" A Contribution to the Study of General Paralysis, with Special Reference to Non-luetic Aetiological Influences, and to the Results of Combined Specific and Non-specific Therapy. "

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BY

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- C O N T E N T S -

All of the cases quoted in the following pages were patients in Hawkhead Mental Hospital, Glasgow, and throughout their residence were under the personal observation and treatment of the writer. They are quoted with the permission of the Medical Superintendent of that Institution. The serological examinations were made by Dr. William Whitelaw, Director of the Scottish Western Asylums' Research Institute. Unless where otherwise stated, all other investigations were performed personally.

P R E F A C E.

The chief objects of this thesis are

(1) to review the history and the clinical course of each of a series of consecutive cases of General Paralysis of the Insane, taking special account of the nature of any aetiological circumstances or agencies additional to syphilitic infection;

(2) to compare these findings with those of previous investigations;

(3) to detail the treatment of ten selected cases of General Paralysis of the Insane, noting the clinical and the serological results;

and (4) to compare these results with those obtained by similar and by different methods of treatment carried out by other investigators.

We may, therefore, conveniently divide our considerations of the matter into two parts, Part 1 dealing mainly with the question of aetiology, and Part 11 with that of treatment.

(A list of references to quotations is appended at the end of Part 11).

- PART I. -

PART 1.

Long before Wassermann, in 1905, devised his complement-deviation test for proof of existent or pre-existent syphilis, it had been suspected, and in many quarters accepted, that General Paralysis was directly related to the question of syphilis. Subsequent observations confirmed this hypothesis, but the critics were not fully satisfied until Noguchi (1) demonstrated in the brain-tissues of a general paralytic the presence of the Spirochaeta Pallida. It is now everywhere agreed that luetic infection is an essential agent in the production of the disease, but it is commonly believed that, in addition, other factors or circumstances may be necessary in order to complete the aetiological requirements. It has been computed that only from two to four per cent of all syphilised individuals ultimately suffer from General Paralysis To explain this fact, many theories have been propounded.

Current opinions may be summarised by a brief enunciation of the most popular suggestions made in this connection.

1. Bolton (2) after a searching clinical and pathological inquiry regarding one hundred and two cases, came to the conclusion that, in addition to syphilis, there must previously have existed a "cortical inferiority". Other writers support his contention on purely clinical evidence. "The subjects of this disease would, if they had not been syphilised, have suffered from one or other of the types of primarily neuronic dementia. The ordinary sane individual may suffer from syphilis with impunity, as regards the later onset of Dementia Paralytica. ------ On the other hand, a psychopath who possesses cortical neurones of subnormal durability, and who, apart from an attack of syphilis, would develop a moderate grade/

grade of dementia, would, after an attack of that disease, sooner or later suffer from one or other of the types of Dementia Paralytica". (As will be shown later, Bolton also attached importance to hereditary pre-disposition, and, in lesser degree, to psychic stresses, as further possible accessory causes.

2. Krafft-Ebing (3) held that General Paralysis was due to the combined effects of syphilis and "to the pernicious effect on mind and body brought about by the inordinate demands in earlier life of the present social conditions, to the abuse of condiments and stimulants especially of alcohol, and to a debauched manner of living. --------- Among the contributory predisposing factors would then be reckoned: hereditary taint and a neuropathic constitution, damages to the skull and brain from rachitis, a premature wearing-out of the brain from mental and physical stress, debauches and other pernicious influences;---- an unhygienic mode of life, overwork and other outgrowths of civilisation". His conclusions were summarised in the classical statement that "to set forth the aetiology of paresis in two words, one would choose 'syphilisation' and 'civilisation'."

3. It was from an early period recognised that few General Paralytics had any signs of previous syphilitic lesions, and that, in a large majority of cases, there could not from any source be obtained a history of either primary sore or secondary rashes. A knowledge of this, together with the fact that most cases of General Paralysis proved resistant to the exhibition of the usual anti-syphilitic remedies, led to the hypothesis by Mott (4) that there might conceivably exist a special strain of Spirochaeta Pallida which had a peculiar attraction for nervous tissues - a neurotropic strain. Instances too, have been quoted (5) of cases where men who had acquired the infection from the same source, all developed some form of neurosyphilis. This suggestion has recently received some confirmation from the findings/

findings of several American Syphilologists (6) who, after extensive experiences in the treatment of all stages of syphilis by Tryparsamide, conclude that this drug "has little benefit in the earlier stages" and that "its use ought to be confined strictly to the treatment of neurosyphilitic infections"

4. On the analogy of tuberculosis it has been variously suggested that certain individuals possess a peculiar hypersusceptibility for General Paralysis - a "General Paralytic-diathesis". This appears to evade the problem, however, and cannot be accepted as being fully satisfactory until the possible influences of other pre-disposing or of exciting causes have been completely eliminated.

5. Fildes and McIntosh (7) believe that the pathological changes in the brain result from the reaction of hypersensitised tissue to a later dose of spirochaetal toxins. Sensitisation they consider to occur in the secondary stages, the toxin passing from cutaneous and mucous membranes via the nerves This theory would, in other words, explain the disease as being a type of anaphylactic phenomenon.

6. Kraepelin (8) is of opinion that the disease occurs in (a) individuals whose resistance is lowered by alcoholism;and he believes that (b) in all cases the long-continued prevalence of syphilis has tended to lower the specific immunity of races of men, and this is added to by (c) a synchronous loss of resisting power in brains which are highly specialised.

7. All authors attach a varying amount of importance to the influence of such factors as psychopathic heredity, alcoholic excess, head-injury, acute physical illness, auto-intoxications, malnutrition and anaemia.

These are the most popular theories in the neurological and bacteriological conceptions which, to-day, hold the

field/

field. Other theories, e.g., Ford-Robertson's (9), are not even outlined, as they find little mention in most current text-books.

All theories, when reduced to common level, attempt to answer the much debated question: "Is the cause of General Paralysis to be found in the man (the soil) or in the organism (the seed)?".

In reviewing the course of a series of cases suffering from General Paralysis, it was the object of the writer to investigate each chiefly from the aspect of non-luetic aetiological influences. From the information so obtained, an attempt will be made to explain their occurrence, in the light of the expressed opinions of Bolton, Krafft-Ebing, Erb and others. It is obvious that these opinions are, for the most part, widely divergent and fundamentally opposed to each other.

The difficulties of obtaining information concerning the histories of all mental patients are notoriously great, especially in cases of General Paralysis. The wife is frequently the only visitor, and it is quite common for the others of the patient's family to be unknown to her. In some instances, the age of the patient proves a serious drawback, as, the older he is, the fewer are the available relatives who can supply reliable facts regarding the family history. In other cases, the real nature of the disorder is suspected, but not admitted, all sorts of reasons and excuses being brought forward to explain the onset of the illness. Again, in view of the question of financial compensation claims, Army Pension-appeals, etc., it is usual to find that the relatives adduce and magnify numerous trivial details of "over-work", "bad company", and "accidents". In addition, care has to be exercised in discriminating between what were really symptoms and not causes. This is particularly applicable to the incidence of alcoholism, unemployment, falls and injuries, and lesser degrees of mal-

malnutrition and auto-intoxication. Lastly, it is quite common to find that the relatives have been informed that the disease is not insanity, but is the natural sequel of former dissipation; this is quite frequently done by some tactful, if not always strictly truthful, general practitioner, in an endeavour to relieve the natural apprehensions regarding the offspring. The consequence is, that, in such types of cases, there are intentionally concealed, many facts of family history which otherwise would have been mentioned.

In the collection of the following case-histories, due recognition was given to the prevalence of these possible fallacies. A genuine endeavour has been made to gather and to present the facts in a manner free from bias, either of the relatives or on the part of the writer. For purposes of comparison, there is later given a statistical table showing the incidence of the same causative agencies as they occurred in other types of mental disorder in patients also under the personal care of the writer.

Mott (10) speaks very scathingly of asylum case-histories, and concludes that these are "of little value as scientific contributions to the study of mental disease". It is to be hoped, however, that, in view of the care and time expended in the taking of this series, his remarks may not here be applicable.

In the following brief records of cases, then, special note is made of the occurrence and of the nature of any circumstances or accessory factors which might conceivably have played a part in the causation of the disease. Thus, the family history is given, with a view to showing the existence or absence of a psychopathic or a neuropathic inheritance, and to determining the general quality of the "family stock". Reference is made in some cases, to the psychic "make-up" of the individual prior to the onset of mental symptoms. For example, some of the patients will be shown apparently to have had a mental re-

reaction which, while not by any means sufficiently morbid to call for certification, may well have been an evidence of psychopathic inferiority, e.g., undue introversion and marked unsociability, moral laxity, or intellectual deficiency. Where possible, the general type of the previous mental reaction-type is noted, e.g., "manic" or "depressive" types, etc. It is now recognised that, in a vast majority of normal individuals, there do exist manic-depressive and introverted tendencies in their life-reactions. It is here assumed, however, that when these tendencies are so much in evidence as to show themselves as "peculiarities" to relatives, they constitute possible signs of a type of psychic inferiority. The date of primary infection is given, where it was ascertainable, together with the nature of any secondary lesions, and the treatment, if any, that was received.

In addition, there is also remarked on the occurrence of such possible aetiological agencies as psychic stress resultant from, for example, a prolonged period of unemployment, or from the strain of War Service. The incidence of alcoholism is noted, distinction being made between habitual excess which might have been causative, and sudden over-indulgence, which was purely symptomatic. Indication is also given regarding the history of any former mechanical trauma, special attention being given to head-injury. In a few cases there falls to be observed the possible relationship between an acute physical illness and the later onset of mental symptoms. Finally, the general bodily condition of each patient is briefly given, note being made of such toxic foci as oral sepsis, pulmonary tuberculosis, etc.

The clinical picture and the subsequent course of the illness are shortly outlined, with the ultimate cause of death.

For the sake of brevity, negative findings are omitted, and, in most instances, generalisation is adopted.

The case records are all those of male patients.

Here/

Here, it may be remarked that between September, 1923, and January, 1926, there were 43 cases of General Paralysis in a total of 305 male patients admitted - that is, 14%. This is a somewhat higher figure than that usually quoted, and is an increase on the percentage for Hawkhead Mental Hospital for the past ten years, the average for which is 10.2%. It is possible that this increase is a result of the incidence of Army Service, and of post-war unemployment. It will be shown later that, so far as this investigation goes, both of these circumstances exercise an influence on the occurrence of the disease.

CASE 1. Admitted 26-9-23. Age, 42 years. Sail-maker.

Patient was the eldest of a family of four, the others of whom were alive and apparently in good health. His father died of malignant disease and his mother of chronic nephritis. There was no suggestion of mental instability in any relatives. Patient was a delicate child and, on account of debility, did not attend school till the age of seven years, but he proved to be intelligent. He was married for sixteen years and had three of a family, of whom two had died in infancy, each of tubercular meningitis. He was a confirmed alcoholic for many years. In July, 1921, he was rendered unconscious by a fall from a bicycle and was confined to bed for one week. He was unemployed from January, 1922, onwards. The mental illness was first suspected in May, 1922, when he became depressed and irritable. Later, he threatened to commit suicid and bullied his wife in a most unreasonable manner.

On admission, he was still somewhat depressed, introspective, suspicious and uncommunicative. His memory was fairly good and he was accurately orientated. Physically, he was anaemic, poorly nourished and asthenic. Oral sepsis was extensive and constipation severe. He had Argyll-Robertson pupils, exaggerated knee-jerks and coarse tremors in the hands.

Blood Wassermann Reaction : Strongly positive
Cerebro-Spinal Fluid. Cells: 40 per c.m.m.
Globulin content: increased
Wassermann Reaction: strongly positive
Colloidal Gold Curve:5.5.5.4.3.2.1.0.0.0

Progress: Patient became increasingly demented, but was always considerably depressed. His death occurred on 20th October, 1924.

Comment: The possible factors in aetiology, in this case, are -

(1) alcoholism;
(2) head-injury;
(3) the psychic effect of unemployment:
and (4) malnutrition and oral sepsis.

CASE 2. Admitted 28-9-23. Age, 36 years. Labourer.

Patient's parents both died in old age. He had one younger sister who had been in a Mental Hospital in England, following an attack of influenza. One brother was killed on service, and another died in infancy.

Patient was always robust and had an average education. As a youth, he led a loose, immoral life, and was several times imprisoned for various minor offences. He drank heavily and regularly. From 1914 till 1919, he was in the Army, and was pensioned for gun-shot wounds in the head and arm. His later career was not known to his friends, but it was believed that he had spent most of his time in model lodging-houses.

When admitted, he was ina very filthy condition. Anaemia and malnutrition were obvious, the tongue was filthy, the breath foetid. His mental condition was one of morbid exaltation, amnesia for recent events, associated with fleeting delusions of grandeur. He had physical signs of General Paralysis in the nervous system, and the diagnosis was confirmed by the serological findings in the blood and cerebro-spinal fluid. The scalp-wound was quite healed and there was no depression of the skull-vault.

Progress: Patient was kept in bed on account of his erratic conduct and filthy habits. He developed pulmonary tuberculosis and died on 1st July, 1924.

Comment: In this case, the patient probably contracted the syphilitic infection in early life. It seems likely that he was always deficient in the moral sphere. The onset of General Paralysis may have been determined by alcoholism, war-service, head-injury and malnutrition. It is of note that his disability was admitted by the Ministry of Pensions as being "aggravated by War Service".

CASE 3. Admitted 29-10-23. Age, 31 years. Dock Labourer.

Patient was the third of a large family of whom the

first/

first two had died in infancy - cause not known to relatives - and the youngest had died of pulmonary tuberculosis. His father, aged fiftysix, was a chronic alcoholic; his mother died of post-partum haemorrhage. There was no definite history of mental disorder in the family.

Patient had always been physically healthy, but at school he was backward and did not attain an average degree of proficiency. He was shy, and never sociable with his fellows. He was in the Army for three years, but was seldom in action. On returning home, in 1919, he was still very dull, but worked regularly until February, 1923, when he was in bed for three weeks on account of influenza, from which he recovered slowly. He returned to work in March. In May, he became unusually cheerful, talkative and active. He was certified, following an attempt to steal some articles from a jeweller's shop.

On admission, he was exalted and grossly deluded. His memory was defective and, in speech and conduct, he evinced signs of loss of control. His physical state was poor, and an active phthisis was present in both lungs. The pupils were small and fixed, the speech slow and slurred, the tongue tremulous and the knee-jerks exaggerated. The blood and cerebro-spinal fluid findings were those of General Paralysis.

Progress: Patient rapidly emaciated and, with the advancement of the pulmonary lesion, he became very cachectic. He died on 11th April, 1924.

Comment: Patient came from a poor stock, and he himself was intellectually defective and of the introverted type. The onset of General Paralysis may have been determined, or precipitated, by the attack of influenza, and the resultant phthisis, each acting as a toxic and as an exhaustive agent.

CASE 4. Admitted 6-12-23. Age, 34 years. Machine-man.

This man was the youngest of a family of six. His parents/

parents had both died in old age and the others in the family were alive and in every way normal. He had an uneventful childhood and youth, and was efficient at his work. In 1915, he joined the Army and was on active service for nearly two years. He contracted syphilis and gonorrhoea in France, about February, 1917, but received very little treatment. He remained well until June, 1923, when he became very erratic in his conduct and "wandering in his talk". His friends stated that, while on holiday, in July, 1922, he was struck on the head by a golf-ball, but, at the time, the accident did not leave any effect. He had always been a tee-totaller.

On admission, he presented a typical picture of moderately advanced General Paralysis and the serological findings were confirmatory.

Progress: Patient was employed working in the wards till September, 1924, when, on account of ataxia, he was confined to bed. He ultimately developed cystitis and died on 7th February, 1925.

Comment: In this case, the onset of General Paralysis occurred six years after infection with syphilis - an unusually short period. The only possible contributory causes are (1) head-injury, and (2) Army Service. All of his relatives appeared to be particularly stable individuals and he, himself, had never shown any signs of psychic inferiority.

CASE 5. Admitted 22-1-24. Age, 35 years. Sheet-iron Worker.

Patient was unmarried and the eldest of a healthy family of three. The family history was negative. As a child and a youth, patient was always very shy and reserved, but manifested no abnormal signs till the age of 26 years, when he suffered from "neurasthenia" and was sent to the country for a few months' rest, after which he was fairly well. He was always a strict abstainer, and led a temperate life, in all ways. He had no military service and nothing was known as to the/

the date of his venereal infection. In February, 1922, he was knocked down by a motor-lorry, sustaining a fracture of the right humerus, and his relatives dated his mental illness from that time. Shortly after the accident, he was noticed to be very dull and reticent and this, with marked unsociability, increased till January, 1923. A few days prior to admission, he became extremely exalted and expressed incongruous delusions of grandeur.

On admission, he was very anaemic and poorly-nourished but no focal disorders were detected. Mentally, he was morbidly exalted and suffered from fleeting delusions of grandeur. His memory for recent events was poor and he was disorientated with regard to time and place. He had Argyll-Robertson pupils, coarse tremors of hands and tongue, slurring dysarthria and exaggerated knee-jerks.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 46 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve: 5.5.5.5.5.4.3.2.1.0.

Progress: Patient remained in an exalted, megalomanic state, for nearly six weeks. He was excited and restless, and frequently required sedatives, at night. From 5th March, 1924, onwards, there was an elevation of temperature each evening, and signs of active phthisis were observed. He became progressively weaker and died, ina very emaciated condition, on 23rd March, 1924.

Comment: This man was never quite normal, being persistently reticent and introverted. His break-down in 1916 was further evidence of instability. Possibly, too, trauma played a part in determining the later onset of General Paralysis. The other feature in his case is the rapidity of his decline, which was accentuated by his previous ill-health and by the invasion of his lungs by tuberculosis.

CASE 6. Admitted 28-1-24. Age, 44 years. Coal-miner.

Patient/

Patient, who was unmarried, came of a healthy stock. He was intelligent, of a "very boisterous" nature, and always was only a moderate alcoholic. He was believed to have contracted syphilis in 1917, or 1918, but did not receive treatment. In August, 1923, he received a severe blow on the head from a coal-hammer and was unconscious for half-an-hour. He resumed his occupation next day, however, and seemed well, till November, 1923, when his fellow-workers observed him to be unusually profane, abusive and irritable. A few days later, he became unduly elated and, finally, very deluded.

On admission, he was found to be an exceedingly well-built and well-nourished man. He talked freely, but was not definitely deluded. His memory was reasonably good and there was no element of dementia evident in his conversation. His pupils were unequal, but reacted freely to light and on accommodation, his speech was unaffected, but his knee-jerks were definitely exaggerated.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 206 per c.m.m.
Globulin content: increased.
Colloidal Gold Curve:4.4.4.4.4.2.2.0.0.0.
WassermannReaction: strongly positive.

Progress: He was well-behaved, for the first five weeks after his admission, but, on 19th February, 1924, he was very quarrelsome and impulsive. On 20th February, 1924, he took a succession of epileptiform seizures, from which none of the usual methods (including lumbar puncture) gave relief and he died at 2 a.m. on 21st February, 1924.

Comment: This man was apparently of the manic reaction type. He developed General Paralysis seven years after the primary infection with syphilis - an unusually short time. It is possible that the disease was localised by the severe trauma of his head-injury.

CASE 7. Admitted 8-2-24. Age, 54 years. Labourer.

Patient/

Patient, an unmarried man, was the youngest of a healthy family of four. His father had died in a Mental Hospital, suffering from Senile Dementia, but otherwise the family history showed no unusual features. He was a sociable young man, but, for nine years prior to the commencement of his illness, had indulged excessively in alcohol. His relatives were unable to tell the date of his infection with syphilis. The onset of the disease was sudden: on 1st February, 1924, he became talkative, aggressive, and impulsive.

On admission, he was in fairly good general physical condition, but the heart showed signs of mitral stenosis. Mentally, he presented extreme exaltation, with grandiose delusions and signs of loss of control in his speech and in his conduct. The pupils were unequal and sluggish to light; the speech was slurring and the knee-jerks were exaggerated.

Blood Wassermann Reaction: strongly positive.
Cerebro-Spinal Fluid: Cells: 60 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve:5.5.5.5.5.4.3.2.1.0.

