland Road, Govan.
Sickened : 20/2/23.
Admission to Ruchill Hospital : 5/3/23.
Dismissed : 23/3/23.

INITIAL ILLNESS—1923.

A fortnight before admission to hospital, the patient fell from a ladder. Shortly afterwards he became drowsy, and could only be roused with difficulty. He complained of headache and dizziness, but no diplopia.

5/3/23. On admission T. 98° F., P. 88, R. 22. Patient very drowsy, but answers questions intelligently. Knee reflexes normal. Suggestion of Babinski sign on left. No ankle clonus. Pupils react to light and on accommodation. No diplopia. C.S.F. : 50 c.c.s. clear fluid withdrawn, under slight pressure. Cell count 50, mainly lymphocytes. No excess globulin.

20/3/23. Wassermann reaction negative. Patient up. Complains of stiffness of legs.

23/3/23. Dismissed well.

CONDITION IN MARCH, 1924.

The patient suffered from stiffness of the legs for about a month after his dismissal from hospital. Salivation is excessive. He has resumed work.

CONDITION IN MARCH, 1928.

After leaving hospital, the patient complained of weakness of the lower limbs ; salivation was excessive for over a year, but this condition gradually cleared up. He was able to resume work in a yard shortly after his illness, and since has constantly been employed. He is now quite fit.

Physical examination : Nil.

CASE 42.—Annie M'Guinness.
Age : 2.
Residence : 302 Garngad Road.
Sickened : 22/4/23.
Admission to Ruchill Hospital : 26/4/23.
Dismissed : 18/6/23.

INITIAL ILLNESS—1923.

Onset characterized by drowsiness and vomiting.

26/4/23. On admission T. 103° F., P. 130, R. 48. Child drowsy and appears acutely ill. Twitching of left leg. Lungs : Clear to percussion. R.M. more harsh over left apex than right. Heart : Nil. Nervous system : Kernig's sign markedly present. Babinski sign. Knee reflexes present. C.S.F. : 20 c.c.s. withdrawn, clear under marked pressure. Cell count 50. No excess globulin.

2/5/23. Temperature normal. Respirations rapid. Condition still acute.

18/6/23. Dismissed well.

CONDITION IN MARCH, 1924.

The child made a good recovery after leaving hospital, and is now quite well.

CONDITION IN MARCH, 1928.

The child went to school at the age of 5, and has made quite good progress. At present she is bright and well. Physical examination : Nil.

CASE 43.—Mrs. Mary MacLachlan.
Age : 50.
Residence : 1 Hartfield Street, N.
Sickened : 20/2/23.
Admission to Ruchill : 5/3/23.
Dismissed : 22/3/23.

INITIAL ILLNESS—1923.

A fortnight before admission to hospital, while cleaning a window, the patient fell heavily from the ledge. Immediately after, she complained of pain in back of head, neck and limbs. Later drowsiness, diplopia, nystagmus, and internal strabismus of right eye.

5/3/23. On admission T. 98·6° F., P. 76, R. 20. Patient drowsy, but answers questions clearly. Diplopia and internal strabismus now absent. Nervous system : Pupils dilated and sluggish reaction to light and on accommodation. Knee jerks normal. No Babinski. No ankle clonus. C.S.F. : 50 c.c.s. clear, under slight pressure. No excess globulin. No increase of cells.

6/3/23. Giddiness. Slight tremor of left arm.

17/3/23. No drowsiness.

22/3/23. Dismissed well.

CONDITION IN MARCH, 1924.

The patient has made a good recovery, feels well, and is quite fit for household duties.

CONDITION IN MARCH, 1928.

Shortly after her discharge from hospital, the patient resumed her household duties, felt quite fit, and was apparently well recovered until June, 1926, when, suddenly, she sustained a shock during the night, news being broken to her of the illness of her daughter, who was removed to hospital for an operation. From this time forward there was a noticeable change. She complained of nervousness, and shakiness of the left arm and leg, and found great difficulty in performing her daily duties. At present the face is masked, with marked greasiness on the right side ; the gaze is fixed, speech is thick and monotonous, and salivation is profuse. There is a constant rhythmic movement of both arms and left leg, the gait is slow with seeming difficulty of movement ; the arms are stiff and held across front of body, the first finger and thumb touching. The body bends forward when sitting and in walking. Sleep is normal and her appetite is good.

Nervous system : Knee jerks active, left increased.

Eyes : Pupils equal, sluggish reaction to light and on accommodation.

Tongue : Tremor.

CASE 44.—Helen M'Leod.
Age : 22.
Residence : 177 Claythorn Street.
Sickened : 26/3/23.
Admission to Belvidere Hospital : 6/4,23.
Dismissed : 30,6/23.

INITIAL ILLNESS—1923.

Onset characterized by drowsiness, headache, and constipation. Later, pain in back of head, neck, feet and legs, and vomiting.

6/4/23. On admission T. 99·2° F., P. 98, R. 24. Patient very drowsy and restless. Pupils react normally to light and on accommodation. Knee jerks normal. No twitchings. Slurring of speech. Constipated.

8/4/23. Less drowsy. Mentally clear. Pain in knee joints.

14/4/23. Partial aphonia.

22/4/23. Face mask-like. Katatonia present. C.S.F. : Fluid clear.

28/5/23. Giddiness.

30/6/23. Dismissed. Improved. Face still masked.

CONDITION IN MARCH, 1924.

The patient suffers from insomnia, exhaustion, and weakness of the lower limbs. Neuralgic pains have greatly lessened. Facial expression is masked, and there is an increase of salivation. She has become emotional, quick-tempered, and lacks initiative. Previous to her illness, she held a responsible position in a factory, but, owing to her general condition, is now only able to work part-time.

CONDITION IN MARCH, 1928.

The patient resumed work 4 months after leaving hospital. At that time, she was nick-named " pleasant face " by the factory girls. She was bad-tempered and readily flew into a passion. Owing to her inability to cope with the work, she was dismissed 18 months later. At present, she spends most of the time in bed. About a year ago, headache, pain in back of neck, shoulder blades, soles of feet, also in joints of large toes, became very troublesome, and she has suffered greatly since then. Her expression is mask-like, speech is hurried and difficult, and salivation is increased. When walking, she holds the right arm stiffly and droops from the waist ; when standing, she is inclined to fall forward. There is some weakness of the lower limbs, and tremor of the right leg has been present since leaving hospital. At times she complains of giddiness and falls to the left side. She has become very emotional, irritable, fearful, and tired, and suffers from insomnia. She sighs and yawns frequently, and the eyesight is weak. She is quite intelligent, although her memory for present happenings is not good. There is no past history of neuritis nor rheumatism.

Nervous system : Knee jerks increased. Abdominal reflexes increased.

Eyes : Right eye sluggish reaction to light. Ptosis of left eyelid. Twitching of eyelids.

Tongue : Tremor.

CASE 45.—Mary M'Nulty.
Age : 20.
Residence : 41 Grove Street.
Sickened : 15/2/23.
Admission to Ruchill Hospital : 18/2/23.
Died : 21/2/23. 6 days' illness.

INITIAL ILLNESS—1923.

Onset characterized by drowsiness, restlessness, and diplopia. Tremulous condition of hands. No strabismus.

18/2/23. On admission T. 103° F., P. 126, R. 30. Patient drowsy, but answers questions clearly.

19/2/23. Comatose condition. T. 105° F. Pupils sluggish reaction to light and on accommodation. Knee jerks absent. No Babinski sign. No ankle clonus. Abdominal Reflexes absent. C.S.F. : Clear, 30 c.c.s. withdrawn. Cell count 50, mainly lymphocytes.

21/2/23. Extreme restlessness and tremors. Died.

CASE 46.—Alexander M'Pherson.

Age: 9.
Residence: 10 Fauldhouse Street, Oatlands.
Sickened: 8/2/23.
Admission to R.H.S.C.: 2/3/23.
Dismissed: 3/5/23.

INITIAL ILLNESS—1923.

Onset characterized by restlessness and excitability. That night, child was unable to sleep, and insisted on doing his home lessons over again.

2/3/23. Child drowsy during day, but quite intelligent. Pains all over head. Twitching of feet.
3/3/23. Extreme restlessness, with nocturnal insomnia. Physical examination: Nil.
8/3/23. Paresis of lower part of face. Pupils unequal, react normally to light. C.S.F.: Negative.
3/5/23. Dismissed. Improved.

CONDITION IN MARCH, 1924.

The child is restless and sleepless until early morning, and sleeps the greater part of the day, so that he is unable to attend school. Salivation is excessive, and he has become very irritable. His intelligence is good.

CONDITION IN MARCH, 1928.

The boy suffered from restlessness and nocturnal insomnia for 2 years after leaving hospital. He had a constant desire to be doing something, and, if not otherwise employed, kept tearing up papers, even whilst in bed. Sleep gradually became normal. He resumed school a year ago, and seems to be making good progress. He is irritable, emotional, and at night salivation becomes increased. Since his illness he shows an asthmatic tendency.

Nervous system: Eyes: Ptosis of left eyelid.

CASE 47.—Elizabeth M'Philmeny.

Age: 4.
Residence: 4 Chester Street, Shettleston.
Sickened: 13/3/23.
Admission to Belvidere Hospital: 27/3/23.
Died: 29/3/23. 16 days' illness.

INITIAL ILLNESS—1923.

The child has been ill for 2 weeks.

27/3/23. On admission T. 100° F., P. 118, R. 28. Condition acute. Child very drowsy. Ptosis of left eyelid; both eyes discharging; pupils dilated, but react to light and on accommodation. Twitching of toes and right leg. Knee jerks absent.

29/3/23. Died.

CASE 48.—James Meikle.

Age: 37.
Residence: 772 Pollokshaws Road.
Sickened: 25/2/23.
Admission to Victoria Infirmary: 8/3/23.
Died: 12/4/23. 6 weeks' illness.

INITIAL ILLNESS—1923.

Onset characterized by giddiness, squint and drowsiness.

