

" An Investigation into the Value of
Tryparsamide in the Treatment of
General Paralysis of the Insane, with
Special Consideration of the Clinical
and Serological Factors which may
affect the Prognosis. "

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Preface.

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P R E F A C E.

The chief objects of this thesis are

- (1) to review the history of the treatment of General Paralysis of the Insane;
 - (2) to detail the treatment of fifty cases of General Paralysis of the Insane;
 - (3) to investigate carefully the various factors which might influence the result of such treatment;
 - (4) to record the clinical and the serological results of treatment;
 - (5) to compare and contrast the relative value of treatment of General Paralysis of the Insane by tryparsamide alone and treatment by tryparsamide in combination with non-specific therapy;
- and (6) to compare these results with those obtained by similar and different methods of treatment carried out by other investigators.

Until comparatively recently it was generally accepted that General Paralysis was one of the most serious diseases affecting the human race. Associated with the diagnosis there has always been a feeling of pessimism and complete hopelessness. It included one hundred per cent. incurability and a fatal outcome within four years, generally much sooner. All forms of treatment proved of no avail. Remissions were recognised but any claim of recovery aroused, in the minds of most, grave doubts as to the diagnosis. As an introduction to this thesis a brief summary of the methods of treatment which have been employed appears appropriate.

The first recorded case of general paralysis was by Haslam (1), in 1798, who was then apothecary at Bethlem Royal Hospital. The description of Case XV leaves little doubt that it was one of general paralysis. It was not, however, until 1822 that the condition was recognised by Bayle (2) as an entity, with a definite clinical course, based upon a known pathology. His description of the naked eye, pathological appearances and of the clinical symptoms holds good in its essentials to-day. To it he gave the name "Chronic Arachnitis", for which he later, realising the involvement of the pia mater, substituted the term "Chronic Meningitis". Although the condition had been described thus early its origin was for many years a topic of much controversy. Bayle's work was conducted just after the cessation of the Napoleonic wars and the fact that soldiers were prone to suffer from general paralysis was early seen. The incidence of syphilis in military ranks was also well appreciated, but it was so common among the general population that he dared

not suggest it as the cause of general paralysis. He attributed the condition rather to the combination of alcoholic and venereal excess at a time of exhaustion.

Following upon this advance and before the discovery that general paralysis was syphilitic in origin numerous concepts were elaborated to explain the aetiology. These causes were usually considered in two groups, the moral and the physical. Under the moral group were included such factors as domestic trouble, worry, fright and love affairs. The physical included sexual excesses, alcoholism, venereal disease, injury, privation, starvation and over-exertion. The treatment of the disease consisted of (a) prophylactic measures, and (b) the treatment of the developed disease.

The prophylactic measures were concerned with such questions as the regulation of marriage, the development of a good moral and intellectual education, the regulation of rest hours, diet, exercise, sexual indulgence, and the removal of every source of anxiety.

The therapeutic measures recommended to be adopted once the disease had manifested itself required to be very varied in order that the numerous causes might be attacked. They included such diverse methods as venesection, cautery to the head and spine, baths of varying temperature, purgatives and electricity. Of drugs, iron, potassium bromide, quinine, silver nitrate and digitalis all had their supporters.

These methods of treatment were prominent at various stages and little headway was made from the therapeutic angle until a better understanding of the aetiology was obtained.

Esmarck and Jessen (3) were considered by many to be the first to stress the relationship between general paralysis and syphilis. In 1857 they reported three cases of general paralysis caused by syphilis. Mott (4) also included Kjelberg with the two workers already named as one of the first to point

out this connection. Thereafter there developed a controversy as to the nature of the causation which lasted over fifty years and was only settled by the researches of Wassermann and Noguchi.

In 1874, Bucknill and Tuke (5) continued to lay stress upon dissipated habits as causing general paralysis. The chief of these were alcoholism and sexual excess. As a result of comparison of cases of general paralysis admitted to different types of mental hospitals they concluded that such factors and also the influence of certain occupations were of prime importance. They found that labourers, soldiers and marines provided by far the greatest number of cases. The modus operandi of these factors, however, remained obscure.

Clouston (6) in 1883 expressed the opinion that there was no proof that the disease was syphilitic in origin. By 1886 we find there was a much closer relationship between syphilis and general paralysis suggested. Mickle (7) recognised what he described as Brain Syphilis and gave a differential diagnosis between it and general paralysis. He discussed the rôle of syphilis in general paralysis and quoted Kjelberg's view that the disease never occurred in an organism free from syphilis. At the same time he gave equal prominence to the work of Lewin who investigated twenty thousand cases of syphilis. Only one per cent. were found to have become insane and of these there were no general paralytics. He suggested three ways in which syphilis may "conduce" to general paralysis. The last of these was: "Syphilis may perhaps directly produce the inflammatory changes of the brain."

Savage (8), writing in 1892, brought the connection between syphilis and general paralysis much closer. He found that among the better classes where a more detailed case history could be obtained at least seventy per cent. of general paralytics had clear histories of constitutional syphilis. He did not regard general paralysis as necessarily of specific

origin but considered syphilis as one of its most common causes. It might play the sole part or only be a partial cause.

Krafft-Ebing (9), in a paper read at the International Medical Congress in 1897, gave it as his opinion that among the causes of general paralysis syphilis stood first. It was possible that syphilis was the only cause of the disease and in support of this he quoted experiments he had carried out. Eight advanced, hopeless general paralytics were inoculated with fresh chancre secretion in different parts of the body and were then carefully observed for one-hundred-and-eighty days. In none of these did any syphilitic reaction occur. From this he concluded that in all these there was latent syphilis which made them immune to fresh infection. In support of the assumption that syphilis was the cause of general paralysis was the fact that in juvenile general paralysis a high percentage of congenital syphilitics had been established. Further, in urban populations syphilis and general paralysis were more frequent than in rural and they also occurred more frequently among officers and very seldom among clergy or women of the upper classes. In areas where syphilis was rare general paralysis was rare. His conclusions were summarised in the classical statement that the aetiology of general paralysis might be summed up in two words, "syphilisation" and "civilisation".

Mott (4), writing in 1900, however, did not agree that syphilis was the only factor in the production of general paralysis and suggested it resulted from two factors, stress plus syphilis.

In 1905 Schaudinn discovered the spirochaete pallida and thereafter the hope of the cure and prevention of syphilitic diseases, especially neurosyphilis, became greater. The following year Wassermann developed his serum test for the diagnosis of syphilis. As a result of this it was possible to ascertain whether or not a patient had previously suffered from syphilis.

The other great advance that remains to be mentioned was the discovery in 1913 by Noguchi (10) of the spirochaete pallida in the brain of cases that had died from general paralysis. Prior to this the organism had only been found in the nervous system of the foetus.

For many years prior to the above-mentioned discoveries mercury had been the basic treatment of syphilis. Many other drugs had been tried only to be abandoned again in its favour. In 1908 Ehrlich as the result of many years of painstaking research introduced his arsenical preparations culminating in "606". These have been used extensively and as a result there has issued a steady stream of literature concerning the form and method of their administration. These may be summarised according to the routes by which the drugs were introduced into the body.

- (a) Intramuscular method.
- (b) Intravenous method.
- (c) Intraspinal method.
- (d) Intracranial method.
- (e) Spinal drainage method.

Of the intramuscular and intravenous methods little more need be said here than to take note of them. By their means intensive courses of treatment have been elaborated. Treatment by either alone gave dissappointing results and so various combinations were devised.

The best known intraspinal method is the technique devised by Swift and Ellis (11). This consisted in giving intravenously a dose of salvarsan and within twenty-four hours thereafter forty c.cs. of blood were withdrawn and the clot was allowed to separate. Twelve c.cs. of this serum were combined with eighteen c.cs. of normal serum. The mixed sera were then heated to 50°C. for half-an-hour. Lumbar puncture was performed and thirty to forty c.cs. of cerebro-spinal fluid were withdrawn and the mixed sera then injected.

The beneficial results were assumed to be dependent upon the presence of antibodies in the serum developed in response to the preliminary injection of salvarsan.

In 1916 Gilpin and Earley (12) drew attention to the fact that after the administration of arsenic or mercury, by the mouth, skin, or blood-vessels, neither was found in the cerebro-spinal fluid. They suggested withdrawing the cerebro-spinal fluid by lumbar puncture, thereby lowering the pressure in the cerebro-spinal sac, thus causing the drugs to osmose through the capillaries. They therefore advocated spinal drainage following upon intravenous injection. In their report of three cases, so treated, patients were drained once a week and as much cerebro-spinal fluid drained off as would flow, usually twenty to forty c.cs.

Dercum (13) also supported this method and pointed out that as the cerebro-spinal fluid did not carry any nutrition to the nervous tissue the method of Swift-Ellis was valueless. He advocated spinal drainage alone or following upon intravenous injection of arsenical preparations. The rapid withdrawal of cerebro-spinal fluid was followed by an increased vascularity and he considered the good results which followed this method were due to the improved nutrition of the nerve tissues. Thus he drew a parallel to the results of the Bier treatment in surgery.

Kohmer (14) criticised the Swift-Ellis method on the ground that the amounts of arsenic in the mixed sera were so minute that no benefit could accrue. He therefore combined his treatment with mercurials and to the mixed sera obtained by a similar procedure as in the Swift-Ellis technique he added further salvarsan and introduced this into the cerebro-spinal fluid.

Stokes and Osborne (15) treated fifty patients with spinal drainage plus arsenic and mercury and fifty with arsenic

and mercury alone. From the results they concluded there was no superiority in the drainage method.

Intracranial methods have been employed less frequently no doubt because workers are afraid of this method. Skoog and Menninger (16) treated twelve cases with intraventricular injections. This entailed trephining the skull which they state was done, without causing any pain, under local anaesthesia. The site chosen varied with the operator. Thereafter they withdrew directly from the ventricle on an average twenty-five c.cs. and the average quantity of salvarsanised serum injected was twenty c.cs.

Purves Stewart (17) quoted recently a patient whom he treated by injections of salvarsanised serum into the lateral ventricle administered through a trephine opening in the vertex. He admitted, however, that such treatment was too heroic for routine adoption. The most frequently adopted method of intracranial administration is that described by Wedgeforth, Ayer and Essick (18). Here the needle is inserted just above the spine of the axis and the injection is given directly into the cisterna magna. The main mass of serum is said to flow forwards and then upwards to reach its destination in the cortical subarachnoid space.

In recent years much attention has been given to the non-specific treatment of general paralysis. This was based on the production of a febrile reaction. The beneficial effect of such a reaction in the psychoses had been observed from time to time since the days of Hippocrates and Galen. More recently Pinel (19) enunciated among the various conditions operating to produce a "permanency of cure", a quartan fever.

Clouston (20), a little over forty years ago, wrote: "I believe some day we shall hit on a mode of producing a local inflammation or manageable septic blood poisoning by which we shall cut short and cure attacks of acute mania."

The methods of non-specific therapy may be grouped as follows :

1. Chemical substances (milk, sodium nucleinate, etc.).
2. Bacterial products (tuberculin, typhoid vaccine, etc.).
3. Infectious disease (relapsing fever, rat-bite fever, malaria).

The treatment of inducing pyrexia by the injection of milk consisted in injecting intramuscularly ten c.cs. of milk. This method was tried in this hospital and the result was found to depend on the degree of sterility of the milk. Specimens containing saprophytic bacteria produced the greatest reaction without the formation of localised abscesses while sterile samples produced no reaction. Similar results have been recorded by Petrie (21).

In 1887 Wagner Von Jauregg (22) reported that he was struck by the fact that the best remissions were obtained in those in whom during the course of the disease an infectious disease had set in. He then thought of directly producing an actual infectious disease and had suggested malaria. Instead, however, of infecting them with live organisms he treated them with the products of dead bacteria and used Koch's tuberculin. He began with 0.1 gm. as the initial dose and increased it later as far as 0.5 to 1 gm. This treatment he combined with mercury. He later treated some of the patients with typhoid vaccine. He was convinced that these methods of producing fever were valuable, especially the tuberculin method. In this he was later supported by many others of whom Pilcz (23), in 1911, was probably the most noteworthy.

Later Bercovitz (24) pointed out that in certain countries where syphilis and malaria were endemic cases of general paralysis and tabes were rare. Mattauschek and Pilcz (25) analysed the case histories of 4,134 Austrian army officers

who had become infected with syphilis. They pointed out that those who had developed an acute febrile condition such as pneumonia or typhoid during the first year after infection did not develop neurosyphilis later, whereas those who did develop neurosyphilis, practically without exception, did not have an acute febrile illness during the first year after infection with syphilis.

Fortified by these observations Von Jauregg (22), in 1917, thirty years after his original suggestion, inoculated cases of general paralysis with malaria from a soldier suffering from that condition who had never been treated with quinine. His method has been followed in the treatment of many of the cases under review and will be described later. There are unfortunately certain disadvantages attached to this form of treatment. Briefly these are : (a) The infecting organism cannot be kept active in culture or in laboratory animals, and it must be transmitted by mosquito or directly from patient to patient. (b) The reaction caused in patients is sometimes severe and leads to a certain mortality. There is in all cases a degree of anaemia due to the destruction of the red cells and jaundice may develop. (c) In transmitting the infection from one patient to another one frequently carries over syphilitic blood. (d) Some are not susceptible to malaria and some have a limited number of paroxysms which then spontaneously cease.

To overcome these difficulties two other methods have been put forward.

In 1919 Plaut and Steiner (26) introduced the treatment by relapsing fever. They were originally guided by the idea that the therapeutic action could be intensified if a microörganism were employed that was closely allied to the spirochaete pallida. This they claimed for *Spirochaeta Duttoni*. Moreover, the infecting organism could be kept alive in laboratory

animals and the fever was alleged to be less severe than that of malaria.

The infectious material was taken from the tail of the mouse or preferably from the thoracic cavity after the heart had been severed. The blood was thereafter mixed with saline and injected into the patient either hypodermically or intravenously. Thereafter blood could be transferred directly from one patient to another if desired. This method of treatment was tried in this hospital but the results were not favourable. The temperature did not respond to arsenic and was difficult to control.

Solomon (27) failed to get a strain of Relapsing Fever of sufficient virulence. He only succeeded in getting two to four mild rises of temperature in patients. He therefore commenced treatment by Rat-bite Fever, the infecting organism of which is *spirochaete morsus-muris*. For this he claims the following advantages.

(1) The clinical effects produced by *spirochaete morsus-muris* offer more favourable and fewer unfavourable characteristics than does malaria.

(2) The organisms can be kept in a laboratory animal available for inoculation at any time.

The present consensus of opinion is in favour of a combination of specific and non-specific forms of treatment. At a recent meeting of the Psychiatric Section (28) of the Royal Society of Medicine this combination was advocated. Von Jauregg (29) begins the specific treatment as soon as the fever is stopped. With the first dose of quinine he gives neosalvarsan. Altogether six doses of neosalvarsan are administered. In Bonhoeffer's clinic (29) twelve doses of neosalvarsan and twelve doses of bismuth are given after the fever to complete the treatment. Solomon (30) combines the treatment by rat-bite fever with tryparsamide.

Treatment adopted by the Writer.

The cases of general paralysis here submitted, fifty in number, have all been treated by tryparsamide either alone or combined with a non-specific form of treatment. Some of those have been undergoing treatment since 1923 and consequently the method adopted has varied as the result of observation and experimentation. All of them have been under observation for at least twelve months.

Tryparsamide was first synthesised by Jacobs and Heidelberger (31) at the Rockefeller Institute in 1915. It is the sodium salt of n-phenylglycineamide-p-arsonic acid, a pentavalent arsenical compound containing 25 per cent. of arsenic. Thereafter extensive experimental work with the drug was carried out by Brown and Pearce (32). This was primarily in relation to trypanosomiasis and later it was administered to cases of late syphilis. According to the early reports it was administered to improve the general condition so that these cases might later be treated in the ordinary way. It was found, however, to have a very beneficial effect, both on lesions and also serologically, so its use was extended. It was given to patients with primary and secondary lesions. No improvement was noticed; in fact in some cases the lesions were said to have progressed. The properties of the drug, summarised by these workers were :

(1) The drug was comparatively free from untoward effects.

(2) A slight but definite spirochaeticidal action.

(3) An unusually high penetrability. There was no other substance known with an equal degree of spirochaeticidal action that possessed the same degree of penetrability.

(4) A remarkable power of reinforcing the processes of natural resistance and of promoting recuperation.

The first report of its use in the treatment of neurosyphilis was made by Lorenz (33) in 1923, and a short time later by Moore (34).

In 1924 a supply of this drug became available for use in several hospitals in this country and twenty patients were submitted to this treatment in the Maudsley Hospital. Three of these were cases of tabes and have not been included in this series. Although I was not responsible for the treatment of these patients or for any treatment given to others before the summer of 1926 I have included them in this series for two reasons. Firstly, several of these patients have received from me treatment since that date, and secondly, it was considered that the subsequent histories of these patients would be most interesting. Consequently I have traced and obtained periodic reports of all these patients as is detailed later in their case histories. In the early stages the drug was administered in courses of eight injections. Each injection consisted of two grammes dissolved in ten c.cs. of sterile water and was given intravenously at weekly intervals. After an interval of two months another course of eight injections could be given, but prior to 1926 none of these patients had received more than three courses of eight injections. Of the seventeen cases of general paralysis originally submitted to this treatment only one died during the course. The remaining sixteen I have kept under review and continued to treat where such was possible during the past three years.

There were no complications of note and the dose was increased to three grammes given intravenously at weekly intervals. It was claimed for the drug that it could be given intravenously, intramuscularly or subcutaneously. I thought that since the absorption into the body would be slower if the drug was given intramuscularly, this method of administration might be more efficacious. Accordingly, in 1927, several

patients were submitted to intramuscular injections of two grammes twice a week, thereby also increasing the weekly intake of arsenic. The site of injection was as a rule the buttock. In spite of strict aseptic precautions several patients developed a localised abscess. It was interesting to note that those patients had previously received such injections intravenously without any untoward effect. Some of these localised abscesses were aspirated and a haemorrhagic purulent fluid was obtained. From this there was obtained in culture the staphylococcus. Cultures were then made from the solution of tryparsamide but, as anticipated, these were sterile. The solution of tryparsamide was then infected with the staphylococcus which had been isolated. It was found that after twelve to twenty-four hours these were again sterile owing to the antigermicidal action of the arsenic. These abscesses then were considered to be "mechanical abscesses" due to an irritation of the tissues by the drug with a secondary infection from the deeper layers of the skin. As the majority of the patients were able to be at home, many of them working, it became of the utmost importance that if they were to be expected to continue treatment they must not be called upon to suffer unnecessarily, or to have to cease work. I therefore resorted to the intravenous method of administration and have continued to employ it.

In 1923 treatment of general paralysis by malaria was adopted here. Unfortunately one of the cases so treated in 1926 died and owing to the attitude adopted by the local coroner it was decided to discontinue meantime this form of treatment. Later that year four cases were inoculated with relapsing fever. One of those, an advanced case, died prior to the onset of the fever; one died during pyrexia; the remaining two received in addition tryparsamide and are included in this series (Cases Nos. 31 and 32).

During the past two years malaria has been used

extensively here and its use has been combined with tryparsamide. In 1927 when I had to resort to the intravenous method of administration I increased the quantity of tryparsamide given in a course from sixteen to forty grammes and no bad effects were noted. When visiting the Boston Psychopathic Hospital and the Psychiatric Institute, New York, eighteen months ago, I found that Solomon and Bunker were giving this drug over an indefinite period. I resolved to give this a trial. Consequently I have modified the treatment considerably from that given in the early stages and this I will now describe in detail.

As soon as a diagnosis of general paralysis is made the patient is examined by the ophthalmic surgeon who reports as to the presence of any suggestion of optic atrophy. If no signs are found contraindicating the use of the drug, tryparsamide treatment is begun. An intravenous injection of three grammes dissolved in ten c.cs. of sterile water is given each week. This is especially valuable if the patient's general condition is poor.

As early as possible the patient is inoculated with from three to five c.cs. of malarial blood (benign tertian). Blood inoculation is preferred as this has been found to be more reliable than inoculation by mosquitoes. The intravenous route is frequently chosen, though some have been injected intramuscularly. After the usual incubation period the patient develops the characteristic pyrexia and blood films are examined regularly for the presence of parasites. Some of the blood used for inoculation has had a double infection and the resultant pyrexia has been quotidian. The patient is allowed to have a varying number of rigors depending on the general condition. Eight to twelve regors are considered adequate. At the end of this period quinine is given usually in the form of quinine sulphate, ten grains three times a day, for a few days.

Throughout the fever and at weekly intervals thereafter tryparsamide in three gramme doses is given intravenously. These injections are continued for prolonged periods in the effort to produce clinical and serological improvement. Lorenz (35) has stated that treatment by tryparsamide should be continued at least six months.

The cases under review therefore have been treated by either of two methods. One series have had tryparsamide only, and the other series have had treatment by tryparsamide plus pyrexia. Several of the first group did not show clinical improvement after treatment here, and had to be admitted to a mental hospital where they were treated with malaria. These cases I have transferred to the second group. In the first group, treated by tryparsamide alone, there are described seventeen cases. In the second group, treated by tryparsamide plus pyrexia, there are thirty-three cases.

Some of the patients have received varying doses of tryparsamide. At first they received two gramme doses, then four gramme doses, and latterly three gramme doses. In my comment on each case I have calculated these injections on a basis of three grammes and I have designated the number as "the equivalent of - injections of three grammes". The highest number of injections which I have given to any patient has been the equivalent of eighty-two injections of three grammes.

Certain difficulties arose with regard to the attendance over long periods of patients for their injections. These, however, I have surmounted by giving their injections either in the evening or at the week-ends. In most cases the patients have been willing to come so long as there was no interference with their work.

The malarial blood and the relapsing fever infection have been obtained through Dr. Golla, Director of the Central

Laboratory of the London County Mental Hospitals. All the serological examinations reported have been made by Mr. Partner in this laboratory except where otherwise mentioned.

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

Case 1. A.J.C. Admitted 12.12.23 Occupation Clerk Age 36.

Patient was the youngest of a family of six and had always enjoyed good health. He was unmarried. Twelve years ago he contracted syphilis and was treated by injections in his buttocks for fourteen months but had had no treatment since. A brother suffered from epileptic fits and was said to have died in one of these. None of his other relations had had any nervous or mental disorder.

His present illness began about three months ago when he was given up by a lady friend and this upset him considerably. For some indefinite time before this he had been rather irritable, and complained of difficulty at his work but otherwise no change was noted and he was said to have discharged his duties satisfactorily. He gave up his work about three months ago and he has since then become dull and displayed little interest in his environment. If crossed at all he became irritable and abusive.