Progress: He remained very noisy, unsettled and deluded, for nearly a month, but thereafter he quietened and became more rational and did useful work. Ataxia commenced in May, compensation of the cardiac lesion broke down and he died on 23rd May, 1924.

Comment: In this case, the possible contributory agencies in causation are (1) hereditary pre-disposition; and (2) excessive alcoholism. Nothing suggestive of a psychic inferiority was elicited in his history.

CASE 8. Admitted 18-3-24. Age, 36 years. Clerk.

Patient was the eldest of a family of seven, two of whom had died, one of scarlet fever in infancy, the other of pneumonia at the age of fifteen years. His parents were alive and healthy. His youth and adolescence were uneventful and presented no features of note. He was always strictly tee-

total/

teetotal. In 1915, he joined the Navy and served for four years on a cruiser, but without any mishap. Married at the age of twentyseven, he had one healthy child, eight years of age. The time of his infection with syphilis was not known. He was removed to hospital, following a seizure, on 16th March, 1924, but his wife had observed an alteration of his speech since June, 1923, though he had been working up till 15th March, 1924.

On admission, he was anaemic and walked with an ataxic gait. His general muscular power was weak, pupils very small and fixed. Mentally, he presented an organic type of reaction - amnesia for recent events, and considerable disorientation in all spheres. His emotional tone was variable but, on the whole, he was unduly depressed and tended to weep at inappropriate times.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 23 per c.m.m.
Globulin Content: increased.
Wassermann reaction: strongly positive.
Colloidal Gold Curve: 5.5.5.5.5.5.2.1.0.0.

Progress: On account of ataxia, patient was confined to bed during the whole of his stay in hospital. He became more and more exalted and finally was euphoric. Signs of pulmonary phthisis were noted in September, and he quickly emaciated and died on October 31st, 1924.

Comment: There is no obvious aetiological factor in the causation of this man's disease. His case, however, is of interest, in that his wife observed definitely pathological signs for fully nine months prior to his admission but, during that time, he was able, and apparently with some degree of proficiency, to carry out his routine work as a clerk.

CASE 9. Admitted 18-3-24. Age, 35 years. Engineer.

Patient was an only child and was well educated. His parents were both alive and well and there was no history of hereditory pre-disposition to mental disease. After being apprenticed as an engineer, he worked very efficiently until he joined/

joined the Army, in 1914. He was strictly teetotal and never showed signs of instability. He was on foreign service for nearly four years and it was in France, in 1916, that he was infected with syphilis. After a few weeks of treatment, he was again sent into action. On demobilisation, he returned and continued to work in his former satisfactory manner, until 1920, when, on account of trade depression, he ceased working and remained unemployed until admission.

The first signs of mental disorder were observed by his mother, in January, 1924, when patient became very slovenly in his dress, faulty and dirty in his habits, and extravagant in his ideas and desires. A few weeks prior to admission, he stole money from his father and spent it recklessly, finally ending with an alcoholic bout which led to his arrest by the police.

On admission, he was in a very dirty, unkempt state. Anaemia and malnutrition were evident, and the heart sounds were soft, but pure. Mentally, he was very talkative, emotionally exalted, and unable to give a coherent account of his recent movements. Numerous grandiose delusions, many of a bizarre nature, were expressed and he displayed loss of judgment and self-control in his diction and in his conduct. He had Argyll-Robertson pupils and exaggerated knee-jerks, but there was no dysarthria.

Blood Wassermann Reaction: Negative.
Cerebro-Spinal Fluid: Cells: 62 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve:5.5.5.5.5.4.2.1.0.0.

Progress: He remained in a very exalted state for over five months. His physical condition improved and he was able to do some work in the wards. The Wassefmann Reaction of the blood was persistently negative. He died, on 8th September, 1924, following the onset of an acute tuberculous broncho-pneumonia.

Comment: In this case, the aetiological factors appear to be/

be (1) the strain of War Service, followed by (2) a period of anxiety due to unemployment. The other points of note are the persistently negative Wassermann Reaction of the blood; and the fairly early, and somewhat unexpected, onset of a tuberculous lesion.

CASE 10. Admitted 17-6-24. Age, 45 years. Plate-layer.

The history of this case was supplied by a friend, who knew nothing of the family history, but who stated that the patient had, for the past fifteen years, been leading a very debauched life, smoking and drinking excessively, and obtaining very little real nourishment. He could not estimate the probable date of syphilitic infection.

When he was admitted, patient was very violent, impulsive and intolerant of any form of restraint. He was obscene in his language, filthy in his habits, and constantly interfered with other patients. His general physical condition was very poor: he was thin and ill-nourished, extremely anaemic and unsteady in his gait.

Blood Count: Red Cells - 2,600,000
Haemoglobin - 40%
Colour Index - .9
White Cells - 7,500 per c.m.m.

Blood films showed anisocytosis, poikilocytosis and ring staining. No lesion was found to explain this secondary anaemia. Examination of the nervous system showed the presence of Argyll-Robertson pupils, with spinal myosis and brisk tendon reflexes.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 6 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve: 5.5.4.3.2.1.0.0.0.0

Progress: Patient was bed-ridden until his death, on January 2nd, 1926. He was persistently anaemic, in spite of receiving iron and arsenic tonics, and the blood count and blood picture showed only slight variation. The impulsivity soon ceased and

the/

the former tendency to violence and instability was replaced by a well-marked exaltation, which remained until death.

Comment: In this case, the alcoholic excess and the malnutrition probably acted as contributory causes. It is difficult to say whether the anaemia was aetiological or symptomatic.

CASE 11. Admitted 25-8-24. Age, 54 years. Labourer.

Patient was a married man with a healthy family of six, whose ages ranged from 30 to 15 years. His only brother was mentally defective and confined in an institution from an early age, but his other relatives were healthy. Patient himself was always of a "very cheerful" nature, but he took no alcohol and led a temperate life. No information as to venereal infection was obtainable from any source. He had been unemployed since September, 1922.

The first signs of the condition were observed in July, 1924, when patient became careless, forgetful and unduly elated. He spent money recklessly and proposed all manner of absurd schemes to alleviate unemployment.

On admission, patient was found to be morbidly exalted and to be suffering from delusions of grandeur, with amnesia for recent events, and a degree of intellectual deterioration. He was poorly nourished and anaemic and was very much constipated. Pyorrhoea Alveolaris was extensively present and the breath was foetid. The knee-jerks were very brisk, but otherwise the nervous system showed no abnormality.

Blood Wassermann Reaction: Strongly positive
Cerebro-Spinal Fluid: Cells: 79 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve: 5.5.4.4.3.2.2.1.0.0.

Progress: Patient remained in the above condition for nearly three months, after which he became depressed, unsociable and very reticent, and he continued thus till July, 1925, when he again became exalted, deluded and almost megalomaniac. He died on November 26th, 1925, following septic absorption from a suppurating/

suppurating gland-abscess in the neck. The physical signs in the nervous system remained unaltered throughout the whole illness.

Comment: Here the accessory factors in aetiology may have been (1) hereditary instability, and (2) strain of unemployment. His earlier history was, in some ways, suggestive of a manic reaction type and the Manic-Depressive course of the illness is, therefore, of great interest.

CASE 12. Admitted 25-8-24. Age, 54 years. Machine-man.

Patient was the eldest of a large family, of whom only three were alive, the others having died in infancy and childhood, of broncho-pneumonia, following one of the specific fevers. His family history was quite negative. Throughout his life he had always been "quick-tempered and quarrelsome", but was only moderately alcoholic. Married for thirtyfive years, he was the father of nine children, all of whom were alive and well. There was no history of syphilitic infection. He was unemployed for over three years, prior to the onset of his illness in February, 1924. At that time, he became very irritable and suspicious towards others and, within a few weeks, he was definitely delusional in his statements regarding his wife. His memory began to fail and his habits were faulty. His removal to hospital was the outcome of his making an unprovoked assault on his wife and daughter.

Patient, when admitted, had all the physical signs of a well-marked and moderately advanced case of General Paralysis. He was flabby, but somewhat anaemic, and the arteries were sclerosed. Systolic blood-pressure - 184 m.m. Hg. His memory was very defective for recent events, he was partially disorientated, and his conversation was incoherent.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 25 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve:5.5.5.4.4.2.1.0.0.0.

Progress/

Progress: This patient's illness never showed any signs of remission and the onset of dementia was soon evident. He was almost constantly in bed, partly on account of increasing ataxia, and partly because of his foolish and impulsive behaviour towards others, when he was allowed to walk about the ward. Loss of weight, anorexia, and an hectic temperature commenced in March, 1925, and signs of acute ulcerative tuberculosis were present in both lungs. He died on May 1st, 1925.

Comment: The only possible contributory agencies in aetiology, in this case, are unemployment and arterial disease.

CASE 13. Admitted 16-10-24. Age, 59 years. Machine-man.

Patient was an only child and an orphan from an early age. He was unmarried and, from about the age of twenty-five, he led a very loose and immoral life, gambling and drinking heavily. He had, on several occasions, been imprisoned for disorderly conduct whilst intoxicated. On July 2nd, 1924 he fell from a height of twelve feet, but was not apparently much affected at the time. For over one month before admission he had been depressed and introspective.

Patient was in a poorly-nourished, anaemic condition. Arterial degeneration was very marked and his mouth was in a very dirty state. Mentally, he was very indifferent to his environment and he made very few spontaneous remarks. Amnesia for recent events, clouding of consciousness and almost complete disorientation were present.

Physical signs: Pupils unequal, but prompt and free in reaction to light and on accommodation. Knee-jerks exaggerated; Rhomberg's sign positive. There was very little alteration in speech, but his tongue was tremulous.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 88 per c.m.m.
Globulin content: much increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve: 4.4.3.2.2.1.0.0.0.0

Progress/

Progress: Patient went downhill very rapidly. Emotional apathy persisted to the end and was associated with the quick development of physical signs. The pupils became more and more sluggish and, finally, would not react at all. Progressive ataxia soon rendered him bed-ridden, his speech altered, and swallowing became difficult. On 15th April, 1925, he died from intercurrent infection with pneumonia.

Comment: This case is of considerable interest, in that the man was probably infected with syphilis in early life, but, despite the association with chronic alcoholic excess, arterial degeneration, oral sepsis, etc., the disease appears to have been localised only after head-injury. His earlier history is suggestive of moral enfeeblement. The rapid course of his illness, with the quick development of physical, after the mental, signs, were also of note.

CASE 14. Admitted 29-10-24. Age, 58 years. Crane-man.

Patient was an only child and nothing was known of his parents and other relatives. He was healthy, in every way, as a boy and in his youth. He had been married for nearly thirty years, but there were no children. His wife stated that he had never taken alcohol and that he had always been temperate in other ways. She admitted having had syphilis (untreated) before marriage, but she never noticed any signs of the disease in her husband. Patient was unemployed, from June 1922 onwards, but remained quite cheerful and optimistic till June 1924, when it was observed that he was unduly irritable and tended to be impulsively violent towards his wife. His illness was ascribed to the results of a fall from steps on May 3rd, 1924.

On admission, he was very restless and unsettled. His memory for recent events was deficient and he conversed in a very incoherent, disconnected manner. Physically, he was thin and poorly-developed. The arteries were hypertrophied and the second aortic sound accentuated. Systolic Blood-Pressure -

180/

180 m.m. Hg. The pupils were unequal, irregular in outline, and responded feebly to light, but freely on accommodation. The knee-jerks were exaggerated.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 20 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve:5.5.5.5.4.3.2.1.0.0.

Progress: Patient improved both mentally and physically and, for nearly three months, he was allowed out of bed. This was soon followed, however, by a fairly rapid decline, and he was bed-ridden from March, 1925, till his death on 14th May, 1925. He was further weakened by a succession of epileptiform seizures, shortly before death.

Comment: In this case, the syphilitic infection probably occurred thirty years before the onset of General Paralysis of the Insane. Localisation of the disease may have been aggravated by (1) psychic strain of unemployment; and (2) injury to the head. Arterial disease may have been severe in the cerebral vessels, and this also may have played a part.

CASE 15. Admitted 19-12-24. Age, 32 years. Carter.

Patient was a married man with three healthy children. His father had been confined in an Asylum for about eight years, probably suffering from Senile Psychosis. The other relatives were healthy, excepting a younger sister, who was known to be definitely phthisical. Patient was in the Army for nearly four years and was on active service in France during most of that time, though he was never wounded.

He was in good bodily health until December, 1923, when he began to lose weight and to have night sweats. His wife was informed that he was suffering from tuberculosis of both lungs, but was unable to have him treated ina Sanatorium. Mental symptoms developed in July, 1924, when patient became unusually exalted, careless, untidy, and, later, very grandiose and expansive in his statements.

When/

When admitted, he was in a very poor state of health. Both lungs were extensively involved with phthisis, and anaemia was severe. The blood count and picture were those of secondary anaemia. Emotional exaltation, incongruous delusions of grandeur and amnesia for recent events were the outstanding features of the mental condition.

Pupils: One pupil was fixed, the other irregular and sluggish in all reactions. The tendon reflexes were all exaggerated; speech slurring; gait ataxic.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 86 per c.m.m.
Globulin Content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve: 5.4.4.3.2.2.1.0.0.0.

Progress: Patient remained in an euphoric state. His habits were extremely objectionable, in every way. Evening rise of temperature (from 99° to 102°) continued, with severe night sweats and progressive emaciation. He died on 15th January, 1925.

Comment: The association of the onset of General Paralysis of the Insane, after that of phthisis, is striking, and appears to be more than coincident. Note also the psychopathic inheritance.

CASE 16. Admitted 30-5-25. Age, 54 years. Marine Engineer.

Patient, the eldest of a healthy family of five, was married and had three healthy children, whose ages ranged from 17 to 13 years. His parents had died in old age, and the family history, otherwise, was not suggestive. Since leaving school, he had been at sea practically constantly, and his relatives saw him only occasionally, but had reason to believe that he was a heavy drinker, for over twenty years. About January, 1924, it was observed that his letters to his friends were not coherent and that the writing was very poor. When next seen by his friends, he was careless, untidy, and somewhat foolish in conversation and behaviour and, in September, 1924,

he was/

was discharged, medically unfit. His speech altered and he was troublesome at nights, on account of insomnia and restlessness.

On admission, he was very incoherent and unable to converse for any length of time. His memory was defective, he was considerably disorientated and his intellectual powers were much blunted. Physically, he was very pale, but well-nourished. Arterio-sclerosis was marked and there was also present an aortic incompetence, with relative mitral incompetence. The pupils were unequal, irregular, and responded only on accommodation. Knee-jerks present and brisk. Rhomberg's sign positive.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 10 per c.m.m.
Globulin Content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve: 5.5.5.5.5.5.4.3.2.1.

Progress: Patient was always in bed. His mental condition advanced to a deep dementia, with emotional exaltation constantly in evidence. His cardiac lesion was quite well compensated. Emaciation commenced in December, 1925, and he died on 15th January, 1926.

Comment: Note (1) heavy alcoholic history; (2) arterial degeneration. The comparative longevity of his illness was surprising, in view of the cardiac lesion, arterial disease and alcoholism.

CASE 17. Admitted 15-6-25. Age, 34 years. Plumber.

Patient was the elder of a family of two, his sister, twentysix years of age, being alive and well. The father had a heavy alcoholic history and died of pneumonia at the age of fortyseven, but the mother was alive and healthy. Patient led a normal life and was a good tradesman. He was with the Army in France, from 1915 to 1918, and was, for two years thereafter, pensioned for gun-shot wounds in the head. He remained well, in every way, till May, 1924, when he became very exalted, extravagant and irresponsible. He was treated at home for about

one/

one year, but his habits became so objectionable that certification was required.

On admission, he was considerably demented, but not definitely deluded, though often morbidly elated. Ataxia and dysarthria were marked, and the nervous system showed all the signs of General Paralysis. Only a small scar remained to mark the site of the former injury.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 30 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve:5.5.4.4.3.3.2.2.1.0.

Progress: Patient was confined to bed till his death, from exhaustion, on 23rd August, 1925. He was often troublesome, on account of restlessness at nights, and his mental condition showed progressive deterioration in all spheres.

Comment: In this case, the syphilitic infection probably occurred between 1915 and 1918. The strain of Army Service and the element of trauma may have tended to localise the disease.

CASE 18. Admitted 16-7-25. Age, 51 years. Ship's Rigger.

Patient was a married man, with seven children, five alive and well and two dead - one of pneumonia and one of tubercular peritonitis. His father, a heavy alcoholic, had been in an asylum for six months, but his other relatives showed no abnormality. Patient was a moderately heavy whisky drinker for nearly twenty years. The time of the specific infection could not be ascertained. He was unemployed from 1922 till January, 1925, when he returned to work for a few weeks, but again ceased, owing to severe injuries received from a fall at his work. Two months later, March, 1925, he became very irritable and depressed He refused to go out and would not accept medical advice. His certification was the result of an assault on his wife.

His mental condition, on admission, was one of considerable depression, morbid suspicion, associated with persecutory delusions with regard to various people. His memory was

fairly good and he was accurately orientated.

His general physical state was fair. The pupils were unequal, irregular and sluggish in all reactions. The knee-jerks were brisk; but the speech and gait were practically unaffected.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 28 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve:5.4.4.3.2.1.1.0.0.0.

Progress: Patient was allowed up, after a fortnight's rest and, for a time, he behaved well. On September 15th, however, he became aggressive, threatening, and required sedatives. His memory began to fail and his habits became faulty. On 14th October, 1924, he had two epileptiform seizures, after which he was considerably dazed and wandering in his conversation. He received Potassium Iodide gr.X.T.I.D. for six weeks. His death occurred on 19th December, 1925, following a succession of seizures.

Comment: The aetiological factors here would appear to be (1) hereditary pre-disposition; (2) alcoholism; (3) unemployment; and (4) head-injury. The other point of note is the shortness of the illness and, in this respect, his case bears a striking contrast to Case 16.

CASE 19. Admitted 24-7-25. Age, 52 years. Labourer.

Patient was the youngest of three survivors of a large family. His parents were both addicted to alcoholic excess and he himself had been a heavy drinker for many years. From an early stage of his life, he led a very loose, vagrant and immoral existence, having been several times arrested by the police for minor breaches of the peace, petty theft, etc.

When admitted, he was rather dull, amnesic and suspicious. Physically, he was poorly nourished and had extensive oral sepsis. The arteries were somewhat thickened. The pupils were unequal and showed the Argyll-Robertson phenomenon. The/

The knee-jerks were much exaggerated, the hands were tremulous, and the speech thick.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 32 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve: 5.5.4.3.2.1.1.0.0.0.

Progress: Patient has, up till now, done fairly well. He is less suspicious, converses more freely and is able to do some ward work. At times, he is a source of trouble, on account of his thieving propensities. He is becoming ataxic, however, and will soon require bed treatment.

Comment: Patient was always, apparently, defective in the moral sphere. The incidence of alcoholism, malnutrition and oral sepsis, were probably also contributing factors in determining the onset of the disease.

CASE 20. Admitted 4-8-25. Age, 28 years. Baker.

Patient was the youngest of a family of four, two of whom were alive and well; the other was killed on service in 1917. His parents died some years ago, of infirmity, and his family history, otherwise, was negative.

As a youth, he was always very shy, reserved and markedly unsociable. He was moderately efficient, however, at his work, but led a very temperate life. He was in the Army from 1916 till 1919 and, according to his own statement, he contracted syphilis in France, probably about 1918, but he received only a short course of treatment. He stated that he had, at that time, a diffuse rash which lasted for nearly a month. He was unemployed for two years prior to admission, and at that time, he was very dull and worried. The onset of his illness was insidious and was characterised by increasing apathy, carelessness and lethargy, spreading over a period of some months.

On admission, he was extremely indifferent, reticent and disinclined to converse. His memory was fairly good and

he/

he was not deluded nor hallucinated.

Physically, he was well nourished and possessed of normal muscular strength. The pupils were unequal and responded only on accommodation, and the knee-jerks were exaggerated.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 36 per c.m.m.
Globulin Content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve: 5.5.5.4.3.2.1.0.0.0.

Progress: Patient is now brighter, more alert, and does useful work. He is somewhat exalted and expresses no desire to better himself, living a day-to-day existence.