8/3/23. On admission T. 99° F., P. 52, R. 20. Patient drowsy and mentally dull. Face mask-like, speech slow and slightly slurred. Twitching of arms and catalepsy easily produced. Reflexes: Slightly increased. Chest clear to percussion, R.M. vesicular. No increased V.R. or V.F.

15/3/23. Very drowsy.

30/3/23. Patient suddenly took a fit and became unconscious.

12/4/23. Died.

Post-mortem examination. Tumour of the lung with metastases in the brain and in the right suprarenal.

CASE 49.—Wm. Miller.
Age: 26.
Residence: 30 Annette Street, Govanhill.
Sickened: 20/2/23.
Admission to Victoria Infirmary: 5/3/23.
Dismissed: 26/5/23.

INITIAL ILLNESS—1923.

Onset characterized by pain in right shoulder and neck and down right arm, with sleeplessness. Later twitching of right hand and left arm, with jerky movements of arm and face. No diplopia.

5/3/23. On admission T. 99° F., P. 100, R. 24. Facial expression masked. Knee reflexes increased. Abdominal reflexes increased. Pupils react to light, but not to accommodation. Right pupil larger than left.

14/3/23. Nocturnal excitement, singing and tossing in bed. Drowsy by day. Perspiration of forehead and upper part of chest. Slight difficulty of speech.

26/5/23. Dismissed. Improved.

CONDITION IN MARCH, 1924.

The patient complains of discomfort of right arm, with occasional twitchings of head and arm on right side, which have been present since leaving hospital. He has returned to work, but tires easily, and is very irritable. Salivation is increased.

CONDITION IN MARCH, 1928.

The patient resumed work 2 months following his discharge from hospital, and 6 months after his illness recovered normal sleep. He married 2½ years ago, and has one child. He readily becomes exhausted, and, other than irritability and slight increase of salivation, there is no evidence of further symptoms. The patient served in the war and suffered from shell-shock.

Physical examination: Nil.

CASE 50.—Wm. Milne.
Age: 43.
Residence: From Victoria Infirmary.
Sickened: 9/2/23.
Admission to Belvidere Hospital: 21/2/23.
Died: 24/2/23. 15 days' illness.

INITIAL ILLNESS—1923.

Onset characterized by headache, drowsiness, delirium and convulsions. Later diplopia, nystagmus, and bilateral ptosis.

21/2/23. On admission T. 98·8° F., P. 100, R. 26. Patient very lethargic, but answers questions clearly. Legs and arms spastic. Slight nuchal rigidity. No Kernig's sign. Reflexes normal.

24/2/23. T. 104° F. Extreme restlessness. Died.

Post-mortem examination: Brain very congested.

CASE 51.—Rose Mitchell.
Age: 7.
Residence: 63 West Scotland Street.
Sickened: 18/3/23.
Admission to Belvidere Hospital: 27/3/23.
Died: 20/6/23. 3 months' illness.

INITIAL ILLNESS—1923.

The child had a fall on 18/3/23 and since then took convulsions.

27/3/23. On admission T. 98·4° F., P. 88, R. 28. Child very drowsy. Left eye discharging. Nervous system: Knee jerks increased. No nuchal rigidity and no Kernig's sign. Pupils react normally to light and on accommodation. Internal strabismus. No diplopia. C.S.F.: 40 c.c.s. clear fluid, under pressure.

28/3/23. Child still drowsy. Speech slurred. No twitchings.

16/4/23. Patient has had several convulsions.

20/6/23. Died suddenly.

CASE 52.—David Nicol.

Age: 13.
Residence: c/o Gillies, Middle Quarter Farm, Shettleston.
Sickened: 5/3/23.
Admission to Lightburn Hospital: 12/3/23.
Discharged: 11/4/23.
Admission to Hartwood Asylum: September, 1925.

INITIAL ILLNESS—1923.

Onset characterized by frontal headache, vomiting, and sleeplessness. Later drowsiness, diplopia, fever, giddiness and muscular twitchings.

12/3/23. Boy very drowsy; answers questions clearly. Choreiform movements. Pupils react to light and on accommodation. Knee jerks increased. C.S.F.: Clear under marked pressure.

14/3/23. More drowsy.

20/3/23. Patient apparently normal.

11/4/23. Dismissed.

CONDITION IN MARCH, 1924.

The patient suffered from drowsiness and headache for some time after dismissal from hospital. Salivation is increased, and there is some incontinence. Since his illness he has become absolutely unmanageable; he lies, steals, and is a general nuisance.

CONDITION IN MARCH, 1928.

The boy was back at school for 2 months after leaving hospital, but was expelled owing to bad conduct. After the age of 14, he was employed by several shopkeepers, but time and again was dismissed, as he was found to be incorrigible and untrustworthy. He was ravenous for food, snatching it where he could. The police were continually on his track; he lied, stole, was violent-tempered, and was constantly interfering with young girls. One day he entered a shop and attempted to strangle a girl, but, owing to timely intervention, was deterred. Two years ago he applied and was appointed to a naval training ship at Devonport, where he remained for 5 months. Here there was no improvement in his conduct, and, as he was found to be homosexual and generally degraded, he was certified for Hartwood Asylum in September, 1925. At this time symptoms of Parkinsonism became evident.

When visited in the Asylum in Spring, 1928, he was going about and performing his daily duties. From the shoulders upwards he is typically Parkinsonian. The face is expressionless, gaze fixed, salivation excessive, speech difficult, but there is no loss of co-ordinated movements. Sleep is now normal, but he still suffers from frequent headaches, and, during an attack, both eyes turn in and he shakes all over. He is cheeky, emotional, and entirely lacking in self-control and discipline, showing great irritability. At times he is childish and facile, with an underlying astuteness. He requires careful watching, as he is homosexual. This patient is an illegitimate child and his parentage is not good, the father belonging to a low and degraded class. He states his grandmother and an uncle were at one time in Hartwood Asylum. His conduct was abnormal prior to his illness.

Nervous system: Knee jerks, left increased.

Eyes: Sluggish reaction to light and on accommodation.

Tongue: Tremor.

Hands: Tremor on extension.

CASE 53.—Martha O'Hare.

Age: 5.
Residence: 199 Hamilton Road, Cambuslang.
Sickened: 10/3/23.
Admission to Lightburn Hospital: 18/3/23.
Died: 20/3/23. 10 days' illness.

INITIAL ILLNESS—1923.

Onset characterized by headache, drowsiness and twitchings. Later delirium.

18/3/23. On admission T. 103° F., P. 100, R. 72. Child very restless and delirious. Twitching of face and limbs, especially upper limbs. Paralysis of R. side of face; drooping of angle of mouth on affected side. Head and neck drawn to right side and downwards. No nuchal rigidity. No Kernig's sign. Knee jerks: Exaggerated. Eyes: Pupils react to light. Convergent strabismus. C.S.F.: Fluid clear.

19/3/23. Comatose. Pupils unequal.

20/3/23. Died.

CASE 54.—Robert Paul.
Age: 10.
Residence: 21 Alexander Row, S.S.
Sickened: 20/2/23.
Admission to Belvidere Hospital: 6/3/23.
Dismissed: 31/5/23.

INITIAL ILLNESS—1923.

The patient had a fall from a stable loft shortly before the onset. He hit his head, but managed to walk home. Onset characterized by frontal headache, drowsiness, delirium, diplopia, and convergent strabismus.

6/3/23. On admission T. 98·4° F., P. 80, R. 20. Child very drowsy, but answers questions clearly, after a delay. Face expressionless. Some slurring of speech. Reflexes: Normal. Eyes: Sluggish reaction to light and on accommodation. C.S.F.: Clear, under slight pressure. Cell count slight increase.

20/3/23. Patient irritable, and clicks tongue constantly. Appetite is voracious. Spasms of deep breathing.

31/5/23. Dismissed. Well.

CONDITION IN MARCH, 1924.

The patient is very restless and sleepless. The face is expressionless, speech monotonous, and salivation increased. When standing he holds himself stiffly, the arms tending to hang forwards; there is some weakness of the right arm. He has now resumed school, but is constantly in trouble owing to his violent temper. Since his illness his character has deteriorated.

CONDITION IN MARCH, 1928.

The boy resumed school 2 months after leaving hospital, but was dismissed some months later, owing to his malbehaviour. His temper was bad, and his language was disgraceful, and altogether he proved unmanageable. Salivation was excessive, breathing was deep, and he constantly clicked his tongue. His appetite was voracious and he could rarely be satisfied. Parkinsonian symptoms developed within a year from the initial illness; he went steadily on the downward path, symptoms increased, and, by the end of the next year, he was unable to feed himself.

He is now confined to bed, a complete invalid, and mostly lies in one position. Speech is thick and difficult, and salivation is excessive. The face is immobile, the eyes staring, and there is internal strabismus of the left eye. The arms are held across the front of the body, first finger and thumb touching; both hands show coarse tremors. Rigidity is more marked in legs than in arms, and left foot is flexed inwards at ankle joint. He is restless, sleepless, snores constantly, and complains of frontal headache.

Nervous system: Knee jerks, right side increased. Ankle clonus right side, but not sustained.

Eyes: Pupils equal, sluggish reaction to light and on accommodation. Left internal strabismus.

Tongue: Tremor.

CASE 55.—Rose Reilly.
Age: 19.
Residence: 36 Milton Street, Cowcaddens.
Sickened: 13/2/23.
Admission to Eastern District Hospital (Observation Wards): 18/2/23.
Died: 23/2/23. 10 days' illness.

INITIAL ILLNESS—1923.

Onset characterized by diplopia, sleeplessness and delirium.

18/2/23. On admission T. 103° F. Patient restless and delirious. Squint. Twitching of body and arms.

20/2/23. Very restless and sleepless.

23/2/23. Died.

CASE 56.—Mrs. Riddell.
Age: 30.
Residence: 55 Bell Street, Calton.
Sickened: 8/1/23.
Admission to Eastern District Hospital: 19/2/23.
Dismissed: 26/2/23.

INITIAL ILLNESS—1923.