On admission he was dull and apathetic. He was content to lie in bed and resented being disturbed. If spoken to he became very irritable. Frequently he read peculiar meanings into the actions and sayings of other patients and would then become noisy, abusive and threatening. He was very unstable emotionally and for no apparent reason would start weeping. This mood was easily replaced by a more cheerful one. His memory for both recent and remote events was impaired, especially for the former. Simple calculations he could perform fairly well but he made many gross errors in attempting to take seven serially from one hundred. Physical examination showed marked tremors of the lower half of his face, lips, tongue and hands. There was no evidence of any sensory impairment. His gait was steady and there was no

Rombergism. His speech was slow but he managed the usual test phrases. He had unequal, irregular, Argyll Robertson pupils. The deep reflexes were present, equal and active, and the superficial gave a normal response.

His serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	80 per c.mm.
	Protein	125 mg.%
	Lange	555543210

He received weekly injections of tryparsamide in doses of two grammes.

He remained in hospital until 26.4.24 when he was discharged to attend as an out-patient for his weekly injections. His condition had then improved somewhat in that he was more cheerful and displayed more interest in his surroundings. He still remained very irritable and would get upset over trifles when he would become abusive to the other patients and the staff. Emotionally he was still very unstable. His memory remained impaired but he was correctly oriented in all spheres. There was no change in his physical signs. His serological findings after sixteen injections were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 8 +
	Cells	10 per c.mm.
	Protein	50 mg.%
	Lange	5554432100

A third course of eight injections of tryparsamide was given as an out-patient. At the end of that period, 9.10.24, he was reported to be more cheerful and active and had resumed work. He was still somewhat irritable and would easily get upset. In this respect his relatives had to exercise great caution. His general physical health had improved considerably. He was much brighter and conversed more freely and quite intelligently. His memory showed distinct improvement especially that for recent events. Simple calculations he did quite well but he still failed to

take seven serially from one hundred. He still showed slight tremors of his hands and tongue. His gait was steady and there was no Rombergism. He still had unequal, irregular, Argyll Robertson pupils. Both the deep and superficial reflexes were normal. His speech was more fluent and he managed the test phrases quite well. The serological findings on 9.10.24 were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	5 per c.mm.
	Protein	45 mg. %
	Large	0011100000

Thereafter nothing was heard of him until 15.5.27. Previous enquiries he had failed to acknowledge. An effort was made on that date to get him to attend hospital but he replied that owing to business he could not do so, and he was unwilling to come at the week-end or in the evening. He had remained well and had been working regularly since the latter part of 1924.

In reply to a further enquiry on 17.9.28 he stated that he had been quite well and employed in the office of a consultant engineer for three years. He had not been under any medical care since October 1924, and expressed the hope that should he have a recurrence of his illness he might be allowed to attend here. He was unwilling to attend here until then.

Another enquiry was sent on 6.12.29 when it was ascertained that his improvement had been maintained and he had been working regularly for over four years. An effort was made to get him to come to hospital but this he refused to do. A brother was visited and he stated that the patient was now very much better and apart from a degree of irritability foreign to him prior to his illness he appeared normal. He was most anxious to forget about his illness and consequently would not come to hospital. His memory was good and he appeared to do his work quite well.

Comment. A case of general paralysis of the simple type whose symptoms had been present at least three months prior to treatment. He received twenty four injections of two grammes of tryparsamide and showed marked clinical and serological improvement. He has been included in the group of patients enjoying a good remission.

Case 2. P.S.M. Admitted 11.2.24 Occupation Silver Chaser Age 39.

Patient was married and had one child. His wife had had no other pregnancies. He had enjoyed very good health until six years ago when he began to complain of shooting pains in his legs. These have persisted and were considered to be rheumatic in origin. Twenty three years ago he contracted syphilis and was treated by penile inunction for three weeks. He had received no treatment since then.

The onset of his present illness was rather insidious. For several months his family had noticed a change in his manner. He became very irritable, frequently cursing and swearing at his family without cause. Previously he had been of a rather docile disposition. Three months ago he became unsteady on his feet and complained of abdominal pains which were considered to be due to chronic appendicitis. At the same time he became very dull and would sit about for long periods displaying no interest in anything. He became suspicious of people and thought they planned to do him harm. Within the past three months he had steadily become worse.

On admission he was dull and rather confused. He reproached himself for the death of his first wife several years ago, though he apparently had no reason to do so. He was very suspicious and begged to be removed from the ward as queer things were going on. He stated he could hear the

others talk about him and that we were all conspiring against him and were drugging him to make him insane. His memory was considerably impaired especially that for recent events and he was unable to give the present date. Simple arithmetical calculations he was unable to perform and he made many gross errors in attempting to take seven serially from one hundred. Physical examination showed marked tremors of tongue, face and hands. His speech was slow but he repeated successfully the test phrases. A specimen of his handwriting was very tremulous. There was some impairment of the sense of touch over his face and legs. His gait was ataxic and Romberg's sign was present. He had unequal, irregular Argyll Robertson pupils. The deep reflexes of his upper limbs were present and equal. His knee jerks and ankle jerks were absent. The abdominal and plantar reflexes gave a normal response. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	100 per cmm
	Protein	125 mg %
	Lange	555543200

He received eight injections of two grammes of tryparsamide administered at weekly intervals.

His condition after admission fluctuated considerably, from being dull and suspicious to being cheerful and happy. Frequently his mood would vary very rapidly and for no apparent reason he would start weeping. On the whole he remained suspicious of the staff and other patients whom he thought were all against him. Three weeks after admission he passed into a very restless and excited state. He declared we were all against him and planning to do him harm and he was frequently impulsive towards the staff. He had auditory hallucinations, was completely disoriented, and had to be treated in the continuous bath. He remained in this noisy

excited state and it was impossible to retain him here so he was discharged on 28.4.24 recommended for admission to the infirmary. At that time his physical signs remained unchanged. The serological findings following treatment were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 8 +
	Cells	70 per cmm
	Protein	100 mg %
	Lange	5555433200

He was admitted to Banstead Mental Hospital on 1.5.24 in the condition just described. He remained in this noisy, excited, suspicious state till August of that year when he became less restless and began to converse more rationally. Emotional instability remained a marked feature of his condition. He continued to improve slowly but was on the whole rather dull and appeared contented. His suspicious paranoid ideas he ceased to express. His wife was very anxious to have him home and he was discharged to her care "relieved" on 20.10.24. There was no record of his having received any further specific treatment.

Nothing further was heard of him till 20.1.27 when in reply to an enquiry his wife stated he had remained fairly well since leaving hospital. He was able to assist at home and in the garden but had done no active work. He was much less irritable than formerly and was rather placid. His general health was satisfactory. As he lived in the country it was impossible to have the opportunity to examine him.

In reply to a further enquiry on 15.10.28 his wife reported that the improvement in his condition had been maintained. He was now able at times to do some work though it appeared he found this difficult and trying. His general health was satisfactory. He was spending a large part of his time gardening.

On 26.11.29 he reported that he was still enjoying good health and that he had attempted to resume work but found it difficult to obtain. He felt in perfect health and had not

been under medical care since leaving Banstead Mental Hospital. An effort to get him to come here for examination was unsuccessful. His general health was apparently quite good.

Comment. A case of tabo-paresis of the paranoid type whose symptoms were present for at least three months prior to treatment. He received eight injections of two grammes of tryparsamide and showed clinical and slight serological improvement. He has been included in the partially remitted group.

Case 3. J.B. Admitted 1.5.24 Occupation Vanman. Age 49.

Patient had been married twenty years but had had no children. His previous health had always been good and there was no history of having suffered from pains rheumatic or otherwise. He denied ever having suffered from venereal disease or any other illness. There was no history of any nervous or mental disorder in his family.

He had been employed all his life, except for a short period during the war when he was engaged on munitions, as a vanman and discharged those duties satisfactorily. Four months ago he was crushed between two vans and sustained several fractured ribs. Shortly thereafter he became dull and forgetful, in consequence of this he was dismissed from his work. He had gradually deteriorated since and was said to be very childish at times.

On admission he was dull, inactive and had difficulty in understanding what was said to him. His replies to questions were in monosyllables. He smiled in a very fatuous manner and appeared quite contented. He had no insight whatever. His memory for both recent and remote events was much impaired. He did not remember his accident though he was not unconscious then, nor that he had lost his job. He was unable to carry out simple calculations and was imperfectly oriented for time and place. His general physical condition was not good. He showed marked tremors of hands and tongue. There was some impairment of the sensation of touch in his lower limbs. His gait was ataxic and Romberg's sign was present. He had unequal, irregular Argyll Robertson pupils. The biceps, triceps and supinator jerks and ankle jerks were absent. The superficial reflexes were normal. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	80 per cmm.
	Protein	125 mg %
	Lange	5555543200

He received eight injection of two grammes of tryparsamide given intravenously at weekly intervals.

Following this he appeared to show some improvement. He displayed more interest in his surroundings and became more active and worked in the ward. On the whole he remained fatuous and contented and displayed no initiative. His memory remained poor. He was allowed leave from hospital one week-end and while at home he developed a weakness of his legs and could not return. The relatives were advised to have him admitted to the infirmary. There was no change in his physical signs except that he had put on weight. The serological findings after treatment (on 16.10.24) were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	70 per cmm
	Protein	100 mg %
	Lange	555543210

He was admitted to Long Grove Mental Hospital on 4.11.24. The following notes were extracted from their clinical record.

4.11.24 He was dull, depressed, showed no initiative and was disoriented for time and place. His memory was very poor and at times he was incoherent.

24.4.25 There was no change in his condition. He was dull, depressed and emotionally unstable.

24.4.26 He remained dull, disinterested and depressed. He now had auditory hallucinations which rendered him at times restless by night.

24.4.27 He was dull depressed, easily upset by trifles and still hallucinated. At times he was very restless. His physical condition was not good. The physical signs were unchanged.

26.9.28 He was dull and showed no interest in anything - was lacking in emotional control and was easily upset. He suffered from auditory hallucinations, more marked by night

and at times he was very restless. His memory was grossly impaired and he was lacking in initiative. His physical condition was not good. His speech was very slurred. The deep reflexes of his upper limbs were present but those of his lower were absent. The pupils were unequal, irregular and Argyll Robertson in type. The abdominal reflexes were present and the plantars were flexor.

23.10.29 There was no change in his condition. He was dull and apathetic. Occasionally he was noisy and his conduct was influenced by the voices he heard. His physical condition was only fair and the physical signs were unchanged. He had just completed eight injections of tryparsamide in three gramme doses given intravenously at weekly intervals. There was no report of any serological examinations.

Comment : A case of tabo paresis of the simple type whose symptoms had been present for four months prior to treatment. He received eight injections of two grammes of tryparsamide, but had steadily deteriorated and was under care in a mental hospital.

Case 4. F.C.B. Admitted 9.5.24. Occupation Clerk. Age 39.

Patient had been married eleven years and had had one child who died of debility at the age of three months. His general health had always been good and he was said to have had no illnesses whatever. He denied ever having had any venereal disease but there was a suspicious scar on his glans penis. None of his relatives were said to have suffered from nervous or mental disorder. Prior to the war he was a stockbroker but since his discharge from the army he had to occupy the position of a clerk in a city office and this caused him some worry. He appeared to have rendered efficient service there till the onset of his present illness twelve months ago. This manifested itself by a loss of interest, and he had difficulty in applying himself to do anything. He would sit about for long periods and become very irritable if crossed. Since then he has steadily become worse. He was very forgetful, tremulous and was said to become at times very confused.

On admission he was happy and exalted. He declared nothing worried him and he was as happy as a "sandboy". He was disoriented for time and place and his memory for both recent and remote events was grossly impaired. He was quite unable to do simple arithmetical calculations. His mood was very unstable and he would frequently start weeping for no apparent reason. His general physical condition was not good. He showed marked tremors of hands face and tongue. His gait was unsteady but there was no rombergism. His speech was distinctly slurred. He had small equal, irregular pupils which did not react to light and were very sluggish in their reaction on accommodation. The deep reflexes of his upper limbs were present and equal. The knee and ankle jerks were absent. No response was obtained from the abdominal reflexes. The

plantar reflexes were flexor in type. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	60 per cmm
	Protein	125 mg %
	Lange	555542200

He received eight intravenous injections of two grammes of tryparsamide at weekly intervals.

He remained very fatuous and very pleased with his capabilities which he exaggerated considerably. He showed considerable deterioration and was completely disoriented. Of the important events in his life he had no recollection. In his habits he was very faulty and he would micturate openly in the ward. He showed no sign of improvement and he was discharged, his admission to the infirmary being recommended. There was no change in his physical signs. The serological findings after treatment (on 2.7.24) were:

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	10 per cmm
	Protein	80 mg %
	Lange	5543210000

He was admitted to Long Grove Mental Hospital on 11.7.24. The following notes were extracted from their clinical record.

11.7.24 On admission he was in a dull, disoriented, confused state. He had no proper appreciation of his position, was elated and exalted and stated he was going home to make more money on the stock exchange. He laughed in a fatuous manner.

11.10.24 He became very excited and noisy. He expressed many fantastic somatic delusions. He thought he was being pursued by a man who changed his skin, his face and his feet. He was deteriorating rapidly. His habits were very faulty.

23.10.24 Patient developed a terminal pneumonic condition of his lungs and he died to-day. The diagnosis of general paralysis was confirmed at the post mortem. There was no

record of his having received any additional specific treatment.

Comment : A case of general paralysis of the simple type whose symptoms had been present for at least twelve months prior to treatment. No clinical improvement was seen as a result of treatment. There was a slight improvement noticed in the cell count and colloidal gold curve in the cerebro spinal fluid.

Case 5. A.J.W. Admitted 16.6.24 Occupation Engineer. Age 50.

Patient was a married man but had no children. He denied ever having had venereal disease. His previous health was said to have been good. The first thing noted wrong with him was in September 1922 when he had a "fit of shakes" in which he was said to have trembled all over and was very weak. This lasted three days and passed off again. Thereafter he continued at work until September 1923 when he had to give it up. For some time before this he had been peculiar and forgetful.

His relatives date the onset of his trouble to about twelve months ago, though he was able, as already stated, to continue at work till September of last year. He then became very weak and had, at this time, an intractable diarrhoea. His memory was noticed to be very poor and he became generally indifferent. He was admitted to a general hospital and given a course of neosalvarsan with no apparent effect. After he had been there for five months, he became more unstable, rambling in his conversation and very tremulous, so he was discharged to the infirmary. He had since become steadily worse. Prior to his admission here he was reported

to have had auditory hallucinations and peculiar ideas about God. He was unable to swallow properly and was incontinent. He had had generalised twitchings and several convulsions.

On admission he was in the terminal stages of the disease. He lay in bed fairly quietly and displayed generalised tremors which were accentuated on movement. He was very confused. Memory, orientation, comprehension and association of ideas were all grossly impaired. His answers to questions were frequently incoherent and quite irrelevant.

His physical condition was poor. He was feeble, emaciated and bed-ridden. There were generalised tremors; sensory localisation could not be tested owing to his confused state. His speech was very slurred. He had small equal, irregular Argyll Robertson pupils. The deep reflexes were present equal and active. The abdominal and plantar reflexes gave a normal response.

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	100 per cmm
	Protein	200 mg %
	Lange	5555421000

He gradually became weaker and did not appear to understand what was said to him. Swallowing became more difficult and he was frequently doubly incontinent. He was given weekly injections of Tryparsamide in two gramme doses. Of these he had received seven prior to his death which occurred on 28.7.24. Permission for a post mortem examination could not be obtained.

Comment: A very advanced general paralytic of the simple dementing type submitted to this treatment in the terminal stages of the disease with no beneficial effect.

Case 6. J.E.N. Admitted 19.8.24 Occupation Solicitor Age 53.

Patient had been married fifteen years but had no children. He contracted syphilis twenty years ago but received no treatment for this apart from local dressings. His health otherwise had been very good up till two years ago when he had a seizure. From this he recovered in a few days. None of his relatives had suffered from any nervous or mental disorder.

The exact onset of his present illness was indefinite. He had been rather dull and disinterested for some months but these symptoms became much more marked following upon another seizure he had four months ago when he lost, for a few days, the power of speech. He had since become very forgetful and at times was very childish.

On admission he was very unsettled. At one time he desired to leave the hospital, then, within a short period he would request to be allowed to stay as he was quite happy. He was childish in manner and behaviour, very fatuous and showed marked emotional instability. His memory for both recent and remote events was grossly impaired. Shortly after admission he had several seizures. Physically he showed marked tremors of hands, face and tongue. There was some impairment of deep sensation in his calf muscles. His gait was steady and there was no Rombergism. His pupils were unequal, the right being larger than the left, but they reacted to light and on accommodation. His deep reflexes were present and equal. The abdominal reflexes were absent; the plantars were flexor in type. His speech was very slurred and indistinct. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	50 per cmm
	Protein	100 mg %
	Lange	5555543210

He received eight intravenous injections of two grammes of tryparsamide at weekly intervals.

Shortly after admission he had several seizures during which he completely lost consciousness. He suffered from retention of urine and had to be catheterised. On the whole he was quiet but very unstable emotionally and would frequently start weeping for no apparent reason. He was very childish and fatuous. His memory was grossly impaired. There was evidence of extensive intellectual impairment and deterioration. His relatives were anxious to have him home and he was discharged to their care on 30.10.24. At that time there was no change in his physical signs. The serological findings then were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	14 per cmm
	Protein	100 mg %
	Lange	555543210

He was removed to his home in the north of London. In reply to an enquiry on 5.2.25 his physician reported that he was no better than he had been for the past two or three years. Although still childish and weak-minded he showed a greater interest in everyday life and was able to play bridge. He had had no further seizures.

An enquiry sent on 2.5.27 obtained the information that the patient had relapsed and had been admitted to a mental hospital. He was very childish and fatuous and showed marked deterioration.

Nothing further was heard of him till 30.11.29 when in reply to another enquiry it was learned that he was still under care in a mental hospital. His doctor reported that he showed progressive mental and physical deterioration. He had not received any further treatment so far as I could ascertain.

Comment : A case of general paralysis of the simple type whose symptoms had been present for at least four months prior

to treatment. He received eight intravenous injections of two grammes of tryparsamide. For a short period thereafter he showed slight clinical improvement but later relapsed and has been under care in a mental hospital.

Case 7. G.A.C. Admitted 7.10.24 Occupation labourer. Age 26.

Patient is an illegitimate child and unmarried. He was one of a family of four, two of whom were alive and healthy, and one other brother had died many years ago. The cause of death was unknown. At the age of fourteen years and six months he joined the army as a band boy. He ran away after twelve months service and thereafter worked at home till 1914. At the beginning of the war he joined up again. He was wounded after three and a half years in France and received a fifty per cent disability pension in 1918. In 1919 he joined the Police Force but was discharged two years after having been found asleep on duty. He has since done various odd jobs but could only retain them for short periods. He denied ever having had venereal disease but admitted having exposed himself to infection on many occasions. There was a very suspicious scar on the dorsum of his penis. None of his relatives had suffered from any nervous or mental disorder.

He had become somewhat dull and was lacking in initiative for several months, but nothing definite was noticed till four months ago when he had a seizure. Thereafter he had a series of fits and was admitted to the infirmary where a diagnosis of Status Epilepticus was made. These subsided

and beyond noticing that he was simple and childish they did not appear to have realised the true nature of his condition. He was discharged a few days later and had been at home doing nothing since.

On admission he was rather childish and fatuous. He believed he had great powers as a singer and talked at length, very optimistically, about his future on the stage. His emotional state fluctuated rapidly from laughter to tears. His memory for both recent and remote events was grossly impaired and he was unable to give an account of himself. He failed to do simple calculations and made many gross errors in taking seven serially from one hundred. He had no insight whatever. His general physical state was poor. He showed tremors of hands and tongue. There was no sensory abnormality. His gait was steady and there was no rombergism. He had unequal, irregular pupils which reacted well on accommodation but their reaction to light was very sluggish. His deep reflexes were present. Those of the left arm and leg were more active than those of the right. The superficial reflexes were normal. His speech was slow but he managed the test phrases fairly well. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	80 per cmm
	Protein	100 mg %
	Lange	555554321

He received two courses of eight injections of two grammes of tryparsamide given at weekly intervals. Between each course a period of eight weeks was allowed to elapse.

Throughout his stay here he remained fatuous and indifferent as to the future. He would sit about the ward doing nothing and was quite content to remain in hospital. He showed evidence of marked deterioration. His replies to questions were frequently irrelevant and his attention was very difficult to retain. His memory was grossly impaired

and he had no idea of the date. His physical condition had improved and he had put on about two stones in weight. The physical signs were unchanged. He was discharged from here to the care of his relatives on 9.5.25. The serological findings then were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	10 per cmm
	Protein	80 mg %
	Lange	5555432100

He remained at home following his discharge from here. His brother obtained a job for him as a painter but this he only retained a matter of days and was dismissed for dreaming instead of working. He seemed somewhat more active on the whole than before his admission here but he remained very childish and was content to play with his brother's children all day. He always spoke of his powers as a singer and of going on the stage. His memory remained much impaired.

He remained in this state till 23.8.26, when he had a seizure and was removed to the infirmary where he died the following day. He had had no further treatment. No post mortem was performed.

Comment: A case of general paralysis of the simple dementing type whose symptoms had been present for at least four months before treatment. Following sixteen injections of two grammes of tryparsamide he showed no clinical improvement, but there was a reduction in the cell count, in the protein content and a diminution of the colloidal gold curve of the cerebro-spinal fluid. He died fifteen months after treatment.

Case 8. C.B. Admitted 20.11.24 Occupation Packer. Age 33.

Patient was married and had one child aged ten years, alive and well. There had been one other child who died when three months old. The patient's health had been very good until August 1923 when he had a seizure. He lost the power of his limbs and was unable to speak. This cleared up after a few days and he appeared fairly well again and resumed work though he has been somewhat more irritable since. He denied ever having had any venereal disease. None of his relatives had suffered from any form of nervous or mental disorder.

His wife dated the onset of his present illness to three months ago when she noticed that he was becoming very forgetful. He had difficulty in speaking and his speech was very indistinct. At the same time he became dull and displayed less interest in things. Frequently he would have fits of crying which would last a short period and then he would be quite happy again.

He was very reluctant to enter hospital as he saw no need for it. He was rather euphoric and apart from a few aches he felt perfectly well. His attention was difficult to retain and he was very garrulous. During the conversation he started weeping but within a short period he was smiling again. He had no insight whatever. His memory for recent events was impaired but not quite so markedly as that for remote events which was very poor. He failed on simple calculations and made many gross errors in attempting to take seven serially from one hundred. His general physical condition was not very good. He showed tremors of hands and tongue. His writing was very tremulous and his speech distinctly slurred. There was no evidence of any sensory abnormality. His gait was steady and there was no Rombergism.