Comment: In this case, the contributory factors are (1) War Service; (2) unemployment; and (3) a basis of Constitutional Psychopathic Inferiority. The history and the mental state are not unlike those of cases in which an individual, never psychically sound, is confronted with a problem too grave to be dealt with, and adopts the Dementia Praecox reaction.

CASE 21. Admitted 13-11-25. Age, 35 years. Grocer.

Patient was a married man and had two healthy children. His father died in a Mental Hospital and two of his maternal aunts were known to have been insane. In his early years, patient was healthy, active and an all-round athlete of some ability. He joined the Army in 1914 and was discharged in 1918, pensioned for gun-shot wounds in the left leg. During his Army career, and for several years following, he drank heavily, but was seldom actually intoxicated.

Six weeks prior to admission, he became very depressed and threatened to commit suicide. A few weeks later, he assaulted his wife and was very erratic in his conduct.

On admission, he was found to be emotionally unstable, his memory was defective, and at times he was inclined to confabulate. Physically, he was fairly well nourished, but rather flabby. He had Argyll-Robertson pupils, tremors of the hand and exaggerated knee-jerks.

Blood/

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 40 per c.m.m.
Globulin content: increased
Wassermann Reaction: positive.
Colloidal Gold Curve:not yet done.

Progress: He has given little trouble since admission, but is occasionally restless at nights. His suicidal and homicidal tendencies have not been in evidence.

Comment: The features of note in this case are (1) hereditary pre-disposition; (2) Army Service: (3) alcoholism.

CASE 22. Admitted 14-11-25. Age, 48 years. Engineer.

Patient had been married for fifteen years, but had no family. A male cousin (his father's brother's son) was confined in another Asylum, but nothing was known of the parents. His wife stated that he had always been "badtempered and moody" and that he had masturbated regularly, as long as she had known him. He had been a heavy drinker for about twenty years, and was frequently intoxicated, though, on account of poverty, he had not taken drink since 1922, when he became unemployed. For over two years, he had been somewhat depressed, but a sudden change was observed, in October, 1925, when he became very abusive, threatening and sometimes violent. Four months previously, he had fallen off a tram-car but, after a few days in bed, he was quite well.

When admitted, patient was dull, somewhat depressed and resented being questioned. He could give a reasonably accurate account of himself and was not obviously deluded. He was well-built and well-nourished. Extensive pyorrhoea alveolaris was present, the tongue was coated and the breath foul. The arteries were hypertrophied and the systolic blood-pressure was raised - 155 m.m. Hg.

Pupils - Argyll-Robertson
Knee-jerks - Exaggerated.

There were no other pathological signs.

Blood Wassermann Reaction: Strongly positive
Cerebro-Spinal Fluid: Cells: 38 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve:Not yet done.

Progress/

Progress: Patient is now considerably brighter, but he refuses to see his wife. He masturbates frequently, but otherwise gives no trouble. The mouth is now much cleaner, but constipation is severe.

Comment: The possible contributing factors in causation of this case are (1) psychopathic inheritance; (2) alcoholic excess; (3) strain of unemployment; (4) trauma; and (5) toxaemia from oral sepsis. The element of prolonged masturbation is in itself an evidence of arrest of psychic development, in addition to exercising an exhaustive action on the higher nervous centres. In his earlier years, his life-reaction appears to have been marked by slight "depressive waves".

The following cases are grouped together, because they were cases of tabo-paralysis.

CASE 23. Admitted 19-6-24. Age, 33 years. Milk Salesman.

Patient was the second eldest of a family of five. The other members of the family were never in perfect health, but there had been no deaths; his parents were alive and well. He had been married for nine years, and was the father of one child. At his occupation, he was exposed to the rain and cold, but he was in good physical condition, till May, 1923, when his gait altered and he complained of pains in the legs. Two months later, he was observed to be very dull, unsociable and suspicious. He told his friends that he had ruined his life and wanted to give himself up to the Police for numerous alleged crimes. After a period, however, he became brighter but, in May, 1924, his speech altered and he again became dull, irritable and tended to be violent.

On admission, he was very truculent, abusive and uncommunicative. His memory appeared to be good and he did not express any delusions. Physically, he was thin and walked with a/

a markedly ataxic gait. He had Argyll-Robertson pupils, tremors of tongue, and dysarthria. The knee-jerks could not be elicited.

Blood Wassermann Reaction: Strongly positive.
Cerebro-spinal Fluid: Cells: 16 per c.m.m.
Globulin Content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve: 5.4.4.3.2.2.2.2.1.1.

Progress: Patient was confined to bed during his residence in hospital. His mental condition underwent little change for nearly four months, but thereafter his memory failed and he gradually became demented. His physical state also declined rapidly and, on 18th February, 1925, he died of septic absorption.

CASE 24. Admitted 26-6-24. Age, 51 years. Tailor's Presser.

Little was known of this man's family or personal history. He was a widower and had one healthy daughter, sixteen years of age. He was said to be an abstainer and to have led a very religious life.

On admission, he was in a state of mild exaltation, but was not deluded. He gave a fairly accurate account of himself, but was not always reliable in his statements. His general physical condition was quite good. In the nervous system, the pupils failed to react to light and responded only feebly on accommodation. The knee-jerks were absent and the gait ataxic.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 25 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve: 5.4.4.3.2.1.1.0.0.0.

Progress: This man's illness ran a comparatively long course. Progressive dementia, increasing ataxia and general weakness were the main features. On September 9th, 1925, a typical Charcot joint was observed in the right hip-joint. He died of general exhaustion and broncho-pneumonia on 16th October, 1925.

CASE 25. Admitted 15-4-25. Age, 51 years. Grocer.

Patient/

Patient was one of a family of three, the others of whom were alive and healthy. His father died in an Asylum, his mother in a Cancer Hospital. Patient was unmarried and lived apart from his relatives. He was believed to be a tee-totaller and was not in the Army.

The first symptoms of mental disorder were noticed in October, 1924, and consisted of morbid exaltation, carelessness, untidiness, and progressive amnesia, but, as far back as 1922, his gait had been unsteady.

On admission, patient was considerably exalted, but could give little information regarding his illness, his memory, especially for recent events, showing morbid deficiency. He had Argyll-Robertson pupils, slurring dysarthria, ataxia and the knee-jerks were absent.

Blood Wassermann Reaction: Strongly positive.
Cerebro-spinal Fluid: Cells: 12 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve:5.5.5.5.4.4.3.1.0.0.

Progress: Patient was allowed out of bed for nearly four months, but his ataxia grew worse, and he was so filthy and untidy that he was confined to bed from August, 1924, till his death on 7th October, 1925. On three occasions he suffered from urinary retention and was catheterised; at other times he was incontinent. Towards the end, signs of pulmonary phthisis were present.

CASE 26. Admitted 22-4-25. Age, 44 years. Draper.

Patient was the second eldest of a family of five children, all of whom were alive and well. His father was healthy, but his mother had died of pneumonia at the age of fifty. As a youth, patient was very smart, winning numerous prizes at school, and he afterwards conducted a very successful business as a draper. He was unmarried. From 1915 - 1918, he was in the Army in France and was wounded in the left hip in 1917. On demobilisation, he was "weak and unsteady in his walking", but was still very bright and alert. For nearly two years, he was

pensioned/

pensioned - for Locomotor Ataxia - but, after that, his allowance was withdrawn. According to a statement made to his father, patient had contracted syphilis and gonorrhoea in December, 1915. He was a tee-totaller.

Mental symptoms were first observed in July, 1924, when he made several foolish and serious mistakes at business, but he was not certified for over six months, when he was tending to be violent and outrageous. Loss of weight had been observed since January, 1925.

On admission, patient was very thin and exhausted. The lungs showed signs of active tuberculosis, and he ran a hectic temperature. His mental condition was one of great exaltation, with changing grandiose, expansive delusions, amnesia and partial disorientation.

Pupils	-	Argyll-Robertson
Knee-jerks	-	Absent
Rhomberg's sign	-	Present.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 40 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve: 5.5.5.4.3.2.1.1.0.0.

Progress: Patient was always confined to bed, on account of his ataxia, but showed marked mental and physical improvement. His exaltation diminished and, after two months, he was not deluded, though his memory was poor and he had not a proper insight into his condition. His weight increased, the temperature settled and he looked much better, in every way. He remained thus till his death, from broncho-pneumonia, on 16th January, 1925.

CASE 27. Admitted 24-4-25. Age, 44 years. Mason.

Patient, who came of a healthy stock, was a married man with two normal children. He was well until, in 1917, while serving with the Army in Belgium, he was removed to a Base Hospital and found to be suffering from Tabes Dorsalis. On this account, he was discharged and pensioned. He showed no abnormality/

abnormality in the mental sphere till March, 1925, when he was excessively irritable, restless and aggresive.

When admitted, patient was in fairly good general condition. He was found to be exalted, amnesic regarding recent events, and disorientated for time and place. The pupils showed the Argyll-Robertson phenomenon, the gait was ataxic and the knee-jerks were absent.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 18 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve:5.5.5.5.5.5.3.2.2.1.

Progress: Patient is still alive, but is now considerably demented. He has been constantly confined to bed and urinary incontinence has been present for the past six months. He has had two apoplectiform seizures, each of which resulted in a transient hemiplegia.

CASE 28. Admitted 24-4-25. Age, 52 years. Waiter.

Patient was a married man with a healthy family. Two of his sisters were decidedly neurotic and his mother was said to have suffered from a mental illness resembling Manic-Depressive Psychosis. His wife admitted having had syphilis before marriage, but was told she was cured. She had a month's course of pills. She had never seen any skin lesions. Patient was a fairly heavy alcoholic, since 1910.

His mental illness commenced in January, 1924, when it was observed that he was becoming careless at his daily duties, forgetful and, at times, quite incoherent in his speech. A few weeks later, his wife noticed that he was unsteady when walking, and in June, 1924 incontinence of urine was present. No specific treatment was given.

On admission, he had Argyll-Robertson pupils, ataxia, and diminished knee-jerks. The association of these signs with a generalised mental enfeeblement suggested strongly a diagnosis of General Paralysis, and this was confirmed.

Blood/

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 78 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve:5.5.5.5.5.4.3.2.1.0.

Progress: Patient has been in bed constantly, on account of ataxia and incontinence. His mental state is but slowly progressive and occasionally shows a slight remission, for a week or two. His general physical health is surprisingly well maintained.

CASE 29. Admitted 7-5-25. Age, 48 years. Clerk.

Patient was an unmarried man and lived in lodgings. He was known to have taken drink to excess for over fifteen years, but no history of specific infection was obtainable. The family history was incomplete but, so far as it went, was not in any way suggestive.

On January 1st, 1925, patient, whilst very intoxicated, fell down a flight of stairs and was confined to bed for a few days but, although he was apparently very ill, no medical advice was sought. He returned to work after a week and continued till February, 1925, when, on account of his making repeated, foolish mistakes, he was asked to resign. During the next month, he was observed to become unsteady when walking, and his conversation was "very rambling". He was carried home on May 1st, in a dazed condition, and it was believed that he had "taken a shock".

On admission to hospital, he was still somewhat confused in his conversation, his memory for recent happenings being very poor. Spinal myosis, Argyll-Robertson pupils and ataxia, were present; the knee-jerks could not be elicited.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 40 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve:5.5.5.5.5.5.5.5.4.1.

Progress: Patient improved considerably and, after a month, he was allowed out of bed, though still rather dull. On June 12th, however/

however, he had an apoplectiform seizure, which left little permanent result. He was transferred to another Mental Hospital, in July, 1925.

Comment: There is no feature common to all of these patients. In two cases - Nos.25 and 28 - there was distinct evidence of neuropathic heredity; in other two - Nos.26 and 29 - there was a history of trauma; and the incidence of alcoholism is to be noted in Nos. 28 and 29.

The interval between the onset of tabetic and of cerebral symptoms showed considerable variation - from eight years to two months. In two cases, the spinal and cerebral affections showed their effect almost synchronously.

The average duration of the disease was considerably longer than that in the primarily cerebral type.

The last four are cases of Juvenile General Paralysis.

CASE 30. Admitted 23-2-24. Age, 20 years. Labourer.

Patient was an only child. His father was a heavy drinker and admitted having contracted syphilis many years ago. The mother was also alcoholic and, from her appearance and manner, did not seem to be particularly stable.

Patient, as a child, was healthy and developed in a normal manner. He left school at the age of fourteen and, although never very bright, he was sufficiently intelligent to keep up with his fellows. As a youth, he had a trying experience on account of parents' addiction to alcohol, and things went badly for him after January, 1923, when, by reason of trade depression, he became unemployed. Mental symptoms made an insidious commencement in the following October, his mother observing then that he was becoming very dull, depressed, unsociable and given to day-dreaming. These gradually became more marked and, in addition, he began to refuse his food, he lay in bed all day, and his habits became very faulty.

On admission, patient was very depressed, introverted, and disinclined to converse. He would not, or could not, tell very much concerning himself and did not, in any way, co-operate in his treatment. No delusions could be elicited, nor did he appear to be, nor to have been, hallucinated. His physical condition was very poor. He looked ill and "toxic", the tongue was thickly coated, the breath foul and the bowels very confined. The teeth were all in a dirty, carious state. The chest was poorly developed, but no definite signs of disease were present. The heart-sounds were weak, the pulse soft and very rapid - 100,-120.

One of the eyes showed evidences of previous corneal ulceration or inflammation, but there were no other signs suggestive of inherited syphilis. The pupils were unequal and reacted slowly to light and on accommodation. The consensual reflex/

reflex was lost. The tongue and perioral muscles were slightly tremulous, but the articulation was good. The knee-jerks were very brisk and the Plantar reflex was extensor in type.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 40 per c.m.m.
Globulin content: increased.
Wassermann Reaction: positive.
Colloidal Gold Curve:5.5.4.4.3.2.1.1.0.0.

Progress: Patient was allowed up after the third week, but his conduct was never satisfactory, his habits being filthy and his language very obscene. The mental picture was one of progressive dementia. In July he was put to bed. He began to lose weight and signs of pulmonary tuberculosis were detected. In January, 1925, the cervical glands became involved and secondary infection followed. Death occurred on 14th February, 1925, from septic absorption.

CASE 31. Admitted 2-3-25. Age, 20 years. No occupation.

Patient was the youngest of a large family, of whom only two others had survived, the majority of the rest having died in infancy. His mother died, following "a shock", at the age of 53 years. His father was a chronic alcoholic, at present imprisoned for child neglect. Patient was said to have suffered from Infantile Paralysis and was always at a school for Mental Defectives. He was being cared for by his aunt, who stated that he was an obedient, quiet and harmless child. Two months before admission, however, he became very destructive, filthy, and lost his moral sense.

On admission, patient was found to be undersized,weak, and crippled from a flaccid paralysis of the leftleg. He had Hutchinsonian teeth and a suggestion of "saddle-nose". His general intelligence was much impaired. He could read a very little, but could not write, spell nor count. Emotionally, he was unstable. He could tell only a very little about himself and had little idea of time or place. His habits were faulty in spite of repeated correction. The pupils were equal and

responded/

responded normally. The left knee-jerk was absent, the right present and brisk.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 4 per c.m.m.
Globulin content: slightly increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve: 5.5.5.5.3.2.0.0.0.0.

Progress: Patient was always bed-ridden and showed no mental advancement. He had an apoplectiform seizure on 1st August, 1925, resulting in a temporary right-sided hemiplegia, but has at present full power in both arms.

CASE 32. Admitted 1-12-25. Age, 21 years. Apprentice Plumber.

Patient was an only child. His father, an ex-soldier, was alive and very healthy, but his mother died at an early age, of phthisis. The father admitted that he had gonorrhoea in South Africa, about 1900, but had no knowledge of having had syphilis. As a child, patient was always very delicate, but he attended school regularly and did his work there reasonably well. He was bright, cheerful, sociable, and fond of games. His adolescence was uneventful and nothing unusual was noticed till August, 1925, when he returned from holiday-camp with the Cadet Corps. At that time, he was noticed to be "silly and laughing very often", he was untidy, and his language - usually good - was very obscene. He returned to work as usual, however, but his employer refused to have him back after the first week, owing to his irresponsible behaviour. Patient then became dull, suspicious and unsociable and remained thus till a few days before admission, when, without obvious cause, his depression was replaced by a remarkable degree of elation, and he expressed innumerable delusions of grandeur, all of a most incongruous nature.

On admission, he was still very exalted and deluded with regard to his physical powers, his wealth, etc. He tended to be restless and violent if corrected or restrained. His physical/

condition was fairly good and there were no signs of congenital syphilis. He had Argyll-Robertson pupils, tremors of hands, perioral muscles and tongue, dysarthria, ataxia and exaggerated knee-jerks.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 44 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve: not yet done.

Progress: After three weeks, patient gradually quietened, but he is still very foolish and incongruous in his conversation. His memory is beginning to fail and he shows signs of intellectual deterioration.

CASE 33. Admitted 8-12-25. Age, 24 years. Baker's Van-Boy.

No relatives of this patient are known to be alive and no history of his illness has been obtained.

On admission, he was very exalted, but not delusional. His memory was poor, with regard not only to recent, but also remote, events, and he seemed to be quite out of touch with his environment. His intellectual capacity was small, but he could read a little if allowed sufficient time. His general physical state was excellent. He was well-built, well-nourished and possessed of fair strength. The bridge of the nose was depressed and he had Hutchinsonian teeth. He had Argyll-Robertson pupils, exaggerated reflexes and dysarthria.

Blood Wassermann Reaction: Strongly positive.
Cerebro-Spinal Fluid: Cells: 20 per c.m.m.
Globulin content: increased.
Wassermann Reaction: strongly positive.
Colloidal Gold Curve: not yet done.

Progress: Since admission, there has been marked deterioration in all spheres. He is restless, noisy at nights, and at times destructive. His appetite is capricious and his habits often very filthy.

Comment: Of the three family histories available in these four/

four cases, two were such as to give the impression that the patient came of a poor stock and had little initial encouragement. The personal history in Case 30 is quite similar to that of many cases of Dementia Praecox. Case 32 is on the same lines, but has not the same aetiological influences - unemployment and psychic stress. Mental deficiency was present in Cases 31 and 33, and at a later stage paralytic signs were superadded.

Case 32 is of much interest in that there was no definite record of infection in either parent. There were no suggestive lesions on the patient himself, and the mental reaction was decidedly atypical. Mott (11), in his series of twentytwo cases, states that simple dementia is the usual picture and this is the general experience of most writers. These facts naturally raised the question of this being a case of adult disease at an early age. In that case, one would naturally have expected a history of pre-disposing or of exciting causes, but careful enquiry elicited no suggestion of any such circumstances. All things considered, it is more probable that the case is one of the juvenile type, the father being the (unwitting) transmitter of the infection.

The histories of Cases 34 - 43 are given later, when the treatment of these patients is also described, but a brief note of the positive points in each of the histories is supplied so that all of the fortythree cases may be considered together.

Case 34: Age 34; primary syphilis 1917; always quick-tempered; addicted to sexual excess.

Case 35: Age 17; sexually precocious; mother neurotic.

Case 36: Age 24; of poor stock; two years Army Service; two years unemployed.

Case 37: Age 56; alcoholic twenty years; unemployed two years; head-injury six months before onset of symptoms.

Case 38: Age 48; no obvious contributory factors.

Case 39: Age 56; alcoholic twentyfive years; unemployed two years; financial worries; head-injury three months before/

before onset of symptoms.

Case 40: Age 46; head-injury five months before onset of symptoms.

Case 41: Age 45; of poor stock; mother insane; heavy alcoholic.

Case 42: Age 59; has a mentally defective daughter; heavy alcoholic.

Case 43: Age 40; mother insane; one sister mentally defective and one neurotic; psychic stress of supporting sisters.

Case 35 is case of Juvenile type.

The others are Adult, cerebral cases.

The findings regarding the incidence of pre-disposing and exciting causes, etc., in all cases, are next collected; (It is to be borne in mind that some histories were incomplete)

1. Heredity: (35 Cases known).

Insanity in parents	8	22.6%
Insanity in collaterals	2	5.7%
Alcoholism in parents	5	14.2%
Insanity, etc., in brothers or sisters	3	8.5%
"Poor stock" or neuropathic heredity	5	14.2%
TOTAL -	23	65.2%

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2. Ages:

A. Adult type.

Average age (38 cases)	43.7 years.
Average age of ex-Servicemen (12 cases). .	34.5 "
Average age of non-Service men (26 cases).	48.0 "
Average age of pre-War cases in Hawkhead, (1905 - 1914) .. (125 cases) . .	40.2 "

(This latter observation is taken from Case-Books).