Onset characterized by headache, giddiness, clonic spasm of right leg, and mild fainting attacks. Later vomiting.
19/2/23. No fever. Patient drowsy and delirious. Ptosis of right eyelid, left pupil dilated, and strabismus.
26/2/23. Dismissed. Well.

CONDITION IN MARCH, 1924.

The patient complained of giddiness and weak eyesight. There is slight nystagmus to right. She has resumed light household duties, and feels fairly well.

CONDITION IN MARCH, 1928.

Shortly after leaving hospital the patient resumed some of her household duties, although, for more than a year, she suffered from giddiness and weak eyesight. At present she is well and active.
Physical examination: Nil.

CASE 57.—Wm. Robertson.
Age: 19.
Residence: 84 Queen Street, Govan.
Sickened: 14/3/23.
Admission to Victoria Infirmary: 22/3/23.
Died: 27/3/23. 13 days' illness.

INITIAL ILLNESS—1923.

Onset characterized by giddiness, jerky movements of limbs, and extreme restlessness. Later diplopia, squint, and conjunctivitis.
22/3/23. On admission T. 101·3° F., P. 104, R. 28. Patient sleepless and delirious. Twitching of muscles. Internal squint of right eye. Nystagmus. Left pupil larger than right.
25/3/23. Patient quieter. Very exhausted.
27/3/23. Died.

CASE 58.—John Rodger.
Age: 26.
Residence: 22 Hopehill Road.
Sickened: 24/3/23.
Admission to Ruchill Hospital: 4/4/23.
Dismissed: 17/4/23.
Died: 24/10/24.

INITIAL ILLNESS—1923.

Onset characterized by headache, exhaustion, generalised pains and dimness of vision.
4/4/23. On admission T. 97° F., P. 96, R. 20. Patient complains of headache and stiffness of neck. Nervous system: Knee jerks—increased. Abdominal reflexes absent. Babinski sign present. Slight ankle clonus. Slight nuchal rigidity. No Kernig's sign. Pupils very contracted. Sluggish reaction to light and on accommodation. C.S.F.: Excess globulin.
17/4/23. Dismissed. Improved.

CONDITION IN MARCH, 1924.

The patient had been in hospital for some months, suffering from dimness of vision. There he was treated by "injections into the arm." He suffers from weakness of the left arm and leg and bends towards the left side.

STATEMENT OF RELATIVES—MARCH, 1928.

In June, 1924, the patient was admitted to the Eye Infirmary, and at this period became totally blind. After receiving treatment for 3 months he was dismissed unimproved. He was at home for a few weeks, and then was sent to Oakbank Hospital, where he died October, 1924.

There was a gradual loss of power from the beginning, and he was never able for work. Towards the end his speech was gone, both arms and legs were paralysed, and he required to be fed.

CASE 59.—Nathan Sandler.
Age: 11.
Residence: 142 Thistle Street, S.S.
Sickened: 23/1/23.
Admission to R.H.S.C.: 22/5/23.
Dismissed: 15/6/23.

INITIAL ILLNESS—1923.

Onset characterized by sleeplessness, restlessness, occipital headache, vertigo, vomiting, and diplopia. Later fever, with pains in hands and feet.

22/5/23. On admission no fever. Child drowsy by day and sleepless by night. Pupils: Sluggish reaction on accommodation.

15/6/23. Dismissed. Improved.

CONDITION IN MARCH, 1924.

The boy is at present restless and excitable, and suffers from nocturnal insomnia. His disposition has greatly changed since his illness, and the father states that he has become a different child.

CONDITION IN MARCH, 1928.

The boy returned to school 3 months after leaving hospital, where he remained until the age of 14. After his illness, it was noticed he had become quick-tempered and childish; he shunned his contemporaries, and played about with little children and animals. He went for long walks and had no recollection of where he had been; on one occasion he went for a walk without his boots. His appetite is abnormal, and he seldom feels satisfied, and at meals he sucks his food instead of chewing it. Within the last year, there is evidence of the development of Parkinsonism. The face lacks expression, speech is slow, and salivation is pronounced at times. When walking there is stiffness of the left side, and he bends forward somewhat. He is very drowsy and listless in the house, mostly sitting over the fire. The eyesight is weak and the face has lately acquired an unhealthy pallor. For the past few months he has been working with a cabinetmaker, although his father expresses surprise that his services have been retained.

Nervous system: Eyes: Right pupil larger than left. Sluggish reaction to light and on accommodation.

CASE 60.—John Semple.
Age: 5.
Residence: 130 Gourlay Street, Springburn.
Sickened: 16/2/23.
Admission to R.H.S.C.: 22/2/23.
Dismissed: 29/3/23.

INITIAL ILLNESS—1923.

Onset characterized by restlessness, insomnia, delirium and twitching of whole body.

22/2/23. On admission T. 100° to 102° F. Child drowsy, but intelligent when roused. Severe chorea. Nuchal rigidity and left facial paralysis.

29/3/23. Dismissed. Improved.

CONDITION IN MARCH, 1924.

The child has been very restless, excited and sleepless since leaving hospital. He has become impulsive and quick-tempered, and there is some twitching of the right arm and the eyeballs, when tired; salivation is increased. He has resumed school and is making quite good porgress.

CONDITION IN MARCH, 1928.

A definite change has taken place in the child. From being shy and docile, he has become cheeky, bad tempered, and will brook no interference. For about a year after his illness, he was very restless and slept badly, and was unable to attend school for 8 months. His progress has been quite good, but the teacher complains he is quarrelsome, and at times forgets himself and where he is; on one occasion, during a lesson, he left his seat, walked to the window, and exclaimed " This is a fine day, Miss Smith." He is now sleeping well; he is quite intelligent, and his habits are good. There is a certain amount of weakness of the right arm; his eyesight is weak, and he has worn spectacles for the past 3 years. During fits of temper, which occur frequently, salivation becomes excessive, and afterwards there is a resultant frontal headache. He sighs very often.

Physical examination: Nil.

CASE 61.—Mrs. Elizabeth Sievewright.
Age: 48.
Residence: 54 Kingarth Street, S.S.
Sickened: 21/3/23.
Admission to Victoria Infirmary: 29/3/23.
Dismissed: 12/6/23.

INITIAL ILLNESS—1923.

Onset sudden, characterized by severe pain in head, radiating down shoulders, giddiness, vomiting, diplopia, and loss of power of lower limbs. Later drowsiness marked, but no delirium. T. 102·4° F.

29/3/23. On admission T. 98° F., P. 82, R. 24. Patient restless, but mentally clear. Facial expression vacant, no paresis of muscles. Diplopia, nystagmus and internal strabismus of right eye. Reflexes normal. Twitching of muscles.

1/4/23. Patient complains of giddiness, when lying on left side.

5/4/23. No giddiness.

12/6/23. Dismissed. Improved.

CONDITION IN MARCH, 1924.

The patient is still troubled with giddiness, when she stoops or lies on the left side. Her eyesight is weak, and she suffers from headaches.

CONDITION IN MARCH, 1928.

After leaving hospital the patient suffered from headache, giddiness and tremors of the hands, which continued for over a year. After this she seemed to progress; she had, however, a further attack in July, 1927, about 4 years from the time of the initial illness. She was suddenly stricken with severe pain in the head, vomiting and loss of power of lower limbs, and she fell down unconscious, remaining in a lethargic condition for 10 days. The face was drawn to one side, and vomiting continued for 2 days. Since then she has gradually improved, and at present is able to attend to most of her household duties. She becomes readily exhausted, and is easily irritated; her eyesight is weak, and she suffers from frontal headaches. Sleep is normal, and her appetite is good, but, owing to giddiness, she is unable to lie on her left side.

Physical examination: Nil.

CASE 62.—Lewis Silverman.
Age: 23.
Residence: 32 Rutherglen Road.
Sickened: 5/2/23.
Admission to Victoria Infirmary: 14/2/23.
Dismissed: 21/2/23.

INITIAL ILLNESS—1923.

Nine days before admission, the patient complained of great pain in the back of his head, and 4 days later he fell from his cycle. Next day he had several giddy turns, and that night fell out of bed. For the next 2 days he had a succession of these attacks.

14/2/23. On admission T. 99° F., P. 88, R. 20. Patient very drowsy, diplopia, nystagmus, and twitching of the mouth. No evidence of haemorrhage.

15/2/23. Frequent attacks of giddiness, when the patient becomes pale, the eyes roll, arms and trunk are quite lax, respiration is shallow, and when he comes to, he weeps for a short time and is confused in his ideas. Reflexes normal.

21/2/23. Dismissed. Well.

CONDITION IN MARCH, 1924.

Patient has felt quite well since leaving hospital, and has returned to business.

CONDITION IN MARCH, 1928.

The patient has had no further trouble since the time of his illness. He is at present in good physical condition, and pursues his occupation of commercial traveller.

Physical examination: Nil.

CASE 63.—Martha Sinclair.
Age: 48.
Residence: 333 Cumberland Street, S.S.
Sickened: 23/3/23.
Admission to Belvidere Hospital: 6/4/23.
Died: 18/4/23. 26 days' illness.

INITIAL ILLNESS—1923.

Onset characterized by drowsiness, pain in back of neck and in abdomen, twitchings, and dimness of vision. Later mental confusion.

6/4/23. On admission T. 100·8° F., P. 100, R. 24. Patient very drowsy, but could easily be roused. Twitching of muscles of right thigh, and tremor of facial muscles and of tongue. Pupils widely dilated. Nuchal rigidity. No Kernig's sign.

11/4/23. Very drowsy. Continuous twitchings.

18/4/23. Died.

Post-mortem examination: Brain meninges congested; no haemorrhages.

CASE 64.—Jessie Smith.
Age: 5.
Residence: 157 Firhill Road, Queen's Cross.
Sickened: 17/2/23.
Admission to R.H.S.C.: 22/2/23.
Dismissed: 12/7/23.
Died: 29/1/27.

INITIAL ILLNESS—1923.

Onset characterized by restlessness, insomnia, severe choreiform movements of hands and feet.

22/2/23. On admission T. 101° F. Child restless, drowsy by day. Speech indistinct.

24/2/23. Restless and wakeful at night. Physical examination: Nil.