He had small unequal pupils. The left did not react to light, whereas the right reacted somewhat sluggishly. Both reacted on accommodation. His deep reflexes were normal. The serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	100 per cmm
	Protein	200 mg %
	Lange	5555543210

He received eight injections of two grammes of tryparsamide at weekly intervals.

After a few days in hospital he gave in his notice of discharge and would not withdraw it. Consequently he had to leave but was treated as an out-patient. At the end of his series of injections he was able to resume work. He was still very garrulous and mildly euphoric. His memory was still impaired and he had little insight. The physical signs were unchanged. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 $\frac{1}{2}$
	Cells	100 per cmm
	Protein	200 mg %
	Lange	555554321

7.4.25. Since last note he had been able to continue at work, today he began a second series of eight injections which were completed on 9.6.25. He was then more settled and talked more rationally. His attention did not fluctuate so markedly and he was much more stable emotionally. His memory still remained impaired. There was no change in his physical signs.

1.9.25 He attended the out-patient department today to enquire if he could continue treatment. He had been feeling quite well and was working regularly. Arrangements were made for him to have a further series of injections prior to which he was to come into hospital for one night to have his cerebro-spinal fluid re-examined but he failed to return. A specimen of blood was taken and his W.R. was + 40 +.

No reply was obtained to any enquiry sent so the

Protein

social service worker visited his home on 1.10.28. His wife then reported he had been working regularly since 1926 prior to which his work was spasmodic. His health had been good and he was good tempered with his own family but sometimes became very irritable and was easily upset by the children of the neighbours. Arrangements were made for him to attend on a Saturday evening as he desired not to interrupt his work during the week.

When seen on 13.10.28 he was quite bright and cheerful. He gave a good account of his activities since he last attended here. There was no evidence of delusional ideas but he was rather facile. His memory was fairly good and he was correctly oriented in all spheres. His physical condition was fairly good. He still showed slight tremors of hands and tongue. There was no sensory impairment and his gait was steady. He had unequal pupils which did not react to light and their reaction on accommodation was very sluggish. The deep reflexes were present equal and active. The superficial reflexes were normal. His speech was quite good and he managed the test phrases easily. The serological findings on 13.10.28 were :

Blood	W.R.	+ 20 +
C.S.F.	W.R.	+ 40 +
	Cells	20 per cmm
	Protein	90 mg %
	Lange	555543210

He was advised to continue treatment which he agreed to do and he attended regularly on Saturday evenings for injection when he received three grammes of tryparsamide intravenously. On 2.2.29 he had received twelve injections and he was admitted for one night that his blood and cerebro-spinal fluid might be re-examined. His clinical improvement had been maintained and he was working regularly. The serological findings were (9.2.29).

Blood	W.R.	+ 13
C.S.F.	W.R.	+ 4 +
	Cells	4 per cmm
	Protein	35 mg %
	Lange	3332211000

In an attempt to render negative these findings he was advised to continue treatment. Since then he has attended at irregular intervals especially during the summer months and he has received twelve additional injections.

He has been working quite regularly now since 1926 and has earned about £2.15.0 per week. His wife reported he seemed distinctly better and the only complaint she could make was that at times he was rather easily upset and became very irritable. He was quite bright and cheerful but somewhat facile and accepted things as they came along. He conversed rationally and intelligently though he became rather evasive when his former condition was spoken of. He showed no evidence of delusional ideas and was fairly stable emotionally. His memory was quite good and his grasp of general knowledge and current events was average for his social class. According to the Binet Simon tests he had a mental age of eleven years and five months. His physical condition was quite good and no tremors of hands or tongue were made out. His pupils were still unequal and Argyll Robertson in type. Their reaction on accommodation was still very sluggish. His deep superficial reflexes were brisk and normal in their response. His speech was quite good and he managed the test phrases easily. Unfortunately owing to the extra work at this time of the year he has had to work late every night and it has been impossible to re-examine his blood and cerebro spinal fluid. This will be done as early as possible.

Comment: A case of general paralysis of the simple type whose mental symptoms had been present for at least three months prior to treatment. He received the equivalent of thirty five injections of three grammes of tryparsamide and showed marked clinical and serological improvement. He has been included in the group enjoying good remissions.

Case 9. S.M. Admitted 12.1.25 Occupation Baker Age 47.

Patient had been married twenty one years and had two children alive and well. He had been addicted to alcohol all his life. In one of these bouts thirteen years ago he acquired syphilis and his wife was unaware of him ever having received any treatment. His health otherwise had been very good. None of his relatives have suffered from nervous or mental disorder.

During a severe thunderstorm five months ago in which he was scared rather badly he became unable to speak and seemed to have great difficulty in swallowing. These symptoms cleared up after a few days but he thereafter became very forgetful. The following month he was discharged from his work owing to his forgetfulness, forgetting to remove the bread from the oven till it was totally burned. He became very irritable at home and began to show peculiarities in his behaviour. While in the midst of a meal he would suddenly stop eating, get up and begin to clear the things away. He became bombastic and got into trouble through travelling on conveyances without paying his fare.

On admission he was overactive and very garrulous. He talked at length of his abilities and displayed an excessive degree of self-satisfaction. He declared that he felt quite fit and never felt better in his life. He resisted being kept in bed. His memory for recent and remote events was distinctly impaired and he failed on simple arithmetic. He had no insight whatever. Physically he was thin and undernourished. He showed coarse tremors of the tongue and hands. No sensory abnormality was made out. His gait was steady and there was no Rombergism. His speech was very slurred. His pupils were unequal and reacted very sluggishly to light.

His deep reflexes were all present and equal. The abdominal and plantar reflexes gave a normal response. The serological findings were :

Blood W.R. + 40 +
C.S.F. W.R. + 40 +
Cells 200 per cmm
Protein 200 mg %
Lange 555555421

He received two series of eight intravenous injections of tryparsamide in two gramme doses administered at weekly intervals.

During his stay here he became less active but remained very garrulous and euphoric. He talked at length to the other patients of his powers but he developed into a willing worker in the ward. His memory and physical signs were unchanged. He was discharged on 9.5.25. His serological findings then were :

Blood W.R. † 20 +
C.S.F. W.R. + 20 +
Cells 100 per cmm
Protein 200 mg %
Lange 5544321000

Nothing was heard of him after his discharge until 2.5.27. His wife then gave the following account of him. Six months after leaving here he started work and had been employed since. He behaved quite rationally but "was a terrible talker". On examination he was still somewhat euphoric and very garrulous. He remembered quite well his stay here and declared he was then very ill but was now perfectly fit. His memory was still somewhat impaired but he was clearly oriented in all spheres. His physical findings showed no change.

He was given a third series of intravenous injections of tryparsamide. On this occasion he received fourteen injections of three grammes. At the end of these his serological reactions were as follows :

Blood W.R. negative
C.S.F. W.R. + 8
Cells +
Protein ++
Lange negative (slight change in first 6 tubes)

6.10.28 Since last examination he had continued at work as a baker and apparently carried it out satisfactorily. He was still garrulous and mildly euphoric. His memory showed some improvement. His serological reactions were :

Blood	W.R.	negative.
C.S.F.	W.R.	+ 4 +
	Cells	nil.
	Protein	30 mg %
	Lange	negative.

He has since remained under treatment receiving three gramme doses at weekly intervals. His blood and cerebro-spinal fluid were examined on 9.2.29 when he had had thirteen injections in this series. The results were

Blood	W.R.	negative
C.S.F.	W.R.	+ 4
	Cells	nil.
	Protein	25 mg %
	Lange	negative

The injections were continued without interruption in an effort to render negative the abnormal serological findings.

Since then he has had twenty two further injections of three grammes. These were completed on 5.10.29 when his blood and cerebro-spinal fluid were again examined and the results were :

Blood	W.R.	negative
C.S.F.	W.R.	negative
	cells	4 per cmm
	protein	25 mg %
	Lange	negative.

In view of these findings the injections were discontinued. He was re-admitted two months later for re-examination.

Present condition : He had been regularly employed as a baker for the past four years and earned £3 per week. He had in that period changed his job after about a year usually to better his position and he was then in charge of the bakeshop. He was still very garrulous and mildly euphoric; declared he felt fine, lovely, and never felt better. His memory was still

somewhat impaired. He gave the date of the end of the war as 1924 but remembered when he came here and how long he remained in hospital. He was correctly oriented in all spheres. His degree of general knowledge was poor. On the Binet Simon tests he attained a mental age of nine years. Physically he was undernourished. He showed no tremors of tongue or hands. His gait was steady and there was no Rombergism. His pupils were still unequal the left being greater than the right, but they reacted to light and accommodation. His deep and superficial reflexes gave normal responses. His speech was still distinctly slurred.

Comparing these physical signs with those on admission one notes the absence now of tremors and the fact that the pupils reacted normally to light, whereas previously their reaction to light was sluggish.

His serological findings on 10.12.29 were :

Blood	W.R.	negative
C.S.F.	W.R.	negative
	cells	4 per cmm
	Protein	25 mg %
	Lange	negative.

Comment : A case of general paralysis of the euphoric grandiose type whose mental symptoms had been present at least five months prior to treatment. He received the equivalent of sixty injections of three grammes of tryparsamide and showed both clinical and serological improvement. He has been included in the group of those enjoying a good remission.

Case 10. G.G.C. Admitted 16.2.25 Occupation Baker. Age 34.

Patient had been married fourteen years and had five children alive and well. His wife had had no other pregnancies. He had always enjoyed good health and his wife was unaware of him having had any illness. He denied ever having had any venereal disease or of having exposed himself to such infection. There was no history of any of his relatives having suffered from nervous or mental disorder.

His present illness began about three months ago when he complained of feeling ill and had to give up work. For some time before this he had been losing weight and had become more irritable. After giving up his work in December 1924 he became very dull and took no interest in anything. He sat about the house all day and his behaviour at times was said to have been very childish. No improvement was noted after a holiday in the country so he was sent here.

On admission he was dull and apathetic. His replies to questions were as short as possible, but he did not show any evidence of delusions or hallucinations. He was unable to give any account of his illness, and he had no insight into his present condition. His memory for both recent and remote events was markedly impaired. Simple arithmetical calculations he failed to do, and he was quite unable to take seven serially from one hundred. His general physical condition was poor. He showed marked tremors of hands and tongue. There was no evidence of any impairment of cutaneous sensibility but there appeared to be a loss of deep muscle sensibility in his legs. His gait was steady there was no Rombergism. His speech was slurred and he failed on the test phrases. He had unequal irregular Argyll Robertson pupils. The deep reflexes were present, equal and active, and the superficial reflexes gave a

normal response. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 8 +
	Cells	80 per cmm
	Protein	125 mg %
	Lange	5555543220

He received weekly injections of tryparsamide 2 grammes being given intravenously. These he received as an out-patient; after eight injections had been given he was re-admitted for examination of his blood and cerebro-spinal fluid. His wife reported that he was improving and took more interest in things though he still remained at times very childish. On examination he was more active and talked more freely. He stated he felt very well and there was nothing the matter with him at all. His memory was still somewhat impaired though better than when first examined and he was now correctly oriented. He still failed to do simple arithmetic. There was no change in his physical signs. The serological reactions were :-

16.4.25	Blood	W.R.	+ 40 +
	C,S.F.	W.R.	+ 8 +
		Cells	15 per cmm
		Protein	80 mg %
		Lange	5533110000

The injections were discontinued for 2 months and he then had a further series of eight. These were completed on 27.7.25 and he was readmitted for one night for serological examination. His condition then continued to improve and he was much more alert mentally. He could give a fairly clear account of himself, and his memory was much improved. His general physical health was better. He still showed lingual and digital tremors. No sensory abnormality was noted. His gait was steady and there was no Rombergism. His speech was much improved and he managed the test phrases fairly well. He had unequal irregular Argyll Robertson pupils. The deep and superficial reflexes were normal.

The serological findings were :

5.8.25	Blood	W.R.	+ 40 +
	C.S.F.	W.R.	+ 8 +
		Cells	5 per cmm
		Protein	45 mg %
		Lange	2223331100

Nothing further was heard from him until 8.12.26 when in reply to an enquiry he stated that he was now much better. He had been working since December 1925 and felt quite well. He was requested to attend the out-patient department but he did not come.

Periodic enquiries were sent during 1927 and 1928 to which he replied that his improvement had been maintained and he was working regularly but he did not desire to visit the hospital. In February 1929 he replied that he was still well and working and agreed to come for examination. An appointment was made but he failed to keep it. In November 1929 the social worker visited his home. His wife stated he had remained very well since he received treatment at the hospital and that he had been employed regularly since December 1925. In February 1928 he changed his job having worked in the same bakehouse for thirteen years. He then took over the foreman's job in his present bakehouse and was earning £4 per week. He had no trouble or difficulty with his work. He had intended coming to the hospital but always put it off. She thought he might be persuaded to come along. To her he seemed normal. As a result of this visit he attended on 12.12.29. He was bright and cheerful but not unduly self satisfied. He was grateful for what had been done for him but his insight was only partial. He conversed rationally and intelligently and there was no evidence of delusional ideas. As to his activities since the last time he was here he gave a good account. His memory for both recent and remote events was good and he was correctly oriented in all spheres. His grasp of general information and of current events was not very high but probably adequate considering his social class.

Simple calculations he did successfully but he made many gross errors in taking seven serially from one hundred and did not appreciate his mistakes. His general physical condition was not good. He showed tremors of his tongue but none of his hands. There was no sensory abnormality. His gait was steady and Romberg's sign was negative. The pupils were unequal, regular and Argyll Robertson in type. The deep reflexes were present, equal and active. His superficial reflexes were normal. His speech was somewhat slow and deliberate but he managed successfully the text phrases. Arrangements were made for him to come into hospital for one night that his blood and cerebro-spinal fluid might be re-examined, but he did not return.

Comment : A case of general paralysis of the simple type whose mental symptoms had been present at least three months prior to treatment. He received twenty four injections of two grammes of tryparsamide after which he showed clinical and serological improvement. He has been working successfully for four years. He has been included in the group of patients enjoying a good remission.

Case 11. J.B. Admitted 8.7.25 Occupation Tailor. Age 43.

Patient had been married fifteen years and had three children alive and well. As far as his wife knew he had always enjoyed good health and had had no illnesses. He admitted having contracted gonorrhoea when he was twenty years of age. He was unaware of ever having had syphilis although he had frequently exposed himself to infection. A sister had suffered from an attack of depression several years ago from which she made a good recovery. The family history was otherwise negative.

His present illness began about six months ago though for some time previously his wife noticed that he was becoming very irritable. The onset of his present condition the wife attributed to a severe attack of morbidity which he had in January of this year. Thereafter he seemed to become very forgetful and could not get on with his work. His symptoms had gradually become more marked. Formerly a good tailor he had changed so that prior to coming here he was quite unreliable and did his work anyhow. A few days previously he sewed a sleeve on to the bottom of a coat. He was very forgetful and wandered about aimlessly. Although these features had been quite marked for some time no advice was sought until he became rather suspicious of his wife's fidelity.

On admission he was rather elated and euphoric. He expressed rather grandiose ideas as to his wealth, that he would never want, and that he was about to order a new motor car. His family he declared were all well off and had plenty of money. He was somewhat suspicious of his wife and suspected her of having affairs with other men. In the matter of dress and personal appearance he was indifferent and would frequently

put his coat on, outside in. His memory for recent and remote events was very poor and he was disoriented for time and place. His attention was very difficult to retain and he was emotionally unstable. At one time he would dance round the room to the gramophone, then sit down and dissolve into tears. His general physical condition was not very good. There were marked tremors of face, hands and tongue. No sensory abnormality was made out. His gait was steady and there was no Rombergism. He had small, equal Argyll Robertson pupils. The deep reflexes were present, equal and active. His superficial reflexes were normal. His speech was markedly slurred and he failed on the test phrases. The serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	100 per c.mm
	Protein	130 mg.%
	Lange	5555444321

He received eight intravenous injections of two grammes of tryparsamide at weekly intervals. Thereafter he appeared to show slight improvement. He was still fatuous but his behaviour was more rational and he got on quite well when out on pass at the week-end. His memory was still distinctly impaired and there was marked intellectual deterioration. Emotionally he was more stable and his physical state also showed improvement. It was considered he might be able to get on at home and arrangements were made for him to receive treatment as an out-patient. His wife, however, was most uncooperative. There was no change in his physical signs. He was discharged on 10.11.25. The serological findings after treatment were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	100 per c.mm
	Protein	125 mg.%
	Lange	5555554321

Nothing further was heard of him till 24.11.26 when

in reply to an enquiry his wife stated he was still at home. His condition showed very little change and he was unable to do any regular active work. He was advised to attend for further treatment but this he was unwilling to do.

In reply to an enquiry in June 1927 it was ascertained that his condition remained unchanged. He was dull, very irritable and unable to do any work. He refused to attend hospital or have any further treatment whatever.

Several enquiries were sent to his wife but these she did not acknowledge and so the social worker visited the home in November 1929. The wife then stated that her husband's condition remained the same as when he was discharged from the hospital. He was on the whole morbid and gloomy. At times he was very irritable and was difficult to live with. His memory was said to be very poor and this increased his irritability. There appeared, however, to be some improvement in his condition as he had been engaged as a tailor for the past two years. She stated that he was employed by a friend and that he was not paid very much but she was told by his employer that he was pulling his weight. His appetite was good and he slept well. He had improved physically. An effort was made to get him to come to hospital but this failed. The wife stated he was very bitter against doctors and he must on no account learn of the information she had given. On a recent occasion he had had a bad cold but emphatically refused medical aid. She concluded her information with the remark that probably he was a little better.

Comment. A case of general paralysis of the euphoric paranoid type whose mental symptoms had been present for six months prior to treatment. He received eight injections of two grammes of tryparsamide and has since made a partial improvement.

Case 12. J.M. Admitted 17.2.26 Occupation Clergyman. Age 63.

Patient met during the war a woman of doubtful virtue. With the idea of reforming her he married her in 1916 and shortly thereafter contracted syphilis. He attended one of the voluntary hospitals and received treatment by injection for over one year. At the end of that period he was told he was clear of infection. An effort was made to find out what treatment he had received but apparently no detailed records were available for the war period. His health otherwise had been very good and he had had no serious illnesses. There was no history of any of his relatives having suffered from nervous or mental trouble.

His present illness began about six months ago. His colleagues noticed that he was becoming very garrulous and would make statements showing little thought or judgement. Within the past three months he had become very forgetful and frequently turned up late for church. Four weeks ago he was found wandering about in a very confused state when he should have been conducting a service. This confused state persisted for two days and then passed off. Thereafter he became more garrulous and began to squander his money ordering articles which he could not afford.

On admission he was very garrulous and euphoric. He showed great lack of judgement and used words in the wrong place. There was an absence of appreciation of the true state of his income and a tendency to grandiose ideas. He was very unstable emotionally and his mood fluctuated rapidly. His memory for both recent and remote events was much impaired and he was unable to perform simple arithmetical calculations. He made many gross errors in taking seven serially from one hundred and quite unable to appreciate these mistakes. His general physical condition was not very good. He showed tremors

of his tongue and hands. There was no sensory abnormality. His gait was steady but he showed slight Rombergism. His speech was distinctly slurred and he failed on the test phrases. He had unequal pupils which reacted very sluggishly to light whereas their reaction on accommodation was quite brisk. The deep reflexes were present, equal and brisk. The left abdominal reflex was absent. The left plantar gave a doubtful extensor response. The right abdominal and plantar reflexes were normal. His serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 20 +
	Cells	80 per cmm
	Protein	125 mg %
	Lange	5555443221

He received eight intravenous injections of two grammes of tryparsamide at weekly intervals.

He remained very garrulous and frequently used long words in their wrong setting. He was euphoric and somewhat childish in his manner and behaviour. In his personal appearance he was quite indifferent. His memory remained distinctly impaired. There was no change in his physical signs except that his speech seemed more slurred. He was discharged on 7.4.26 - condition not improved.

Thereafter nothing was heard of him till 16.5.27 when in reply to an enquiry he attended the out-patient department. His condition then showed some improvement in that he was less euphoric but he remained very garrulous. He had not done any active work since leaving hospital. His memory was still markedly impaired and he was then regretting having paid his wireless license twice. The physical signs were unchanged. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	35 per cmm
	Protein	70 mg %
	Lange	5443330000

He was advised to continue treatment and he attended

at weekly intervals when he received three grammes of tryparsamide. On 17.9.27 he had received an additional twelve injections. He was then feeling better and had resumed part time clerical work. He was still very garrulous and mildly euphoric but there was no evidence of delusional ideas. His memory remained impaired but he was correctly oriented. Simple calculations he could do but he made several errors in taking seven serially from one hundred. His physical state was distinctly better. He still showed tremors of his hands and tongue. There was no sensory abnormality. His gait was steady and there was no Rombergism. His speech was much clearer and he managed the test phrases. His pupils were unequal and very sluggish in their reaction to light. The deep reflexes were present, equal and reacted briskly. The superficial reflexes were normal.

In reply to a further enquiry he attended here on 4.10.28. He had not received any treatment since the previous examination here. He was still very garrulous and rather facile but had been able to continue at his part time clerical work. His memory showed some improvement but otherwise there was little change. The physical signs showed no change. His serological findings on 4.10.28 were :

Blood W.R. + 40 +
C.S.F. W.R. + 8 +
Cells 10 per cmm
Protein 40 mg %
Lange negative.

He was advised to continue treatment and he agreed to attend weekly for injections. On 18.1.29 he had received thirteen injections of three grammes of tryparsamide and his blood and cerebro-spinal fluid were re-examined. The findings were :

Blood W.R. + 40 +
C.S.F. W.R. + 4 +
Cells 20 per cmm. (blood present)
Protein 65 mg %
Lange 0012211000

Treatment was continued and on 24.5.29 he had received a further fourteen injections. The serological findings then were :

Blood.	W.R.	+ 40 +	
C.S.F.	W.R.	+ 4 +	
	Cells	15 per cmm	(trace of blood)
	Protein	45 mg %	
	Lange	0011221100	

He desired to have a rest during the summer months and so the injections were discontinued. On 19. 9.29 he attended again in reply to an enquiry and his clinical improvement was maintained. The serological findings then were.