B. Juvenile type.

Average age (5 cases)	20.4 years.

ADULT CASES (38).

3. Occupation:

A. Manual - skilled	11	28.9%
- unskilled	16	42.2%
B. Sedentary	11	28.9%

(Five of the seven Tabetic cases were sedentary workers).

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4. Psychic inferiority: (38 cases).

A. Morbidly introverted types . .	3	7.9%
B. Manic-depressive types	3	7.9%
C. Morally defective types . . .	3	7.9%
D. Intellectually defective types.	2	5.3%
TOTAL -	11	29.0%

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5. Alcoholic Excess: (37 cases). . . . . 15 .. .. 40.6%

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6. Head-injury: (36 cases). . . . . 14 .. .. 38.9%.

7./

7. Psychic stress: (36 cases). . . . . 12 .. .. 33.3%
(Unemployment, etc.)

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8. Bodily disease: (38 cases).

A.	Phthisis	3	7.8%
B.	Auto-intoxication	4	10.5%
C.	Mal-nutrition & anaemia . .	5	13.1%
D.	Arterial disease	3	7.8%
	TOTAL -	15	13.25%

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9. Combination of two contributory factors . . . . . 12 .. .. 31.5%

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10. Combination of three or more contributory factors . . . 14 .. .. 36.9%

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11. Cases with no known contributory cause . . . . . 2 .. .. 5.01%

For purposes of comparison, there is next given a table to show the incidence of the same circumstances of history, etc., as they occurred in the other types of mental disorder in the other male patients admitted to Hawkhead Mental Hospital, between September, 1923, and January, 1926. (Cases of mental deficiency are included only in the figures for hereditary influence).

	General Paralytics.	Other types.
1. Heredity.		
Insanity in parents	22.6%	15%
" " collaterals ..	5.7%	3.2%
Alcoholism in parents. ..	14.2%	16.6%
Insanity in brothers or sisters.	8.5%	12.1%
"Poor stock" or neuropathic heredity.	14.2%	10%
TOTAL -	65.2%	46.9%
2. Previous psychic inferiority.	29%	16.5%
3. Alcoholic excess.	40.5%	11%
4. Head-injury.	38.9%	8%
5. Psychic stress..	33.3%	19.2%
6. Physical diseases, etc. ..	13.25%	40.8%

7./

	General Paralytics.	Other types.
7. Combination of two factors ..	31.5%	26.1%
8. Combination of three or more factors	36.9%	24.2%
9. No known cause	5.01%	11.2%
10. Percentage married (for similar ages)	52%	45%
11. Eldest of family attacked ..	25%	18%
12. Youngest of family attacked..	14%	38%
13. Army Service in those of military age	42.4%	35.2%

The inferences to be drawn from this comparative table are:

1. So far as the Hawkhead patients in these years are concerned, the incidence of contributory aetiological factors is much higher in General Paralytics than in other types of disorder.

2. This is especially remarkable with regard to hereditary pre-disposition, alcoholism and head-injury.

3. The record of Army service is more frequent in General Paralytics than in other types of disease.

4. The percentage of married men attacked does not show much contrast, but the position in their family is of unusual note.

(The occupational distribution is similar in all types).

The findings and opinions of some previous investigations are as follows:

Mott (12): "Of all the causes which pre-dispose to syphilitic brain disease, alcohol is the most important, but excesses of any kind, especially in Bacho et venere, or mental stress, tend to develop the disease."

(13):" As a rule they show no stigmata of insanity: they are usually prior to their illness mentally and physically well-developed, and one would predicate the development of/

of the disease rather from their personal than from their family history."

Mott also attaches importance to stress and a striving, ambitious, sexually excitable nature. (14).

Lewis (15) in a series of twenty-three cases, found psychopathic heredity in 60%, alcoholism in 21%, a history of head-injury in 30%, and mal-nutrition in 56%.

Bolton (16), in addition to the theory originally propounded, stated after investigation of his cases, that there was a psychopathic inheritance in 62%, alcoholism in 77%, but that these merely tended to modify the time of onset and the course of the disease.

Stoddart (17) quotes the findings of numerous neurologists and states their average of alcoholic excess in General Paralytics varies from 3% to 75%, with an average of 59%. Psychopathic heredity is found in from 5% to 58.7%, with a general average of 30%; and traumatism in 10%. (These results are not all from the same groups of cases). He further quotes Oebeke, who found sexual excess in 69% and overwork in 57% of 100 cases.

Kraepelin (18), whose views have already been given, gives a history of alcoholism in 42 - 51% of his cases. This author cannot support the views of Krafft-Ebing.

Bianchi (19) finds that in a large series of cases, in 55% an hereditary taint; 56%, heavy alcoholism; 13%, sexual excesses; 10%, psychic stress; trauma, 19%; malnutrition, 6%; and 8% showed evidences of previous psychopathic inferiority.

Rickshcr (20) in 102 cases, finds hereditary predisposition in 6%, alcoholism in 29%, head-injury in 37.7%, psychic strain in 12%, and physical illnesses in 4%. In another series of cases, he finds hereditary influence 7.3%, alcoholism 10%, injury 2.7%, psychic strain 12%, and physical illness 8%.

Cole (21), Mercier (22) and Craig (23), all agree that alcoholism, sexual excess, head-injury and psychic stress may fulfill an aetiological function. In addition, they attach/

attach some importance to the mental reaction of the individual - "usually an ambitious, active, man, who marries early and has numerous social interests". That is, they practically accept the original dictum of Krafft-Ebing.

Before giving any definite conclusions, attention is drawn to some points of importance.

A history of syphilis was obtainable in only 16.5% of cases, and in only one case was there any history of secondary rash. (These estimates take account only of cases where a complete history was obtained). Treatment was known to have been given in five cases, in only one of which was any arsenical medication given.

While these figures are low, they are not representative, as, in many instances, the individual probably contracted the disease while away from home. In former times, when the syphilitic nature of General Paralysis was yet a much debated question, the average investigation (24) found definite evidences of, or histories of, infection in about 65% of cases.

Still, the hypothesis of a special neurotropic spirochaeta receives some confirmation from the finding in this series

The exact role of head-injury in the production of General Paralysis is uncertain. In some cases, it is certainly not aetiological but symptomatic, and resulting from ataxia and errors of judgment. In other cases, it is more precipitating than actually causative. This was the opinion of Craig (23).

In the above series of cases, there was a history of trauma in nearly two-fifths of the cases. The interval between the injury and the lateronset of symptoms varies from ten days to seven years , with an average of eight months for non-service patients. In a majority of cases, a survey of the circumstances suggests that the disease was prematurely induced rather than actually originated.

Finally, the great disparity between the ages of

Service and of non-Service men falls to be commented on. It is here suggested that the increase of admission rate of general paralytics to Hawkhead Hospital is the result of the earlier onset of a number of cases of ex-Service men. The effect of unemployment has been to induce the disease in a number of individuals, rather late in life, who might easily have carried on safely but for the advent of psychic stress.

There being only five cases of the Juvenile type, no comparative statistical tables are prepared.

SUMMARY AND CONCLUSIONS:

It is admitted that this is a small number of cases, but the results of the investigations are, nevertheless, very striking, and, in many aspects, decidedly different from those of other observers. One refrains from making dogmatic assertions, but an unbiased survey of these few case-histories would lead to the following conclusions:

1. In a majority of instances, General Paralysis is the outcome of the combination of differing aetiological factors.
2. The chief of these are hereditary pre-disposition, alcoholic excess, head-injury and psychic difficulties, in that order of frequency.
3. The incidence of combination in these factors is greater in the general paralytics of this series than in those of other writers, and greater than in other types of mental disorder in Hawkhead Hospital.
4. Despite the heavy incidence of these causative agencies, it is not possible to dismiss the hypothesis of a neurotropic type of spirochaete.
5. The relatively high percentage of cases in which there is a history of previous psychic inferiority lends some clinical support to the theory of Bolton.
6. It is rarely possible to explain the production of the disease as being the outcome of unique circumstances, such as the acquisition of a special type of neuro-syphilis in an alcoholic psychopath who has an hereditary pre-disposition, and in whom the onset is induced by psychic stress and head-injury. But in a small, but very important, number of cases, there are no apparent aetiological agencies. Between these extremes are found all grades of circumstances.
7. Each case is a law unto itself.

- PART II -

PART 11.

Introductory Note:

The treatment of General Paralysis has always been a problem of much difficulty. Indeed, it is the rule to find, in all but recent text-books, such remarks as "The disease is a hopeless one, and, apart from symptomatic treatment, little can be done. Death inevitably ensues within a few years". Mention was often made of the occurrence of remissions, and of a few cases which tended to run a prolonged, chronic course, but the general impression created was that little could be done for the unfortunate victims.

More recently, however, some hope has been imparted, and while it is yet too early to speak definitely, there is reason to believe that, in a percentage of cases, prompt and energetic treatment may induce prolonged remissions and, possibly, cures. The therapeutic remedies referred to are those of the administration of such arsenical compounds as tryparsamide, and the artifical induction of a febrile infection such as Malaria. Both of these methods of treatment are the outcome of patient researches extending over a long period of years, and they respectively typefy the two main lines of treatment which have been investigated - the specific, and the non-specific.

Specific therapy was the natural outcome of the earlier theories regarding the propbable syphilitic nature of General Paralysis. It is true that the administration of such drugs as Potassium iodide and mercury did not exercise any apparent benefit, but it was nevertheless concluded that such treatment was at least rational. The confirmation of the true nature of the disease and the synthesis of salvarsan by Erlich, in 1909, revived hopes of success, but again disappointment was encountered,

and in/

in some quarters, indeed, it was believed that harm might easily accrue from the arsenical compounds. The main objection at this time was that little or no arsenic reached the cerebro-spinal fluid, and that, in consequence, the seat of the disease processes was not being affected. Further progress was reached with the advent of intrathecal and, later, intra-cisternal injections, but still the results varied. Meanwhile, the other arsenical preparations, such as neosalvarsan and silbersalvarsan were given a trial, but again without satisfaction. The most recent advance in this direction has been the discovery of tryparsamide, in 1915, through which many very favourable results have been recorded.

Non-specific therapy dates far back (25). It was tried for various affections before its use was extended to treating neurosyphilis and it has assumed many various forms. Jacobi, in 1854, reported on the use of artifical abscesses in the treatment of General Paralysis, and this was carried on by Meyer. A significant statistical discovery by Mattauschek and Pilcz, in 1911, led to the use of vaccines by von Jauregg. These former two traced the subsequent histories of 4,314 cases of syphilis, and found that only 4.7% developed general paralysis. In a group of 157 of the luetic cases, there was a history of some intercurrent infection such as pneumonia, erysipelas, etc. and amongst these did not develop one case of general paralysis. On this basis, von Jauregg began the use of tuberculin, and, later, Pilcz continued the method. Donath, in 1913, used Nucleins: Hauber, at the same time, employed antiluetic plus non-specific remedies; and Szedlak treated a group of patients with nucleic acid, and another group with nucleic acid and mercury. The results of each mode of treatment are given later (p.100). Von Jauregg used vaccines in 1913, and reported favourably, but others who experimented on these lines did not corroborate his findings. Friedlander used anti-typhoid vaccine intravenously/

intravenously, but had only indifferent results.

In 1917, von Jauregg (26) tried the artificial induction of malaria, with almost startingly successful results. Since then, large numbers of patients have been treated by this method, and while the results vary, they are, on the whole,much more hopeful than with any other mode of therapy.

It is not the object here to inquire into the rationale of non-specific therapy. It is desirable to state, however, that its effect is probably due, in part at least, to the resultant elevation of temperature and to the ensuing leucocytosis, acting separately, or in combination. Purves-Stewart (27) lays more stress on the pyrexial effect, but Campbell (28) and Clark (29) attribute the beneficial effect to the general stimulation of the whole defensive agencies of the body. The scientific basis for the treatment is not definitely established, but, in connection with the latest phase of non-specific therapy - malarial infection - it is often adduced (30) that, in malaria-infested areas, syphilis may be very common, but neuro-syphilis is practically non-existent. MacDonald (31), however, states that, while on a recent tour in malarial districts in Italy, he was struck by the fact that almost all of the victims of general paralysis must have had malaria at one time. In such districts, too, the incidence of the disease is no lower than in those which are malaria-free. This observation, while contrary to the usual reports, suggests that influences other than those which are purely post-malarial may exercise an effect on the prophylactic and, therefore, on the therapeutic action of the disease.

Treatment adopted by the writer for his ten cases:

With regard to the treatment of the Hawkhead cases,it was the original intention to carry out malarial inoculation. Very unfortunately, however, the two attempts made proved unsuccessful/

unsuccessful. On two separate occasions, specimens of infected blood were sent by Dr. Hugh Kirkland, Whittinghame Asylum, and, without delay, were injected subcutaneously into patients. For some reason, no reaction, of any kind, occurred, and, in the meantime, this method of treatment has been reluctantly abandoned.

In the choice of some other means of attempting relief for the patients, there was adopted a combination of non-specific and specific remedies. For the former, there was selected anti-typhoid vaccine, and, for the latter, novarseno-billon, mercury and iodides. In addition, one patient received a small number of intra-thecal injections of salvarsanised serum; and two other patients had a short course of hexa-methylene-tetramine, which has an alleged action in certain spinal affections.

Regarding the anti-typhoid vaccine, the type used was that supplied by the Royal College of Physicians and Surgeons, Edinburgh. One cubic centimetre of this contains one thousand millions of organisms. Following the method of Petersen (32), the initial dose, in all cases, was .25 c.c. intravenously. The vaccine was injected in undiluted form. The amount of subsequent doses was regulated by the height of temperature reached. The initial dose was subsequently repeated until the temperature produced was below 103°, and, thereafter, appropriate increments of .05 c.c. were made until ten doses had been administered. The earlier series of cases received this first series at three day intervals, but, owing to a decided tendency to resultant loss of weight, it was decided thereafter to administer weekly doses.

For twentyfour hours prior to each injection, the patients were rested; the diet was restricted, and a saline purge was given. Those who were fit were allowed out of bed about thirtysix hours after the temperature fell to normal.

The reactions were, in a majority of cases, very

similar/

similar and all were, in their general characteristics, akin to those described by Petersen (33). Within thirty to sixty minutes, there was a sharp rigor, lasting from ten minutes to quarter of an hour. The temperature, which was noted half-hourly, rose sharply, reaching its maximum within from three to four hours, after which it gradually subdued, usually becoming normal after about twelve hours. Towards the end of each course, it was observed that the early stages of the reaction were delayed, but that the temperature fell more quickly, the pyrexial period being considerably shortened. Many of the patients seemed to establish a toleration towards the smaller doses, and the later doses were, therefore, in some instances, very considerable. There were no untoward results in any of the cases, although, naturally, all of the patients had the usual signs and symptoms of a rapid rise in body temperature. The urine was tested frequently, and, in a few cases, there was a slight and transient albuminuria, but no haematuria. (This was also reported by Campbell (34) in his "protein shock" therapy in rheumatoid arthritis.) The general effect on the patients was not in any way noteworthy. The earlier cases suffered from profuse night-sweats at irregular intervals, for over two months after the last dose, and synchronously the weight fell. Of the others, one man - No. 38 - appeared to get much worse after a few doses, and the treatment was abruptly terminated. In his case, however, the clinical nature of his mental illness and his previous history did not suggest a hopeful prognosis, at the best.

The novarsenobillon was freshly purchased (May and Baker, London,) and was prepared on the morning of administration, by dissolving it in the proportion of .3 Grm. to 5 c.cs. freshly distilled, sterile water. In all cases, it was given intravenously. In no case was there any accident, and only one man had any signs of arsenical poisoning - a mild superficial dermatitis of the forearm. This cleared up under local treatment/

treatment, and did not interfere with his receiving a full course of treatment. In another case - No.39 - there developed an inflammatory phlebitis of the internal saphenous vein. Though there is no reference to this as a common complication of arsenical treatment, in any standard text-book, the treatment was stopped until the fever and the oedema had subsided.

In one case - No. 56 - there were given six intrathecal injections of salvarsanised serum. The technique differed slightly from the original method as described by Swift and Ellis (35).

Four hours after a dose of novarsenobillon, 20 c.cs. of blood were withdrawn from a superficial vein. The clot and the serum having been separated by centrifugalisation, they were allowed to stand on ice-blocks till the following day. The serum was collected in a syringe and, a lumbar puncture having been performed with the patient in a lateral position, 20 c.cs. of cerebro-spinal fluid were run off. The serum was then steadily injected at a slow rate - twenty minutes per 15 c.cs., attention being paid to the general condition of the patient, and the state of the pulse. The bottom end of the bed was supported on rests for twentyfour hours. Needless to add, very strict aseptic precautions were observed in the execution of all stages of this procedure. As will be shown later, the patient who received this form of therapy did not progress favourably, his ultimate decline being due to the effects of an apoplectiform seizure.

Potassium iodide and mercury were given as antispecific adjuvants, at varying stages throughout the course of treatment of all cases. Hexamine was also tried in two cases, though few have ever admitted any success through its agency. Later, the cerebro-spinal fluid showed no traces of formalin.

The detailed treatment is given later. It will be noted that the second courses of novarsenobillon and anti-

typhoid/

anti-typhoid vaccine are given almost synchronously. A dose of the former was followed, twelve to eighteen hours later, by one of the latter. The theory is that the arsenic being in greatest concentration four to twentyfour hours after its administration (36), greater spirochaeticidal action will be got if, during that time, the effect of arsenic and of "protein shock", particularly pyrexia, be combined.

As previously stated, one of the main difficulties in the arsenical treatment of neurosyphilis is to obtain an adequate amount of the drug into the cerebro-spinal fluid. Whitelaw (37) suggested the use of an intra-thecal injection of normal horse-serum in 10 c.cs. doses, in the hope that this might help to break down the barrier between the blood stream and the spinal fluid. Accordingly, in all but two cases, this procedure was adopted. Lumbar puncture was performed, with the patient in the lateral position, and 15 c.cs. of fluid were allowed to drain off. The horse-serum was then very slowly and very gradually injected, careful observation being made for any untoward results. The patient was rested in bed for three days, with the head kept low. In every instance, in which this treatment was adopted, the patient, after from six to eight hours, complained of severe pain in both legs, occipital headache, and general malaise. These symptoms were associated with a slight increase of pulse and respiration rates, sub-normal temperature, and anorexia. None of the patients was seriously ill, however, and after two to four days, they were sufficiently well to be allowed up, though most of them, for a day or two more, complained of occasional "cramps in the legs". Naturally, this injection was given, in all instances, about the middle of a course of intravenous arsenic medication. It can scarcely be said that, so far as could be judged, either clinically or serologically, any material benefit was achieved by this procedure, though no gross harm resulted.

It will be observed that, in the course of treatment, lumbar/

lumbar punctures were performed at fairly regular intervals. On each occasion, about 10 - 25 c.cs. of cerebro-spinal fluid were drained off. While the operation was not performed sufficiently often to merit the term "spinal drainage", there was certainly an element of that method of therapy in each case. Numerous authors, such as Sachs, Strauss, and Kaliski (36), state the proceeding is harmful and ought not to be performed promiscuously and without careful precautions. Others, for example Gilpin and Early (38), and Pilsbury (39) have tried repeated spinal punctures as a definite line of treatment. In the present series of cases, the aim was to strike a happy medium. Apart from any possible therapeutic value, of course, there was also given a useful prognostic indication of the effect of treatment.

These, then, were the main lines of treatment adopted for the series of ten cases. The total amount of novarsenobillon given varied from 25.2 grms. to 14.6 grms.

It is admitted that in this, and in other respects, the system of treatment carried out was perhaps unusual and drastic. Justification is claimed on the following grounds:

1. Treatment, in all cases, consisted of two main types - specific and non-specific.

2. In all cases, it can be asserted that both methods were given a full and complete trial.

3. The amount of novarsenobillon given was in excess of that usually adopted, but this, it is claimed, is merited by the previous partial failures when only moderate doses of the drug were given.

4. A much modified system of spinal drainage was tried; modification was essential on account of the conflict of current opinion.