12/7/23. Dismissed. Improved.

CONDITION IN MARCH, 1924.

The child is very restless and sleeps badly, and twitchings of the arms, face and eyelids are marked before going to sleep. Salivation is increased, and, at times, she has spasms of deep breathing. She has become very emotional, disobedient and quick-tempered since her illness. Her appetite is capricious, and she tires easily. She has lately resumed school and is making good progress.

STATEMENT OF RELATIVES—MARCH, 1928.

From the time of her illness a change of disposition was noted in the child. She took aversions to certain people, whom previously she had liked; this was most marked in the case of her younger sister, and the mother was in constant dread of what might happen. About 18 months after her illness she complained of weakness of the lower limbs, and, from then onwards, symptoms of Parkinsonism gradually developed. The face became masked and was drawn to the left side, the gaze was fixed, salivation increased, and the speech was thick and monotonous. During sleep the hands were constantly twitching. She became like an old woman, shuffling along with the body bent from the waist. The end came suddenly, and she died in January, 1927. She attended a special school until a few days before her death; drowsiness was constantly present.

CASE 65.—Matthew Steele.
Age: 43.
Residence: 99 Dryburgh Avenue, Rutherglen.
Sickened: 14/2/23.
Admission to Belvidere Hospital: 30/3/23.
Dismissed: 6/5/23.

INITIAL ILLNESS—1923.

The patient was admitted to the Western Infirmary on 26/3/23, diagnosed as a "kidney case." Onset sudden, characterized by headache, vomiting, coma and right hemiplegia. Later restlessness and mental confusion. No diplopia.

30/3/23. On admission to Belvidere, T. 98·8° F., P. 92, R. 24. Patient restless and delirious. Mentally confused. Squint both eyes. Slurring of speech. Pupils dilated and fixed. Face expressionless. Considerable loss of power of right arm. No paresis of lower limbs. Heart and lungs: Nil.

5/4/23. Headache, drowsy, no twitchings. C.S.F.: Fluid clear, no organisms.

6/5/23. Dismissed. Improved.

CONDITION IN MARCH, 1924.

The patient feels himself improved since leaving hospital, although he complains of weak eyesight and a poor memory.

CONDITION IN MARCH, 1928.

The patient had held a position in West Africa for 24 years previous to his illness. In 1918, he took an apoplectiform seizure and was invalided home; since then he has done no work. At present he leads a fairly active life, reading, walking, and golfing. His appetite is good, and sleep is normal, although the eyesight is somewhat weak. His memory is poor, and he eschews company, owing to the fact that, while in conversation, he frequently forgets what he wishes to say.

Nervous system: Knee jerks, right increased. No Babinski sign, no ankle clonus.

Eyes: Pupils equal, react well to light and on accommodation. Nystagmus, bilateral.

Hands: Tremor on extension. R.

Tongue: Slight tremor.

CASE 66.—Jean Stevenson.

Age: 19.

Residence: 37 Stirling Road.

Sickened: 20/2/23.

Admission to Ruchill Hospital: 26/2/23.

Dismissed: 11/4/23.

INITIAL ILLNESS—1923.

The patient was hit with a snowball shortly before the onset. Onset characterized by pain in back of head and shoulders, squint and diplopia. Later drowsiness and twitching of left side of mouth.

26/2/23. On admission T. 100·2° F., P. 116, R. 24. Patient very restless. Knee reflexes increased. No knee nor ankle clonus. No Babinski sign. No Kernig's sign. No nuchal rigidity. Eyes: Pupils contracted, sluggish reaction to light and on accommodation. Nystagmus right eye, less left eye. Internal strabismus of right eye. C.S.F.: 30 c.c.s. clear fluid, under slight pressure. Cell count increased (70), lymphocytes. No excess globulin.

28/2/23. Drowsy, but answers questions clearly. Restless during night. Bilateral ptosis.

12/3/23. Still drowsy. Nystagmus now absent.

11/4/23. Dismissed. Improved.

CONDITION IN MARCH, 1924.

The patient is restless and sleepless at night. There is a lack of facial expression, the speech is monotonous, and salivation is increased. She stares for relatively long periods without winking, and attitude and movement give an impression of stiffness. She complains of headache, dizziness, pain in the back of neck and right hip. There is some dimness of vision and left sided ptosis, and the mouth twitches constantly. She resumed work in a factory 2 weeks after leaving hospital, and a few months later was dismissed owing to her physical condition.

CONDITION IN MARCH, 1928.

A few months after leaving hospital, Parkinsonism manifested itself, symptoms increased, and the patient went steadily on the downward path. She became very emotional and depressed, and in ~~September~~ AUGUST, 1927, she attempted to commit suicide, taking a razor to her throat. She was certified as of unsound mind, and was admitted to Stobhill Mental Wards, where she was detained for 2 months.

Now she lies in bed most of the time. Her expression is masked, the face is drawn to the right side, and the eyes periodically turn upwards and remain so fixed for some time; speech is difficult, and salivation is excessive. When walking, she bends forward and takes short hurried shuffling steps; when standing, she is occasionally forced to take a backward run to retain her equilibrium. When attempting to sit, she flops completely, and in bed she has great difficulty in turning. There is a constant rythmic movement of her right arm and leg; the arms are held rigidly across the front of the body, the first finger and thumb in apposition. She requires to be fed, and, although emaciated, has quite a good appetite. Her memory is acute. She causes a great deal of trouble in the home, being wakeful and

crying most of the night, constantly wailing " Oh, my hands, my hands," with which she has become obsessed. She complains of giddiness and headaches. Menses have been regular since the age of 14.

In this case, the family history shows a neuropathic strain; one uncle has been in Gartnavel Asylum for the past 3 years, while there are signs of mental instability in other members of the family.

Nervous system: Knee jerks: Increased both sides.

Abdominal reflexes: Increased.

Eyes: Pupils equal, sluggish reaction to light and on accommodation. Internal strabismus of left eye and ptosis of left eyelid.

Tongue: Marked tremor.

CASE 67.—Margaret Taggart.
Age: 5.
Residence: 21 Surrey Street, S.S.
Sickened: 1/4/23.
Admission to Belvidere Hospital: 15/4/23.
Dismissed: 14/5/23.

INITIAL ILLNESS—1923.

Onset characterized by vomiting, occipital headache, delirium, hallucinations, restlessness and drowsiness. Later squint and twitching of facial muscles, right side of face and mouth.

15/4/23. On admission Temp. 100·2° F., P. 90, R. 24. Child very drowsy, but can be easily roused, and answers questions clearly. Very constipated. Eyes normal. Speech normal. Heart and lungs normal.

16/4/23. C.S.F.: Fluid clear.

14/5/23. Dismissed. Well.

CONDITION IN MARCH, 1924.

The child tires easily, and complains of headache and pain in the right leg. Her disposition is good, she sleeps well, and is equable in temper. She resumed school a few months after leaving hospital, and is making good headway.

CONDITION IN MARCH, 1928.

Two years ago the child was sent to a special school, owing to her physical condition. She tired very easily, and the mother then noticed a slight wasting of the right leg; this wasting became more pronounced, later the foot dropped, and consequently walking became difficult. At present the right leg is about half-an-inch shorter than the left, the muscles are atrophied, and the foot is dropped and turns inward. She flings the foot when walking, and complains a good deal of pain in the leg, and stiffness and numbness on awakening in the morning. During the winter, she suffers from chilblains on the soles of both feet. She becomes readily exhausted, is occasionally troubled with frontal headache, and, when in bed, the head perspires freely. The eyesight is weak, and she sighs and yawns frequently. She is bright and intelligent, is well up to the average at school, and is placid and even-tempered.

Nervous system:—Knee jerks: Both elicited, right increased. No Babinski sign. No knee nor ankle clonus.

Eyes: Pupils react to light and on accommodation. Right pupil slightly larger than left.

Tongue: No tremor.

Temperature of right foot is lower than that of left.

CASE 68.—John Trivett.
Age: 20.
Residence: 59 Crown Street, S.S.
Sickened: 26/1/23.
Admission to Royal Infirmary: 9/2/23.
Died: 19/2/23. 24 days' illness.

INITIAL ILLNESS—1923.

The patient had a fall and hit his head. The same day he had symptoms of frontal headache, weakness and diplopia. Later fever and drowsiness.

9/2/23. On admission T. 101° F. Patient drowsy, but can be roused, and answers clearly. Twitching of arms and legs. No delirium. Pupils dilated, no reaction to light, dimness of vision, and ptosis. C.S.F.: Not under pressure.

19/2/23. Died.

Post-mortem examination: Brain much congested.

CASE 69.—Edward Whitehead.
Age: 9.
Residence: 14 Coustonhill Street, Pollokshaws.
Sickened: 16/3/23.
Admission to Victoria Infirmary: 22/3/23.
Dismissed: 9/5/23.

INITIAL ILLNESS—1923.

The child was outside at play with his brother, who became quarrelsome and struck him several times on the head. After this he came home, and sat by the fire, where he fell asleep. Later he complained of headache, was very drowsy, the voice was weak and husky, and there was internal strabismus of the right eye, sometimes left (variable).

22/3/23. Child very drowsy. Jerky movements of right arm. Reflexes, all increased. Suggestion of ankle clonus on left side. Pupils react to light and on accommodation; dimness of vision, and nystagmus.

5/4/23. Less drowsy. Ptosis of right eyelid. Pupils unequal, left larger than right. Headache (vertex).

9/5/23. Dismissed. Well.

CONDITION IN MARCH, 1924.

The child does not sleep till the early morning, and is very drowsy at school, which he resumed 2 months after leaving hospital. Since his illness, he has become restless and irritable, and complains of weak eyesight. Salivation is excessive.

CONDITION IN MARCH, 1928.

The boy remained at school until the age of 14; since then he has been employed as a message boy. For over a year, he was sleepless at night and drowsy during school hours, but lately this condition wore off. Salivation is excessive and he is very bad-tempered. At times he suffers from general tremors; his eyesight is weak, and frequently there is a momentary internal strabismus of the left eye.

Physical examination: Nil.