Blood	W.R.	+ 40
C,S.F.	W.R.	+ 3
	Cells	2 per cmm
	Protein	30 mg %
	Lange	negative

With the idea of rendering negative the abnormal serological findings he was advised to continue treatment and he has just completed a further twelve injections and was admitted to hospital for one night for re-examination. He was distinctly better and was still engaged in his part time work. He remained, however, rather facile and contented with his lot. He was very garrulous but his conversation was rational and intelligent though he was inclined to reiterate the same statements. There was no evidence of delusional ideas. The grasp of general knowledge was not quite what one would expect from a man of his position. His memory was still distinctly impaired more especially for remote than recent events. On the Binet Simon tests he attained a mental age of fourteen years and eight months. Simple calculations and the taking of seven serially from one hundred he did successfully. His general bodily health was good, though he was inclined to complain of aches and pains. He still showed facial tremors but his lingual and digital tremors had ceased. There was no sensory abnormality. His gait was steady and Rombergism

was negative. His speech was clear and he managed the test phrases easily. He had unequal Argyll Robertson pupils. The deep reflexes were present, equal and active. The abdominal and plantar reflexes were normal. His serological findings on 20.12.28 were:

Blood	W.R.	+ 20 +
C.S.F.	W.R.	+ 4 +
	Cells.	4 per c.mm.
	Protein	35 mg.%
	Lange.	1123211000

Comment : A case of general paralysis of the mildly euphoric type whose mental symptoms had been present at least six months before treatment. He received the equivalent of fifty-six injections of three grammes of tryparsamide and showed both clinical and serological improvement. He was included in the partially remitted group.

Case 13. D.A.N. Admitted 3.3.27 Occupation Tailor. Age 28.

Patient had been married five years and had one child aged nine months alive and well. His wife had one pregnancy prior to this which ended in a miscarriage. Apart from an attack of acute rheumatism in 1918 his health had always been good and his wife was not aware of him having had any other illnesses. He contracted syphilis during his period of service in the Army ten years ago.

His relatives denied any history of nervous or mental disorder in the family.

He appeared to have been fairly well till four months ago when he was dismissed from his job as his work was unsatisfactory. He was very irritable and complained of general weakness which resulted in him being admitted to the local infirmary where he remained until Christmas 1926. He had since become indifferent, garrulous and very childish in manner and behaviour.

On admission he was mildly euphoric and somewhat overactive. He had come here on the advice of others but did not know why he should be in hospital. His replies to questions were childish and fatuous and he was quite unable to give an account of his recent activities. His memory for both recent and remote events was impaired but he was correctly oriented. He was unable to do simple arithmetical calculations. He stated he had been married six years, he knew the present year was 1927 but he was unable to tell me in what year he was married. His physical state was not very good. He showed tremors of hands and tongue. There was no sensory abnormality and his gait was steady. His pupils were equal and Argyll Robertson in type. The deep reflexes were present and active. The superficial reflexes gave normal responses. His speech was markedly slurred and he failed on test phrases.

The serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 8 +
	Cells	90 per cmm
	Protein	125 mg %
	Lange	555555421

He received intramuscular injections of tryparsamide twice weekly, two grammes being given in each dose. His first course was completed on 17.5.27 when he had had twenty injections

He remained very childish and was easily pleased. He always declared he felt quite well and was at times rather dictatorial towards the other patients who resented this and quarrels tended to occur. His habits were dirty and he took little interest in his personal appearance. His physical signs remained unchanged. The serological reactions after his first course of treatment were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 20
	Cells	30 per cmm
	Protein	80 mg %
	Lange	5554321000

On 20.8.27 he was discharged as an in-patient. His condition then showed distinct improvement. Though still mildly overactive and self satisfied he was less childish in his behaviour. He worked willingly in the ward and he was anxious to resume his work outside. There was no evidence of delusional or hallucinatory ideas. His memory was somewhat impaired and he was well oriented. The physical signs showed no change.

A second course of tryparsamide was commenced on 6.9.27 and he agreed to attend regularly for injections. At first he came every week, then he only attended at very irregular intervals. He started work just after his discharge from here and did it satisfactorily till about Xmas when he found the extra work a great tax on him and he ceased to attend for treatment. Nothing further was heard of him till 19.4.28 when he was brought here by his wife. She stated that within

the past month he had become worse and was again very childish and bombastic. He was unable to stay at home as he quarrelled with everyone. He was, therefore, readmitted on that date.

On admission he was distinctly euphoric and boasted of his abilities and the amount of work he could do. There was marked intellectual impairment and he had no insight into his condition. His memory was poor but he was correctly oriented. Simple arithmetical calculations he could not perform. His grasp of current events was very poor and in his outlook he was very childish. Physical examination still showed distinct tremor of hands and tongue, equal Argyll Robertson pupils, overactive deep reflexes and very slurred speech. His relatives refused permission to treat him with malaria so the injections were continued and he received three grammes intravenously once a week.

By 27.6.28 he had received in his second course the equivalent of nineteen injections of three grammes.

His mental and physical state at that time were unchanged. He was self satisfied, childish and quite devoid of insight. He was quite pleased with his abilities and declared he felt very well but he did not express any delusions of grandeur nor was there any evidence of hallucinations. His habits at times were faulty. His memory was very poor. As he gave in his notice of discharge and refused to withdraw this he had to be discharged. His wife was advised to place him in the infirmary. This his relatives were unwilling to do.

Nothing further was heard of him till 11.10.28 when in response to an enquiry he attended the out-patient department. His condition then showed little change either mentally or physically. He was still mildly euphoric and very garrulous. In his outlook he remained childish and insight was completely lacking. His physical signs were unchanged.

The serological reactions then were :

Blood W.R.	+ 40 +
C.S.F. W.R.	+ 3
Cells	10 per cmm
Protein	40 mg %
Lange	5443211000

Treatment as an outpatient was offered to him provided he would attend regularly. This he agreed to do and he has received weekly injections intravenously of three grammes of tryparsamide.

On 24.7.29 he had received in this series thirtyone injection of three grammes.

His wife reported that she thought he was better though he still remained irritable at times. He had been able to work periodically and has been offered a job as a tailor but this he refused to do. On examination his condition showed some improvement. He was still very garrulous but appeared less euphoric than formerly. When questioned as to why he was not working he replied that he would not return to the tailoring trade as that was the cause of his illness. In any case, he stated, he could get more from the Jewish Society and the unemployment bureau than he could make as a tailor. This, on investigation, appeared to be quite true. There was no evidence of delusional ideas. His memory had improved also and he was correctly oriented. His outlook was still rather childish but in my opinion he could have been working regularly. The tremors of his hands and tongue were now absent. His pupils were equal and Argyll Robertson in type. The deep reflexes were still somewhat exaggerated but were equal on both sides. The superficial reflexes gave a normal response. His speech was much more distinct than formerly though there was still a tendency to run syllables together and he had difficulty with test phrases. The serological reactions were :

Blood	W.R.	+ 13
C.S.F.	W.R.	negative
	Cells	6 per cmm
	Protein	45 mg %
	Lange	4321110000

In an effort to render negative these serological findings he was advised to continue treatment and he has since received a further nineteen intravenous injections each of three grammes.

Present condition : His wife reported that he was unable to retain a job and that he was very irritable and frequently they came to blows. On examination he was very garrulous and showed evidence of considerable deterioration. His general outlook was childish and he was contented with his lot. When spoken to about working he refused to go back to tailoring and appreciated that he could get from insurance and poor relief as much as he would receive were he working. He always stated he was going to find other work but never did so. He was mildly euphoric and distinctly overactive. There was no evidence of delusional ideas. His grasp of general knowledge and current events was very poor. His memory for both recent and remote events remained impaired but he was correctly oriented. Simple calculations he could not perform and he failed to take seven serially from one hundred. According to the Binet Simon tests he had a mental age of eight years. His general physical condition had improved. He showed no tremors of tongue or hands. His gait was steady and Romberg's sign was negative. His pupils were unequal regular in outline and did not react to light or accommodation. The deep reflexes were present equal and active. The superficial reflexes were normal. His speech remained slurred and he failed on the test phrases. The serological findings were :

Blood	W.R.	+ 20
C.S.F.	W.R.	negative
	Cells	2 per c.mm.
	Protein	20 mg.%
	Lange	negative.

Comment : A case of general paralysis of the euphoric type whose symptoms had been present four months prior to treatment.

He has had the equivalent of eighty two injections of three grammes of tryparsamide. His condition showed clinical and serological improvement, the latter being more marked than the former. He has been included in the partially remitted group.

Case 14. Mrs.R. Admitted 4.4.27 Occupation Manageress. Age 39.

Patient had been married twelve years and had one son aged eleven years alive and well. She married her husband ten years ago when he was a university student and immediately thereafter contracted syphilis from him. He died two years later from tuberculosis. Apart from an operation for appendicitis she has enjoyed very good health and so far as could be ascertained neither she nor her relatives have ever suffered from any nervous or mental disorder. Since her husband's death she has been employed as a manageress in a business warehouse and was considered exceptionally competent.

Her present illness began about three months ago following upon the death of her mother. The patient since has become dull and depressed. As she was not improving at home she was admitted to a nursing home two weeks ago. There she began to behave peculiarly. She seemed to have lost all sense of decency. Her habits were faulty and she would eat her food with her fingers apparently oblivious to the abnormality of her conduct.

On admission here she was dull and disinterested and showed a considerable degree of confusion. She seemed to have vague fears of something but would not express what they

were. She was very restless and completely disoriented. Her memory for both recent and remote events was considerably impaired. Her physical state was not good and she was undernourished. There was no evidence of sensory impairment and her gait was steady. She had unequal irregular pupils which did not react to light and only sluggishly on accommodation. Her deep reflexes and superficial reflexes were normal. Her speech was slow and deliberate but she managed the test phrases fairly well. The serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	50 per cmm
	Protein	125 mg %
	Lange	555543211

She received twice weekly an intramuscular injection of two grammes of tryparsamide.

Within a week of her admission she became more or less inaccessible. She suffered from retention of urine, and stated she was holding it voluntarily but would give no reason for so doing. She remained dull and showed no interest in her surroundings. She appeared to be hallucinated and would carry on conversations with imaginary people. Frequently she would endeavour to carry out the commands of these voices.

The first course of tryparsamide was completed on 30.6.27 when she had received fifteen injections of two grammes. One of these into her buttock unfortunately formed a localised abscess and had to be drained. The serological findings then were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 4 +
	Cells	10 per cmm
	Protein	75 mg %
	Lange	5555432100

In July 1927 she began to improve and was more cheerful. She was no longer hallucinated but was still rather restless at times. Thereafter she passed into a state of euphoria. She was elated and declared there was nothing the matter with her. She became very extravagant, a state

which, according to her relatives, was quite foreign to her usual disposition. She declared she had plenty of money and formulated great schemes whereby she would increase her fortune. She wrote letters ordering all sorts of things to be sent to the hospital which had later to be cancelled. Her emotional state was very unstable, within a few minutes of being happy and cheerful she would dissolve into tears. Insight was completely lacking.

She remained excitable and her mood fluctuated easily from being happy and elated to weeping copiously. Her tears, however, could be rapidly changed to smiles again. She persisted in her extravagant schemes and frequently upset the other patients with her wild talk. She attributed the onset of her illness to the fact that, as she declared, she was not allowed to go to the lavatory when she came here, and this had a permanent effect on her. A second course of tryparsamide had been started and she had received six injections of two grammes when she gave in her notice of discharge and had to leave the hospital. Her relatives were loath to have her certified and were going to make arrangements for her supervision at home. Until such arrangements could be made she was admitted to the local infirmary. She had then received altogether twenty one injections of two grammes of tryparsamide. She was discharged on 29.10.27.

Several enquiries were sent to the patient and her relatives but none were acknowledged and nothing further was heard of her until November 1929 when a social worker paid a visit to her sister. She found the sister rather unwilling to give much information about the patient. No reply to my enquiries had been sent because the patient was now so well. Apparently she remained in the infirmary for two weeks and

arrangements were made for her to go with friends in the country. Thereafter she steadily improved. She became more rational in her behaviour and ceased to talk about her great schemes. She improved sufficiently to resume her work and for the past nine months she has acted in the same capacity as before her illness. When visited she was out of work but the sister said she had left to take up a better position in the New Year. Her memory was said to be good, and she showed an active interest in everyday life. As far as her relatives could see she was normal. Unfortunately her relatives stated she was in the country and so could not be got to attend here for examination.

Comment : A case of general paralysis of the euphoric type whose mental symptoms had been present at least three months prior to treatment. She received twenty-one injections of two grammes of tryparsamide after which she showed slight serological but no clinical improvement when discharged from here. She has since improved and has been working efficiently. She has been included in the group of patients enjoying a good remission.

Case 15. E.T. Admitted 9.5.27. Occupation Carman Age 48.

Patient was unmarried and since the war had been employed as a carman. Prior to that he served in the Navy and subsequently in the Army. He saw service in the South African and the Great War. When seventeen years of age he contracted syphilis and he stated he took medicine thereafter three times a day for about eighteen months. He never received any injections. Apart from an attack of enteric fever when nineteen years old his health had always been good. There was no history of nervous or mental disorder in the family.

According to his brother he had been changing in manner for a long time, the chief feature of which was irritability. Two years ago he suddenly became very confused and remained dull for a few weeks. He appeared to get alright again till twelve months ago when the conductor with whom he worked committed suicide. This upset him at the time but he was able to continue at work. During the past six months he had gradually become more dull and disinterested. He was able to remain at work however till four weeks ago. He became forgetful and wandered away from home, being found two days later by the police in Kent. He was then taken to the infirmary and later transferred here.

On admission he was fatuous and rather childish. He liked the hospital, the staff, the food and everything. He was mildly euphoric and believed he was one of the best, if not quite the best, carman in the world. His memory for remote events was fairly good but that for recent events was considerably impaired. He was fairly well oriented. Simple arithmetical calculations he could not do and his grasp of

current events and general information was poor. His physical state was fairly good though he appeared older than his years. He showed distinct tremors of hands and tongue. There was no sensory abnormality. His gait was steady and Romberg's sign was negative. His speech was fairly good but he had difficulty in repeating the test phrases. He had unequal, Argyll Robertson pupils. The deep and superficial reflexes were present, equal and very active. His serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 20 +
	Cells	50 per c.mm
	Protein	90 mg.%
	Lange	555554400

He received while in the hospital twelve intramuscular injections of two grammes of tryparsamide. Thereafter he became more active and cheerful and he was discharged to the care of his brother on 30.7.27. He attended here once a week and he received six injections of four grammes intramuscularly. Unfortunately one of these, the last of his first course, did not absorb and formed an abscess which had to be drained and for which he had to be re-admitted to hospital.

His mental condition then was improving. His brother reported that he was much less irritable and showed a greater interest in things. He was not doing any work. On examination he seemed more settled and conversed more rationally and coherently. He did not express any delusional ideas and his grasp of current events was better. He was correctly oriented but his memory for recent events was distinctly impaired whereas that for remote events was fairly good. There was no change in his physical signs. He was discharged again on 15.10.27 his abscess having healed.

He reported in the out-patient department on 25.1.28. The brother then stated he was much better and was behaving

normally. He assisted in the brother's business and did light work. Occasionally if crossed he would get somewhat irritable but that was only momentary. On examination he appeared much better and could converse rationally and intelligently. There was no evidence of delusional ideas. His memory for recent events was still somewhat impaired. He did better on simple arithmetic but failed to take serial sevens from one hundred. He showed no change in his physical signs. The serological reactions then were :

Blood	W.R.	+ 20
C.S.F.	W.R.	+ 8
	Cells	9 per c.mm.
	Protein	75 mg. %
	Lange	555543210

He was advised to have further treatment but this he was unwilling to do and nothing further was heard of him until November 1929 when in reply to an enquiry his brother stated that his improvement had been maintained. He had done no regular work but assisted the brother at times in his business. He showed a greater interest in things but remained rather irritable and was easily upset. An effort was made to get him to attend here for examination which he did on 13.12.29. He was still somewhat self satisfied and rather childish. His replies to questions were rational and were accompanied by a fatuous smile. He stated he felt quite well and never felt better in his life. There was no evidence of delusional ideas. He stated he was working regularly assisting his brother in business but apparently this was not so, his work being only very spasmodic. His memory was still impaired for both recent and remote events and he could only give approximate dates. He was correctly oriented in all spheres. Calculations involving continued attention he could not do, and he failed completely to take seven serially from one hundred. His grasp of general

information and of current events was poor. His general physical condition was good and he had put on weight. He showed tremors of tongue and hands. No sensory abnormality was made out. His gait was steady and there was no Rombergism. He had unequal Argyll Robertson pupils. The deep reflexes were present, equal and somewhat exaggerated. The superficial reflexes were normal. His speech was slow and deliberate but he managed the test phrases successfully. The serological findings were :

Blood	W.R.	+ 20 +
C.S.F.	W.R.	+ 8
	Cells	4 per c.mm
	Protein	40 mg.%
	Lange	4443321000

Comment : A case of general paralysis of the simple type whose mental symptoms had been present for at least six months prior to treatment. He received the equivalent of sixteen injections of three grammes of tryparsamide and thereafter showed clinical and serological improvement. He has made a partial recovery and has been included in this group.

Case 16. H.S. Admitted 1.9.27 Occupation Post Office Sorter Age 53.

Patient was the youngest of four ; the other members of his family were alive and well. He had always enjoyed good health and had been engaged in his present employment for many years, where he was highly respected. He denied ever having had syphilis or other venereal trouble. There was no history of any nervous or mental disorder in the family.

His present illness began twelve months ago, though his friends stated that he had been very irritable for some time previously. He was noticed then to be rather solitary. He gave up reading and seemed disinclined to explain, talk or argue about anything. In this respect the change was conspicuous. In February 1929 he became "queer" while travelling to his work. He seemed confused and had difficulty in talking or getting people to understand him. This cleared up in a few days but he has since done practically no work. He would return to duty and then after three days he would have to give it up again and would be off two to three months. During that period he has steadily deteriorated and now takes no interest in anything.

On admission he was dull and apathetic. He lay in bed displaying no interest in his surroundings. It was with difficulty one got him to reply to questions and he never volunteered any statements. There was no evidence of delusions or hallucinations. His memory for both recent and remote events appeared grossly impaired. He was correctly oriented for time and place. His grasp of recent events was very poor and he showed considerable intellectual deterioration. His physical state was poor. He showed marked tremors of hands and tongue. There was no evidence of any sensory

abnormality. His gait was unsteady but Romberg's sign was negative. His speech was markedly slurred. His deep reflexes were present, equal and active. The superficial reflexes were normal. His serological reactions were :

Blood W.R. + 40 +
C.S.F. W.R. + 40 +
Cells 50 per cmm
Protein 100 mg. %
Lange 5443210000

He received twice weekly intravenous injections of two grammes of tryparsamide.

He remained dull and complained at length of bodily aches and pains for which no physical basis could be found. On 24.10.27 he made a suicidal attempt. He tried to force a tube of toothpaste down his throat but this was successfully extracted. He succeeded however in lacerating his soft palate and the posterior wall of the pharynx and epiglottis. He was very depressed and had auditory hallucinations. He stated he could hear the other patients talk about him having some infectious disease and of spreading it. The first course of tryparsamide was completed on 10.1.28 when he had had twenty two injections of 2 grammes. There was slight improvement in his condition in that he was less depressed but he remained very hypochondriacal.

It was decided that he could not be retained here any longer and he was discharged on 24.3.28. At that time he was still dull and depressed. He complained of innumerable pains and that there was a foul discharge from his body. This was not the case. His memory for both recent and remote events was very poor and he had no idea how long he had been here. Simple arithmetical calculations were beyond him and he failed to take seven serially from one hundred. Physically he remained somewhat thin. He still showed marked tremors of

hands and tongue. His gait was unsteady but Romberg's sign was negative. His pupils were unequal, irregular and Argyll Robertson in type. The deep and superficial reflexes were normal and active. His speech was still very slurred and he failed on the usual test phrases. The serological reactions were :

Blood	W.R.	+ 10 +
C.S.F.	W.R.	+ 20 +
	Cells	5 per c.mm.
	Protein	35 mg.%
	Lange	negative.

His relatives arranged for him to go to the Old Manor Mental Hospital, Salisbury and he was admitted there on 24.3.28. He remained there till 17.5.28 when he was discharged "improved" to the care of his brother-in-law. In reply to an enquiry sent to the Medical Officer there he stated that the patient on admission was very depressed, self centred and hypochondriacal. He appeared to improve during his stay but the degree of improvement was very slight. He remained thin and was unsteady in his gait. No further special treatment was given.

Unfortunately he has gone to live with his sister in the country and was unable to attend here for examination. His sister in reply to an enquiry in November 1928, stated that he was somewhat better but remained confined to the house. He was still very difficult in many respects and required constant persuasion before he would do anything.

In reply to an enquiry sent to his relatives on 29.11.29 they stated his condition had shown a little further improvement though his interests were still very meagre. He had only recently been able to go out unaccompanied. On the whole he was more manageable but had not done any work since his discharge from hospital. It was impossible to get him to attend here for further examination.

Comment : A case of general paralysis of the depressive variety whose symptoms had been present for twelve months before treatment. He received the equivalent of fifteen injections of three grammes of tryparsamide. He showed considerable serological improvement with little or no improvement in his clinical condition when discharged from here. He has since improved slightly in his clinical state and has enjoyed a partial remission.

Case 17. A.H. Admitted 19.6.28 Occupation Tailor. Age 59.

Patient had been married thirty seven years and had two sons alive and well. His wife had not had any other pregnancies. Apart from an attack of rheumatic fever when he was thirty-five years old his health had been very good. None of his relatives had suffered from any nervous or mental disorder. He denied ever having had any venereal disease or of having exposed himself to such infection.

His present illness began four weeks ago when he became morose and uncommunicative. His behaviour became peculiar and he began to leave the house unobserved. When he did get out he wandered aimlessly and was frequently brought back by the police. When asked later where he had been he would state that he had been at home all the time. Gradually he had become more forgetful. A week ago he declared he was a millionaire and wanted to purchase a new car. He tried to make arrangements to go for a six month's holiday although he was actually very poor.

On admission he was rather dull and apathetic. He lay in bed showing no interest in anything, but would speak if spoken to. He did not express any delusional ideas and

one had difficulty in getting him to converse at all. His memory for both recent and remote events was very poor, and he was disoriented for time and place. So far as could be ascertained his grasp of general information and his knowledge of current events were poor, and there was evidence of distinct deterioration. His general physical state was poor. He had a voracious appetite and excessive thirst.