5. At an appropriate time, the intra-thecal use of horse-serum was tried.

6. These methods for dealing with a desperate disease/

disease were adopted only after two abortive attempts at treatment by malarial inoculation.

Care was exercised in the selection of patients. As far as possible, early cases were chosen, and none of these had any obvious contra-indication to the methods of treatment adopted. A majority of them presented manic-reaction types of general paralysis, it being the almost general opinion that success is more likely to follow treatment of such cases than of other types. In most instances, also, there were signs of a commencing remission before any active therapy had been started - a fact which has to be borne in mind when assessing the results.

One of the treated patients was a juvenile general paralytic. The ages of the others varied from twentyfour to fiftysix years. Unfortunately, it was not possible to obtain younger men in all cases; for many reasons this would have been ideal, but it was a regrettable feature that, in most of the younger patients, there was some contra-indication to such treatment as was undertaken.

It will be seen that the patients were treated in four groups - two groups of three and two of two.

Details of the history, clinical and serological, of each patient, with treatment, etc., are now given. Apology is made for the length of each case history, but it was thought that, to be of any value, the notes of these cases would require to be full.

CASE 34. Admitted 12-12-24. Age, 34 years. Caulker.

Patient was the eldest of three children, the others of whom were well. His father was healthy, but his mother died in 1919, aged 60 years, of chronic bronchitis and asthma. None of the relatives were known ever to have shown mental symptoms. Patient as a child was robust, and at school he proved himself industrious and successful. He was fond of games. On leaving school he went straight to learn his trade. During the War, he worked in a ship-yard. He was always a strict abstainer, but was "bad-tempered" and inclined to be unnecessarily aggressive and bullying in his attitude to others. He contracted syphilis and gonorrhoea in 1917, and had a brief course of mercurial treatment. Evidently under the impression that he was free of venereal disease, he married in 1922, and had one healthy child. During his married life, he was addicted to sexual excess; the old gonorrhoeal lesion lit up and he infected his wife. It was this latter fact which caused him to seek medical advice and he was given a course of treatment in a Corporation Dispensary. (See later). He worked steadily and appeared to be in excellent health until July, 1924, when he suffered from headaches and insomnia, neither of which responded to the usual methods of treatment. These continued and within a few months he was exhausted from loss of sleep. He voluntarily stopped his work in December, in the hope of obtaining relief. During this time, his wife had not observed any mental symptoms, and it was a great surprise to her when he was arrested for indecent assault on a young girl, on December 10th. On the recommendation of the Police, he was sent to an Observation Hospital. Whilst there he became very excited, and after a few days was removed to Hawkhead.

Condition on Admission: Height - 5 ft. 4 inches. Weight - 8 stones 3 lbs. Patient was pale and undernourished, but the muscular power was excellent. The heart and lungs were normal, but there was, for a few days, a trace of albumen in the urine, without/

without casts. The tongue was clean but dry; no upper teeth; lower teeth in good condition. The pupils were unequal, the left being smaller, but they were circular and central. The reaction of both to light was sluggish and limited, but prompt and free to convergence. Tremors of the perioral muscles, tongue and hands were present. The speech was good until patient tired, when it was slurred and indistinct. The knee-jerks were equal and much increased, but the other tendon reflexes were normal.

The mental reaction was that of hypomania. He was restless and resistive, talked excessively and with a definite flight in ideas. Emotionally, he was exalted, but he was easily irritated if opposed. His memory was good for remote events, but there was an amnesia for the events of the preceding week. He expressed delusions of grandeur, chiefly regarding his physical strength, and stated that he had won the D.C.M. in 1917. At first, he was quite obedient, but within an hour he had made repeated violent endeavours to break windows and to escape.

Blood Wassermann Reaction: Strongly positive.(++)
Cerebro-Spinal Fluid: Cells: 56 per c.m.m.
Globulin content: increased. (++)
Wassermann Reaction: strongly positive. (++)
Colloidal Gold Curve:5.5.5.5.5.4.3.2.1.0.

From 14th December, 1924, till 22nd December, 1924, he was very troublesome, on account of his impulsivity and continued restlessness. On three occasions he received Morphia gr.$\frac{1}{4}$ and Hyoscin gr.$\frac{1}{75}$ in addition to continuous baths, sulphonal, etc. He was very abusive and obscene and refused to converse with anyone, persistently demanding his liberty. Thereafter, his manic reaction gradually subsided and, on 3rd January, 1925, his wife obtained (through the Board of Control), permission for his release. He was brought back on 8th January, 1925, his wife stating that he had been well until 6th January, 1925, when he again had been very filthy in his language, sleepless, and/

and threatening in his attitude towards her.

On his return, it was evident that he had had a seizure probably apoplectiform, and traces of a right-sided hemiparesis were detected. His mental condition was much worse in that he was extremely exalted and made numerous delusional statements. His memory was much worse and he became very confused at the end of long conversations. On 10th January, 1925, and for two days following, he passed faeces and urine in bed, but as a rule his habits were clean.

Inquiry at the Corporation Dispensary elicited the following information: "Patient came under observation on December 29th, 1922. He had no clinical manifestations of syphilis, but the Blood Wassermann Reaction was positive (++) and the Cerebro-Spinal Fluid ++. The pupils reacted normally and knee-jerks were present and active.

Treatment: January 1923 - May 1923. Neo-Trepol 3 grms.
June 1923. Blood ++
Cerebro-Spinal Fluid:
Cells: Not increased.
Globulin: Not increased.
Wassermann Reaction ++.

July 27th - September 19. 4 injections of novarsenobillon.

September - October. 4 injections Contramin.

November, 1923 - February, 1924. Contraluesin 8 c.c.s.
Blood still slightly positive.
Pupils first noted sluggish to light, 27-11-23.

March - May, 1924. On Potassium Iodide. "

Specific treatment was started on 18th January, 1925, and consisted in all of -

(a) ten intravenous injections of Anti-Typhoid Vaccine, at intervals of three days.

(b) six weekly injections of Novarsenobillon, followed by three weeks rest.

(c) a course of Potassium Iodide and Mercury.

(d) ten doses of Novarsenobillon with an injection of Anti-Typhoid Vaccine following each.

(e) a six weeks' course of Potassium Iodide and Mercury.

(f) a further course of Novarsenobillon with an intra-thecal injection of normal horse serum, halfway through the course.

(g)

(g). a final course of Iodide and Mercury.

The full treatment is noted below, with notes on the progress, clinically and serologically.

			Highest Temperature reached -
18-1-25.	.25 c.c.	Anti-Typhoid Vaccine.	105°
21-1-25.	.25 c.c.	" "	105°
24-1-25.	.25 c.c.	" "	105°
27-1-25.	.25 c.c.	" "	103°
30-1-25.	.25 c.c.	" "	102.6°
2-2-25.	.30 c.c.	" "	102.8°
5-2-25.	.35 c.c.	" "	103.6°
8-2-25.	.35 c.c.	" "	102.9°
11-2-25.	.40 c.c.	" "	103.6°
14-2-25.	.40 c.c.	" "	103.4°
17-2-25.	.30 GRM.	Novarsenobillon.	
24-2-25.	.30 GRM.	"	
25-2-25.		Potass. Iodide Gr. X thrice daily and Pil. Hydrarg. gr. $\frac{1}{11}$ once daily.	
3-3-25.	.45 GRM.	Novarsenobillon.	
10-3-25.	.45 GRM.	"	
17-3-25.	.60 GRM.	"	
24-3-25.	.60 GRM.	"	

24-3-25. Patient is still anaemic, but more robust. Weight, 8 stones, 6 lbs. He is much quieter and though still exalted, is not deluded. He sleeps very little, however, is occasionally noisy at nights, and requires sedatives. Pupils unequal, and still reacting sluggishly to light. Tremors of tongue still present, but speech is normal; knee-jerks still exaggerated.

1-4-25. Blood Wassermann Reaction: Positive (+).
Cerebro-Spinal Fluid: Cells: 17 per c.m.m.
Globulin content: increased (+).
Wassermann Reaction: positive (++).
Colloidal Gold Curve: 5.4.3.3.3.1.1.1.0.0.

3-4-25. Pot. Iodid. and Mercury discontinued.

					Highest temperature reached -
15-4-25.	Novarsenobillon.	GRM. .45			
16-4-25.	Anti-Typhoid Vaccine.	.25	c.c.	.. ..	104.6°
22-4-25.	Novarsenobillon.	GRM. .45			
23-4-25.	Anti-Typhoid Vaccine.	.25	c.c.	.. ..	104°
29-4-25.	Novarsenobillon.	GRM. .60			
30-4-25.	Anti-Typhoid Vaccine.	.25	c.c.	.. ..	103°
6-5-25.	Novarsenobillon.	GRM. .60			
7-5-25.	Anti-Typhoid Vaccine.	.25	c.c.	.. ..	102.5°
13-5-25.	Novarsenobillon.	GRM. .75			
14-5-25.	Anti-Typhoid Vaccine.	.30	c.c.	.. ..	103°
20-5-25.	Novarsenobillon.	GRM. .75			
21-5-25.	Anti-Typhoid Vaccine.	.30	c.c.	.. ..	102.4°
26-5-25.	Potassium Iodide stopped.				
27-5-25.	Novarsenobillon.	GRM. .75			
28-5-25.	Anti-Typhoid Vaccine.	.35	c.c.	.. ..	103°
3-6-25.	Novarsenobillon.	GRM. .75			
4-6-25.	Anti-Typhoid Vaccine.	.40	c.c.	.. ..	102.8°

10/

		Highest Temperature reached -
10-6-25.	Novarsenobillon. GRM. .75	
11-6-25.	Anti-Typhoid Vaccine. .45 c.c.	103.2°
17-6-25.	Novarsenobillon. GRM. .75	
18-6-25.	Anti-Typhoid Vaccine. .45 c.c.	103°

24-6-25. Patient is now much improved. He behaves extremely well, both day and night, though he seldom obtains more than five hours of sleep each night. He is no longer deluded, his memory is excellent and he is in touch with his environment. At times he is somewhat easily annoyed, but this is possibly a natural result of the limitation of his liberties.

The pupils now react more freely and there are no tremors.

25-6-25. Blood Wassermann Reaction: Negative.
Cerebro-Spinal Fluid: Cells: 14.5 per c.m.m.
Globulin content: increased (++).
Wassermann Reaction: (++).
Colloidal Gold Curve: 1.1.2.3.2.1.0.0.0.0.

25-6-25. Put on Syr.Glycerophos. Co. T.i.D.

15-7-25.-10-8-25. Patient released on pass, to have a rest at the Coast.

11-8-25. Patient's wife states that he was well-behaved and slept well. She noticed no unusual signs. Patient looks much improved and has put on two pounds in weight.

12-8-25. Syr. Glycerophos. Co. stopped.

Put on Potassium Iodide gr.$\overline{xv}$ thrice daily
Pil. Hydrarg. gr. $\overline{IV}$ twice daily.

8-9-25. Blood Wassermann Reaction: Negative.
Cerebro-Spinal Fluid: Cells: 4.5 per c.m.m.
Globulin Content: +
Wassermann Reaction: ++
Colloidal Gold Curve: 1.2.3.3.2.1.0.0.0.0.

9-9-25.	Novarsenobillon.	GRM.	.45
16-9-25.	"	"	.45
23-9-25.	"	"	.60
26-9-25.	Mercury and Iodide stopped.		
30-9-25.	Novarsenobillon.	GRM.	.60
7-10-25.	"	"	.75
10-10-25.	"	"	.75
17-10-25.	"	"	.75
24-10-25.	"	"	.90

25-10-25. Horse Serum - 10 c.c. intra-thecally.

Cerebro-Spinal Fluid withdrawn: Cells: 8 per c.m.m.
Globulin Content: +
Wassermann Reaction: +
Colloidal Gold Curve: 2.3.3.3.2.1.1.0.0.0.

31-10-25.	Novarsenobillon.	GRM.	.90
7-11-25.	"	"	.90
14-11-25.	"	"	.90
21-11-25.	"	"	.90

22-11-25. Blood Wassermann Reaction: Negative
Cerebro-Spinal Fluid: Cells: 7 per c.m.m.) a few blood
Globulin Content: +)cells present
Wassermann Reaction: ++
Colloidal Gold Curve: 1.1.1.1.1.0.0.0.0.0.

28-11-25.	Novarsenobillon.	GRM.	.90
5-12-25.	"	"	.90
12-12-25.	"	"	.90
19-12-25.	"	"	.90
26-12-25.	"	"	.90
2- 1-26.	"	"	.90
9 -1-26.	"	"	.90
16 -1-26.	"	"	.90

16-1-26. Put on Potassium Iodide gr.~~xx~~ T.i.D.
Pil. Hydrarg. gr. $\overline{iv}$ once daily.

30-1-26. Patient is still extremely well and shows no signs of mental instability. His emotional tone is appropriate and he has never again expressed any delusions. His memory is good although he cannot recall all that happened in the first few days of his illness. His insight is excellent, his judgment good, and he is well in touch with the outside world. He is at present having a few weeks' well-earned holiday.

The last reports on Blood and Cerebro-Spinal Fluid are :

Blood Wassermann Reaction: Negative.
Cerebro-Spinal Fluid: Cells: 4.1 per c.m.m.
Globulin Content: very slight increase.
Wassermann Reaction: ++
Colloidal Gold Curve: not yet done.

CASE 35. Admitted 31-12-23. Age, 17 years. Messenger-Boy.

Patient was an only child. His father was a good-living man and the mother was a very respectable type of woman, but always appeared to be distinctly neurotic. The family history was not in any way suggestive.

Patient, as an infant and as a child, was very healthy, and at school he proved himself bright, alert, and intelligent. He played games with the others, and in every way seemed normal, until he reached the age of thirteen years, when he manifested signs of sexual precocity in his attitude to girls of his own age. It was clearly established that, at this stage in his life, he indulged freely in promiscuous sexual intercourse; but in no other way did he seem abnormal, and following close supervision by his parents, he finally ceased his malpractices, after a period of about six months.

On leaving school, he worked as a message-boy in a grocer's shop, and he appears to have performed his duties in a satisfactory manner, and to have reacted appropriately and adequately to all his circumstances and his problems. In September, 1923, however, he became increasingly "nervous and shy". He wept at inopportune moments, and in other ways was emotionally unstable. After a few weeks, he was discharged by his employer for making repeated and careless mistakes, and he became very restless and sleepless. Finally, on October 27th, he was very destructive, tearing his own and his parent's clothes; his speech altered and he was scarcely able to express his ideas; and on the following day, he refused his food, alleging that it was poisoned. He was then sent to an Observation Hospital, and from there he was ultimately transferred to Hawkhead.

Condition on admission: Height, 5 ft. 6 inches. Weight 8 st. 11 lbs. Patient was a poorly-nourished, anaemic lad, with little muscular power and scarcely able to walk without support.

The/

The lungs were normal, but there were haemic murmurs over the cardiac area. The tongue was coated and dry, the breath foul and the bowels confined. There was a septic bed-sore on the right buttock. There were no signs of congenital syphilis; but neither was there any trace of a former chancre, adenitis, etc. The pupils were equal but widely dilated and would not respond to any reaction. Coarse tremors were obvious in the perioral, lingual and hand muscles. The speech was hurried, staccato in type, and for the most part unintelligible. The abdominal reflexes were absent, the knee and ankle jerks much increased, plantar reflexes flexor, and Rhombergism very marked. Generalised muscular inco-ordination was evident.

For the first week, he was deeply confused and seldom seemed to appreciate what was said to him. His replies to questions were monosyllabic, inaccurate, and inappropriate. Emotionally, he was very unstable, but usually appeared very depressed, and he looked miserable. During this time, he was unable to feed himself, he passed his excreta in bed, and spat indiscriminately around him. His temperature was persistently subnormal.

With considerable difficulty, specimens of blood and Cerebro-Spinal Fluid were removed and examined, with the following results:

Blood Wassermann Reaction: Strongly Positive (+++).
Cerebro-spinal Fluid: Cells: 60 per c.m.m.
Globulin content: increased (++).
Wassermann Reaction: strongly positive (++++).
Colloidal Gold Curve: 5.5.5.5.5.5.4.3.1.0.

About this time, and also later, both parents were separately and confidentially interviewed, but neither admitted having had venereal disease of any kind, but each thought it improbable that the infection had been an acquired one.

Progress: Patient improved slowly, both physically and mentally. The bed-sore, however, was very callous. After a fortnight, he was able to feed himself, but still required assistance in

Walking/

walking. He became somewhat brighter, he appeared less confused, and regained control of the sphincters. He was put on Potassium Iodide and Easton's Syrup.

In May, he was allowed up, for the first time. He was then quite rational, his memory was much improved, and he behaved very well, though he was always subdued and lacking in initiative. His general intelligence was not of a high order.

The pupils were still very large and immobile and the knee-jerks exaggerated; but the tremors and the ataxia were scarcely noticeable. He remained thus till the commencement of specific treatment.

This consisted of -

(a) ten intravenous injections of Anti-Typhoid Vaccine, at three day intervals.

(b) six weekly doses of Novarsenobillon.

(c) a course of Potassium Iodide and Mercury.

(d) ten doses of Novarsenobillon, with a "protein shock" on the day following each.

(e) one month's rest from specific treatment.

(f) a further course of Iodide and Mercury.

(g) eight (weekly) doses of Novarsenobillon, with an intrathecal injection of horse - serum after the fourth dose.

Details of treatment are as follows:-

			Highest Temperature reached:
18-1-25.	Anti-Typhoid Vaccine.	.25 c.c.	.. 104°
21-1-25.	" " "	.25 c.c.	.. 103.8°
24-1-25.	" " "	.25 c.c.	.. 103.2°
27-1-25.	" " "	.25 c.c.	.. 102.8°
30-1-25.	" " "	.30 c.c.	.. 102.6°
2-2-25.	" " "	.35 c.c.	.. 102.8°
5-2-25.	" " "	.40 c.c.	.. 103.
8-2-25.	" " "	.40 c.c.	.. 102.6°
11-2-25.	" " "	.45 c.c.	.. 102.6°
14-2-25.	" " "	.50 c.c.	.. 102.8°
17-2-25.	Novarsenobillon.	GRM. .30	
24-2-25.	"	" .30.	
3-3-25.	"	" .45	
10-3-25.	"	" .45	
17-3-25.	"	" .60	
24-3-25.	"	" .60	

25-3-25. Put on Potassium Iodide gr. x thrice daily and Pil. Hydrarg. gr. ii/11 once daily.

Condition of patient is much as at start of treatment and there is no change in neurological signs.

1/

1-4-25. Blood Wassermann Reaction: Strongly positive (++).
Cerebro-Spinal Fluid: Cells: 12 per c.m.m.
Globulin Content: increased (++).
Wassermann Reaction: (++++).
Colloidal Gold Curve: 5.5.5.5.4.4.2.1.0.0.

			Highest temperature reached.
1-5-25.	Iodide and Mercury stopped.		
6-5-25.	Novarsenobillon. GRM.	.30	
7-5-25.	Anti-Typhoid Vaccine.	.25 c.c.	103°
13-5-25.	Novarsenobillon. GRM.	.30	
14-5-25.	Anti-Typhoid Vaccine.	.25 c.c.	102.4°
20-5-25.	Novarsenobillon. GRM.	.45	
21-5-25.	Anti-Typhoid Vaccine.	.30 c.c.	102.8°
27-5-25.	Novarsenobillon. GRM.	.45	
28-5-25.	Anti-Typhoid Vaccine.	.35 c.c.	103°
3-6-25.	Novarsenobillon. GRM.	.60	
4-6-25.	Anti-Typhpid Vaccine.	.35 c.c.	102.2°
10-6-25.	Novarsenobillon. GRM.	.60	
11-6-25.	Anti-Typhoid Vaccine.	.40 c.c.	102.4°
17-6-25.	Novarsenobillon. GRM.	.75	
18-6-25.	Anti-Typhoid Vaccine.	.45 c.c.	102.6°
24-6-25.	Novarsenobillon. GRM.	.75	
25-6-25.	Anti-Typhoid Vaccine.	.50 c.c.	102.6°
1-7-25.	Novarsenobillon. GRM.	.75	
2-7-25.	Anti-Typhoid Vaccine.	.55 c.c.	103°
8-7-25.	Novarsenobillon. GRM.	.75	
9-7-25.	Anti-Typhoid Vaccine.	.55 c.c.	102.6°
10-7-25.	Put on Syr. Glycerophos. Co.		