CASE 70.—John Wood.
Age: 37.
Residence: 27 Milton Lane.
Sickened: 25/2/23.
Admission to Ruchill Hospital: 6/3/23.
Dismissed: 11/4/23.
Admission to Belvidere Hospital: 8/6/23.
Died: 9/6/23. 3½ months' illness.

INITIAL ILLNESS—1923.

Onset characterized by headache and pain at back of neck. Later sleeplessness marked, diplopia, strabismus and ptosis of right eyelid.

6/3/23. On admission T. 99·2° F., P. 96, R. 22. Patient very drowsy, but answers intelligently. Face expressionless. Clonic spasms of arms and legs. Knee jerks normal. No Babinski sign. No ankle clonus. Pupils react to light and on accommodation. Heart and lungs normal. C.S.F.: Under marked pressure.

8/3/23. Very drowsy.

11/4/23. Dismissed. Improved.

8/6/23. On admission to Belvidere, T. 103·2° F., P. 120, R. 40. Case diagnosed as pneumonia. Patient had been ill since 2/6/23 with pain at right side, shivering and cough.

9/6/23. Acutely ill. Pulse very feeble. Lungs: Right upper and lower lobe show signs of consolidation. Breathing tubular.

Died this evening.

APPENDIX II.

A clinical analysis of the initial symptoms (1923) and the sequelae five years later (1928) with a classification of the cases referable to the present condition (1928). Five Charts are given.

APPENDIX III.

A detailed Summary of the initial symptoms (1923) and the findings five years later (1928), a statistical comparison having been made between the initial symptoms and the sequelae.

APPENDIX II.

CHART I.

RECOVERY COMPLETE

INITIAL SYMPTOMS (1923)

Name.	1. Lethargy.	2. Insomnia.	3. Lethargy + Insomnia.	4. Eye Phenomena. Diplopia.	Ptosis.	Strabismus.	Nystagmus.	Blurred Vision.	Reaction to Light & Accom.	Pupils.	5. Fever.	6. C. S. F.	7. Tremors and Twitchings.	8. Paresis.	9. Reflexes.	10. Neuralgias.	11. Giddiness.	12. Speech Defect.	13. Respiratory Disturbance.	14. Vomiting.	15. Salivation.	16. Duration of Illness.
1. **Cameron** -	Drowsiness			Diplopia								Clear, slight pressure. No increase of cells. No excess globulin. Fehling's reduced	Face twitchings. Coarse tremors of hands, increased on action		Abdominal Reflexes—absent		Giddiness					6 weeks
2. **Leckie** - -	Drowsiness			Diplopia							Temp. 99° F.		Movement of head from side to side		Knee Reflexes absent.	Headache. Neuralgic pains throughout body	Giddiness			Vomiting		3 weeks
3. **M'Carthy** -	Drowsiness											Clear, slight pressure. Cell count 30. No excess globulin			Knee Reflexes increased	Headache						4 weeks
4. **M'Farlane, Wm.**	Drowsiness											Clear, slight pressure. Cell count 50. No excess globulin			Suggestion of Babinski on left side	Headache	Giddiness					4 weeks
5. **M'Guinness** -	Drowsiness										Temp. 103° F.	Clear, marked pressure. Cell count 50. No excess globulin	Twitching of L. leg	Kernig's sign marked	Babinski sign					Vomiting		8 weeks
6. **Riddell** - -	Drowsiness Delirium				Ptosis R. Eyelid	Strabismus				Dilated L. Pupil				Clonic spasm of R. leg		Headache	Giddiness Mild fainting attacks			Vomiting		6 weeks
7. **Silverman** -	Drowsiness Mental confusion			Diplopia			Nystagmus				Temp. 99° F.		Twitching of mouth			Headache	Apoplectiform attacks					2 weeks

INITIAL SYMPTOMS (1923).

Name.	1. Lethargy.	2. Insomnia.	3. Lethargy + Insomnia.	4. Eye Phenomena. Diplopia.	Ptosis.	Strabismus.	Nystagmus.	Blurred Vision.	Reaction to Light & Accom.	Pupils.	5. Fever.	6. C.S.F.	7. Tremors and Twitchings.	8. Paresis.	9. Reflexes.	10. Neuralgias.	11. Giddiness.	12. Speech Defect.	13. Respiratory Disturbance.	14. Vomiting.	15. Salivation.	16. Other Symptoms.
Class A. MENTAL RETARDATION.																						
1. **Kearney** - - -		Inversion of Sleep Rhythm							Paralysis of Accom.													
2. **M'Donald** - - -	Drowsiness Delirium Hallucinations										Temp. 107°-102° F.		Twitching of legs and left side of body Choroiform movements			Pain in legs						Constipation. Rash on neck and arms Incontinence
Class B. MENTAL INSTABILITY.																						
1. **Carnegie** - - -		Inversion of Sleep Rhythm Hallucinations				Internal Strabismus R. eye							General twitchings			Pain in elbows and lower dorsal region		Voice husky				Fine papular rash on back and buttocks
2. **Semple** - - -		Inversion of Sleep Rhythm									Temp. 100° to 102° F.		Acute Chorea Twitching of whole body	Nuchal Rigidity Left facial Paralysis								
Class C. NERVOUS INSTABILITY.																						
1. **Cohen** - - -		Insomnia Mental Confusion		Diplopia				Dimness of Vision			Temp. 101° F.			Abdominal Spasms		Headache (frontal)				Vomiting		
2. **Curran** - - -	Drowsiness Hallucinations			Diplopia					Fixed Paralysis of Light & Accom.	Dilated		Slight pressure Cell count 60 No excess globulin			Knee Reflexes—Very active	Headache (vertex)	Giddiness				
3. **Dillon** - - -	Drowsiness Delirium										Temp. high		Twitching movements R. side			Headache (vertex)						
4. **Fraser** - - -	Drowsiness			Diplopia									General Tremors			Headache						
5. **Hitchcock** - - -	Drowsiness			Diplopia		Bilateral Ptosis			Sluggish Reaction R. pupil					Facial expression masked		Headache (frontal)	Giddiness					
6. **Houston** - - -	Drowsiness			Diplopia		- -	Nystagmus						Twitching of both arms		Knee reflexes—very active	Headache (frontal), general pains, chiefly in joints of ankles & wrists. Pain in lumbar region	Giddiness				Constipation	
7. **Lloyd** - - -	Drowsiness			Diplopia		Internal Strabismus		Dimness of Vision			Temp. 100·4° F.	Clear, pressure slight increase	Twitching of R. hand	Katatonia Masked Face No facial palsy	Knee Reflexes—very active	Headache		Slurred		Vomiting		Incontinence Constipation
8. **M'Alister** - - -	Drowsiness							Dimness of Vision			Temp. 99·8° F.			Slight nuchal rigidity	Knee Reflexes—absent Abdominal Reflexes—absent	Pain in back of neck, head and right arm	Giddiness				
9. **M'Coll** - - -	Drowsiness			Diplopia	Ptosis				Sluggish Reaction to Light & Accom.	Dilated			Twitching of arms			Headache (right side)						
10. **M'Pherson** - - -		Inversion of Sleep Rhythm								Unequal			Twitching of feet	Paresis of lower part of face		Pains all over head						
11. **Miller** - - -		Insomnia							Reaction to Light, not to Accom.	R. pupil > L.	Temp. 99° F.		Twitching of R. hand & L. arm, jerky movements of arm and face	Facial expression masked	All Reflexes increased	Pain to right shoulder and neck and down right arm		Slight difficulty				Perspiration of forehead and upper part of chest
12. **Sievewright** - - -	Drowsiness			Diplopia		Internal Strabismus R. eye	Nystagmus				Temp. 102·4° F.		Twitching of muscles	Loss of power of legs. Facial expression vacant		Pain in head, severe, back and front—radiating down shoulders	Giddiness on lying on left side			Vomiting		
13. **Whitehead** - - -	Drowsiness				Ptosis R. eyelid	Internal Strabismus R. eye	Nystagmus	Dimness of Vision		Unequal L. pupil > R.			Jerky movements of Right arm.		All Reflexes—increased Suggestion of Ankle Clonus—L. side	Headache—vertex		Weak, husky				
Class D. PHYSICAL DEFECT.																						
1. **Taggart** - - -	Drowsiness Delirium Hallucinations					Strabismus					Temp. 100·2° F.		Twitching of facial muscles, R. side of face and mouth			Headache—occipital	Giddiness			Vomiting		Constipation
Class E.—PHYSICAL DEFECT + MENTAL INSTABILITY.											Temp. 99° F.	Clear, under slight pressure. Cell count 30. No excess globulin										
1. **Crosan** - - -	Drowsiness																					
2. **Drummond** - - -		Inversion of Sleep Rhythm				Bilateral Ptosis			Reaction to Light, not to Accom.		Temp. 99° F. later 100.6° F.	No increased pressure Fehling's reduced	Twitching of muscles, abdominal muscles and diaphragm. Twitching of limbs (L. side)			Severe pain in right arm, wrist and right side of back. Abdominal pain.		Slurred	Spitting Hyperpnoea			Constipation. Septic sores on face, head and back. Incontinence

CHART II.—RECOVERY INCOMPLETE.

5TH YEAR SYMPTOMS (1928).