Examination of his urine showed it to contain 9% of sugar but no acetone or diacetic acid. His blood sugar fasting level was 300 mgrs.%. He showed distinct tremors of hands and tongue. There was no sensory abnormality and his gait was normal. His speech was clear. He had equal Argyll Robertson pupils. His deep reflexes were equal and active and the superficial reflexes gave normal responses. The serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 20 +
	Cells	88 per c.mm.
	Protein	110 mg.%
	Lange	5554432100

His diabetes was treated by giving insulin and regulating his diet. This did not produce any change in his mental state. He remained dull and apathetic. When allowed up one evening he wandered away from hospital and had to be brought back by his relatives. The following day he denied ever having left the hospital at all. He showed little interest in his personal appearance and in this respect his relatives stated he had formerly been most particular. Owing to his poor physical condition and the fact he had diabetes it was decided not to give him malaria meantime but to treat him with tryparsamide and he was given three grammes intravenously at weekly intervals.

Thereafter he gradually became more active and displayed a great interest in his surroundings. He read the daily paper which he had ceased to do previously. With his food

he had to be watched carefully as he appropriated the diet of the other patients. His memory was still markedly impaired.

He remained in hospital till 4.10.28 when he was discharged to attend here weekly for his injections. He had then improved considerably. He was cheerful, active and worked well in the ward. His conversation was rational and coherent but his memory for recent events was still impaired whereas that for remote events had improved considerably. Simple calculations he could do but he failed to take seven serially from one hundred. His physical signs were unchanged. His sugar level remained fairly steady with the administration of ten units of insulin daily and this was to be continued by his panel doctor.

13.12.28 He had had fourteen injections of tryparsamide and he was admitted for examination of his blood and cerebro spinal fluid. The clinical improvement was maintained and his relatives reported that he was very much better and behaved now in a normal manner although his memory was still noted to be deficient. He had started work. The serological findings were :

Blood	W.R.	+ 20
C.S.F.	W.R.	+ 8
	Cells	8 per c.mm.
	Protein	50 mg.%
	Lange	5444322100

He desired a rest from injections over Christmas and this was granted. He next attended on 13.2.29. His improvement was maintained and he was bright and cheerful. There was no evidence of delusional ideas and he conversed rationally and coherently. His memory for recent events was much better. His grasp of general information and knowledge of current events was adequate. Physical examination showed 0.75% sugar still present in his urine. He was still receiving ten units of insulin daily. There were still tremors of tongue but

none of hands. His gait was steady and there was no sensory abnormality. He had equal Argyll Robertson pupils. The deep reflexes were equal and somewhat exaggerated. His abdominal and plantar reflexes were normal. The serological findings on 13.2.29 were :

Blood	W.R.	+ 20 +
C.S.F.	W.R.	+ 8 +
	Cells	18 per c.mm.
	Protein	45 mg %
	Lange	4443321100

He was advised to continue treatment and he has attended regularly since. He had been working regularly since the beginning of December 1928 and was rendering satisfactory service.

On 9.9.29 he had received a further series of twenty-eight injections and his blood and cerebro spinal fluid were examined with the following results :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 8
	Cells	10 per c.mm.
	Protein	40 mg %
	Lange	2221110000

Treatment was continued and he had just completed a further series of ten injections. His relatives reported that apart from a slight irritability he seemed normal. For twelve months he had rendered satisfactory service as a barman.

On examination he was quite bright and cheerful. He talked rationally and intelligently and there was no evidence of delusional ideas. His memory for both recent and remote events was much better than previously. His grasp of general knowledge and current events was adequate. According to the Binet Simon tests he had a mental age of twelve years and three months. Simple calculations he did successfully and he took seven serially from one hundred, though in these tests he tended to get somewhat irritable. His general physical condition was quite good. Examination of his urine showed 0.5% of sugar to be present but no acetone or diacetic acid. He had been receiving

ten units of insulin daily.

His general physical condition was good. His tongue was still tremulous but he showed no tremors of his hands. There was no sensory abnormality. His gait was steady and there was no Rombergism. He had small equal Argyll Robertson pupils. The deep reflexes were normal. His speech was clear and he managed successfully the test phrases. The serological findings on 13.12.29 were :

Blood W.R. + 20
C.S.F. W.R. + 8 +
Cells 4 per c.mm.
Protein 30 mg.%.
Lange negative.

Comment : A case of general paralysis of the simple type whose mental symptoms had been present for one month prior to treatment. He has received fifty-two injections of three grammes of tryparsamide and showed marked clinical and serological improvement. He has been included in the group who are enjoying a good remission.

Case 18. W.C.B. Admitted 16.11.23 Occupation Fitter. Age 29.

Patient had been married six years and had one child alive and well. As far as his wife knew his previous health had been good, and he had no serious illnesses. He denied ever having had venereal disease but admitted exposure to infection on many occasions. There was a suspicious scar on his penis.

His present illness began in November 1922. He complained of headache and was found on examination by his doctor to have unequal pupils. A few days later he became excited and noisy. He stripped himself naked and tore up his bedclothes. He was admitted to Hanwell Mental Hospital on 22.12.22. At that time he was reported to have been somewhat confused and hallucinated. He was deluded and believed he was to be offered as a sacrifice for the Jews. His speech was slurred and he had unequal Argyll Robertson pupils and a right-sided ptosis. His blood Wassermann was + 20. The cerebro-spinal fluid was apparently not examined. Six doses of 0.6 gramme salvarsan were given and thereafter he showed considerable improvement and so much so that on 11.6.23 he was reported as being better and mentally he appeared well. His slurred speech, Argyll Robertson pupils and right ptosis of upper eyelid were still present. He was discharged on that date and a diagnosis of cerebro-spinal syphilis was recorded.

He was advised to attend the out-patient department here which he did at irregular intervals until 29.10.23. During that period he had done no work. He appeared somewhat self-satisfied and his memory was poor. On that date he again became excitable and was hallucinated. He heard people talking about him and he rushed into the garden in his pyjamas in response to one of these voices. He was careless in his habits. It was impossible to offer him a vacancy here so he was admitted to the infirmary

until such arose. He was transferred here on 16.11.23.

On admission he was very garrulous and somewhat euphoric. He was very pleased to be here but did not understand why he should need to be in hospital. He showed marked emotional instability and was subject to excited outbursts in which he was very abusive. Auditory and visual hallucinations troubled him considerably, and he would carry on conversations with imaginary people. His memory for recent events was poor. He did arithmetical calculations with confidence and did not appreciate his many errors. Neurological examination showed fine tremors of his hands but none of his tongue. There was no evidence of sensory disturbance. His gait was steady and there was no Rombergism. His speech was distinctly slurred. He had unequal, Argyll Robertson pupils, and a ptosis of the right eye which was said to have been congenital. His deep reflexes were equal and active. The superficial reflexes gave normal responses.

On 20.11.23 he was inoculated with malaria, three ccs. of malarial blood being injected. He was allowed to have eight rigors. The first four occurred on alternate days and the last four were on successive days. The highest temperature reached was 104.8. The first rigor was on 12.12.23 and the last on 23.12.23 on which date quinine was administered. He remained euphoric throughout the fever, and very confident of his own abilities. His mood was very unstable and he was liable to become noisy and abusive without adequate cause. Thereafter he improved slowly and was reported on 28.1.24 as being less querulous and fatuous. He was more rational in his conversation and was very anxious to resume work but was not considered fit to do so.

His blood and cerebro-spinal fluid were examined and the results were :

Blood	W.R.	+ 20
C.S.F.	W.R.	+ 40
	Cells	20 per c.mm.
	Protein	80 mg.%
	Lange	5544321000

In March 1924 he was reported as showing improvement. He was still somewhat fatuous but much less irritable. There was no evidence of hallucinations and he conversed more rationally. His memory was still impaired. He was correctly oriented for time and place. On 18.3.24 he commenced a series of eight weekly intravenous injections of tryparsamide in two gramme doses. This series was completed on 13.5.24. He was afterwards transferred to a Ministry of Pensions Hospital his wife being unwilling to have him at home. His condition then was improved. He was still mildly euphoric and garrulous but there was no evidence of hallucinations or delusions. His memory for recent events showed some improvement and he was well oriented. He was anxious to do some work and was given a job with the engineer but he was only able to do simple routine work and very easily got confused and muddled. There was no change in his physical signs. The serological findings when discharged from here on 6.5.24 were :

Blood	W.R.	+ 4 +
C.S.F.	W.R.	+ 4 +
	Cells	10 per c.mm.
	Protein	60 mg.%
	Lange	544321000

While at the Ministry of Pensions Hospital he was allowed to attend here unaccompanied for two further courses of tryparsamide. The second course consisted of eight injections of two grammes and was given from 18.8.24 until 17.10.24 when his condition was reported as showing steady improvement.

The serological findings thereafter were :

Blood	W.R.	+ 20
C.S.F.	W.R.	negative
	Cells	10 per c.mm.
	Protein	50 mg.%
	Lange	5432100000.

The third course also of eight injections of two grammes he received from 5.1.25 until 24.2.25. The clinical improvement was maintained. He was still, however, very garrulous, somewhat unstable emotionally and had remained a patient in the pensions hospital. His memory showed some improvement and he was credited with winning the hospital chess tournament. He was a useful worker in the hospital. The serological findings after the third course were :

Blood	W.R.	negative.
C.S.F.	W.R.	+ 3 +
	Cells	5 per c.mm.
	Protein	45 mg.%
	Lange	1111100000

He remained in the Pensions hospital until 30.10.25 when he demanded his discharge which had to be granted. He went home to live with his wife but the following day he became very threatening to her and declared he was going to kill her. He went out on to the street and caressed various women whom he did not know and invited sexual intercourse. He was very noisy and impulsive and had to be removed to the infirmary. From there he was admitted to Cane Hill Mental Hospital on 7.11.25 and the following notes are extracted from their clinical record.

8.8.29. He was very quarrelsome and very garrulous. Frequently he came to blows with the other patients. He declared he was worth millions of pounds which he had obtained from the poetry he had written. His memory, judgement and reasoning powers were markedly impaired. The physical signs remained unchanged. There is no record of any further specific treatment having been administered.

Comment : A case of general paralysis of the manic type whose mental symptoms were present twelve months prior to receiving treatment. He was treated here with malaria and tryparsamide. Of the latter he received twenty four doses of two grammes. He showed a temporary partial improvement in his clinical condition only to relapse and require treatment in a mental hospital. He showed marked serological improvement.

Case 19. G.B.W. Admitted 19.3.24 Occupation Artist Age 35.

Patient had been married fourteen years but had no children. As far as his wife knew his previous health had always been good and he had had no serious illnesses. He contracted syphilis fifteen years ago and was treated then with mercury and arsenic, by the mouth, for several months. No further treatment was received till about four years ago when he had his blood Wassermann reaction done and this was positive. He has since received several courses of stabilarsen but it was impossible to ascertain the total amount given.

He remained fairly well till September 1923 when he complained of feeling dull and of being unable to concentrate on his work. He showed no improvement after a sea voyage, indeed he seemed more depressed. Since then he has fluctuated greatly. Some days he was dull and morbid; other days he seemed normal and was bright and active again. He had, however, become very irritable and was easily upset. Within the past month his friends had noticed a change in his speech, which was becoming very indistinct.

On admission he was dull and depressed. He declared that his bowels were stopped up, that his saliva was dried up. Although he tried to cry he had no tears, his sexual organs were altered, and even his teeth had all changed. He felt there was no hope, a swelling had formed in his abdomen which no one could appreciate. His memory was impaired more for recent than for remote events, but he was correctly oriented. Mental calculations demanding continued attention he could not do and he was unable to take seven serially from one hundred. His general condition was fairly good. He showed marked tremors of his hands and tongue. There was no sensory impairment. His gait was steady and Romberg's sign was absent. His speech was markedly slurred. The pupils were small, unequal and Argyll Robertson in type. His deep reflexes were present, equal and active. The superficial reflexes were normal. The serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	100 per c.mm.
	Protein	130 mg %
	Lange	555522000

He received nine intravenous injections each of two grammes of tryparsamide at weekly intervals. He remained for several weeks after his admission in the dull, depressed, hypochondriacal state already described. Then gradually he began to show a greater interest in his surroundings and was no longer hopeless about himself. His memory remained impaired and he still failed on arithmetical calculations. The physical signs showed no change. On 30.5.24 he was discharged to the care of his wife.

His serological findings then were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 20 +
	Cells	50 per c.mm.
	Protein	110 mg %
	Lange	555532000

Nothing further was heard from the patient until 20.1.27 when in reply to an enquiry his relatives stated that he had gradually improved after his discharge from here, and had remained apparently well until three months previously when he had relapsed and had become rather dull and morbid again. His memory was then impaired considerably. He was inoculated at home with malaria in December 1926 and not quite recovered from this. A further enquiry on 1.5.27 obtained the information that he was much better again but was not working.

On 2.10.28 another letter of enquiry was sent and his relatives stated that he appeared to be in perfect health. He had not done much work as he had not a proper studie but was devoting his time and energies to golf and tennis.

Nothing was heard of him till 20.11.29 when the reply to an enquiry stated that his improvement had been maintained. He had retired from active work but was on the whole bright and cheerful. He took an active interest in games and played chiefly golf and tennis. As he lived in the Midlands it was impossible to get him to attend here for examination.

Comment : A case of general paralysis of the depressed type whose symptoms had been present at least six months prior to treatment. He received nine injections of two grammes of tryparsamide. Thereafter he showed clinical improvement and this was maintained for over two years when he relapsed. He was then treated with malaria and thereafter improved again. He was included in the group of patients enjoying a partial remission.

Case 20. J.W. Admitted 16.4.24 Occupation Newspaper Age 33.
Distributor.

Patient had been married ten years and had two children alive and well. He had always enjoyed very good health and his wife was unaware that he had had any illness whatever. Nine years ago he contracted syphilis and received a few injections in his arm from his doctor. He had no treatment since. There was no history of any nervous or mental disorder in his family.

In August 1923 he began to feel rather nervy and was not sleeping well. Ten days later when out delivering his papers on a motor cycle and sidecar he got sandwiched between a 'bus and a tramcar. He escaped physical injury but felt more nervous and became very much afraid. The following day he complained of feeling ill and was advised by his doctor to stay in bed. Later that day he suddenly became very excited, declared he was being imprisoned and got up and smashed the windows and furniture. Policemen were called in and he assaulted them. Thereafter he was admitted to Banstead Mental Hospital. On admission there he was euphoric and excited. He talked at length of his achievements and had no insight into his condition. He showed some tremors of hands and tongue. His pupils were unequal, irregular, and inactive to light. His deep reflexes were active. His serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	100 per c.mm.
	Protein	150 mg.%

He improved considerably in Banstead and on 7.4.24 was discharged that he might attend here for treatment by tryparsamide. On admission here he gave a coherent account of his illness but appeared unconcerned about the serious

nature of this and was mildly euphoric. He attributed his breakdown to excessive study as he had become greatly interested in motor engineering. His memory was quite good and he was correctly oriented in all spheres. He was enjoying a good remission. Physically he showed distinct tremors of his tongue. His gait was steady and there was no Rombergism. No sensory loss was made out. His pupils were unequal, irregular, and did not react to light. His deep reflexes were exaggerated but were equal on both sides. There was no defect noticed in his speech. His serological findings on 16.4.24 were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	100 per c.mm.
	Protein	150 mg.%
	Lange	5555332000

He was given a series of eight injections of two grammes of tryparsamide in weekly doses. These were completed on 25.6.24. His clinical improvement was maintained and he was working regularly. There was no change in his physical signs. The serological reactions on 25.6.24 were :

Blood	W.R.	+ 20
C.S.F.	W.R.	+ 30
	Cells	negative
	Protein	40 mg.%
	Lange	negative

A second series of eight injections was completed. on 22.12.24 In his notes on that date he was described as being very well. He conversed rationally and intelligently and had good insight into his illness. He was anxious to continue treatment. Since his discharge from here on 30.4.24 he had been working regularly and doing his work satisfactorily. Except for the fact that no facial or lingual tremors were now visible his physical signs were unchanged. His serological findings on 6.1.25 were :

Blood	W.R.	+ 4 +
C.S.F.	W.R.	+ 8 + (admixture with blood)

In view of the clinical and serological improvement he was advised that he could have a rest from injections and nothing further was heard of him till 27.3.26 when his wife brought him to the out-patient department. She stated he had continued at his work, that of distributing papers, until the previous day and had done it satisfactorily. She had noticed that he was rather nervous during the previous two weeks and she feared he was relapsing. He was then admitted to hospital. Thereafter he became excited and noisy. His conversation at times was incoherent but the prevalent topic which he elaborated was that people were against him especially his trade union. He was quite impervious to argument or reason. At times he would become very emotional and burst out weeping but this usually lasted only a short time. He improved considerably in hospital and was discharged on 24.4.26. His physical signs were unchanged. The serological findings were :

Blood	W.R.	negative
C.S.F.	W.R.	+ 8 +
	Cells	10 per c.mm.
	Protein	35 mg.%
	Lange	negative.

He resumed work but unfortunately for him the general strike occurred a month later and he became excited again expressing the ideas that his trade union was after him. He was removed to the infirmary and from there he was admitted to Colney Hatch Mental Hospital on 19,5.26. The following notes are extracted from their clinical record.

On admission he was confused and rather grandiose. If asked anything he would commence a long irrelevant conversation. He was very self satisfied and stated he could earn one pound a day for a very short period of work in the mornings. Actually this was not so. In his manner and behaviour he was frequently very childish. His memory for recent events was poor and he was unable to do simple arithmetical calculations.

His serological reactions were :

Blood	W.R.	negative.
C.S.F.	W.R.	+ 8 +
	Cells	40 per c.mm.
	Protein	70 mg.%
	Lange	5432100000

On 4.8.26 he was inoculated with malarial blood. He had his first rigor on 11.8.26 and these were allowed to continue till 23.8.26 when quinine was administered. There was no record as to the number of rigors he had had. Following upon his fever he was given six doses of neokharsivan at weekly intervals.

13.12.26. He was reported as showing improvement and was able to give a detailed account of himself. He was very optimistic about the future and was still mildly euphoric. He was lacking in insight. On this date he was discharged on pass to the care of his wife and four weeks later he was discharged recovered.

Nothing further was heard of him till November 1928 when in reply to an enquiry he attended the out-patient department. His wife reported he had remained well since leaving Colney Hatch Hospital and that he had been working regularly. Apart from getting rather more easily tired, irritable and upset than before his illness she saw nothing amiss in his behaviour. On examination he was somewhat elated and self satisfied. He stated he felt very well indeed and there was nothing wrong with him. His conversation was rational and there was no evidence of delusional ideas. His memory was still somewhat impaired. Simple calculations he did successfully but he was unable to take seven serially from one hundred. His physical state was quite good. He showed very slight tremors of hands and tongue. He had unequal, irregular Argyll Robertson pupils. His deep and

superficial reflexes reacted normally. The serological findings were :

Blood	W.R.	negative
C.S.F.	W.R.	+ 4 +
	Cells	4 per c.mm.
	Protein	25 mg.%
	Lange	negative.

In an effort to render the reaction of his cerebro spinal fluid entirely negative he was advised to continue treatment and he attended regularly for injections. He received weekly doses of three grammes of tryparsamide intravenously. On 14.1.29 his wife brought him to the out-patient department. She stated that he had been in bed for four days suffering from influenza and that he had become afraid he would relapse. He was rather dull and did not look well physically so he was admitted to the ward which he was very anxious to be. His conversation was rational. He had a great fear of relapsing and having to go back to a mental hospital. Towards the staff he was frequently very irritable but this state only lasted a few days and he then improved and became cheerful and rather elated again. He had received thirteen injections of three grammes and his cerebro spinal fluid was re-examined on 18.1.29. The results were :

Blood	W.R.	negative
C.S.F.	W.R.	+ 4 +
	Cells	2 per c.mm.
	Protein	30 mg.%
	Lange	negative.

He was discharged from here on 16.2.29 and resumed work thereafter at which he has remained since. On 22.9.29 he had received a further twenty injections and his blood and cerebro spinal fluid was reexamined with the following results :

Blood	W.R.	negative
C.S.F.	W.R.	negative
	Cells	3 per c.mm.
	Protein	20 mg.%
	Lange	negative

No further treatment was given. After a period of three months he was re-examined. His wife reported that except for a degree of irritability unknown in him before, he appeared normal. His work was that of a motor driver distributing papers and he had been able to do this work every day. It did not worry him at all. On examination he conversed rationally and intelligently. There was no evidence of delusional ideas but he was still somewhat self-satisfied. His memory for both recent and remote events was fairly good. He did simple arithmetical calculations readily but he failed to take seven serially from one hundred. His grasp of general information and current events was not very good but conformed to his social class. According to the Binet Simon tests he had a mental age of eleven years. His physical condition was quite good. No tremors of his hands or tongue were apparent. There was no sensory abnormality. His gait was steady and Romberg's sign was negative. He had unequal irregular pupils which did not react to light, nor on accommodation. The deep reflexes were present, equal and active. The superficial reflexes were normal. His speech was clear and he managed the test phrases easily. The serological findings on 15.12.29 were :

Blood	W.R.	negative
C.S.F.	W.R.	+ 4
	Cells	3 per c.mm.
	Protein	20 mg.%
	Lange	negative.

Comment : A case of general paralysis of the manic type whose mental symptoms were present for eight months before treatment. He improved after treatment with tryparsamide but later relapsed and then he was treated with malaria. Since then he has had further tryparsamide. Altogether he has received the equivalent of thirty four injections of three grammes and showed clinical and serological improvement. He has been included in the partially remitted group.

Case 21. R.B. Admitted 6.5.24 Occupation Waiter Age 41.

Patient had been married four years but had no children. He contracted syphilis eleven years ago and for a few months thereafter he was given medicine to be taken three times a day. He had received no treatment since. Apart from this his health had been very good and he had had no serious illnesses. There was no history of any of his relatives having suffered from any nervous or mental disorder.

The onset of his present illness was said to have been sudden. Eight months ago he became confused and his conversation was incoherent. He then imagined people were against him and were pursuing him, and at times he was very excited and violent. Thereafter he declared he was God and ruled the universe. He was admitted to Colney Hatch Mental Hospital on 3.10.23, a month after the onset of illness. The following notes relating to his condition there were extracted from their clinical record. On admission he was reported to have been euphoric and self-satisfied. He declared he had thirteen billion millions of golden sovereigns and that he paid the wages of the whole world every Thursday. He possessed superhuman talents re. singing, boxing and wrestling, etc. He declared he was the Holy Son of God. His memory was grossly impaired and he was disoriented for time and place. He had small irregular, unequal pupils which reacted very sluggishly to light. Sensation appeared normal. The deep and superficial reflexes were present and equal. His speech was distinctly slurred.

3.1.24. He was reported as being foolish and fatuous but had ceased to express his former grandiose ideas. His insight was still lacking and he was emotionally unstable. The physical signs remained unchanged.