Patient's condition is stationary. He is still tidy, does a little ward work, and has a walk each day. His memory is good, but he has no insight into his illness. The neurological signs are unchanged.

11-7-25. Blood Wassermann Reaction: Positive (+).
Cerebro-Spinal Fluid: Cells: 30 per c.m.m.
Globulin content: increased (+).
Wassermann Reaction: positive (+++).
Colloidal Gold Curve: 5.5.5.5.4.3.2.1.1.0.

15-7-25. - 4-8-25. on pass from hospital.

5-8-25. Patient's mother states that he did well when on holiday, but thinks him "rather dull" and "lacking in confidence".

6-8-25. Put on Potassium Iodide gr. $\overline{xv}$ thrice daily and Pil. Hydrarg. gr. $\frac{\cdot\cdot}{11}$ once daily.

3-9-25.	Iodide and Mercury stopped.		
4-9-25.	Novarsenobillon.	GRM.	.30
11-9-25.	"	"	.45
18-9-25.	"	"	.60
25-9-25.	"	"	.90
26-9-25.	Horse - Serum .	10 c.c. intra-thecally.	

Cerebro-Spinal Fluid withdrawn: Cells: 30 per c.m.m.
Globulin content: increased (+).
Wassermann Reaction: +++
Colloidal Gold Curve: 5.5.5.5.4.3.2.1.0.0.

2-10-25.	Novarsenobillon.	GRM.	.90
9-10-25.	"	"	.90
16-10-25.	"	"	.90

23/

23-10-25. Novarsenobillon. GRM. .90

25-10-25. Blood Wassermann Reaction: Negative.
Cerebro-Spinal Fluid: Cells: 26 per c.m.m.
Globulin content: increased (+).
Wassermann Reaction: + +
Colloidal Gold Curve: 5.5.4.2.2.1.0.0.0.0.

Patient is now somewhat restless and unsettled, and on several occasions has been untidy, destructive and tended to be quarrelsome.

12-11-25. Patient has again been put to bed. He is very childish, unstable, dirty and unable to dress himself or keep his clothes clean. His speech is again very hurried and the tremors are present in the facial and lingual muscles, with the result that he cannot make himself easily understood. The gait is ataxic.

19-11-25. Blood Wassermann Reaction: Strongly positive (+ +).
Cerebro-Spinal Fluid: Cells: 95 per c.m.m.
Globulin content: increased (+ +).
Wassermann Reaction: + + + +
Colloidal Gold Curve: 5.5.5.3.1.0.0.0.0.0.

30-1-26. Patient is bed-ridden and scarcely able to walk, on account of weakness and inco-ordination. He is fat, but flabby: weight, 10 stones 1 lb. He is deeply confused and quite oblivious to his environment. At times, he tears his bed-clothes and his habits are always faulty. His parents think that he hardly recognises them.

Blood Wassermann Reaction: Strongly positive (+ +). Owing to his restless, agitated and resistive attitude, lumbar puncture could not be performed.

CASE 36. Admitted 12-5-24. Age, 24 years. Dispatch Clerk.

Patient was an illegitimate child and no information was obtained concerning his father. His mother was a healthy woman, but came from a poor stock. Both of her parents were confirmed alcoholics, one of her sisters was mentally defective from birth, and her only brother had been several times convicted of various minor offences.

Patient received a poor education, but was always an intelligent boy and enjoyed good health. On leaving school, he was employed as a message-boy, and evidently performed his duties satisfactorily, as he was later promoted and assisted in a grocer's shop for nearly two years. In 1918, he became of military age and served for two years with the Army of Occupation in Belgium and, later, in Germany. On being discharged, in 1922, he returned home, but was unable to find employment anywhere. He was at first quite cheerful and continued to look for work and to take an active interest in sports. About January, 1924, however, his mother observed him to be rather dull and, after this, he became progressively indifferent. He refused to go out and, later, lay in bed all day, but occasionally rose and went for long walks during the night. A few days before admission, he refused to take food, alleging that it was being poisoned, and he also spoke of "wireless voices" which had been annoying him for the past month or two.

Condition on admission: Height, 5 ft. 5 inches. Weight 8 stones 2 lbs. Patient was well-developed, but poorly nourished, anaemic and "pasty". The tongue was very dirty and dry, the breath foetid and the bowels confined. The heart and lungs were normal. Epigastric tenderness was present, probably arising from gastritis. The urine was concentrated and contained a trace of albumin. There were no evidences of syphilis - either acquired or congenital. The pupils were unequal, the right being larger. The right responded sluggishly to light and shade, but freely on convergence/

convergence; the left reacted freely and promptly. No tremors were present, the speech was unaffected, and co-ordination was good. The knee-jerks were brisk, but other reflexes were normal. The gait tended to be spastic; there was no Rhombergism.

Mentally, he was very depressed, introverted and sullenly uncommunicative. He was extremely suspicious of others, and resented examination. His memory was good for recent and for remote events, he was accurately orientated, but he had little knowledge of current affairs of interest. He stated that he felt miserable on account of prolonged unemployment and that he felt that people were all talking about him, laughing at him, and generally up against him. His mental reaction was that commonly seen in Paranoid Dementia Praecox.

The blood Wassermann Reaction was done as routine, and was reported to be "Strongly Positive" on 17th May, 1924.

30-6-24. Cerebro-Spinal Fluid: Cells: 66 per c.m.m.
Globulin content: increased (+).
Wassermann Reaction: positive (++).
Colloidal Gold Curve: 5.4.4.4.1.0.0.0.0.0.

Meanwhile, patient had been very depressed and unwilling to converse. Without giving reason, he refused food for four days, and for nearly a week later he took only fluids. After a month, however, he improved and behaved more satisfactorily, and this was followed by an improvement in his physical condition.

In July, he was allowed up and seemed very much better, in every way. The tongue was clean, the appetite good, the bowels regular. He now spoke quite freely and could tell all that had happened since admission and in the few months before it. He was cheerful, without being exalted, he mingled with other patients and took part in their entertainments. He remained thus till January, 1925. On 15th January, 1925, the blood and cerebro-spinal fluid were again examined:

Blood Wassermann Reaction: strongly positive (+++).
Cerebro-Spinal Fluid: Cells: 60 per c.m.m.
Wassermann Reaction: ++++
Globulin content: increased (++).
Colloidal Gold Curve: 5.5.5.5.5.2.2.1.0.0.

Specific/

Specific treatment in this case consisted of :

(a) ten "protein shocks".

(b) six doses of Novarsenobillon.

(c) a course of Potassium Iodide and Mercury.

(d) ten further doses of Novarsenobillon with a "protein shock" after each.

(e) a second course of Iodide and Mercury.

(f) eight doses of Novarsenobillon with an intra-thecal injection of auto-serum after each of the last six doses.

Details:			Highest temperature reached -
18-1-25.	Anti-Typhoid Vaccine.	.25 c.c.	104.8°
21-1-25.	" "	.25 c.c.	104°
24-1-25.	" "	.25 c.c.	103°
27-1-25.	" "	.25 c.c.	102.6°
30-1-25.	" "	.30 c.c.	103.2°
2-2-25.	" "	.30 c.c.	102.8°
5-2-25.	" "	.35 c.c.	102.6°
8-2-25.	" "	.40 c.c.	103°
11-2-25.	" "	.40 c.c.	102.8°
14-2-25.	" "	.45 c.c... ..	102.8°
17-2-25.	Novarsenobillon. GRM.	.30	
24-2-25.	" "	.30	
3-3-25.	" "	.45	
10-3-25.	" "	.45	
17-3-25.	" "	.60	
24-3-25.	" "	.60	

26-3-25 - 1-5-25. Potassium Iodide gr. $\overline{xv}$ thrice daily, and Pil. Hydrarg. gr $\frac{\cdot\cdot}{II}$ once daily.

4-4-25. Blood Wassermann Reaction: ++
Cerebro-Spinal Fluid: (Blood present).
Wassermann Reaction: +++
Colloidal Gold Curve: 5.5.5.5.5.4.2.1.0.0.

Patient is still very well. He is putting on weight - 9 stones 9 lbs. Mental condition unaltered.

			Highest temperature reached -
1-5-25.	Novarsenobillon.	.30 GRM.	
2-5-25.	Anti-Typhoid Vaccine.	.25 c.c.	104°
8-5-25.	Novarsenobillon.	.30 GRM.	
9-5-25.	Anti-Typhoid Vaccine.	.25 c.c.	103.6°
15-5-25.	Novarsenobillon.	.45 GRM.	
16-5-25.	Anti-Typhoid Vaccine.	.25 c.c.	102.8°
22-5-25.	Novarsenobillon.	.45 GRM.	
23-5-25.	Anti-Typhoid Vaccine.	.30 c.c.	103°
29-5-25.	Novarsenobillon.	.60 GRM.	
30-5-25.	Anti-Typhoid Vaccine.	.30 c.c.	102.6°
5-6-25.	Novarsenobillon.	.60 GRM.	
6-6-25.	Anti-Typhoid Vaccine.	.35 c.c.	103.2°
12-6-25.	Novarsenobillon.	.60 GRM.	
13-6-25.	Anti-Typhoid Vaccine.	.35 c.c.	102.6°
19-6-25.	Novarsenobillon.	.75 GRM.	
20-6-25.	Anti-Typhoid Vaccine.	.40 c.c.	103°
26-6-25.	Novarsenobillon.	.75 GRM.	
27-6-25.	Anti-Typhoid Vaccine.	.40 c.c.	102.6°

		Highest temperature reached -
3-7-25.	Novarsenobillon. .75 GRM.	
4-7-25.	Anti-Typhoid Vaccine. .45 c.c.	102.6°
10-7-25.	Novarsenobillon. .75 GRM.	
11-7-25.	Anti-Typhoid Vaccine. .50 c.c.	102.8°
13-7-25.	Blood Wassermann Reaction: Negative	
	Cerebro-Spinal Fluid: Cells: 12 per c.m.m.	
	Globulin Content: +	
	Wassermann Reaction: +++	
	Colloidal Gold Curve: 5.5.4.3.2.2.1.0.0.0.	

Patient is still very alert and bright, and retains a good grasp of the situation. He is anxious for discharge.

15-7-25 - 30-7-25. On pass from hospital. Put on Potassium Iodide gr. $\overline{xv}$ thrice daily.

1-8-25. Patient's mother states he was very well when on holiday, and noticed little change in him compared with his former state.

15-8-25.	Potassium Iodide stopped.
18-8-25.	Novarsenobillon. GRM. .30
25-8-25.	" " .45
1-9-25.	" " .60
2-9-25.	Auto-Serum. 12 c.cs. intra-thecally.
8-9-25.	Novarsenobillon. GRM. .75
9-9-25.	Auto-Serum. 10 c.cs. intra-thecally.
15-9-25.	Novarsenobillon. GRM. .90
16-9-25.	Auto-Serum. 14 c.cs. intra-thecally.
22-9-25.	Novarsenobillon. GRM. .90
23-9-25.	Auto-Serum. 16 c.cs. intra-thecally.
29-9-25.	Novarsenobillon. GRM. .90
30-9-25.	Auto-Serum. 16 c.cs. intra-thecally.
7-10-25.	Novarsenobillon. GRM. .90
8-10-25.	Auto-Serum. 13 c.cs. intra-thecally.

20-10-25. Patient to-day had an apoplectiform seizure, and has a right-sided hemiplegia. He is only partially conscious. Temperature 100.2°. Purgative enema given with good results. It was deemed inadvisable to perform a lumbar puncture. (In no case has the writer seen beneficial results follow this procedure, and, in several patients, the operation has actually appeared to render the patient's state worse).

22-10-25. Patient is now conscious and the signs of hemiplegia are passing off. He is still mildly confused. Put on Potassium Iodide gr. $\overline{x}$ thrice daily. It was originally intended that ten intra-thecal doses of serum should be given, but this treatment was suspended, owing to the occurrence of the seizure.

14-11-25. Patient is still in bed on account of his mental condition/

condition. He is somewhat foolish in conversation and in conduct, laughing inopportunely and attempting to tear the bedclothes. His memory is not so good as formerly, and he takes little interest in those around him.

21-11-25. Potassium Iodide stopped.
Blood Wassermann Reaction: Strongly positive (+++).
1-12-25. Cerebro-Spinal Fluid: Cells: 20.5 per c.m.m.
Globulin content: increased.
Wassermann Reaction: +++
Colloidal Gold Curve: 5.5.5.5.5.4.2.1.0.0.

20-1-26. Patient is now considerably demented and is bed-ridden. At times, he is very exalted, but he is not deluded. His memory is very poor and he is quite indifferent to his fate.

Physically, he has also failed remarkably. Tremors of facial and lingual muscles are marked and the articulation is poor. The pupils still react as on admission, but the limbs are weak and ataxia is marked. Unless carefully watched, he passes his excreta in bed. At nights, he is often noisy and requires sedatives.

20-1-26. Blood Wassermann Reaction: Positive +++
Cerebro-Spinal Fluid: Cells: 12.1 per c.m.m.
Globulin content: increased (++).
Wassermann Reaction: +++
Colloidal Gold Curve: not yet done.

CASE 37. Admitted 25-8-24. Age, 56 years. Engineer.

Patient was the eldest of a large family, two of whom died in childhood, following scarlet fever, and one of whom was drowned at sea. The others were alive and healthy. His parents had died in old age. There was no history of mental instability in any of the relatives.

Patient was healthy in infancy and childhood. At school, he displayed average intelligence at his work, and he was always a keen and energetic footballer. He served his apprenticeship at the engineering trade, and thereafter was constantly employed until 1922. He married at the age of twentytwo and had a family of six, all of whom were well and apparently normal. For fully twenty years, he drank regularly and was occasionally intoxicated. The date of infection was not known and he never suferred from any lesion recognised to be syphilitic in nature.

In 1922, owing to general trade depression, he was suspended from his work, and in October, 1923, he fell down a flight of stairs, bruising his head severely and suffering from a degree of cerebral concussion.

In May, 1924, he became very irritable and depressed; he refused to go out to draw his Unemployment Allowance, and tended to be violent if opposed. On July 16th, he committed an assault on his wife and eldest daughter, he was arrested, convicted, and sentenced to thirty days imprisonment. Towards the end of his detention, his behaviour must have been peculiar, for on the expiry of his sentence, he was sent to an Observation Hospital, from which he was soon transferred to Hawkhead.

Condition on admission: Height, 5 ft. 6 inches. Weight, 9 st. 1 lb. Patient was thin, pale, and in poor general condition, though there were no obvious lesions to account for this. The tongue was dirty and oral sepsis from pyorrhoea alveolaris was extensive. The arteries were hypertrophied and the second cardiac sound was accentuated. Systolic Blood-Pressure: 170 m.m. Hg.

The/

The urine was non-albuminous and repeated examination did not reveal the presence of casts.

In the nervous system, the pupils were equal and reacted normally. The tongue had a slight antero-posterior tremor, but the articulation was good. The knee-jerks were much exaggerated, but the reflexes were normal and there was no incoordination.

Mentally, patient was in a manic phase. He was exalted, mildly excited, and spoke freely, with a definite "flight of ideas". He did not express any delusions, but comported himself with an unwarranted air of self-confidence and conscious superiority over others. To elicit information from him was difficult, but it appeared that his memory was morbidly defective regarding recent events. With tactful management, he caused little trouble.

3-9-24. Blood Wassermann Reaction: Strongly positive (++).
Cerebro-Spinal Fluid: Cells: 14 per c.m.m.
Globulin Content: increased (++).
Wassermann Reaction: +
Colloidal Gold Curve: 5.5.5.4.3.2.1.1.0.0.

Patient remained very talkative and occasionally was restless till the beginning of December, after which he was more subdued, though still unduly self-assertive and lacking in self-control. On numerous occasions he had been guilty of thefts of all sorts of articles, which he presented to his wife at her weekly visit. Definite delusions were not observed until January, 1925, when he spoke of being a "world-famed musician", "an expert dancer", and "a famous athlete". His memory was not reliable, but he always contrived to keep in touch with the outside world.

Specific treatment was started in February. Immediately prior to this, specimens of Blood and Cerebro-Spinal Fluid were again examined.

Blood Wassermann Reaction: ++
Cerebro-Spinal Fluid: Cells: 37 per c.m.m.
Globulin content: +
Wassermann Reaction: ++++
Colloidal Gold Curve: 5.5.5.5.4.3.1.0.0.0.

Treatment/

Treatment consisted of -

(a) ten injections of anti-Typhoid Vaccine.
(b) six doses of Novarsenobillon.
(c) a course of Potassium Iodide and Mercury.
(d) six weeks' rest.
(e) eight doses of Novarsenobillon;a course of hexamine.
(f) an intra-thecal injection of Horse-Serum.
(g) eight further doses of Novarsenobillon.
(h) a further course of Iodide.

Details:				Highest temperature reached -
22-2-25.	Anti-Typhoid Vaccine.	.25 c.c.	..	105°
25-2-25.	" "	.25 c.c.	..	104.6°
28-2-25.	" "	.25 c.c.	..	103.2°
3-3-25.	" "	.25 c.c.	..	102.6°
6-3-25.	" "	.30 c.c.	..	103°
9-3-25.	" "	.30 c.c.	..	102.8°
12-3-25.	" "	.35 c.c.	..	103°
15-3-25.	" "	.40 c.c.	..	103°
18-3-25.	" "	.45 c.c.	..	102.6°
21-3-25.	" "	.50 c.c.	..	103.2°
24-3-25.	Novarsenobillon.	GRM. .30		
1-4-25.	"	" .30		
8-4-25.	"	" .45		
15-4-25.	"	" .45		
22-4-25.	"	" .60		
29-4-25.	"	" .60		

1-5-25. Patient is putting on weight, 10 st. 2 lbs. He is still somewhat talkative and unwarrantedly self-confident, but he is no longer deluded. His memory is still defective, however, and though he has no insight into his condition, he has no desire to better himself and never asks for his freedom. He no longer steals from other patients.

Blood Wassermann Reaction: Doubtful positive.
Cerebro-Spinal Fluid: Cells: 4 per c.m.m.
Globulin content: +-
Wassermann Reaction: + +
Colloidal Gold Curve: 5.5.5.3.2.1.0.0.0.0.

4-5-25. Put on Potassium Iodide gr. $\overline{xv}$ thrice daily and Pil. Hydrarg. gr. $\frac{ii}{ii}$ once daily.

11-5-25. Despite care, the mouth is very dirty and patient complains of tenderness of the gums. Mercury discontinued.

20-6-25. Iodide stopped.
18-7-25. Blood Wassermann Reaction: + +
Cerebro-Spinal Fluid: Cells: 1.2 per c.m.m.
Globulin content: very slightly increased.
Wassermann Reaction: + +
Colloidal Gold Curve: 1.1.2.3.2.1.0.0.0.0.

Patient's mental condition unchanged.

3-8-25.	Novarsenobillon.	GRM.	.30
10-8-25.	"	"	.30
17-8-25.	"	"	.45

24-8-25. Put on Hexamide gr. $\overline{xv}$ and Sod. Phos. Acid gr. x thrice daily.

Novarsenobillon/

24-8-25. Novarsenobillon. GRM. .60
31-8-25. " " .75
7-9-25. " " .75
14-9-25. " " .90
21-9-25. " " .90
22-9-25. Horse-Serum. 10 c.c. intra-thecally.

Cerebro-Spinal Fluid withdrawn -
Cells: 3.5 per c.m.m.
Globulin content: very slightly increased.
Wassermann Reaction: + +
Colloidal Gold Curve: 2.3.4.4.3.1.0.0.0.0.
no formalin present.

28-9-25. Novarsenobillon. GRM. .90
5-10-25. " " .90
12-10-25. " " .90
19-10-25. " " .90
26-10-25. " " .90
2-11-25. " " .90
9-11-25. " " .90
16-11-25. " " .90
19-11-25. Blood Wassermann Reaction: + +
Cerebro-Spinal Fluid: Cells: 1.4 per c.m.m.
Globulin content: Pandy and Ross-Jones tests both negative.
Wassermann Reaction: + +
Colloidal Gold Curve: 2.2.2.2.1.0.0.0.0.0.

Patient's weight is practically unchanged, and his general physical condition is satisfactory. Mentally he is still slightly exalted and self-complacent, but he is now asking to be allowed home to work for money. He is no longer deluded. His memory is still defective, but he is accurately orientated.