Name.	1. Lethargy.	2. Insomnia.	3. Lethargy + Insomnia.	4. Eye Phenomena. Diplopia.	Ptosis.	Strabismus.	Nystagmus.	Blurred Vision.	Reaction to Light & Accom.	Pupils.	5. Fever.	6. C.S.F.	7. Tremors and Twitchings.	8. Paresis.	9. Reflexes.	10. Neuralgias.	11. Giddiness.	12. Speech Defect.	13. Respiratory Disturbance.	14. Vomiting.	15. Salivation.	16. Other Symptoms.
Class A. MENTAL RETARDATION.																						
1. **Kearney** - - -	Drowsiness																					Irritability
2. **M'Donald** - - -	Drowsiness																					
Class B. MENTAL INSTABILITY.																						
1. **Carnegie** - - -	Sleep	normal				Strabismus R. eye (slight)		Weak eyesight					General twitchings									Irritability Exhaustion
2. **Semple** - - -	Sleep	normal						Weak eyesight														
Class C. NERVOUS INSTABILITY.																						
1. **Cohen** - - -	Sleep	normal																				
2. **Curran** - - -	Sleep	normal						Weak eyesight														
3. **Dillon** - - -	Sleep	normal						Weak eyesight					Tremors									Irritability Quick temper
4. **Fraser** - - -	Drowsiness							Blurred Vision					General tremors Tremor of tongue									Irritability.
5. **Hitchcock** - - -	Drowsiness							Weak eyesight														
6. **Houston** - - -		Insomnia																				Irritability
7. **Lloyd** - - -	Sleep	normal						Weak eyesight														Constipation Exhaustion
8. **M'Alister** - - -	Sleep	normal						Blurred Vision	Sluggish reaction to light and accom.	L. pupil > R.												
9. **M'Coll** - - -	Sleep	normal																				
10. **M'Pherson** - - -	Sleep	normal			Ptosis of L. eyelid																	
11. **Miller** - - -	Sleep	normal																				
12. **Sievewright** - - -	Sleep	normal						Weak eyesight														
13. **Whitehead** - - -	Sleep	normal				Strabismus (internal momentarily)		Weak eyesight					General tremors									Irritability
Class D. PHYSICAL DEFECT.																						
1. **Taggart** - - -	Sleep	normal						Weak eyesight		R. pupil > L.												
Class E.—PHYSICAL DEFECT + MENTAL INSTABILITY.																						
1. **Crosan** - - -	Drowsiness (marked)												Tremor of tongue									Violent temper
2. **Drummond** - - -	Sleep	normal																				

CHART III.

INITIAL SYMPTOMS (1923).

Name.	1. Lethargy.	2. Insomnia.	3. Lethargy + Insomnia.	4. Eye Phenomena. Diplopia.	Ptosis.	Strabismus.	Nystagmus.	Blurred Vision.	Reaction to Light & Accom.	Pupils.	5. Fever.	6. C.S.F.	7. Tremors and Twitchings.	8. Paresis.	9. Reflexes.	10. Neuralgias.	11. Giddiness.	12. Speech Defect.	13. Respiratory Disturbance.	14. Vomiting.	15. Salivation.	16. Other Symptoms.
Attwell - -		Inversion of Sleep Rhythm									Temp. 99·2° F.	Clear, slight pressure No excess globulin Cell count 20 Fehling's reduced	Choreiform movements of arms and legs and twitching of facial muscles		Knee Reflexes—absent Abdominal Reflexes —very active							Incontinence
Gallacher -		Inversion of Sleep Rhythm											Choreiform movements of arms and legs and twitching of facial muscles			Headache				Vomiting		

PERVERSION OF CONDUCT.

Name.	1. Lethargy.	2. Insomnia.	3. Lethargy + Insomnia.	4. Eye Phenomena. Diplopia.	Ptosis.	Strabismus.	Nystagmus.	Blurred Vision.	Reaction to Light & Accom.	Pupils.	5. Fever.	6. C.S.F.	7. Tremors and Twitchings.	8. Paresis.	9. Reflexes.	10. Neuralgias.	11. Giddiness.	12. Speech Defect.	13. Respiratory Disturbance.	14. Vomiting.	15. Salivation.	16. Other Symptoms.
1. **Attwell** -	Sleep	normal											Choreiform movements of arms and legs						Hyperpnœa at sight of food		Salivation excessive at sight of food	Incontinence
2. **Gallacher** -	Sleep	normal			Bilateral Ptosis	Internal Strabismus L. eye (slight)		Weakness of L. eye					Choreiform movements of mouth and shoulder						Spitting and yawning		Salivation excessive	

5TH YEAR SYMPTOMS (1928).

CHART IV.

PARKINSONIANS.

INITIAL SYMPTOMS (1923).

Name	1. Lethargy	2. Insomnia	3. Lethargy + Insomnia	4. Eye Phenomena: Diplopia	Ptosis	Strabismus	Nystagmus	Blurred Vision	Reaction to Light and Accom.	Pupils	Ocular Spasm	5. Fever	6. C.S.F.	7. Tremors and Twitchings	8. Paresis	9. Reflexes	10. Neuralgias	11. Giddiness	12. Speech Defect	13. Respiratory Disturbance	14. Vomiting	15. Salivation	16. Other Symptoms
Class A. Normal Mentality																							
1. **Blue**			Drowsiness + Insomnia	Diplopia	Bilateral Ptosis					R. Pupil > L.			Clear—increased pressure. Cell Count 20. Marked excess of Globulin and Fehling's not reduced	Jerking of head to left and twitching of muscles of left side of chest	Weakness of R. arm		Pain R. side of neck and down R. arm	Giddiness					
2. **Campbell**		Inversion of Sleep Rhythm				Strabismus R. eye						Temp. 100° F.	Clear—increased pressure	Twitching of both arms and of body and limbs	Katatonia		Headache						
3. **Crawford**		Insomnia—Hallucinations		Diplopia								Temp. 103° F.		Fantastic co-ordinated movements of arms, shoulders and head			Headache (occipital) Abdominal pain						
4. **Hutchison**			Insomnia + Drowsiness, Hallucinations	Diplopia			Nystagmus	Blurred vision		L. Pupil > R.		Temp. 98·8° F.		Muscular Twitchings	Lack of facial expression No paresis of facial muscles	Knee reflexes diminished Abdominal reflexes increased				Hiccough			
5. **Joyce**	Drowsiness			Diplopia	Bilateral Ptosis	Strabismus L. eye			Reaction to light. Sluggish to accom.	R. Pupil > L.			Clear—increased pressure Cell Count 20 No excess Globulin	Twitching of L. leg		Reflexes (deep) equal Abdominal—Very active	Headache. Pain in epigastric region		Slurred		Vomiting		
6. **M'Alpine**			Drowsiness + Insomnia	Diplopia										General convulsions. Choreiform movements	Weakness of R. arm and hand		Severe intra-abdominal pain			Yawning			
7. **M'Ewan**			Insomnia + Drowsiness, Delirium	Diplopia	Bilateral Ptosis	Internal Strabismus L. eye	Nystagmus		Reaction to light. Not to accom.	R. Pupil > L.		Temp. 101° F.		Twitching R. side of face and body. Jerky movements of body and tongue	Katatonia in upper and lower limbs. Face masked		Pain in R. shoulder		Hoarse voice				
8. **M'Fadden**		Inversion of Sleep Rhythm Hallucinations		Diplopia		Strabismus Convergent								Twitching of L. side of face and L. arm			Headache (occipital)						
9. **M'Lachlan**	Drowsiness			Diplopia		Internal Strabismus R. eye	Nystagmus		Sluggish reaction to light and accom.	Dilated		Temp. 98·6° F.	Clear. Slight pressure. No excess Globulin. No increase of cells	Tremor of L. arm			Headache. Neuritic pains in head, back of neck and limbs	Giddiness					
10. **M'Leod**	Drowsiness—later restlessness											Temp. 99·2° F.			Katatonia. Face masked		Headache. Pain in back of head, neck, feet and legs	Giddiness	Slurred—Partial aptionia		Vomiting		
Class B. Abnormal Mentality																							
1. **Eadie**		Inversion of Sleep Rhythm										Temp. 98·8° F.		Choreiform movements		Knee reflexes—increased			Speaks in whisper				
2. **Forsyth**	Drowsiness—Hallucinations					Strabismus R. eye						Fever		General tremors									Irritability
3. **Gibson**	Drowsiness—Hallucinations												Clear—pressure normal. Cell count normal. No excess Globulin. Fehling's reduced		Face masked	Knee reflexes—sluggish	Pain in stomach		Slow				
4. **Nicol**			Insomnia + Drowsiness	Diplopia								Fever	Clear—great pressure	Muscular twitchings (Choreiform)		Knee reflexes—increased	Headache (frontal)	Giddiness			Vomiting		
5. **Paul**	Drowsiness—Delirium			Diplopia		Strabismus Convergent			Sluggish reaction to light and accom.				Clear—slight pressure. Cell count slight increase		Face masked		Headache (frontal)		Slurred	Hyperpnoea—Clicking of tongue			Irritability
6. **Sandler**		Inversion of Sleep Rhythm		Diplopia					Sluggish reaction to accom.			Fever					Headache (occipital). Pain in hands and feet	Giddiness			Vomiting		
7. **Smith**		Inversion of Sleep Rhythm—Restlessness										Temp. 101° to 102·6° F.		Severe chorea					Indistinct				
8. **Stevenson**	Drowsiness—Restlessness			Diplopia	Bilateral Ptosis	Strabismus R. eye	Nystagmus right eye—less left eye		Sluggish reaction to light and accom.	Contracted			Clear. Cell count increased (70). No excess Globulin. Slight pressure	Twitching of left side of mouth		Knee reflexes—increased	Headache. Pain in back of head and shoulder						

5TH YEAR SYMPTOMS (1928).