25.4.24. He continued to show improvement and was much more stable. His memory was better and he was correctly oriented in all spheres. There was no evidence of delusions or hallucinations and he appeared to be enjoying a remission. He was discharged to-day that he might attend the Maudsley Hospital for treatment with tryparsamide.

He attended the outpatient department here and was admitted to hospital on 6.5.24. He was rather dull and apathetic, and did not appear at times to understand what was said to him. At other times he was able to converse fairly rationally. He was hallucinated and complained of voices which troubled him but the contents of these remarks he could not make out. His memory was impaired more for recent than remote events. He was correctly oriented for time and place. Simple calculations he could perform but he was quite unable to take seven serially from one hundred. His general physical condition was fairly good. There were marked tremors of his hands, tongue, and face. No sensory abnormality was made out. His gait was steady and Romberg's sign was absent. He had small unequal, irregular, Argyll-Robertson pupils. The deep reflexes were present, equal and active. His superficial reflexes were normal. His speech was definitely slurred. The serological reactions were:

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 20 +
	Cells	18 per c.mm.
	Protein	50 mg. %
	Lange	5555543210

He received eight injections of two grammes of tryparsamide at weekly intervals. He remained dull and apathetic. Occasionally he suffered from auditory hallucinations. There was still a marked impairment of memory and he had no insight. He did not express any evidence of delusional ideas. His grasp of general information and current events was poor. There was no change in the physical signs. On 21.7.24 he was discharged and advised to attend as an out-patient. The

serological findings then were :

Blood	W.R.	+ 4 +
C.S.F.	W.R.	+ 8
	Cells	2 per c.mm.
	Protein	100 mg. %
	Lange	5554432100

A second course of eight injections was given from 30.10.24 till 2.1.25. He had in the interval resumed work as a waiter and was employed regularly. He was somewhat fatuous and self-satisfied. His memory for recent events showed some improvement but was still impaired. The physical signs were unchanged. The serological findings were :

Blood	W.R.	+ 4
C.S.F.	W.R.	+ 4 +
	Cells	10 per c.mm.
	Protein	50 mg. %
	Lange	2211100000

16.7.25. He has had a further series of twelve injections of two grammes of tryparsamide as an out-patient. His mental condition was worse. He was hallucinated and carried on conversations with imaginary people. He declared the public were following him about and were pumping something into his mouth which caused his teeth to decay. His memory for recent and remote events was markedly impaired. His speech was very slurred. His pupils were unequal and Argyll-Robertson in type. The other physical signs were unchanged. The serological findings were :

Blood	W.R.	negative
C.S.F.	W.R.	+ 4
	Cells	5 per c.mm.
	Protein	55 mg. %
	Lange	negative

His wife was advised to have him admitted to the infirmary should he become unmanageable at home.

Nothing was heard thereafter till 29.9.26 when, in reply to an enquiry, his wife reported his condition was unchanged. He was still at home and had done no work. He heard voices and was always talking to them. His habits were clean. He had not had any further treatment and refused to attend the hospital.

2.5.27. In reply to another enquiry his wife attended to-day. She reported that he had been treated with malaria but he showed little change thereafter. He was still at home, childish, and was content to sit about all day. He still refused further treatment. His doctor was communicated with and he stated that the patient was infected with malaria in October, 1926, and the fever allowed to last fourteen days. Thereafter no immediate mental change was noticed but he was not now so troubled by his delusional ideas. He was much quieter and if asked about the people who worried him he would state that he had ceased to take any notice of them now.

No reply was obtained to an enquiry in November, 1929, so the social worker visited the home. The wife unfortunately was in hospital and could not be seen. The patient resented any enquiry from the hospital as we had told lies about him. In his appearance he was untidy and seemed to have lost interest. His behaviour was childish and he was very garrulous and self-satisfied. He stated he felt quite well and would shortly be looking for work. His statements and replies to questions were accompanied by much laughter and he appeared emotionally facile. He spoke of his wife's illness and did not appear at all distressed about it. He lacked insight and stated there was never anything the matter with him and he should never have been in hospital. He absolutely refused to attend for examination.

Comment : A case of general paralysis of the euphoric type whose symptoms had been present at least eight months prior to treatment. He received twenty-eight injections of two grammes of tryparsamide and thereafter showed clinical and serological improvement and he resumed work. This improvement was not maintained, and he was treated at home with malaria with further slight improvement. He was included in the group of patients enjoying a partial remission.

Case 22. W.A.S. Admitted 16.5.24 Occupation Ret. Navalman Age 38.

Patient had been married six years but had no children. As far as his wife knew his health had always been good. He served in the Navy until 1919 when he retired, having completed twenty years' service. For the following three years he worked as a furnaceman. This he had to give up three years ago, and he has done no work since. At that time he suddenly lost the power of speech and his right arm became weak. These symptoms disappeared in a few hours, but thereafter he remained somewhat dazed. He was said to have been perfectly well again two days later. He denied ever having had any venereal disease. None of his relatives had suffered from any nervous or mental trouble.

His wife dated the onset of his present illness to twelve months ago, but it would appear to have been earlier than that. The first sign she noticed was that he was losing interest in things and became forgetful. This made him very irritable. About the same time he began to have repeated attacks in which he would become dazed and weak. Frequently he dropped things which he had been holding in his hands. He had these attacks on an average once a week. He became more apathetic and frequently talked of committing suicide. Four weeks ago he attempted to do so by taking Friar's Balsam, and he was removed to the infirmary from where he was transferred to this hospital.

On admission he was dull and displayed little interest in his surroundings. He did not appear to appreciate there was anything wrong with him. He was indifferent and somewhat fatuous. His replies to questions were frequently very childish, as was also his manner and behaviour. Emotionally he was very unstable, and for no apparent reason he would suddenly start weeping. This would last a short period and he could

very easily be got to smile again. His memory for both recent and remote events was grossly impaired. He failed completely on simple arithmetical calculations. His grasp of general information was very poor. There was no evidence of hallucinations. At one time he would say there was nothing the matter with him, then later, that it was no good, he could never get better again. His physical condition was fairly good. He showed marked tremors of his hands and tongue. His speech was slow and slurred. There was no sensory impairment. His gait was steady and there was no Rombergism. The pupils were equal and reacted rather sluggishly to light, whereas on accommodation their reaction was brisk. The deep reflexes were present, equal and active. His superficial reflexes were normal. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	90 per c.mm.
	Protein	125 mg. %
	Lange	555542200

He received eight injections of two grammes of tryparseamide administered at weekly intervals. After the first course he appeared slightly improved in that he showed more interest in his surroundings. He remained, however, fatuous and childish. He did not express any delusional ideas. His memory remained impaired. Emotionally he was still very unstable. He was discharged to the care of his wife on 12.9.24. His serological findings then were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	50 per c.mm.
	Protein	120 mg. %
	Lange	5555432100

A second course of eight injections was given from 1.12.24 until 27.1.25. At this time his wife reported he was very irritable and childish, and this was borne out on examination. The serological findings after his second

course were :

Blood	W.R.	+ 20 +
C.S.F.	W.R.	+ 8 +
	Cells	10 per c.mm.
	Protein	80 mg. %
	Lange	55544321000

A third course of eight injections was given from 19.3.25 until 12.5.25. He was then childish and unduly self-satisfied. His memory was grossly impaired for both recent and remote events. His speech was very slurred. His wife reported that he showed no improvement and was becoming unmanageable at home owing to his irritability. The serological findings following the third course were :

Blood	W.R.	+ 13
C.S.F.	W.R.	+ 8
	Cells	10 per c.mm.
	Protein	50 mg. %
	Lange	5544321000

In November, 1925, his wife brought him to the out-patient department as she was unable to keep him at home. He was very garrulous and stated that people were making fun of him in the street. He accused his wife of infidelity, and he had been very threatening at times towards her. She was advised to have him admitted to the infirmary, which she did, and from there he went to Bexley Mental Hospital where he was admitted on 3.12.25. The following notes were extracted from their clinical record.

3.12.25. On admission he was simple and childish in manner and was very easily pleased. He was unduly happy, and continually talked of his capabilities, and appeared to be delighted with his surroundings. He showed fine tremors of his hands. His gait was steady and there was no sensory loss. His speech was slurred and indistinct. The pupils were unequal, irregular, and reacted sluggishly to light. The deep reflexes were present and equal. The superficial reflexes gave a normal response.

28.4.26. He remained fatuous and had no insight whatever. He laughed foolishly without apparent cause. Occasionally

he could be got to do some work in the ward. He was to-day inoculated with five c.cs. of malarial blood injected intramuscularly.

27.5.25. He was allowed to have twelve rigors. Three of his peaks of temperature were 105° or over, seven were 104°, and two were 103°. Quinine was then administered.

7.9.26. His condition was unchanged. He was simple, fatuous and elated. His ideation was poor and there was a general mental impairment. The serological findings were :

Blood	W.R.	+ 20 +
C.S.F.	W.R.	+ 20
	Cells	30 per c.mm.
	Protein	70 mg. %
	Lange	5555432100

3.11.27. He was childish and fatuously pleased with himself and his abilities. He was pleasant and a good worker, but had no insight. He did not appreciate his limitations and had a poor grasp of reality. The physical signs were unchanged.

13.12.28. There was no change in his condition from the last note. He was childish and fatuous. His memory was markedly impaired, and he had no insight. The serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 8
	Cells	10 per c.mm.
	Protein	40 mg. %
	Lange	4443211000

15.10.29. He remained quiet but childish and was still very pleased with himself. He displayed no initiative, but could be got to do things automatically. He talked of going home, but he was quite unfit to do so. He had no insight whatever. His general condition was maintained and there was no change in his physical signs.

Comment : A case of general paralysis of the depressed type whose mental symptoms had been present at least twelve months

prior to receiving treatment. He received twenty-four injections of two grammes of tryparsamide. He showed serological improvement but little clinical improvement, and he had later to be admitted to a mental hospital. There he was treated by malaria without any beneficial result. He has been included in the unimproved group.

Case 23. C.F.T. Admitted 16.5.24 Occupation Jobmaster Age 44.

Patient was married and had three children alive and well. Apart from an accident when at work nine years ago whereby he suffered from concussion, his health had been very good. He denied ever having suffered from venereal disease, but admitted having exposed himself to infection. There was no history of nervous or mental disorder in his family.

For many months he had been noticed by his wife to be more irritable than previously. About Xmas, 1923, he became very sullen; would sit about by himself and frequently laugh to himself. He had gradually become worse but was able to continue at work till two weeks ago when he became muddled and lost the power of speech. These symptoms, however, passed off in a few hours, but since then his speech had been very slurred. He laughed a lot to himself, and became very irritable without adequate cause. A few days before admission he got up during the night and acted as though he were at his daily work.

On admission he gave a very disjointed account of his illness. He was mildly euphoric and somewhat overactive. He was quite contented to be here and showed marked emotional irritability, varying rapidly from a state of laughter and merriment to one of tearfulness. His memory for both recent

and remote events was distinctly impaired. He was clearly oriented for time and place. He showed marked intellectual impairment and his grasp of general information was poor. He was unable to do simple calculations. Physically he showed marked tremors of his hands and tongue. There was a loss of deep sensation in the calf muscles. His gait was ataxic, and Romberg's sign was positive. His speech was markedly slurred. The pupils were equal, but very sluggish in their reaction to light, whereas on accommodation their reaction was brisk. The reflexes of his upper limbs were present, equal and active. The knee and ankle jerks were absent. His superficial reflexes were normal. The serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	50 per c.mm.
	Protein	130 mg. %
	Lange	5555543210

He received eight weekly injections of two grammes of tryparsamide. Thereafter he showed slight improvement in that he displayed more interest in his surroundings. He was still rather fatuous and appeared perfectly happy and contented in hospital. In his manner and behaviour he was frequently very childish. His memory for both recent and remote events was poor. He did not express any delusional or hallucinatory ideas, but his outlook was childish. There was no change in his physical signs. The serological results following his first course of treatment were :

15.7.24.	Blood	W.R.	+ 40 +
	C.S.F.	W.R.	+ 40 +
		Cells	45 per c.mm.
		Protein	125 mg. %
		Lange	5544321000

Another course of eight injections of two grammes was given, but little further improvement was noted. These were completed on 18.10.24, when his serological reactions

were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	28 per c.mm.
	Protein	86 mg. %
	Lange	5533221000

He was discharged from hospital on 3.1.25. His condition then showed some improvement and he was more in touch with his surroundings. He obtained part-time employment thereafter. On 12.3.25 he commenced a third course of eight injections. These were completed on 13.5.25. He was then said to be feeling very well and was working regularly every day. He conversed rationally and coherently, but his grasp of current events and of general knowledge was very poor. His memory was still markedly impaired. He was unable to do simple calculations. There was no change in his physical signs. The serological reactions on 13.5.25 were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 20 +
	Cells	10 per c.mm.
	Protein	60 mg. %
	Lange	3221110000

He ceased to attend thereafter until September, 1926, when his wife reported he had remained fairly well until a few weeks before. He had been able to continue at work since his last visit, but was always very easily pleased and showed little initiative. On examination he was fatuous and very garrulous. Insight was completely lacking. His memory was very poor, and he was completely disoriented. His speech was slurred. The pupils were equal and very sluggish in their reaction to light. The deep reflexes of his upper limbs were equal and active, but those of the lower were absent. His gait was ataxic, and Romberg's sign was positive. She was advised to have him admitted to the infirmary, and from there he was admitted to Bexley Mental Hospital on 23.9.26. The following notes were extracted from their clinical record.

23.9.26. He was garrulous, and showed a marked impairment

of all his faculties. His memory was very poor, and he was completely disoriented. He suffered from auditory hallucinations. His general condition was poor, and he was very tremulous and ataxic. The other physical signs were the same as those found here.

9.11.26. He was inoculated with malaria and allowed to have four rigors. Owing to his poor physical state these had to be curtailed. There was no record as to the highest temperature which he developed. He showed no mental improvement. He was still disoriented and confused. His fever was cut short by administration of quinine on 26.11.26.

10.7.27. He was simple, childish and fatuous. He remained disoriented for time and place. His hallucinations were now no longer evident, and in this respect he was somewhat improved. His physical condition was better - he had put on about three stones in weight. Optic atrophy was noted as being present in both eyes.

6.9.28. He was very dull and fatuous. He appeared quite contented with his lot, and carried on imaginary conversations all day long. He was very feeble and was confined to bed. Tremors of his face, tongue, and hands, were present. The pupils were equal and did not react to light. He had a double optic atrophy and was quite blind. The deep reflexes of his upper limbs were present, but those of the lower limbs were absent. The superficial reflexes were normal.

10.10.28. He gradually deteriorated and could not attend to his simplest needs. He died to-day. Permission for a post mortem examination was not obtained. There was no record of any serological examination having been made.

Comment : A case of tabo-paresis whose mental symptoms were of the simple type and had been present at least six months prior to receiving treatment. He received twenty-four injections

of two grammes of tryparsamide and thereafter showed clinical and serological improvement. He relapsed after sixteen months and had to be admitted to a mental hospital, where he received malaria. He gradually deteriorated, and died about five years after the commencement of his illness.

Case 24. E.W.C. Admitted 30.5.24 Occupation Engineer Age 40.

Patient was a married man and had three children alive and well. As far as his wife knew he had always enjoyed good health and she was unaware that he had ever had any illness. He contracted syphilis fifteen years ago, and was treated with pills for several months. None of his relatives had suffered from any nervous or mental disorder. In February, 1923, while on business in India, he woke up one morning to find he had lost the power of his right arm and leg. Within three weeks he was quite well again, and when he returned to his family in August of that year he appeared perfectly well. Last winter he complained of becoming easily tired, and he consulted his doctor who did a blood Wassermann and this was positive. Thereafter he received twelve injections of stabilarsan, at the end of which his blood was still positive.

His first mental symptoms were said to have appeared two months ago when his daughter was seriously injured in an accident. This caused him considerable worry, and he became sleepless and irritable. Then he seemed to change in manner and became extravagant. Although unable to afford it, he bought a new car. He elaborated various schemes for the benefit of the world, and quarrelled with his relatives when they opposed him. As the result of one of these quarrels

he was persuaded to come to hospital.

On admission he was elated and garrulous. He had many schemes for improving his position in life, which schemes were very fantastic. He declared he had invented a new sand filter which would revolutionise the world. He had plans for acquiring large woods that he might start a timber business. He was very bombastic and euphoric. His memory was impaired more for recent than remote events, but he was correctly oriented as to time and place. He did simple calculations all right, but failed to take seven serially from one hundred. Examination showed marked tremors of his hands and tongue. There was no evidence of any sensory impairment. His gait was steady, and Romberg's sign was absent. His pupils were equal and reacted to light and on accommodation. The deep reflexes of his arms were present and equal, whereas those of his lower limbs were somewhat sluggish. His superficial reflexes were normal.

The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	80 per c.mm.
	Protein	130 mg. %
	Lange	5543211000

He received eight intravenous injections of two grammes of tryparsamide at weekly intervals. After his admission here he became very excited and noisy. He was difficult to manage, would not remain in bed, and was frequently impulsive towards staff and the other patients. He expressed numerous grotesque schemes for making money. Emotionally he was very unstable and very easily became upset. His letters were childish and covered the whole page. He was completely disoriented and had no insight whatever. There was no change in his physical signs. The serological findings on 7.8.24 were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	} blood admixture
	Protein	
	Lange	5554432100

He remained excited, restless, noisy and abusive, and showed no improvement as the result of treatment. He was very difficult to manage, and was discharged on 11.8.24. His relatives arranged his admission to Camberwell House on that date. From there he was transferred to Colchester Mental Hospital, it being nearer to his home. He went there on 5.9.24 and the following notes were extracted from their clinical record.

5.9.24. He was restless, talkative and exalted. He had numerous schemes for making money, and had a greatly exaggerated idea of his own abilities. He was very difficult to treat. His general physical state was fairly good. He showed marked tremors of his hands and tongue. The pupils were equal and reacted to light and accommodation. The deep reflexes of his lower limbs were sluggish.

29.9.24. He was inoculated to-day with malaria, four c.cs. of malarial blood being injected intramuscularly.

30.10.29. He had had twelve rigors before quinine was given. There was no record of the dates on which the fever occurred or the highest temperatures reached. Prior to the fever he remained noisy, and was hostile to the other patients. He was exalted in his ideas of his own powers and had no insight.

25.11.29. He was reported as showing improvement. He was not so exalted and was becoming more normal in his demeanour. Still somewhat self-centred and very talkative. His pupils were noted as being sluggish in their reaction to light.

8.4.25. Patient was discharged to-day.

24.8.25. He reported at the Mental Hospital to-day, and appeared to be fairly well and was doing useful work at home. He did not feel able for anything of a responsible nature. His memory was good. His general physical condition was good. There were slight lingual tremors. The pupils reacted very sluggishly to light, but briskly on accommodation. There

was no record of any further treatment or any serological examinations having been made.

Nothing was heard of him until 3.11.28, when he replied to an enquiry sent to him. He stated that for the previous twelve months he had been doing exactly the same work as before he went to India in 1923. He found no difficulty in doing that work but stated that prior to twelve months ago he could only do part-time work. His father also replied to the enquiry and confirmed the patient's statements. As he lived in Colchester it was impossible to re-examine him.

An enquiry was sent in November, 1929, when it was ascertained that his improvement had been maintained. He was said to be well, and was discharging successfully the duties he had done prior to his illness. He had not received any medical aid or advice in the interval. As he lived in the country it was impossible to have the opportunity of re-examining him.

Comment : A case of general paralysis of the manic type whose mental symptoms had been present for two months prior to the onset of his illness. He received eight injections of tryparamide but remained excited and was transferred to a mental hospital where he received malaria and has since enjoyed a good remission.

Case 25. T.S. Admitted 17.6.24 Occupation Engineer Age 54.

Patient was married and had three children alive and well. As far as his wife knew he had always enjoyed good health and had had no serious illnesses. He denied ever having suffered from venereal disease, but admitted having exposed himself to infection. There was no history of any of his relatives having suffered from any nervous or mental disorder.

His present illness began seven months ago, when he displayed less interest in things and complained that his business duties were too heavy. Later he became very forgetful, and had great difficulty in speaking. Frequently he became very muddled and his conversation was disjointed. His work was unsatisfactory and he was forced to give it up several weeks ago.

On admission he was dull and apathetic. He had great difficulty in collecting his thoughts, and his replies to questions were in monosyllables. The following day he became talkative and somewhat overactive. He showed an excessive degree of self-satisfaction and declared he was the best man at his job and that he was quite well. His memory for both recent and remote events was grossly impaired. He stated the Great War began in 1894 and ended in 1895. Simple calculations he performed accurately, but he failed to take seven serially from one hundred. He was correctly oriented for time and place. His general physical condition was fairly good. There were marked tremors of hands and tongue. No sensory abnormality was made out. His gait was steady, and Romberg's sign was absent. His speech was markedly slurred. The pupils were unequal and reacted sluggishly to light, whereas on accommodation their reaction was brisk. The deep reflexes were all present, equal and active. The superficial reflexes were normal.

The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	100 per c.mm.
	Protein	180 mg. %
	Lange	5555543210

He received eight intravenous injections of two grammes of tryparsamide, administered at weekly intervals. Three weeks after admission he became very confused and did not understand what was said to him. When asked to sit down he would remove his coat. He was completely disoriented and suffered from auditory hallucinations. He carried on conversations with imaginary people. If prevented from carrying out their instructions he would frequently become noisy and restless. This state lasted about one week, and thereafter he appeared clearer mentally, though he still wandered about in an aimless manner. He gradually improved, and when discharged on 3.10.24 he was able to converse rationally and worked well in the garden and the ward. His memory was still markedly impaired. His grasp of current events and general information was poor. He was distinctly facile, and showed evidence of intellectual deterioration. The physical signs were unchanged. The serological findings after treatment were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 20 +
	Cells	5 per c.mm.
	Protein	50 mg. %
	Lange	5554321000

On 7.10.24 he commenced a second series of eight injections, and these were completed on 3.12.24. He was then reported as being rather fatuous and unduly pleased with himself. He had done no active work since his discharge, but he assisted at home. The serological findings on 3.12.24 were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 8
	Cells	8 per c.mm.
	Protein	50 mg. %
	Lange	4444443210

He ceased to attend and nothing was heard of him thereafter until, in reply to an enquiry, he attended here on 16.5.27. His wife reported that he was much better but had not been able to do any active work. On examination he was somewhat fatuous and rather childish. He conversed rationally, but his grasp of general information and current events was very poor. His memory was still grossly impaired, but he was correctly oriented. Simple calculations he failed to do. He still showed tremors of his hands and tongue, and his speech was distinctly slurred. The pupils were equal and reacted sluggishly to light. The deep reflexes were present, equal and active. His superficial reflexes were normal. He had no insight. He refused to come into hospital for serological investigation, or have any further treatment.