22-11-25 - 15-1-26. On Potassium Iodide gr. $\overline{xx}$ thrice daily.

30-1-26. Blood Wassermann Reaction: + +
Cerebro-Spinal Fluid: Cells: 3.5 per c.m.m.
Globulin content: + +
Wassermann Reaction: + + +
Colloidal Gold Curve: not yet done.

Patient is still very active and in good physical condition. He helps in ward work and has a walk each day. The neurological signs have changed very little.

The mental reaction is that often seen in General Paralytics in a remission - that is, he is perfectly able to manage his affairs inside an institution, but he is lacking in insight and has no proper appreciation of the real nature of his illness.

CASE 38. Admitted 8-1-25. Age, 48 years. Policeman.

Patient was a married man, with a healthy family of three. His wife could tell very little of his relatives, but had not reason to believe that there was any mental disease in any of them. He was always healthy, temperate in his habits, and efficient in his duties. His wife admitted having had syphilis, but she had believed herself to be cured before her marriage (twenty years previously), and she had never observed any suspicious lesions on her husband.

On 15th November, 1924, while on duty, patient had "a shock" and was removed to Glasgow Royal Infirmary, but after a few days he was transferred to an Observation Hospital, where, for a time, he improved and seemed well. On 6th January, 1925, however, he turned very noisy and destructive and was certified.

On admission, patient was so resistive that physical examination was impossible, but he appeared to be in good bodily condition. His mental reaction was that of acute mania, with periods of extreme violence and excitement. At the end of a week, he became somewhat quieter and the following signs were observed: Height, 6 feet, 2 inches. Weight, 14 st. 7 lbs.
Heart and Lungs: Normal.
Nervous System: Pupils equal, dilated, and sluggish in all responses.

Knee-jerks exaggerated markedly.
Gait spastic.

Blood Wassermann Reaction: Strongly positive (+++).
Cerebro-Spinal Fluid: Cells: 45 per c.m.m.
Globulin Content: increased (++).
Wassermann Reaction: ++++
Colloidal Gold Curve: 5.5.5.5.4.3.2.1.0.0.

By 30th January, 1925, he was much improved, but still very exalted and unsettled, and still required prolonged baths and other sedative measures. At this time, his memory was poor but he appeared to know where he was, and learned to call patients and staff by name. He received Potass. Iodid gr. $\overline{xv}$ and Potass. Brom. gr. $\overline{xx}$ thrice daily.

Specific/

Specific treatment: It had been intended that this should follow the lines of Case 36, but it was brought to an untimely end by the death of the patient.

			Highest temperature reached -
22-2-25.	Anti-Typhoid Vaccine.	.25 c.c.	103.8°
25-2-25.	" "	.25 c.c.	103.4°
28-2-25.	" "	.25 c.c.	103.2°
3-3-25.	" "	.25 c.c.	102.8°
6-3-25.	" "	.30 c.c.	103.2°
9-3-25.	" "	.30 c.c.	100.6°
12-3-25.	" "	.40 c.c.	101.2°

14-3-25. Patient is not doing well. He is rapidly losing weight and he is still very restless and excited. After each injection of vaccine, he has been sweating profusely. He takes very little food and is not obtaining sufficient sleep, despite administration of Bromide, Chloral, Sulphonal, Veronal, Luminal, etc., lumbar puncture and the use of baths. Vaccines stopped.

30-3-25. Patient is very ill. Temperature 100° - 103° each evening and signs of broncho-pneumonia present. The mental reaction is still manic in type.

9-4-25. Patient is in a critical state. He has signs of acute Tuberculous broncho-pneumonia, with rapid soft pulse and great emaciation. He is still manic and his treatment is, on this account, rendered very trying.

11-4-25. Died at 5 p.m.

Permission for post-mortem examination was refused.

CASE 39. Admitted 20-1-25. Age, 56 years. Caulker.

Patient was the second eldest of a family of seven brothers. His elder brother died of acute nephritis at the age of fortytwo, but all of the others were alive and well. His father and mother had both lived to a good age, and there was no indication of mental disorder in any of the relatives.

Little was known of patient's earlier years, but when he married, at the age of twentytwo, he was healthy, industrious and of a sociable type. He was the father of five children, all of whom were fairly well and had no obvious signs of congenital syphilis. For over twentyfive years, he drank regularly, but was only occasionally intoxicated. He was unemployed from 1922 onwards and during that time he was, of necessity, tee-total. For over a year prior to admission, he was much distressed by financial troubles, but he was said not to have shown definitely abnormal signs until 15th January, 1925, when he suddenly became very noisy, restless, and destructive. In October, 1924, he had fallen down a short flight of stairs, and landed heavily on his head, but he was dazed only for a short time and refused to go to bed. For a week afterwards, however, he complained of severe frontal headache, which kept him awake at nights. This, too, gradually passed off.

On admission, he was found to be a well-nourished man, with good muscular power. Height, 5 ft. 6 inches. Weight, 10 st. 9 lbs. The circulatory, respiratory and excretory systems were normal. The tongue was thickly coated and very dry, and both jaws were edentulous. His temperature was slightly elevated (99°-100°) for a few days, but no local causes for this were detected.

Nervous System: Pupils were small and immobile. Paralysis of the external rectus oculi on the left side was present. The tongue was somewhat tremulous and there was a degree/

degree of dysarthria. The tendon reflexes were all exaggerated and the gait was slightly ataxic.

He was amnesic for recent events and quite unable to explain how or why he had come to hospital. Emotional exaltation was marked, he expressed numerous grandiose delusions and was very suggestible.

22-1-25. Blood Wassermann Reaction: Strongly positive
Cerebro-Spinal Fluid: Cells: 250 per c.m.m.
Globulin Content: + +
Wassermann Reaction: + + - -
Colloidal Gold Curve: 5.5.5.5.5.5.3.2.1.0.

Patient remained in this condition for nearly a month and then showed signs of gradual improvement. He began to affect more interest in his environment, his memory became better and he was not so exalted as formerly. His general behaviour was satisfactory.

Specific treatment was then started and was along the same lines as that of Case 36.

				Highest temperature reached -
22-2-25.	Anti-Typhoid Vaccine.		.25 c.c.	104.6°
25-2-25.	"	"	.25 c.c.	104°
28-2-25.	"	"	.25 c.c.	102.6°
3-3-25.	"	"	.30 c.c.	102.8°
6-3-25.	"	"	.35 c.c.	102.8°
9-3-25.	"	"	.40 c.c.	103°
12-3-25.	"	"	.45 c.c.	102.8°
15-3-25.	"	"	.50 c.c.	102.6°
18-3-25.	"	"	.55 c.c.	102.8°
21-3-25.	"	"	.60 c.c.	102.4°
24-3-25.	Novarsenobillon.	GRM.	.30	
1-4-25.	"	"	.30	
8-4-25.	"	"	.45	
15-4-25.	"	"	.45	
22-4-25.	"	"	.60	
29-4-25.	"	"	.60	

Patient is now fairly rational. The emotional exaltation is still in evidence, but his memory is much improved, though still defective regarding the events immediately prior to and following admission. He is no longer deluded. Though unable to explain his presence here, he seems fairly happy, and never expresses any desire to return home.

30-4-25. Blood Wassermann Reaction: + +
Cerebro-Spinal Fluid: Cells: 9.8 per c.m.m.
Globulin content: + +
Wassermann Reaction: + + + +
Colloidal Gold Curve: 5.5.5.5.4.2.1.0.0.0.

1/

1-5-25 - 29-5-25. On Potassium Iodide gr. $\overline{xv}$ thrice daily
and Pil. Hydrarg. gr. $\frac{\cdot\cdot}{11}$ once daily.

1-7-25. Novarsenobillon. GRM. .30
8-7-25. " " .30

10-7-25. Patient to-day has phlebitis affecting the internal saphenous vein of the right leg. Temperature 101°. To be put on light diet and alkaline diuretics, with complete rest in bed.

20-7-25. The oedema has subsided and the pain gone, but patient is still in bed on account of occasional elevations of temperature.

1-8-25. Allowed up. The limb is now well.
5-8-25. Novarsenobillon. GRM. .30
12-8-25. " " .30
19-8-25. " " .45
26-8-25. " " .45
2-9-25. " " .60
9-9-25. " " .60

Put on Hexamine gr. $\overline{xv}$
Sod. Phos. Acid gr. $\bar{x}$ thrice daily.

16-9-25. Novarsenobillon. GRM. .60
23-9-25. " " .90
24-9-25. Horse-Serum 10 c.cs. intra-thecally.

Cerebro-Spinal Fluid withdrawn -
Cells: 12 per c.m.m.
Globulin content: + +
Wassermann Reaction: + + + +
Colloidal Gold Curve: 5.5.5.5.4.3.1.0.0.0.

30-9-25. Novarsenobillon. GRM. .90
7-10-25. " " .90
14-10-25. " " .90
21-10-25. " " .90
28-10-25. " " .90
4-11-25. " " .90
11-11-25. " " .90
18-11-25. " " .90

20-11-25. Patient remains very well. He eats and sleeps well, and behaves in a very satisfactory manner, working in the wards each morning, and enjoying a walk in the grounds, in the afternoon. The neurological signs are as on admission, excepting that the gait is steadier. Mentally, he is alert and intelligent, reading the papers each day and writing every week to his wife. His letters are coherent and legible. His memory remains good and he is now developing an insight into his previous condition.

Blood Wassermann Reaction: Negative.
Cerebro-Spinal Fluid: Cells: 8.5 per c.m.m.
Globulin/

Globulin content: +
Wassermann Reaction: + +
Colloidal Gold Curve: 5.4.3.2.1.1.0.0.0.0.

No formalin present.

25-11-25. Hexamine stopped. Put on Potass. Iodid. gr. $\overline{xx}$ thrice daily, and Pil. Hydrarg. gr. iv once daily.

15-1-25. Iodide and Mercury stopped.

20-1-25. Patient is again considerably exalted, and, while not definitely deluded, he shows a tendency to be suggestible. His memory is failing and he appears to be almost devoid of ambition to better himself, living a happy, care-free, day-to-day existence. He has stopped writing home, partly on account of physical inability, and partly also because of disinclination. On the odd occasions on which he does read newspapers, he contents himself with a glance over their pictorial columns. Physically, he is putting on weight (10 st. 9 lbs.) and he has a capricious appetite. His gait is again ataxic. Tremors are present in the lingual and facial muscles, causing dysarthria.

Blood Wassermann Reaction: + + +
Cerebro-Spinal Fluid: Cells: 35 per c.m.m.
Globulin content: + +
Wassermann Reaction: + + + +
Colloidal Gold Curve: 5.5.5.4.3.2.1.0.0.0.

CASE 40. Admitted 11-3-25. Age, 46 years. Warehouseman.

Patient was of Highland stock. He was the eldest of a family of four, of whom two younger brothers were killed on Service in France, and a sister had died in early life of abdominal tuberculosis (probably peritonitis). His parents, when alive, were always healthy, and both died late in life. Patient came to stay in town at the age of twentyone, but no details of his earlier career were available. He was said to be very "shy and retiring in disposition" and was always temperate in every way. He had been married for nearly twenty years, but there were no children, nor were there any miscarriages. His wife had reason to believe that he had contracted syphilis two years before marriage, but he had a partial course of treatment, and was believed to be cured. She herself had never had any suspicious lesions. In June, 1924, a heavy parcel fell on his head, and the combined effects of the blow and his resultant fall rendered him unconscious for nearly one hour. His recovery was quick, however, and after a fortnight he resumed working.

Mental symptoms commenced insidiously about November, 1924. Patient became very suspicious, especially regarding his wife, and within a few weeks he was very irritable towards her. In January, 1925, he went to the house of his Church Minister and accused him of "misinterpretation of the Gospel", but the matter was hushed up. A few weeks later, his employer discharged him for repeated carelessness. Certification was necessitated by reason of his violent attitude towards his wife.

Condition on admission: Height 5 ft. 8 ins. Weight 11 stones. Patient was a powerfully built man, well-nourished, and with no gross physical lesions. The pupils were normal, the speech unaffected, and the reflexes unaltered. He was morbidly suspicious and resented being examined. His memory seemed to be quite good and he was accurately orientated in all dimensions. After a few days, he voiced his beliefs concerning his wife, stating that she/

she had been persistently unfaithful to him, and had attempted to poison him by putting arsenic in his food. Noteworthy points were the weakness of his rationalisations and his gross illogicality.

Blood Wassermann Reaction: ++
Cerebro-Spinal Fluid: Cells: Blood present, count inaccurate.
Globulin content: probably increased.
Wassermann Reaction: +++
Colloidal Gold Curve: 5.5.5.5.5.5.4.4.2.0.

Patient remained in the above condition until the commencement of specific treatment. This was somewhat shorter than in previous cases and consisted of:

(a) a course of Mercury and Potassium Iodide.

(b) ten doses of Novarsenobillon, each followed by an injection of Anti-Typhoid Vaccine.

(c) two weeks rest.

(d) a further course of Mercury and Iodide.

(e) ten doses of Novarsenobillon; with a short course of Hexamine; an intra-thecal dose of horse-serum.

Details: 15-4-25 - 7-5-25. Potass. Iodid. gr. $\overline{xx}$ thrice daily, and Pil. Hydrarg. gr. $\frac{\cdot\cdot}{II}$ once daily.

				Highest temperature reached.
8-5-25.	Novarsenobillon. GRM.	.30		
9-5-25.	Anti-Typhoid Vaccine.	.25	c.c.	104°
15-5-25.	Novarsenobillon. GRM.	30		
16-5-25.	Anti-Typhoid Vaccine.	.25	c.c.	103°
22-5-25.	Novarsenobillon. GRM.	.45		
23-5-25.	Anti-Typhoid Vaccine.	.30	c.c.	102.6°
29-5-25.	Novarsenobillon. GRM.	.45		
30-5-25.	Anti-Typhoid Vaccine.	.35	c.c.	102.8°
5-6-25.	Novarsenobillon. GRM.	.60		
6-6-25.	Anti-Typhoid Vaccine.	.40	c.c.	103°
12-6-25.	Novarsenobillon. GRM.	.60		
13-6-25.	Anti-Typhoid Vaccine.	.40	c.c.	102°
19-6-25.	Novarsenobillon. GRM.	.75		
20-6-25.	Anti-Typhoid Vaccine.	.45	c.c.	102.6°
26-6-25.	Novarsenobillon. GRM.	.75		
27-6-25.	Anti-Typhoid Vaccine.	.50	c.c.	102.8°
3-7-25.	Novarsenobillon. GRM.	.75		
4-7-25.	Anti-Typhoid Vaccine.	.55	c.c.	102.8°
10-7-25.	Novarsenobillon. GRM.	.75		
11-7-25.	Anti-Typhoid Vaccine.	.60	c.c.	102.4°

15-7-25. Patient shows no improvement. He is still unduly suspicious and expresses numerous delusions of persecution regarding his wife. His memory is not nearly so good as on admission, and he/

he is not adapting himself well to his environment. On the occasion of his last dose of Anti-Typhoid Vaccine, he accused the nurses of having poisoned his blood.

Blood Wassermann Reaction: ++
Cerebro-Spinal Fluid: Cells: 40 per c.m.m.
Globulin content: ++
Wassermann Reaction: +++
Colloidal Gold Curve: 5.5.5.5.5.4.4.3.2.1.

1-8-25 - 1-9-25. On Potassium Iodide gr. $\overline{xx}$ thrice daily and Pil. Hydrarg. gr. $\frac{\cdot}{IV}$ once daily.

3-9-25.	Novarsenobillon.	GRM.	.30
10-9-25.	"	"	.30
17-9-25.	Hexamine gr. $\overline{xx}$ Sod. Phos. Acid. gr. $\bar{x}$ thrice daily.		
	Novarsenobillon.	GRM.	.45
24-9-25.	"	"	.60
1-10-25.	"	"	.75

2-10-25. Horse-Serum 10 c.cs. intra-thecally.
Report on Cerebro-Spinal Fluid withdrawn:
Cells: 35 per c.m.m.
Globulin content: ++
Wassermann Reaction: +++
Colloidal Gold Curve: 5.5.5.5.5.4.4.3.2.1.

8-10-25.	Novarsenobillon.	GRM.	.90
15-10-25.	"	"	.90
22-10-25.	"	"	.90
29-10-25.	"	"	.90
5-11-25.	"	"	.90

6-11-25. Patient is much worse than formerly. He is failing physically and unable to help in the general work. His gait is ataxic and his speech is slurred and indistinct. The pupils still react freely to light and shade.

Mentally, he is considerably demented. His memory has failed and his intellectual faculties are blunted. He is very unstable in the emotional sphere, but on the whole he displays what really is a morbid exaltation, in view of his condition. He is very incongruous in his statements and his ill-knit delusional scheme has rapidly extended to include even Royal personages.

20-11-25. Blood Wassermann Reaction: ++
Cerebro-Spinal Fluid: Cells: 16 per c.m.m.
Globulin content: ++
Wassermann Reaction: ++++
Colloidal Gold Curve: 5.4.3.2.1.0.0.0.0.0.
No formalin present.

21-11-25. Hexamine discontinued.

29-1-26. Patient is now very unsteady and able to be up only for a short time each day. He is occasionally faulty in his habits, soiling his clothes, both day and night. The speech is very/

very bad, but the pupils still react.

Blood Wassermann Reaction: ++
Cerebro-Spinal Fluid: Cells: 40 per c.m.m.
Globulin content: ++
Wassermann Reaction: ++++
Colloidal Gold Curve: Not yet done.

CASE 41. Admitted 16-3-25. Age, 45 years. Labourer.

The history concerning this patient was given by his only daughter, and was consequently incomplete. She knew, however, that his mother had been in an Irish Asylum for several years and that his brothers - five or six in all - were all heavy drinkers. Patient's wife had never been healthy and died in 1915, of pneumonia. His daughter - aged 22 years - was a bright, intelligent girl. She stated that her father was always inclined to be intemperate, and that during the past eight years he had spent nearly all his available money on drink. On November 1st, 1924, he was arrested for theft of scrap-iron from a ship-yard and was sentenced to twentyone days imprisonment. A few days after his liberation, he repeated the offence and this time was imprisoned for sixty days. Both of these offences were committed in a very open, conspicuous manner, and were undoubtedly evidences of his mental disorder. During February, 1925, he became increasingly dull, "far-away and stupid", and his physical health quickly declined.

Condition on admission: Height 5 ft. 7 inches. Weight 9 st. 1 lb. He was pale and looked exhausted. His tongue was very dirty and his breath was foetid. The heart-sounds were pure but of poor quality. Arterio-Sclerosis was marked.

The pupils were unequal and immobile. Tremors were generalised, rendering him weak; dysarthria was very evident, and the gait was ataxic.

Mentally, he was very drowsy and could scarcely be got to answer questions. He was deeply confused and unable to appreciate what went on around him.

Blood/

Blood Wassermann Reaction: ++
Cerebro-Spinal Fluid:
Globulin content: +
Wassermann Reaction: +++
Colloidal Gold Curve: 5.5.5.5.5.4.3.2.1.0.

He remained stuporous for a few days, but the lumbar puncture gave relief (the fluid was under pressure), and on 20th March, 1925, he was able to answer questions, though still very incoherent and obviously confused. He was given Potassium Iodide gr. $\overline{xx}$ and Potassium Citrate gr. $\overline{xv}$ thrice daily for a week. On 5th May, 1925, he was much improved, though still considerably amnesic and slowed in cerebration. Specific treatment commenced on 8th May, 1925, and was originally intended to be identical with that of Case 39, but later was altered owing to the course his illness ran.