Name	1. Lethargy	2. Insomnia	3. Lethargy + Insomnia	4. Eye Phenomena: Diplopia	Ptosis	Strabismus	Nystagmus	Blurred Vision	Reaction to Light and Accom.	Pupils	Ocular Spasm	5. Fever	6. C.S.F	7. Tremors and Twitchings	8. Paresis	9. Reflexes	10. Neuralgias	11. Giddiness	12. Speech Defect	13. Respiratory Disturbance	14. Vomiting	15. Salivation	16. Other Symptoms
Class A. Normal Mentality																							
1. **Blue**	Drowsiness				Ptosis L. eyelid				Sluggish reaction to light and accom.					Tremor of L. arm. Marked tremor of tongue	Face masked. Stiffness of L. arm				Difficult hurried	Sighing		Salivation excessive	Irritability
2. **Campbell**	Sleep	Normal			Bilateral Ptosis				Sluggish reaction to light and accom.		Spasm of Ocular Muscles			Tremors of arms and legs. Tremor of tongue	Face masked. Generalised rigidity	Knee reflexes—increased R. side			Aphonia	Snoring		Salivation excessive	Irritability
3. **Crawford**	Sleep	Normal			Ptosis L. eyelid				Sluggish reaction to light & accom. of R. eye		Spasm of Ocular Muscles			Twitching of R. eyelid. Marked tremor of tongue and of R. arm and R. leg	Face masked. Rigidity of R. knee joint. Stiffness of R. arm—drags R. leg	Knee reflexes—increased R. side Babinski R. side		Giddiness	Slow difficult	Sighing Yawning		Salivation excessive	Irritability
4. **Hutchison**		Insomnia		Diplopia							Spasm of Ocular Muscles			Tremor of tongue. Coarse tremor of L. arm and L. leg	Face masked. Both arms powerless and rigid Spasm of jaw muscles	Knee reflexes—increased Ankle Clonus on right side but not sustained	Pain L. side of face		Monotonous difficult			Salivation excessive	Irritability Retropulsion
5. **Joyce**		Insomnia—Restlessness		Diplopia		Internal Strabismus left eye			Sluggish reaction to light and accom.		Spasm of Ocular Muscles			Tremor of eyelids. Tremor of tongue. Fine tremor of both hands and R. leg—also L. leg (slight)	Face masked and drawn to R. side. Generalised rigidity	Knee reflexes—increased L. side. Ankle Clonus both sides—not sustained	Headache, severe (occipital)		Aphonia	Sighing constant		Salivation excessive	
6. **M'Alpine**		Insomnia						Weak eyesight	Sluggish reaction to light and accom.					Tremor of tongue. Tremor of hands on extension	Face masked. Weakness of R. arm. stiffness of L. arm	Knee reflexes—increased			Monotonous				
7. **M'Ewan***		Insomnia			Bilateral Ptosis									Tremor of tongue General tremors	Face masked. Generalised rigidity				Aphonia			Salivation excessive	
8. **M'Fadden**	Sleep	Normal							Sluggish reaction to light and accom.					Tremor of tongue and of L. hand on extension. Fine tremors of arms & legs—tremor increased on action	Face masked. Stiffness of L. arm. R. side of face drawn to left (on stress)	Knee reflexes—increased R. side			Slow monotonous			Salivation excessive	Irritability. Retropulsion. Swaying movement
9. **M'Lachlan**	Sleep	Normal							Sluggish reaction to light and accom.					Tremor of tongue. Constant rhythmic movement of both arms and L. leg	Face masked. Stiffness of both arms	Knee reflexes—increased L. side			Monotonous			Salivation excessive	Perspiration R. side of face
10. **M'Leod**		Insomnia			Ptosis L. eyelid			Weak eyesight	Sluggish reaction to light of R. eye ...					Twitching of eyelids. Tremor of tongue and of R. leg	Face masked. Stiffness of R. arm	Knee reflexes—increased Abdominal Reflexes increased	Headache. Pain in back of neck, shoulder blades, soles of feet & joints of large toes	Giddiness	Hurried difficult	Sighing Yawning		Salivation excessive	Irritability Propulsion
Class B. Abnormal Mentality																							
1. **Eadie**	Sleep	Normal												Tremor of tongue	Face masked. Stiffness of R. arm	Knee reflexes—increased Abdonimal Reflexes increased			Monotonous			Salivation excessive	
2. **Forsyth***	Drowsiness marked										Spasm of Ocular Muscles			Tremor of tongue. General tremors marked. Choreiform movements of hands and face	Face masked. Generalised rigidity. Loss of power of upper and lower limbs				Aphonia			Salivation excessive	Violent temper
3. **Gibson**	Drowsiness										Spasm of Ocular Muscles			Tremor of tongue	Face masked. Stiffness of arms	Knee reflexes—increased Abdominal Reflexes increased			Difficult			Salivation excessive	Irritability Violent temper Retropulsion
4. **Nicol**	Sleep	Normal				Momentary internal Strabismus (convergent)			Sluggish reaction to light and accom.					Tremor of tongue and of hands on extension	Face masked	Knee reflexes—increased L. side	Headache accompanied by tremors		Difficult			Salivation excessive	Violent temper
5. **Paul**		Insomnia—Restlessness				Internal Strabismus L. eye			Sluggish reaction to light and accom.					Tremor of tongue. Coarse tremor of both hands	Face masked. Rigidity more marked in legs than arms	Knee reflexes increased on right side. Ankle Clonus right side but not sustained	Headache (frontal)		Slow difficult	Snoring		Salivation excessive	Violent temper
6. **Sandler**	Drowsiness							Weak eyesight	Sluggish reaction to light & accom. L. eye	R. pupil > L.					Face masked. Stiffness of L. arm and L. leg				Slow	Sucking		Salivation excessive	Irritability
7. **Smith***	Drowsiness													Twitching of hands during sleep	Face masked. Generalised rigidity				Monotonous			Salivation excessive	Irritability Violent temper
8. **Stevenson**		Insomnia			Ptosis L. eyelid	Internal Strabismus		Weak eyesight	Sluggish reaction to light and accom.		Spasm of Ocular Muscles			Marked tremor of tongue. Constant rhythmic movements of R. arm and R. leg	Face masked. Face drawn to R. side. Rigidity of arms	Knee reflexes increased both sides. Abdominal Reflexes increased	Headache	Giddiness	Difficult			Salivation excessive	Irritability Retropulsion

* Died.

CHART V.—DEATHS OCCURRING AT THE TIME OF THE INITIAL ILLNESS.

INITIAL SYMPTOMS (1923).

Name.	1. Lethargy.	2. Insomnia.	3. Lethargy + Insomnia.	4. Eye Phenomena.							5. Fever.	6. C.S.F.	7. Tremors and Twitchings.	8. Paresis.	9. Reflexes.	10. Neuralgias.	11. Giddiness.	12. Speech Defect.	13. Respiratory Disturbance.	14. Vomiting.	15. Salivation.	16. Duration of Illness.
				Diplopia.	Ptosis.	Strabismus.	Nystagmus.	Blurred Vision.	Reaction to Light & Accom.	Pupils.												
1. **Blackwood**		Insomnia Restlessness Delirium					Nystagmus				Temp. 100°–102° F.		Choreiform movements			Headache						16 days
2. **Blane**	Drowsiness later deep coma										Temp. 99° F. later 103°–106° F.	Increased pressure		Spasticity of arms and legs Jaws tightly closed	Reflexes—all increased		Giddiness					9 days
3. **Buchanan**		Insomnia Restlessness Delirium									Temp. 101°–103° F.		Twitching of whole body Jerky tremulous movements			Headache Pain in right shoulder						5 weeks
4. **Higgins**		Insomnia later Delirium Coma		Diplopia		Internal Strabismus R. eye					Temp. 101° F. later 106° F.		Twitching of facial muscles and of arms			Headache						7 days
5. **Kelly**			Drowsiness + Insomnia Delirium								Temp. 100° F.	Cell count 30	Convulsions	Knees drawn up, head flexed, no nuchal rigidity Kernig's sign doubtfully present								10 days
6. **M'Crorie**		Insomnia Restlessness Delirium								Pupils dilated unequal	Temp. 100.6° F.	Clear—increased pressure								Vomiting		10 days
7. **Macfarlane (Euphemia)**	Drowsiness Restlessness				Bilateral Ptosis							Clear—marked pressure	Choreiform movements of angles of mouth. Twitching of lower limbs	Face expressionless, nuchal rigidity and Kernig's sign	Knee reflexes increased	Headache		Difficult				30 days
8. **Macfarlane (Malcolm)**		Insomnia Restlessness Delirium				Internal Strabismus	Nystagmus				Temp. 100° F.	Not quite clear Increased pressure	Choreiform movements Body going into extreme state of extension and flexion.			Pain in left arm and left hip				Vomiting		5 months
9. **M'Nulty**	Drowsiness later coma			Diplopia					Sluggish reaction to light and accom.		Temp. 103° F. later 105° F.	Clear Cell count 50	Tremulous condition of hands		Knee reflexes absent Abdominal reflexes absent							6 days
10. **M'Philmeny**	Drowsiness				Ptosis L. eyelid					Pupils dilated Both eyes discharging	Temp. 100° F.		Twitching of toes and R. leg		Knee reflexes absent							16 days
11. **Milne**	Drowsiness Delirium			Diplopia	Bilateral Ptosis		Nystagmus				Temp. 98.8° F. later 104° F.		Convulsions	Slight nuchal rigidity Legs and arms spastic		Headache						15 days
12. **Mitchell**	Drowsiness					Internal Strabismus				L. eye discharging		Clear increased pressure	Convulsions		Knee reflexes increased			Slurred				3 months
13. **O'Hare**	Drowsiness Delirium later coma					Convergent Strabismus				Pupils unequal	Temp. 103° F.		Twitching of face and limbs, especially upper limbs	Paralysis of R. side of face, drooping of angle of mouth on affected side. Head and neck drawn to left side and downwards	Deep reflexes increased	Headache						10 days
14. **Reilly**		Insomnia Delirium		Diplopia		Strabismus					Temp 103° F.		Choreiform movements Twitching of arms									10 days
15. **Robertson**		Insomnia Restlessness Delirium		Diplopia		Internal Strabismus R. eye	Nystagmus			L. pupil > R. Conjunctivitis	Temp. 101.3° F.		Choreiform movements Twitching of limbs				Giddiness					13 days
16. **Sinclair**	Drowsiness Mental confusion							Blurred Vision		Pupils wildly dilated	Temp. 100.8° F.		Twitching of muscles of thigh. Tremor of facial muscles & tongue	Nuchal rigidity		Pain back of neck & abdomen						26 days
17. **Trivett**	Drowsiness			Diplopia	Ptosis			Blurred Vision	No reaction to light	Pupils dilated	Temp. 101° F.		Twitching of arms and legs			Headache (frontal)						24 days
18. **Wood**			Insomnia + Drowsiness	Diplopia	Ptosis R. eyelid	Strabismus					Temp. 99.2° F.	Marked pressure	Twitching of arms and legs	Face masked		Headache. Pain in back of neck						3½ months

APPENDIX III.