On 2.4.28 his wife brought him to the outpatient department. She stated that he had not been well during the past six months. His memory had become worse. On one occasion he was distemping the walls and did this with two different colours. He had become very childish and obstinate. At times, if crossed, he became almost violent. He had lost all sense of decency and took no interest in his personal appearance. On examination he was fatuous and quite pleased with himself. His speech was very slurred, and his conversation at times rambling and incoherent. He laughed for no apparent reason, and was quite unable to give any account of himself. His general physical condition was poor, and he showed marked tremors of hands, face, lips, and tongue. His gait was unsteady. The pupils were equal and reacted sluggishly to light and accommodation. The deep reflexes were present, equal and active. His superficial reflexes were normal. He was considered unsuitable for treatment here, and his wife was advised to have him admitted to the infirmary, which she did. From there he was admitted to the National

Hospital, Queen Square, on 21.5.28. The Registrar supplied the following notes as to the patient's progress. His condition, on admission there, corresponded to that just described.

The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40
	Cells	37 per c.mm.
	Protein	80 mg. %
	Lange	443222110

Following his admission he became very restless, and was sometimes incontinent of urine. He was inoculated with malaria and had five rigors, but on 25.6.28 he died, about twenty-four hours after a rigor. A post mortem was held, and the diagnosis of general paralysis was confirmed.

Comment : A case of general paralysis of the simple type whose mental symptoms had been present at least seven months prior to treatment. He received sixteen injections of two grammes of tryparsamide and thereafter enjoyed a partial remission for three years, when he relapsed and was admitted to another hospital. There he was treated with malaria, during the course of which he died.

Case 26. Mrs. G. Admitted 24.6.24 Occupation Housewife Age 38.

Patient had been married twelve years, and had had four pregnancies. Three children had been born dead, and the fourth, born nine months ago, died last month. Her previous health was said to have been good and she had had no serious illnesses. No history of syphilis was obtained. An uncle was for many years, prior to his death, an inmate of one of the London County Mental Hospitals.

She appeared quite well and was able to do her housework efficiently till five months ago, when she became rather forgetful. The onset was attributed to worry over her baby who was not thriving. She sought advice at a general hospital, and there both she and her husband received injections. She had only three injections as these produced a reaction, and she was thereafter treated with medicine by the mouth. After the child's death a month ago she became dull and depressed, and would sit about all day staring vacantly around her. She lost all interest in her home and would not attend to herself or her husband.

Her general appearance on admission was suggestive of general paralysis. Her face was greasy, mask-like, and rather fatuous in expression. Her mental state was one of mild elation, and she was very self-satisfied. She declared she felt better than ever before, that she was extremely well, and that there was nothing the matter with her now. There was no evidence of delusional or hallucinatory ideas. Her memory for both recent and remote events was somewhat impaired and she very easily got muddled. She failed over simple arithmetical calculations. She was, however, correctly oriented in all spheres. Her general physical condition was not very good. She showed marked tremors of hands, face, and tongue. There was no sensory abnormality made out. Her gait was

somewhat unsteady, but there was no Rombergism. Her speech was markedly slurred, and she failed on the test phrases. She had unequal pupils which were very sluggish in their reaction to light, whereas, on accommodation, they reacted briskly. The chief reflexes of the upper and lower limbs were present and equal. Her superficial reflexes were normal. The serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 20 +
	Cells	80 per c.mm.
	Protein	80 mg. %
	Lange	5555543210

She received eight injections of two grammes of tryparsamide at weekly intervals. Shortly after her admission here she became dull, apathetic, and indifferent to her surroundings. Thereafter she improved somewhat and became more cheerful and active again. She worked in the ward quite well, and on the whole got on fairly well with the other patients. She remained very emotional, and was easily upset. She was constantly asking to be allowed to go home, and was therefore discharged on 29.8.24 against advice. She returned to hospital two days later, very emotional and depressed again, and was readmitted. She rapidly improved and appeared to settle down here. After a few days she was found trying to smuggle out of hospital, with the aid of her husband, some of the other patients' property. Previously she had shown a tendency to pilfer their property. Thereafter she became more irritable and emotional, and could not get on with the others. Her memory remained impaired, and her physical signs were unchanged. On 11.9.24 she was discharged to the care of her husband. He was advised to have her admitted to the observation ward, should she become unmanageable at home. The serological findings after treatment were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 8
	Cells	10 per c.mm.
	Protein	80 mg. %
	Lange	555554320

She appeared, after her discharge from here, to show some improvement and was able to look after her home until the last week in December, 1924, when she became dull and suspicious. She then stated that her neighbours were against her and were working on her with wireless. At times she became very noisy and violent, necessitating her admission to the infirmary. She was removed to Horton Mental Hospital on 16.1.25. The following notes were extracted from their clinical record.

16.1.25. On admission she was emotionally very unstable. She had auditory hallucinations, and expressed numerous delusional ideas regarding her neighbours. She had ideas of grandeur, and would frequently talk of her husband's wealth, then, a short time later, would state that he was a labourer. She was constantly accusing the staff of using her cheque book. Frequently she was very noisy, and her language was obscene. She showed considerable deterioration. Her memory was impaired for both recent and remote events, and she was not clearly oriented. There was no sensory abnormality, and her gait was steady. Her deep and superficial reflexes were present and reacted normally. She had unequal pupils, which reacted very sluggishly and unequally to light.

30.5.25. She was to-day inoculated with malaria.

16.6.25. She has had twelve rises of temperature to 104° or over. On six occasions she reached 105°. Quinine was administered to-day. Her mental state showed no change.

22.6.25. C.S.F. W.R. + 8
Cells 40 per c.mm.
Protein 120 mg. %
Lange 5554432100

22.12.25. She remained very noisy. She had auditory hallucinations and was deluded. She stated that they brought her children here, and murdered them beneath the floor. Frequently her answers to questions were incoherent and irrelevant. She was fatuously happy and showed no interest in anything.

29.12.26. She was still acutely hallucinated, and frequently talked to imaginary persons. At times she was very resistive and would not speak at all except in terms of abuse. There was no change in her physical signs.

16.10.27. She remained abusive and resistive. She showed marked deterioration, and her memory for both recent and remote events was grossly impaired. She was completely disoriented. Her language frequently was very obscene. Physically she was in fairly good condition.

24.12.28. She was dull and took no interest in anything. If spoken to she usually became very abusive. She was still hallucinated, and carried on conversations with imaginary people. Frequently she was impulsive. It would appear as if the progress of the disease had been arrested.

19.10.29. There was no change in her mental state. She was fatuously happy. Quite frequently she became noisy and impulsive towards the other patients and the staff. She remained hallucinated. She was disoriented for time and place. Her memory was markedly impaired for both recent and remote events. She had no insight whatever. Her physical state remained quite good. The only change in her physical signs was that her pupils were now equal and did not react to light, whereas previously their reaction to light was sluggish.

Comment : A case of general paralysis of the simple type whose mental symptoms had been present at least five months prior to treatment. She received eight injections of two grammes of tryparsamide, and thereafter showed slight serological and clinical improvement. The clinical improvement was maintained only a very short period. Thereafter she relapsed and has been in a mental hospital since. She was included in the unimproved group.

Case 27. O. de L. Admitted 10.11.24 Occupation Russian Army Officer Age 31.

Patient had been married ten years and had one child, aged two years, alive and well. As far as his wife knew he had enjoyed very good health all his life. Eleven years ago he contracted syphilis and received at the time (in Russia) medicinal treatment. Exactly what this was it was impossible to find out. He acted as an official interpreter during the Great War and until he was demobilised in 1919. There was no history of any of his relatives having suffered from any nervous or mental disorder.

Fourteen months ago he consulted his doctor and complained that he did not feel well. He was very talkative and rather grandiose, and this led to his blood Wassermann reaction being done, which was found to be positive. His doctor then gave him eight weekly injections of salvarsan. He gradually became more grandiose. He wrote letters to himself supposed to be from the Grand Duke Michael appointing him a general. His conduct became affected, and he went to the police station declaring he had orders to take over charge of that department. This led to him being sent to Claybury Mental Hospital, where he was admitted on 19.10.23. While there, he was reported as having been very grandiose and euphoric. He declared that he was the Czar of Russia and the Emperor of the Universe. His memory for both recent and remote events was very poor. He was disoriented in all spheres, and made gross mistakes of identity. His serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	100 per c.mm.
	Protein	200 mg. %
	Lange	555554321

4.11.23. He was inoculated with malaria to-day. After having had eight rigors quinine was administered, and he was given six intramuscular injections of neokharsivan at weekly intervals.

He remained very garrulous and grandiose. He very easily became excited. Declared the Shah of Persia had given him a pony, and he desired to compete in an exhibition of horsemanship. His memory was still markedly impaired, and he had little insight. He was discharged "relieved" on 3.6.24, under Section 72 of the Lunacy Act, to the care of his wife.

He attended the outpatient department, and was admitted to hospital on 26.6.24. His wife reported that since being in Claybury he had been less restless, but was still very grandiose. He was continually losing things, and his memory was very poor. On admission he was euphoric and very self-satisfied. He talked incessantly about his powers and his wealth. He had millions of pounds in Russia, and was related to the Czar. His memory for both recent and remote events was considerably impaired, but he was correctly oriented for time and place. Simple calculations he did with confidence, but he failed to see his many errors. His general physical condition was fairly good. There were marked tremors of hands, tongue, and face. There appeared to be some impairment of deep sensation in his calf muscles. His gait was steady, but Romberg's sign was slightly positive. His speech was markedly slurred. He had unequal, irregular pupils which reacted sluggishly to light, whereas on accommodation their reaction was brisk. The deep reflexes of his upper limbs were present, equal and active. His knee and ankle jerks were not obtained. The superficial reflexes were normal. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	100 per c.mm.
	Protein	125 mg. %
	Lange	5555432100

He was given eight intravenous injections of two grammes of tryparsamide in weekly doses. These were completed on 22.8.24, and he was then discharged. His condition showed

little change. He was euphoric, garrulous, and had no insight whatever. The physical signs were unchanged. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 20 +
	Cells	10 per c.mm.
	Protein	75 mg. %
	Lange	5544332100

A second course of tryparsamide was given and was completed on 30.12.24, when there was no material change to report in his condition. He was at home, but was not working.

A third course of eight injections was given and was completed on 4.8.25. He was reported then as still garrulous, euphoric, and bombastic. He was doing part-time work as an interpreter. There was no change in his physical signs. The serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 8 +
	Cells	30 per c.mm.
	Protein	70 mg. %
	Lange	1233222000

Patient thereafter ceased to attend. He reappeared on 5.7.26, when he came up to enquire about the result of the last test. He was still garrulous and euphoric. He wanted to know what treatment the Duchess of York had. He felt very well and was unduly self-satisfied. There were still marked tremors of hands and tongue. The pupils were unequal, irregular, and very sluggish in their reaction to light. The knee and ankle jerks were absent and there was no Rombergism. He refused further treatment.

19.5.27. In reply to an enquiry he attended to-day. He was still fatuous and euphoric, but appeared to be more in touch with his surroundings, and his grasp of current events was greater. His memory had improved somewhat, and he was correctly oriented. The physical signs were unchanged. He refused further treatment, and would not allow a specimen of his cerebro-spinal fluid to be taken. His blood was re-examined and the result was : Blood W.R. + 20.

A further enquiry was sent on 4.10.28, and, as a result, he attended here again. He was still very garrulous and distinctly euphoric. He spoke of the millions he had in capital in Russia. He called to see everybody throughout the hospital to tell them how well he was. His memory was fairly good, and he was quite well and in touch with his surroundings, but he had no insight. He spoke of several grotesque schemes which he had on hand, and it was somewhat difficult to see how he evaded being certified. There was no change in his physical signs. He was persuaded to come into hospital for one night, and his blood and cerebro-spinal fluid were re-examined. The results were :

Blood	W.R.	+ 20 +
C.S.F.	W.R.	+ 3 +
	Cells	4 per c.mm.
	Protein	35 mg. %
	Lange	negative

He was advised to continue treatment, and attended regularly thereafter. He received fourteen injections of three grammes of tryparsamide intravenously at weekly intervals. These were completed on 15.1.29. His mental condition showed little change. He talked to anyone who would listen, and was still very grandiose. He had done no work for several months. His general physical condition was fairly good. He still showed distinct tremors of his hands and tongue. There was an impairment of deep sensibility in the lower limbs, but no other sensory abnormality was made out. His gait was steady, but there was slight Rombergism. His speech was still definitely slurred. He had unequal, irregular, Argyll-Robertson pupils. The reflexes of his upper limbs were present, equal and active. The knee and ankle jerks were absent. His superficial reflexes reacted normally. He refused to come into hospital, so his cerebro-spinal fluid could not be re-examined.

Thereafter he ceased to attend. An enquiry was sent on 15.11.29, to which he replied that he had been working

for six months as standard-bearer of the British Legion. He regretted he could not attend for examination, but would advise me when it would suit his convenience. A social worker visited, but unfortunately his wife was not at home. The patient was seen. He was very talkative and very bombastic. He stated he supervised the branch of the British Legion and if he absented himself the others would do no work. In the evenings he canvassed new members. He appeared to the social worker to be fairly well in touch with current events, and discussed topics apart from himself more rationally. His memory was fairly good. He had no insight whatever. He agreed to attend for examination early in the new year.

Comment : A case of tabo-paresis with numerous grandiose ideas, whose mental symptoms had been present for at least two months prior to his removal to a mental hospital. He was treated with malaria, and showed a slight clinical improvement thereafter. He was removed by his wife against advice. Since then he has received the equivalent of thirty-three injections of three grammes of tryparsamide. He showed marked serological but slight clinical improvement. He was included in the group of patients showing a partial remission (stationary group).

Case 28. H.E.M. Admitted 5.1.25 Occupation Clerk Age 39.

Patient had been married fourteen months and had no children. He acquired pulmonary tuberculosis while on service during the Great War and received a fifty per cent. disability pension. He contracted gonorrhoea eleven years ago, but was not aware of any syphilitic infection, and he had no treatment other than local treatment for gonorrhoea. There was no history of any nervous or mental disorder in his family.

His present illness began four months ago following upon the death of a sister. She died of tuberculosis, and he began to fear a similar fate would be his lot. Prior to that he had always been bright, active and cheerful. He became dull and lost interest in things. Then he became very forgetful, and could not succeed with his work.

On admission he was very depressed and retarded. He stated that everything had been a trouble to him and he could not concentrate. His memory he found was poor, and he forgot to do things, mislaid things, and easily got muddled. He answered questions with great hesitation, and he was very self-reproachful. He was correctly oriented for time and place. His memory was markedly impaired, more for recent than remote events. Simple arithmetical calculations he could not do, and he made many gross errors in taking seven serially from one hundred. His physical condition was fairly good. He showed marked tremors of his tongue and hands. There was no impairment of sensation, and his gait was steady. His pupils were equal, regular, and in their reaction to light they were very sluggish. His deep reflexes were equal and brisk. The superficial reflexes gave a normal response. His speech was slow and deliberate, but he managed the test phrases successfully.

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 20 +
	Cells	80 per c.mm.
	Protein	100 mg. %
	Lange	5555432100

He received five weekly injections of two grammes of tryparsamide.

Six days after admission he became very excited and restless. He became auditory hallucinated, and rushed about his room in obedience to the commands which he stated came from a high authority. At times he was very noisy, abusive and impulsive. He remained in this state for two weeks. He then quietened down somewhat, but remained hallucinated, though these influenced his conduct less than formerly. He was completely disoriented, and could not state how long he had been here. He declared he felt very well, and he possessed no insight whatever. A week later he again became very noisy and violent towards the other patients and staff. He was very excitable, rushed about, and would not remain in bed, and consequently his relatives were requested to have him removed to the infirmary. He was discharged from here on 11.2.25, and later admitted to Bexley Mental Hospital. The following notes are extracted from their clinical record.

He was admitted on 14.2.25, and was very restless, excited and resistive. He would not answer questions, but rushed about his room demanding to see the King of France. He had auditory hallucinations, and he stated that he received messages from above and it was his duty to act on them. He frequently had visions. Last night he had the vision of a new war, and feared he would be arrested for not joining up. The physical signs found were the same as those found in examination here.

10.3.25. He remained noisy, destructive, and very restless, frequently rushing around to obey his hallucinations. He was inoculated to-day with five c.cs. malarial blood intramuscularly.

After five rigors this was discontinued owing to his weak state and remembering that he had an old tubercular lesion.

9.5.25. He was reported as being much better. He was able to be up and worked well in the stores. His conversation was rational, and his memory was improving. Periodically he developed some oedema of the lower limbs, but his urine contained no abnormal constituents. His serological reactions were :

Blood	W.R.	+ 40
C.S.F.	W.R.	+ 8 +
	Cells	50 per c.mm.
	Protein	80 mg. %
	Lange	4432100000

On 14.5.25 he was allowed out on trial for four weeks. At the end of that period his improvement had been maintained and he was discharged to the care of his wife.

When discharged from Bexley he was advised to attend the outpatient department of this hospital if he should at any time feel ill. Nothing was heard of him till May, 1927, when in reply to enquiry he came here. He had been working regularly as a clerk in the Civil Service since July, 1925, and had been feeling fairly well, though at times he got a little sleepless and feared he might have a relapse. His wife was anxious for him to attend here as he had not recently been quite so cheerful. He conversed rationally and intelligently. His speech was quite clear, and there was no evidence of any delusional ideas whatever. His memory was good, and he was oriented in all spheres. Arithmetical calculations he did perfectly. Physical examination showed some tremors of his hands and around the angles of his mouth. There was no sensory impairment, and no abnormality in gait. His pupils were equal, regular, and showed practically no response to light, but reacted actively on accommodation. The superficial and deep reflexes were present and reacted normally. His

serological reactions were :

Blood	W.R.	+ 20 +
C.S.F.	W.R.	+ 8 +
	Cells	30 per c.mm.
	Protein	60 mg. %
	Lange	0001111000

He was advised to resume treatment, and it was decided to give him tryparsamide. After three injections he failed to attend here owing to an attack of influenza, and was lost sight of till the following year. An enquiry from here reached him when he was not feeling quite so well, and so he came along for an interview. He complained of sleeplessness. This may have resulted from extra work and responsibility, as he was very busy at that time and was doing a lot of night work. Apart from this, he appeared well. His sensorium was clear, and he conversed rationally and intelligently. His memory was good, and he was correctly oriented. His physical signs remained unchanged. His serological reactions were :

Blood	W.R.	+ 40
C.S.F.	W.R.	negative
	Cells	4 per c.mm.
	Protein	30 mg. %
	Lange	0001111000

He was again advised to have further treatment, which he agreed to do, and started on 31.10.28 a series of weekly injections of three grammes of tryparsamide. On 6.2.29 he had received twelve injections, and his clinical improvement had been maintained. The serological reactions then were :

Blood	W.R.	+ 13
C.S.F.	W.R.	negative
	Cells	4 per c.mm.
	Protein	20 mg. %
	Lange	negative

He continued to attend regularly, and on 30.7.29 he had received a further eighteen injections. He was working and felt quite well. He was admitted to hospital for one night, and his blood and cerebro-spinal fluid were re-examined. The findings were :

Blood	W.R.	negative
C.S.F.	W.R.	negative
	Cells	3 per c.mm.
	Protein	20 mg. %
	Lange	negative

In view of these findings the injections were discontinued. In reply to an enquiry he attended on 7.12.29. His wife reported that he had been working regularly as a clerk since 1925, and that so far as she could see he was now normal. She considered he had benefited greatly since he had his injections. He had been off work for a week on account of herpes affecting the right side of his face, but this was improving and he had resumed duty. On examination he was bright and cheerful. He conversed rationally and intelligently. His memory for both recent and remote events was good, and he was correctly oriented in all spheres. His grasp of general information and current events was fairly good. According to the Binet Simon tests he had a mental age of fourteen years and three months. He was in fairly good bodily health, and there was no evidence of tuberculosis made out in his chest. He had an extensive herpetic eruption over the right side of his face, which caused him much pain, and he was feeling rather out of sorts. He showed fine tremors of his tongue, but none of his hands. There was no sensory abnormality. His gait was steady, and there was no Rombergism. He had unequal, regular, Argyll-Robertson pupils. The deep reflexes were present, equal and active. His superficial reflexes were normal. Owing to his recent incapacity and the fact that he had not quite recovered therefrom, his blood and cerebro-spinal fluid were not re-examined. He promised to attend again early in the year for lumbar puncture examination.

Comment : A case of general paralysis of the manic type whose mental symptoms had been present at least four months prior to treatment. He was treated with tryparsamide, but owing to his excited state he had to be discharged and was admitted to a mental hospital. There he received malaria, and thereafter

showed clinical and serological improvement and was discharged. Since then he has received further injections of tryparsamide. Altogether he has had the equivalent of thirty-six injections of three grammes. His clinical improvement has been maintained, and his serological reactions are normal. He was included in the group of good remissions.

Case 29. L.M. Admitted 22.1.25 Occupation Salesman Age 48.

Patient had been married fourteen years and had one child, aged thirteen, alive and well. His previous health had always been good, and he had had no serious illness. Twenty years ago he contracted syphilis, and for a few months thereafter he received intramuscular injections from his doctor. None of his relatives were said to have suffered from any nervous or mental disorder.

His present illness began about three months ago, when he complained of feeling easily tired. His wife noticed a change in his manner. He was very irritable and easily upset. He complained of feeling the extra rush at Xmas time very much, and seemed then very muddled, but he was able to remain at work. Three weeks ago he had a seizure, when he was unconscious about half-an-hour and could not speak afterwards for several hours. He became very restless, and was removed to the infirmary where a blood test was done and gave a positive Wassermann reaction. There was no paralysis, but his speech remained slow and slurred, and he appeared to have lost grip with his surroundings.

On admission he was very garrulous and mildly elated. Emotionally he was very unstable and varied rapidly from laughter

to tears. There was no evidence of delusional or hallucinatory ideas. His memory was distinctly impaired, more for recent than remote events. He was correctly oriented. Simple calculations he was unable to do, and he made numerous gross errors in taking seven serially from one hundred. His general physical condition was fairly good. There were marked tremors of his tongue, face, and hands. There was no evidence of any sensory impairment. He had unequal, irregular, pupils, which reacted well on accommodation but were very sluggish in their reaction to light. The deep and superficial reflexes were present and normal in their reaction. His speech was distinctly slurred. The serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	138 per c.mm.
	Protein	150 mg. %
	Lange	5555543210

He received eight intravenous injections of two grammes of tryparsamide at weekly intervals.