Details:				Highest temperature reached.
8-5-25.	Novarsenobillon. GRM.	.30		
9-5-25.	Anti-Typhoid Vaccine.	.25	c.c. ..	104°
15-5-25.	Novarsenobillon. GRM.	.30		
16-5-25.	Anti-Typhoid Vaccine.	.25	c.c. ..	103°
22-5-25.	Novarsenobillon. GRM.	.45		
23-5-25.	Anti-Typhoid Vaccine.	.30	c.c. ..	103.2°
29-5-25.	Novarsenobillon. GRM.	.45		
30-5-25.	Anti-Typhoid Vaccine.	.30	c.c. ..	102.8°
5-6-25.	Novarsenobillon. GRM.	.60		
6-6-25.	Anti-Typhoid Vaccine.	.35	c.c. ..	102.8°
12-6-25.	Novarsenobillon. GRM.	.60		
13-6-25.	Anti-Typhoid Vaccine.	.40	c.c. ..	102.6°
19-6-25.	Novarsenobillon. GRM.	.75		
20-6-25.	Anti-Typhoid Vaccine.	.45	c.c. ..	103.2°
26-6-25.	Novarsenobillon. GRM.	.75		
27-6-25.	Anti-Typhoid Vaccine.	.45	c.c. ..	102.6°
3-7-25.	Novarsenobillon. GRM.	.75		
4-7-25.	Anti-Typhoid Vaccine.	.50	c.c. ..	102.8°
10-7-25.	Novarsenobillon. GRM.	.75		
11-7-25.	Anti-Typhoid Vaccine.	.55	c.c. ..	103°

15-7-25. Patient is still very indifferent and out of touch with his surroundings. His perception is blunted and he takes a long time in answering questions, while his spontaneous statements are few and chiefly concerned with his immediate needs. His memory is still poor, though better than formerly, and his retention is defective. He is untidy regarding his dress, and is allowed up only in the afternoon. Ataxia and dysarthria are still present.

Blood Wassermann Reaction: ++
Cerebro-Spinal Fluid: Cells: 6 per c.m.m.
Globulin content: ++
Wassermann/

Wassermann Reaction: +++
Colloidal Gold Curve: 5.5.5.4.3.2.1.0.0.0.

1-8-25 - 1-9-25. Potassium Iodide gr. $\overline{xx}$ thrice daily; and Pil. Hydrarg. gr. $\overline{iv}$ once daily.

3-9-25. Novarsenobillon. GRM. .30
10-9-25. " " .30

14-9-25. Patient this morning was found to have a right-sided hemiparesis. It is presumed that, during the night, he took a seizure, though nothing unusual was reported. Put on Potass. Iodid. gr. $\overline{x}$ thrice daily.

15-9-25. Lumbar puncture was done to-day. The fluid, however, was not under pressure and, so far, no relief has been obtained.

19-9-25. Patient is now much better, but is still somewhat confused. He passes his excreta in bed and requires to be supervised when feeding.

26-10-25. Potassium Iodide gr. $\overline{x}$ twice daily.

1-11-25. Allowed up for three hours. He is still very dazed and quite unable to conduct a conversation. He is very apathetic and efforts to rouse his interest have all failed.

29-1-26. Patient is still up for a few hours each day. He is deeply demented but apparently quite happy. There are no traces of the hemiplegia, but he is generally paretic.

Blood Wassermann Reaction: ++
Cerebro-Spinal Fluid: Cells: 9 per c.m.m.
Globulin Content: ++
Wassermann Reaction: ++++
Colloidal Gold Curve: Not yet done.

CASE 42. Admitted, 10-4-25. Age, 59 years. Labourer.

Patient was the youngest of a family of four brothers, the others of whom had all died - one (58) of "heart disease"; one (55) of pneumonia following influenza; and one (56) of "a shock". His parents were said to have been healthy and none of his relatives were known to have been insane. Patient was married at the age of twentythree and was the father of four children, the first two of whom died in infancy, and another, aged five, of measles. The surviving daughter, aged seventeen, was said to be healthy, though she always appeared to be very pale and had the appearance of a mental defective. During his early and middle life, patient worked hard, but periodically indulged in alcoholic bouts and, on two occasions, was arrested by the Police and fined for being "drunk and disorderly". Even at his best, he was an excessively ignorant man, with no hobbies or recreations. He was unemployed from November, 1922, till June, 1924, when he again obtained casual work, at which he continued until just before the onset of his illness.

About March 1st, 1925, he was observed to be "talking and laughing to himself", and this persisted for fully four weeks. On 8th April, 1925, he suddenly became very exalted, exuberant, and spoke to his wife about his having motor-cars, aeroplanes, etc. When reproved, he became violent, and so obstreperous that his removal to hospital was necessitated.
Condition on admission: Height 5 ft. 5 inches. Weight 8 stones. Patient was very pale, and badly-nourished, but active and possessed of fair strength. His tongue was thickly coated; he looked ill and "toxic", and his temperature, for two days, was considerably raised - 102° to 103°. Acute bronchitis was present, though his wife had not observed this while he was at home.

He had Argyll-Robertson pupils and a fair amount of tremor; dysarthria was marked; but there was no Rhombergism. Mentally, he was in a manic phase, and displayed extreme exaltation/

exaltation, with bursts of acute excitement. He was very deluded and made all sorts of statements about his wealth, his titles, his physical powers, etc. For a week he remained thus, causing considerable disturbance both day and night, by refusing to stay in bed, and by attempting to break windows. On 17th April, 1924, with the object of relieving pressure, a lumbar puncture was done, with almost disastrous results. Half-an-hour after the withdrawal of 15 c.cs. of cerebro-spinal fluid patient showed signs of collapse, with feeble, fast pulse, sub-normal temperature, cold sweating, pallor, etc., and was with some difficulty roused to consciousness. (The Cerebro-Spinal Fluid was under increased pressure.) This state lasted nearly twentyfour hours, and after that he slowly rallied, though for a week, he complained of occipital headache. During this time, the exaltation was conspicuously absent, and he did not speak of his wealth, etc., as formerly.

Blood Wassermann Reaction: ++++
Cerebro-Spinal Fluid: Cells: 69 per c.m.m.
Globulin content: ++
Wassermann Reaction: ++++
Colloidal Gold Curve: 5.5.5.5.5.5.4.3.3.1.

On 1st May, 1925, he was allowed up and behaved fairly well. He was, at that time, fairly rational, but still amnesic regarding recent events. His emotional tone was one of mild exaltation.

Specific treatment was started on 15th May, 1925, and consisted of:

(a) eight doses of Novarsenobillon, each followed by a "protein shock".
(b) a course of Iodide and Mercury.
(c) one month's rest.
(d) sixteen doses of Novarsenobillon, with an intra-thecal injection of horse-serum after the eighth; and hexamine.

Details:

				Highest temperature reached -
15-5-25.-	1-7-25. Pot. Iodid. gr. $\overline{xxx}$ and Pil. Hydrarg.gr. $\dot{i}\dot{i}$ daily.			
15-5-25.	Novarsenobillon.	GRM.	.30	
16-5-25.	Anti-Typhoid Vaccine.		.25 c.c. ..	104.6°
22-5-25.	Novarsenobillon.	GRM.	.30	
23-5-25.	Anti-Typhoid Vaccine.		.25 c.c. ..	103°
29-5-25.	Novarsenobillon.	GRM.	.45	
30-5-25.	Anti-Typhoid Vaccine.		.30 c.c. ..	102.4°
5-6-25.	Novarsenobillon.	GRM.	.45	
6-6-25/				

			Highest temperature reached -
6-6-25.	Anti-Typhoid Vaccine.	.35 c.c.	103.2°
12-6-25.	Novarsenobillon. GRM.	.60	
13-6-25.	Anti-Typhoid Vaccine.	.35 c.c.	102.8°
19-6-25.	Novarsenobillon. GRM.	.60	
20-6-25.	Anti-Typhoid Vaccine.	.40 c.c.	103°
26-6-25.	Novarsenobillon. GRM.	.75	
27-6-25.	Anti-Typhoid Vaccine.	.45 c.c.	102.8°
3-7-25.	Novarsenobillon. GRM.	.75	
4-7-25.	Anti-Typhoid Vaccine.	.50 c.c.	102.8°

8-7-25. Patient is still exalted and care-free, but is more purposeful and seems to have a better grasp of the situation. He is very much improved physically, and has put on nearly two stones in weight.

Blood Wassermann Reaction: + +
Cerebro-Spinal Fluid: Cells: 19 per c.m.m.
Globulin content: +
Wassermann Reaction: + + + +
Colloidal Gold Curve: 5.5.5.4.4.3.3.2.1.0.

6-8-25.	Novarsenobillon.	GRM.	.30
13-8-25.	"	"	.30
20-8-25.	"	"	.45
27-8-25.	"	"	.45
3-9-25.	"	"	.60

Put on Hexamine gr. $\overline{xv}$ and Sod. Phos. Ac. gr. $\bar{x}$ thrice daily.

10-9-25.	Novarsenobillon.	GRM.	.60
17-9-25.	"	"	.75
18-9-25.	Horse-Serum 10 c.cs. intra-thecally.		

Cerebro-Spinal Fluid withdrawn -
Cells: 10 per c.m.m.
Globulin content: + +
Wassermann Reaction: + + + +
Colloidal Gold Curve: 5.5.5.4.3.3.2.1.0.0.

24-9-25.	Novarsenobillon.	GRM.	.90
1-10-25.	"	"	.90
8-10-25.	"	"	.90
15-10-25.	"	"	.90
22-10-25.	"	"	.90
29-10-25.	"	"	.90
5-11-25.	"	"	.90
12-11-25.	"	"	.90

17-11-25. Patient is at present less exalted and his memory is improved. He has a fair insight into his former condition, referring to his former delusions as "a lot of nonsense". At times, he is childishly irritable and quarrels readily with other patients but, on the whole, he causes little trouble. His weight is well-maintained and he is in a satisfactory physical condition. The speech is fairly good and the tremors are not noticeable.

Blood/

Blood Wassermann Reaction: + +
Cerebro-Spinal Fluid: Cells: 4 per c.m.m.
Globulin content: +
Wassermann Reaction: + +
Colloidal Gold Curve: 5.4.3.2.2.1.1.1.0.0.
No formalin present.

18-11-25. Hexamine discontinued.

18-11-25 - 3-1-26. On Potass. Iodid. gr. $\overline{xx}$
Pil. Hydrarg. gr. $\frac{i}{ii}$ thrice daily.

10-1-26. Patient has not maintained his improvement and shows signs of regression. He is slovenly and untidy in appearance and of very little use in the wards. He is again exalted and suggestible, though not definitely deluded. His memory is failing and he is beginning to lose interest in the visits of his friends. On one or two occasions he has been noisy and restless at nights and has required a sedative.

Physically, there are also signs of decline: he is becoming very fat and paretic (weight 11 st. 7 lbs.). Tremors are present in the labial and lingual muscles. Dysarthria is evident. His gait is unsteady and he is scarcely able for a walk each day.

Blood Wassermann Reaction: + + +
Cerebro-Spinal Fluid: Cells: 12 per c.m.m.
Globulin content: + +
Wassermann Reaction: + + + +
Colloidal Gold Curve: Not yet done.

CASE 43. Admitted 10-4-25. Age, 40 years. Tea-packer.

Patient was the eldest of a family of three. His father was always healthy and died in old age, but his mother was in an Irish Mental Hospital for five years before her death from pulmonary tuberculosis. One of his sisters was a confirmed neurasthenic, the other - the youngest of the family - was mentally defective, but had never required institution treatment.

From the history supplied, it appeared that patient had always been, financially and otherwise, the mainstay of the family. He was an efficient worker and had no known pernicious habits. He himself stated, however, that, for some years, he had led a somewhat dissolute life, but could not honestly remember having contracted syphilis. The date of infection must have been between 1908 and 1914.

His illness commenced about April 1st, 1925, with insomnia and motor restlessness. Within a few days, he was extremely talkative, exalted and later, very deluded.

Condition on admission: Height 5 ft. - inches. Weight 8 st. 9 lbs. Patient was poorly developed, badly nourished and anaemic. The heart, lungs, and digestive system were normal. For a few days, there was slight albuminuria, without any casts, etc. this soon cleared up.

He had Argyll-Robertson pupils, fine tremors of the hands, exaggerated tendon reflexes, and ataxia, but there was no dysarthria.

Mentally, he presented a manic reaction, with psychomotor activity, emotional exaltation, and fleeting delusions of grandeur.

Blood Wassermann Reaction: +
Cerebro-Spinal Fluid: Cells: 6 perc.m.m.
Globulin content: slight positive (both by Ross-Jones and Pandy tests).
Wassermann Reaction: +
Colloidal Gold Curve: 5.4.4.4.3.2.1.0.0.0.

The manic phase lasted for over two weeks, after which he settled down, though he still was very deluded. Specific treatment/

treatment in this case was intended to be exactly similar to that given in Case 41, but was prematurely stopped owing to the action of patient's sister, who managed to obtain his discharge, against medical advice.

Details: 15-5-25. - 1-7-25. Potass. Iodid. gr. $\overline{xxx}$ daily and Pil. Hydrarg. gr. $\frac{+}{II}$ daily.

15-5-25. - 4-7-25. Alternate doses of Anti-Typhoid Vaccine and Novarsenobillon.

5-7-25. Patient is now much improved. His general conduct is good, his memory is fair, and he is no longer deluded. At times, however, he is unduly exalted; his critical faculty is blunted, and he has little insight into the real nature of affairs.

Blood Wassermann Reaction: +
Cerebro-Spinal Fluid: Cells: 4 per c.m.m.
Globulin content: very slight positive.
Wassermann Reaction: + +
Colloidal Gold Curve: 5.4.4.3.2.1.0.0.0.0.

6-8-25. - 17-9-25. Weekly doses of Novarsenobillon.

3-9-25. Put on Hexamine and Acid Sodium Phosphate.

18-9-25. Horse-serum 10 c.cs. intra-thecally.

Cerebro-Spinal Fluid withdrawn -
Cells: 8 per c.m.m.
Globulin content: +
Wassermann Reaction: + +
Colloidal Gold Curve: 5.5.4.3.3.2.1.0.0.0.

24-9-25. - 29-10-25. Weekly doses of Novarsenobillon.

On 30th October, his sister, against advice, secured his discharge. He was very much improved, both physically and mentally. He had put on two stones in weight and looked much fitter. His memory was fairly accurate though he could remember very little of the early stages of his illness. When questioned as to his former delusions, he was very evasive, but denied knowledge of most of them. Slight exaltation was diffused throughout his outlook and general considerations. He wrote numerous letters, all of which were quite legible, but scarcely coherent towards their end. In the Occupational Class, his work was always/

always hurried and never completely satisfactory, and he paid little attention when corrected. The signs in the nervous system were unaltered. So far as is known, he is believed still to be working at his former occupation.

Summary of Results:

Ten patients were treated. One of these - No.38 - died seven weeks after treatment had first been instituted. This was a man, 46 years of age, who had shown symptoms for only eight weeks prior to admission, the first noticed sign of disease being that of a seizure. The ultimate cause of death was exhaustion plus a generalised broncho-pneumonia. It would scarcely be fair to state that his death was the result of treatment, but his end was certainly precipitated by the effects of the seven doses of vaccine which he received. One would not again readily commence such treatment on a patient who displayed the same psychomotor activity, or on a patient who, for any other reason, was tending to lose weight.

The other nine patients are still alive. Case No.34 is the most hopeful of all. The disease process is still evidently present, but there are absolutely no clinical evidences of mental enfeeblement in any direction. He might well have been working at his former occupation, but his friends are anxious to have a further attempt made to have all traces of disease finally eradicated. It is a hopeful sign that the improvement is also evident in the serological and cerebro-spinal fluid findings.

Case 35: Juvenile Type: this boy was already in a partial remission when treatment was started. He remained relatively well for nine months, but is now declining with considerable rapidity. The most optimistic verdict on his case would be that his remission was prolonged, though even this is doubtful.

Case 36 - This lad had been ill for one year before treatment. He also was in an incomplete remission of health when first treated and he made some improvement. The advent of an apoplectiform seizure completely changed a somewhat hopeful picture into one almost hopeless. It is of note that there

was/

was never much serological change in this case, though at one stage the blood Wassermann Reaction was negative.

Case 37 - Patient was eight months ill before the start of treatment. Again one can do little more than claim prolonged remission. It will be noticed that the last report on the condition of the cerebro-spinal fluid is not reassuring.

Case 39 - This man was really about as early a case as one can reasonably hope for in Asylum practice. Treatment gave a decided improvement, and a remission lasting eight months. For a time, there was a slight serological betterment, but, with the relapse of mental symptoms, this has gone.

Case 40.- Adult depressive type. It cannot be said that any good was done for this man. Indeed, it is quite possible that his decline may have been aggravated by treatment. At no time did he show any sign of improvement, either clinically or otherwise.

Case 41 - Adult, simple dementing type. Again one cannot claim for this case any more than that, by treatment, his allotted span may have been lengthened. Note that there is no serological improvement.

Case 42 - This man was considerably improved for a few months, but in the end again showed marked mental symptoms and will soon, indeed, be bedridden. It is of interest that the pathological findings in the cerebro-spinal fluid, for a time, became less marked after the injection of horse-serum.

Case 43 - In this case, treatment was prematurely stopped, owing to discharge of patient from hospital, in a state of comparative health. All circumstances reviewed, it is not possible to make any definite assertion regarding the possible effect of treatment.

It is noteworthy that, so far as could be judged, the clinical and the serological findings were almost always found/

found to have a definite correlation. The mental change preceded the serological by a very short interval. When serological change of any kind did occur, it was the rule to find that:

1. The pleocytosis and the colloidal gold curve were the most affected and the earliest to change.

2. The amount of globulin also showed change, but in less degree.

3. The Wassermann Reaction of the cerebro-spinal fluid was the least affected and the last to show change.

4. The blood Wassermann Reaction, in almost all instances, became less strongly positive, and, in some cases, quite negative. With the recurrence of the former mental state, the reaction again became stronger.

The results, viewed as a whole, are disappointing. One man, who had previously received a long course of treatment, has possibly been prevented from becoming a general paralytic. The rest have either not received any benefit, or have been given a partial remission of health. It is perfectly true that the average duration of the illness of these treated cases will by far exceed that of those untreated, but it again must be remembered that those chosen for treatment were such that they already had a comparatively good prognosis.

TABLE.

Results of treatment by other methods:

1. Malarial inoculation.	Cases.	Complete remission.	Improved.	Not improved or died.
Grant & Silverston (40)	50	16%	68%	16%
Yorke & McFie (41)	84	29%	40%	31%
Lilly (42)	36	28%	38%	34%
Graham (30)	55	36%	45%	20%
Davidson (43)	53	29%	25%	46%
Gertsmann (44)	400	33%	15%	52%
Lewis/				

1. Malarial inoculation.	Cases.	Complete re-mission.	Im-proved.	Not im-proved or died.
Lewis et alia (45)	51	31%	35%	34%
Averages.		29%	32%	39%
2. Tryparsamide.				
Moore et alia (46)	40	10%	43%	47%
Lorenz et alia (47)	84	41%	42%	17%
Read & Paskind (48)	90	33%	66%	-
Ebaugh & Dickson (49)	52	28%	25%	47%
Will & Weider (50)	21	25%	35%	40%
Wolfshon & Lena (51)	21	18%	42%	40%
Averages.		25%	40%	35%
3. Arsenic, etc.				
Goldsmith (52)	155	10%	20%	70%
Finlayson (53)	14	10%	10%	80%
Evans & Thorne (54)	14	8%	17%	75%
Kelly (55)	4	-	25%	75%
Martheus (56)	58	20%	40%	40%
Averages.		12%	20%	66%
4. "Protein Shock" etc.				
Pilcz (57)	66	8%	36%	56%
Szedlak (57)	25	10%	53%	37%
Jauregg (57)	33	10%	48%	42%
Hauber (57)	36	5%	26%	69%
Averages.		8%	38%	54%

Regarding serological changes after treatment, no standard is laid down by any of these authors. The general finding is that the pleocytosis and the colloidal gold curve are most easily influenced; the Wassermann Reaction of the cerebro-spinal fluid is seldom made negative, and in the blood it is really of little prognostic value. On the whole, changes are more apt to occur after the specific, than after the non-specific treatment. A feature of most malaria-treated cases is the absence of correlation between the clinical and the serological results.

Summary and Conclusions:

1. Ten cases of general paralysis were subjected to intensive courses of "protein shock" and arsenical therapy.

2. Of these, one case showed very markedly beneficial results, both clinically and serologically; one case definitely improved for a short time; in seven cases a prolonged remission occurred; in one case death was prematurely precipitated.

3. The most to look for in a majority of instances is a temporary arrest of the disease process.

4. This is followed, sooner or later, by a somewhat rapid decline.

5. The results of treatment by malarial inoculation and tryparsanide administration are much more hopeful than by this method.

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