A detailed Summary of the initial symptoms (1923) and the findings five years later (1928), a statistical comparison having been made between the initial symptoms and the sequelae.

I. RECOVERY COMPLETE.

Total number of patients in Group=7.

Nature of initial symptoms in 1923.	No. of patients showing initial symptoms.
1. Lethargy	7
2. Insomnia	—
3. Lethargy+Insomnia	—
4. Eye Phenomena—	
Diplopia	3
Ptosis	1
Strabismus	1
Nystagmus	1
Pupils dilated	1
5. Fever	3
6. C.S.F.—	
Pressure increased	4
Cell count increased	3
Fehling's reduced	1
7. Tremors and Twitchings—	
Twitching of face	1
Twitching of mouth	1
Tremor of hands	1
Twitching of legs	1
Involuntary movements	1
8. Paresis—	
Kernig's sign	1
Clonic spasm of leg	1
9. Reflexes—	
Knee jerks increased	1
Knee jerks absent	1
Abdominal reflexes absent	1
Babinski sign	1
10. Neuralgias—	
Headache	5
Pain other than headache	1
11. Giddiness	5
12. Speech Defect	—
13. Respiratory Disturbance	—
14. Vomiting	3
15. Salivation	—
16. Other symptoms	—

II. RECOVERY INCOMPLETE.

Total number of patients in Group=20.

Nature of Initial Symptoms in 1923.	No. of Patients showing Initial Symptoms.	Nature of Sequelae in 1928.	No. of Patients showing sequelae
1. Lethargy	13	Lethargy	5
2. Insomnia	7	Insomnia	1
3. Lethargy + Insomnia	—	Lethargy + Insomnia	—
4. Eye Phenomena—		Eye Phenomena—	
Diplopia	8	Diplopia	—
Ptosis	4	Ptosis	1
Strabismus	5	Strabismus	2
Nystagmus	3	Nystagmus	—
Blurred Vision	4	Blurred Vision	11
Sluggish Reaction to light	3	Sluggish reaction to light	1
Sluggish reaction to accom.	6	Sluggish reaction to accom.	1
Pupils dilated	2	Pupils dilated	—
Pupils unequal	3	Pupils unequal	2
5. Fever	11	Fever	—
6. C.S.F.—		C.S.F.—	
Pressure increased	3	Pressure increased	—
Cells increased	2	Cells increased	—
Fehling's reduced	1	Fehling's reduced	—
7. Tremors and Twitchings—		Tremors and Twitchings—	
Twitching of hands, arms and legs	7	Twitching of hands, arms and legs	—
Twitching of face	1	Twitching of face	—
Tongue tremor	—	Tongue tremor	2
Choreiform movements	7	Choreiform movements	1
General tremors	1	General tremors	3
8. Paresis—		Paresis—	
Nuchal rigidity	2	Nuchal rigidity	—
Masked face	4	Masked face	—
Facial paralysis	2	Facial paralysis	—
Katatonia	1	Katatonia	—
Abdominal spasm	1	Abdominal spasm	—
Loss of power of legs	1	Loss of power of legs	—
Weakness of arms	—	Weakness of arms	2
Numbness of arms and legs	—	Numbness of arms and legs	2
Wasting of muscle	—	Wasting of muscle	1
9. Reflexes—		Reflexes—	
Knee jerks increased	5	Knee jerks increased	1
Knee jerks absent	1	Knee jerks absent	—
Abdominal reflexes increased	2	Abdominal reflexes increased	—
Abdominal reflexes absent	1	Abdominal reflexes absent	—
10. Neuralgias—		Neuralgias—	
Headache	13	Headache	7
Pain other than headache	7	Pain other than headache	2
11. Giddiness	6	Giddiness	2
12. Speech Defect	5	Speech Defect	—
13. Respiratory Disturbance	1	Respiratory Disturbance	8
14. Vomiting	3	Vomiting	—
15. Salivation	—	Salivation	10
16. Other Symptoms—		Other Symptoms—	
Incontinence	3	Incontinence	1
Perspiration	1	Perspiration	1
Rashes	3	Rashes	—
Constipation	5	Constipation	1
Asthenia	—	Asthenia	6
Irritability	—	Irritability	16

III.—PERVERSION OF CONDUCT.

Total number of patients in Group=2.

Nature of Initial Symptoms in 1923.	No. of patients showing initial symptoms.	Nature of Sequelae in 1928.	No. of patients showing Sequelae.
1. Lethargy	—	Lethargy	—
2. Insomnia	2	Insomnia	—
3. Lethargy +Insomnia	—	Lethargy+Insomnia	—
4. Eye Phenomena—		Eye Phenomena—	
Ptosis	—	Ptosis	1
Strabismus	—	Strabismus	1
Blurred Vision	—	Blurred Vision	1
5. Fever	1	Fever	—
6. C.S.F.—		C.S.F.—	
Increased pressure	1	Increased pressure	—
Increased cell count	1	Increased cell count	—
Fehling's reduced	1	Fehling's reduced	—
7. Tremors and Twitchings—		Tremors and Twitchings—	
Choreiform movements	2	Choreiform movements	2
8. Paresis	—	Paresis	—
9. Reflexes—		Reflexes—	
Knee Jerks	1	Knee Jerks	—
Abdominal reflexes increased	1	Abdominal reflexes increased	—
10. Neuralgias—		Neuralgias—	
Headache	1	Headache	—
11. Giddiness	—	Giddiness	—
12. Speech Defect	—	Speech Defect	—
13. Respiratory Disturbance	—	Respiratory Disturbance	2
14. Vomiting	1	Vomiting	—
15. Salivation	—	Salivation	2
16. Other Symptoms—		Other Symptoms—	
Incontinence	1	Incontinence	1

IV.—PARKINSONIANS.

Total number of patients in Group=18.

Nature of Initial Symptoms in 1923.	No. of patients showing initial symptoms.	Nature of Sequelae in 1928.	No. of patients showing Sequelae.
1. Lethargy	7	Lethargy	5
2. Insomnia	6	Insomnia	7
3. Lethargy+Insomnia	5	Lethargy+Insomnia	—
4. Eye Phenomena—		Eye Phenomena—	
Diplopia	12	Diplopia	2
Ptosis	4	Ptosis	6
Strabismus	8	Strabismus	4
Nystagmus	4	Nystagmus	—
Blurred Vision	1	Blurred Vision	4
Sluggish reaction to light	3	Sluggish reaction to light	12
Sluggish reaction to accom.	6	Sluggish reaction to accom.	11
Pupils dilated	1	Pupils dilated	—
Pupils unequal	4	Pupils unequal	1
Pupils contracted	1	Pupils contracted	—
Ocular spasms	—	Ocular spasms	7
5. Fever	11	Fever	—
6. C.S.F.—		C.S.F.—	
Pressure increased	7	Pressure increased	—
Cells increased	4	Cells increased	—
Globulin excess	1	Globulin excess	—
Fehling's reduced	1	Fehling's reduced	—
7. Tremors and Twitchings—		Tremors and Twitchings—	
Twitching of arms and legs	4	Twitching of arms and legs	13
Twitching of face & mouth	3	Twitching of face & mouth	—
Choreiform movements	8	Choreiform movements	1
General tremors	1	General tremors	2
Convulsions	1	Convulsions	—
Tongue tremors	—	Tongue tremors	16
Tremor of eyelids	—	Tremor of eyelids	3
8. Paresis—		Paresis—	
Masked Face	5	Masked Face	18
Facial paralysis	—	Facial paralysis	3
Katatonia	3	Katatonia	—
Weakness of arm	2	Weakness of arm	—
Spasm of jaw muscle	—	Spasm of jaw muscle	1
General rigidity	—	General rigidity	5
Rigidity of arms only	—	Rigidity of arms only	9
Rigidity of arms and legs	—	Rigidity of arms and legs	3
9. Reflexes—		Reflexes—	
Knee jerks increased	3	Knee jerks increased	13
Knee jerks decreased	2	Knee jerks decreased	—
Abdominal reflexes increased	2	Abdominal reflexes increased	4
Babinski sign	—	Babinski sign	1
Ankle clonus	—	Ankle clonus but not sustained	3
10. Neuralgias—		Neuralgias—	
Headache	10	Headache	5
Pain other than headache	10	Pain other than headache	2
11. Giddiness	5	Giddiness	3
12. Speech Defect	7	Speech Defect	18
13. Respiratory Disturbance	3	Respiratory Disturbance	7
14. Vomiting	4	Vomiting	—
15. Salivation	—	Salivation	17
16. Other Symptoms—		Other Symptoms—	
Irritability	2	Irritability	13
Perspiration	—	Perspiration	1
Retropulsion	—	Retropulsion	4
Propulsion	—	Propulsion	1
Swaying movement	—	Swaying movement	1

V.—DEATHS.

Total number of patients in Group=18.

Nature of Initial Symptoms in 1923.	No. of patients showing initial symptoms.
1. Lethargy	9
2. Insomnia	7
3. Lethargy+Insomnia	2
4. Eye Phenomena—	
Diplopia	7
Ptosis	5
Strabismus	7
Nystagmus	4
Blurred Vision	2
Sluggish reaction to light	2
Sluggish reaction to accom.	1
Pupils dilated	4
Pupils unequal	3
5. Fever	16
6. C.S.F.—	
Increased pressure	6
Increased cell count	2
7. Tremors and Twitchings—	
Twitching of hands, arms and legs	10
Twitching of face	3
Tongue tremor	1
Choreiform movements	6
Convulsions	3
8. Paresis—	
Nuchal rigidity	3
Kernig's sign	2
Masked face	3
Spasticity of arms and legs	3
Spasm of jaw	1
9. Reflexes—	
Knee jerks increased	4
Knee jerks absent	2
Abdominal reflexes increased	1
Abdominal reflexes absent	1
10. Neuralgias—	
Headache	8
Pain other than headache	4
11. Giddiness	2
12. Speech Defect	2
13. Respiratory Disturbance	—
14. Vomiting	2
15. Salivation	—
16. Other Symptoms	—