He improved under treatment and felt much better. His flow of talk was very rapid but was intelligent, and his attention was easy to hold. There was marked improvement in his memory. He became somewhat hypochondriacal and complained of various bodily aches and peculiar sensations for which no physical basis could be found. There was no change in his physical signs. He was discharged from hospital on 16.4.25, and was advised to attend the outpatient department. An attempt to lumbar puncture him was unsuccessful. His Blood W.R. was + 40 +.

He attended the outpatient department at irregular intervals until September, 1926, when he appeared to be relapsing, and his admission to the infirmary was advised. He was always loquacious, and complained of various bodily aches and pains for which there could not be found a physical basis. His general health appeared good, but he had done no work since his discharge from here.

He was admitted to Colney Hatch Mental Hospital on 16.10.26. He was reported as being self-satisfied, elated, and overactive. He was lacking in the power of attention and fabricated freely. His memory for recent and remote events was very poor, and he was disoriented for time and place. He was visually hallucinated, and expressed numerous fantastic delusional ideas. He was very bombastic, dictatorial, and frequently interfered with the other patients. He was very garrulous, and declared he never felt better in his life. Of his physical strength he made great claims. He stated that he could lift the heaviest lorry by the rear wheel. There was no change in his physical signs. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	10 per c.mm.
	Protein	125 mg. %
	Lange	555555321

12.11.26. Inoculated to-day with malaria, three c.cs. of blood were given intravenously. There was no record as to how many rigors he had. Quinine was administered on 29.11.26, and thereafter he received six injections of neekharsivan.

15.1.27. He was still euphoric, grandiose, and self-satisfied. He was correctly oriented as to time and place. His memory was much impaired, and his conversation at times was rambling and incoherent.

Thereafter he appeared to improve slightly. On 16.8.27 he was reported as showing some improvement mentally, but was still unduly garrulous and boastful. He was correctly oriented, but his memory was still impaired. His wife applied for his discharge and this was granted under Section 79, on 23.9.27.

Three days later he attended the outpatient department of this hospital. He was then distinctly euphoric and very garrulous. He declared that he never felt better in his life,

then shortly thereafter he asked for something to "buck him up". His memory for both recent and remote events was very poor, and he was unable to do simple arithmetical calculations. He was correctly oriented for time, place, and identity.

Thereafter nothing was heard of him until March, 1929, when he reappeared in the outpatient department. He had done no work since his last visit here. He was then very garrulous and somewhat confused. He was disoriented for time and person. His memory for recent and remote events was very poor. He believed he was financially well off, and declared he was related to the "Master of the Mint". Physical examination showed small, unequal, irregular pupils, which reacted very sluggishly to light. There were marked tremors of his hands and tongue. His speech was very slurred. The deep reflexes were all present, equal and exaggerated. The superficial reflexes were normal. His admission to the infirmary was recommended.

He was readmitted to Colney Hatch Mental Hospital on 15.3.29, and the following notes were extracted from their record. His condition was similar to that observed here a few days previously. He became rambling and inconsequent in conversation, and had many grandiose delusional ideas. He declared that he was related to the Grand Duke, and that he was in charge of the Mint. His health, he stated, was perfect and he never felt better.

8.4.29.	Blood	W.R.	negative
	C.S.F.	W.R.	+ 20 +
		Cells	70 per c.mm.
		Protein	125 mg. %
		Lange	5555543210

31.5.29. Treatment by tryparsamide was commenced to-day. He received nine weekly doses of three grammes, which were completed on 2.8.29.

14.11.29. He was reported as being euphoric and overactive. Emotionally he was very unstable, irrationally happy and pleased

with himself. He was entirely lacking in judgment. There was, on the whole, little change in his condition. He worked in the ward, was facile and self-satisfied. His memory for recent events showed some improvement, and he was correctly oriented. His general physical condition was fairly good. There were marked tremors of hands and tongue. No sensory abnormality was made out, and his gait was steady. He had unequal, irregular, Argyll-Robertson pupils. The deep and superficial reflexes were normal. His speech was still slurred.

Comment : A case of general paralysis of the simple type whose symptoms were present for at least three months prior to treatment. He received eight injections of two grammes of tryparsamide, and showed slight clinical improvement. Later he relapsed and was admitted to a mental hospital, where he was treated with malaria, and has since had nine injections of three grammes of tryparsamide. He was still in the mental hospital, and was included in the unimproved group.

Case 30. Mrs.L.H. Admitted 24.5.25 Occupation Housewife. Age 25.

Patient had been married two and a half years and had one child aged six months alive and well. Her husband stated that she had had a macerated foetus before he knew her. She denied ever having had any venereal disease, sore, vaginal discharge or ever having noticed her hair coming out. Her husband had known her for eighteen months before marriage, and as far as he was aware she had always enjoyed good health. There was no history of any nervous or mental disorder in her family.

The onset of her present illness had been rather insidious. Seven months ago, about three weeks before her confinement, she became peculiar in her behaviour. She was careless in her personal appearance and neglectful of her home. She seemed dazed and preferred to stay in bed playing with the bed clothes to dressing. At times she would pick them up and deposit them in another place in the room, then suddenly jump on a chair saying she saw fire behind her. She would rush out into the street shouting out that her husband gave her no food and ill treated her.

On admission she was fatuous and appeared quite contented. She lay in bed displaying no interest in anything and resented being disturbed. Her replies to questions were accompanied by foolish laughter and she was quite indifferent. She expressed vague ideas about her neighbours all being against her. There was no evidence of hallucinations. Her memory for both recent and remote events was markedly impaired. Simple calculations she was unable to perform and she made many gross errors in taking seven serially from one hundred. She had no insight whatever. Her general condition was fairly good and she was quite well nourished. She showed

marked tremors of her hands and tongue. Her gait was steady and there was no abnormality of sensations. She had unequal irregular, Argyll Robertson pupils. All the deep reflexes were present and reacted briskly. The superficial reflexes were normal. Her speech was slow and slurred. The serological findings were :

Blood . W.R. + 40
C.S.F. W.R. + 40 +
cells 150 per c.mm.
Protein 200 mg.%
Lange 555554332.

She received eight intravenous injections of two grammes of tryparsamide at weekly intervals. Thereafter her mental state showed distinct improvement. She became more active and interested in her surroundings. She worked well in the ward. Her conversation was rational and she could give a coherent account of her illness. There was no evidence of delusions or hallucinations.

On 24.8.25 she was inoculated with malaria by mosquito. The following were the details of her fever :

6.8.25	temperature	103.4
7.8.25	"	102
8.8.25	"	102.8
9.8.25	"	102.6
10.8.25	"	102
11.8.25	"	101.2
12.8.25	"	103.8
13.8.25	"	102
14.8.25	"	103.6
15.8.25	"	105
16.8.25	"	104.6.

On 16.8.25 she had had eleven rigors and quinine was administered in ten grain doses three times a day. Thereafter her physical condition improved rapidly.

She was discharged from hospital on 12.10.25. She was then distinctly better. Though quiet and rather simple minded she was optimistic about the future. Her answers to questions were relevant and coherent and there was no evidence of delusional ideas. Her memory was still impaired, more for recent than for remote events. She was correctly oriented

in all spheres. Simple calculations she did successfully but in taking seven serially from one hundred she made gross errors and did not appear to appreciate these. The physical signs were unchanged. An effort to do a lumbar puncture examination was unsuccessful. Her blood W.R. was + 40 +.

Nothing further was heard of her till 19.5.27 when in reply to an enquiry she attended the out-patient department. She stated that she had been unable to afford her travelling expenses to come here, and that was responsible for her absence. She had been quite well and discharged her duties at home satisfactorily. She talked rationally and coherently but was rather facile. There was no evidence of delusional ideas. Her grasp of general information and current events was poor. Her memory though improved was still not very good. She was well oriented in all spheres. She still failed badly in taking seven serially from one hundred. Her general physical condition was quite good. Her appetite was good and she was sleeping well. There were slight tremors of her hands and tongue. Her speech was good and she managed the test phrases alright. Her pupils were irregular, unequal and very sluggish in their reactions to light. The deep and superficial reflexes were normal. Arrangements were made for her to come into hospital for one night for lumbar puncture examination. Her blood W.R. was + 40 +.

19.8.27 As she did not keep her appointment an enquiry was sent and she attended today. She stated there was illness at home and she would return in four weeks time. Her clinical improvement was maintained.

Nothing further was heard from her. She failed to answer any enquiries or keep appointments so the social service worker visited her on 10.12.29. Her husband stated that patient had received no further treatment and was nervous of attending hospital. She had remained very well and discharged

her household duties efficiently. Three weeks previously she had had a second child. The patients appeared to the social worker active and cheerful. She was very proud of her baby. It looked clean and well cared for. The home was well kept. She promised to attend here after Christmas. Her mother-in-law was also seen and she stated that patient had kept wonderfully well but had occasional "waves" when she said everything seemed queer. She did housework quite well and was bright and cheerful.

Comment : A case of general paralysis of the simple type whose symptoms were present for at least seven months prior to treatment. She received malaria and eight injections of tryparsamide and has since shown marked clinical improvement. She has been included in the group enjoying a good remission.

Case 31. H.P. Admitted 4.10.26. Occupation Garage Worker. Age 44.

Patient had been married thirteen years and had two children alive and well. He contracted syphilis twenty-two years ago but received no treatment. His health was very good until two years ago when he developed an ulcer on the inner angle of his left eye which was treated successfully with carbon dioxide snow at a general hospital. It was said to have been a rodent ulcer. About this time he was rather dull and moody but improved when his eye condition began to improve. A brother was said to have had a nervous breakdown but from this he recovered and had been quite well for several years. Otherwise the family history was negative.

His sister dated the onset of his illness to four week ago although for some months previously he had been very irritable. The first symptoms were a difficulty in speaking and an inability to get the words he wanted and he had to give up his work. These symptoms lasted only a few days but thereafter he became dull and apathetic. He declared that he was being poisoned and that crowds were watching him wherever he went. He was very forgetful and would frequently have outbursts of laughing for no apparent reason.

On admission he was talkative and distinctly over-active. His mood was one of mild euphoria, but he was very unstable and would quickly pass from laughter to tears. He maintained he was quite well and rambled about various events in his life which appeared to have little association and made glaring inconsistencies about dates. His memory for both recent and remote events was impaired considerably. He failed on simple arithmetical calculations. Asked to take seven serially from one hundred he suggested six hundred, then one hundred and three. His general physical condition was not

very good. He showed marked tremors of hands and tongue. There was no sensory abnormality. His gait was steady and Romberg's sign was negative. He had unequal, irregular Argyll Robertson pupils. The deep reflexes were present, equal, and active. The superficial reflexes were normal. His speech was markedly slurred and he failed on the test phrases. The serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	75 per c.mm.
	Protein	125 mg. %
	Lange	555555431

On 10.10.26 he was inoculated subcutaneously with 1 c.c. of blood from a patient suffering from relapsing fever. On 17.10.26 he had his first rise of temperature which rose on the 18th to 104.2°. It came down by lysis and reached normal on the evening of the 20th where it remained till the 26th when it rose again. This second attack of fever began nine days from the commencement of the first attack. His temperature remained elevated till the 31st when it again returned to normal. The highest temperature in this attack was 102.2° obtained on the 30th. On November 1st it rose again to 102.2° and reached on November 3rd 103.2°. It remained elevated till November 5th when it returned to normal. His physical condition by this time was not good and he looked very ill. He complained of pains in his head, back and legs. He had some tenderness over the lower edge of his spleen which was just palpable. He complained of pain in this region and also over his liver. His mouth was dry and his pulse soft and rapid (rate 120 per min.) It was considered advisable to curtail his temperature and he was given 1.5 grammes of tryparsamide. This was dissolved in 5 c.c. sterile water and was given intravenously. His temperature fell to normal that evening but rose again the next day. The following day on the 7th it was still high 102° and he looked very ill so he was given two grammes of tryparsamide intravenously.

His temperature remained high until the 9th when it fell to normal. His general condition then gave rise to considerable anxiety. His temperature remained subnormal till the 15th when it rose again to 101.4°. Another two grammes of tryparsamide was given and the temperature fell to normal. Thereafter weekly doses of two grammes were given intravenously and his temperature remained at a normal level. His physical condition gradually improved.

Immediately after his admission he became excited and very noisy. He was very restless, rushed about and would not stay in bed. He was very offensive towards the other patients, and the staff, and at times he was very impulsive. Frequently he accused the other patients of going out with his wife. He remained more or less in this state till he had his first attack of fever. During the days of his fever he was quieter and more manageable but between the first and second attacks of fever he again became excitable and very aggressive. At times his language was very obscene. He suffered from auditory hallucinations and his restlessness was largely due to his ~~effort to obey~~ these voices. He was very destructive and impulsive.

After his second relapse he became much weaker physically and thereafter his excitement quietened. He became very confused and remained so until after his fever ceased. His last pyrexial attack was on 15.11.26. In December he was still somewhat confused, and was unable to give the exact date or tell how long he had been here. His speech was slurred and he had difficulty in formulating his ideas. He was distinctly quieter than formerly but became at times rather irritable. He did not express any delusional ideas and there was no evidence of hallucinations.

He improved steadily and was much more manageable, though at times he got muddled rather easily. He was rather

off-hand and his insight was still deficient. He worked fairly well in the ward and showed a much greater interest in his surroundings. There was no evidence now of delusions or hallucinations. His memory was considerably impaired but he was correctly oriented for both time and place. He was very anxious to get home and agreed to attend as an out-patient for further treatment. He was discharged on 29.1.27. 3.3.27. Having completed his first course of tryparsamide consisting of the equivalent of twelve injections of three grammes he was re-admitted for serological examination. His sister reported he was much better. Formerly he had been irritable, excitable and dictatorial whereas now he took things as they came. He was quiet and well behaved, rather resentful that I should still trouble him as he was now perfectly well. He was working every day and had done so for seventeen months. He was still clear and alert but rather irritable and resentful. His sister, with whom he lived, reported great improvement, and he gave no trouble at all. His serological reactions were :

With the idea of rendering negative his serological findings he was advised to continue treatment. He resented this but attended for seven weeks and received seven further injections of three grammes of tryparsamide. He desired to cease for the Christmas period and would not thereafter continue.

In reply to further enquiries and a visit by the social worker he attended here on 23.11.29. He stated he had been in regular employment since he last came here and that he felt quite well, except for a buzzing noise in his ears which he would like to have investigated. He was therefore willing to come into hospital for one night for examination and the opportunity was taken to re-examine his blood and cerebro-spinal fluid.

He was bright, active and cheerful and conversed rational and intelligently. He had been actively employed in

a motor garage for two and a half years and in that period nothing abnormal in his conduct had been noted. His memory for both recent and remote events was good and he clearly remembered his stay here. His insight was fairly good though he was not desirous of having any further injections should such be advisable. His grasp of general information and knowledge of current events showed that he was well in touch with everyday life, and was adequate considering his social class. Simple calculations he could do but he made several errors in subtracting seven serially from one hundred. He resented these tests as he could see no use in them. His general physical condition was good. The buzzing in the ears of which he complained was due to wax, and this was removed. He showed no tremors of his face, tongue or hands, and his speech was clear. There was no sensory abnormality and his gait was steady. His pupils were small equal, irregular and Argyll Robertson in type. The deep and superficial reflexes gave normal responses. His serological findings were :

Blood W.R. negative.
C.S.F. W.R. negative.
Cells 4 per c.mm.
Protein 25 mg %
Lange negative.

Comment : A case of general paralysis of the manic type who came under treatment one month after the symptoms of his illness appeared. He was treated with relapsing fever and tryparsamide. Of the latter he received the equivalent of thirty-three injections of three grammes. He showed marked clinical and serological improvement and has been included in the group enjoying a good remission.

Case 32. J.L. Admitted 21.10.26 Occupation Painter Age 39.

Patient had been married fourteen years and had five children, all of whom were alive and well. Shortly after his marriage he developed lead poisoning from which he made a good recovery. Apart from this his health had always been good. He contracted venereal disease twenty years ago but received no treatment other than local applications. None of his relatives had suffered from any nervous or mental disorder.

For many months his wife had noticed him to be very irritable but she dated the onset of his present trouble to six months ago when he became forgetful and inefficient at his work. He became more impatient and seemed to be indifferent as regards the quality of the work he did. Since then he had steadily become worse. Four weeks ago he bought a motor car though he really could not afford one. He stated that he could drive it without taking any lessons and consequently he had several accidents. He believed he was fabulously wealthy and became extravagant with his money.

On admission he was euphoric and bombastic. He declared he felt very well and never felt better in his life. He stated that he was worth lots of money and that he was going on a tour round the world. He had several jobs, on hand, which would bring him in thousands of pounds. His memory, both recent and remote, was impaired. He could not do simple arithmetical calculations. In taking seven serially from one hundred he took two and a half minutes and made several gross errors which he did not appreciate. He was disoriented for time but correctly oriented for place and identity. His general condition was good. Physical examination showed marked tremors of his hands and tongue. There was no sensory

abnormality and his gait was steady. His speech was distinctly slurred. He had unequal irregular Argyll Robertson pupils. His deep reflexes were all present, active and equal. The superficial reflexes gave a normal response. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40
	Cells	75 per c.mm.
	Protein	130 mg. %
	Lange	555555321

He was inoculated on 22.10.26 with relapsing fever. Three c.cs. of blood from an infected mouse were injected subcutaneously.

The following day he climbed over the fence and went home. His wife attended here and stated that he refused to come back here. She was advised to have him admitted to the infirmary if he became too difficult to manage at home. All information was given to his family doctor who offered to look after him and he was also offered treatment in the out-patient department.

2.12.26. Nothing further was heard of him till he presented himself in the out-patient department today. He was still euphoric and very pleased that he had left hospital and had his fever at home. He had had four attacks of fever lasting on each occasion 3-4 days. The third attack he felt most of all. The last one was ten days ago. No further particulars could be obtained except that his wife stated he was very "bad" in his third attack of fever. The doctor was approached but could give no further information than that the patient had had four attacks of fever, and the first two were the most severe. He was still tremulous and showed very little change mentally from his condition when admitted here. He felt well and did not want any further treatment. There was no change in his physical signs and he refused to have his blood and cerebro-spinal fluid examined again.

9.5.27. In reply to an enquiry he attended the out-patient department today. His wife reported that he had been distinctly better and had been working at his job since January of this year. He did that quite satisfactorily. On examination he was still somewhat overactive and mildly elated. He declared he never felt better in his life. He remembered clearly having been here and was still unduly pleased about absconding. He was much more in touch with his surroundings and appreciated his position. He was clearly oriented in all spheres. His memory for remote events was still markedly impaired. He showed marked tremors of his hands and tongue. The pupils were unequal, irregular and Argyll Robertson in type. His deep and superficial reflexes showed no abnormality. His speech was still slurred. He was persuaded to come into hospital for lumbar puncture examination and the serological findings were :

Blood W.R. + 40 +
C.S.F. W.R. + 20 +
Cells 50 per c.mm.
Protein 100 mg. %
Lange 5555432100

He was strongly advised to have further treatment and agreed to do so but did not reappear till 2.6.27 when his doctor sent him up as he had become dull and complained of various aches and pains.

He was re-admitted and tryparsamide injections were continued. These were given in two gramme doses, injected intramuscularly, twice weekly. Of these he received altogether twenty-three.

A few days after his admission on 2.5.27 he became more depressed. He stated that he was going to be tortured if he remained here. He became very resistive and was difficult with his food. His physical signs were unchanged.

27.7.27. He had become distinctly weaker physically. Mentally he was still depressed and very resistive. He was very

deluded, and expressed numerous persecutory ideas which made him at times very restless. He was exceedingly difficult with his food as he believed it was poisoned.

10.8.27. He remained dull, depressed and resistive. His physical state was weak and he was put on sick notice. His temperature remained elevated in the region of 100°F. Blood films were examined for the spirochaete of relapsing fever (spirochaete duttoni) and were quite negative. His blood and cerebro spinal fluid were re-examined and the results were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 20 +
	Cells	25 per c.mm.
	Protein	50 mg.%
	Lange	3322100000.

24.8.27 His condition had become progressively weaker. His temperature was 103° and he had developed a broncho-pneumonia. During the past week he had been quite inaccessible and he was at times very restless. No seizures had been noted and he passed water freely.

29.8.27 He became progressively weaker and died today. Strong pressure was brought to bear on his relatives to grant a post-mortem examination. Unfortunately they were orthodox Jews and the Rabbi would not give his consent. It was, therefore, impossible to force a post-mortem examination without refusing to grant a death certificate which I could not do.

Comment : A case of general paralysis of the euphoric, gradiose type, whose mental symptoms had been present for at least six months prior to receiving treatment. He was treated with relapsing fever and showed clinical improvement thereafter. He refused to have any further treatment until, after working for six months, he relapsed and had to be re-admitted to hospital. Thereafter he received twenty-three injections of three grammes of tryparsamide. He showed serological improvement but clinically he deteriorated and death was the outcome.

Case 33. P.W.P. Admitted 3.3.27 Occupation Salesman. Age 48.

Patient had been married nine years but has no children. Six years ago his wife became pregnant but this ended in a miscarriage. Fifteen years ago he contracted syphilis, for which he received medicine by the mouth and a few intramuscular injections, from his doctor. His blood he stated was supposed to have been negative when he joined the Army in 1916. Two years ago he suddenly became very confused and emotional but this passed off rapidly and no attention appeared to have been paid to the occurrence. Since then he had been quite well. His health otherwise had always been good. There was no history of any nervous or mental disorder in his family.

His present illness began two months ago, when following upon the Xmas rush in his shop he became excitable and accused one of his customers of stealing from the shop. Apparently this was unjustified. This state of excitement lasted a few days and then he quietened down again. He appeared fairly well till four weeks ago when he turned up at his work feeling very ill. He forgot what customers asked for gave them the wrong change, and consequently the manager sent him home. Since then he had not felt well. He had at times been very emotional and very forgetful.

On admission he was rather excited and distinctly euphoric. He never felt better in his life and talked of his great abilities as a salesman. He declared he had won all the prizes ever offered by his firm. Actually this was not so. His memory for remote events was fairly good but that for recent events was very poor. Frequently when talking he would suddenly stop and ask what we were talking about. Emotionally he was very unstable and he would be weeping one minute and laughing the next. On simple arithmetic he failed miserably

and he made several errors in trying to take seven serially from one hundred. When he reached fifty he gave it up and could do nor more. His physical state was poor and he complained of gastric pain and nausea. Nothing abnormal could be made out in examination of his abdomen. He showed marked tremors of his hands and tongue. There was no sensory impairment and his gait was steady. His speech was slow but the usual test phrases he enunciated clearly. He had small, unequal, irregular Argyll Robertson pupils. The deep reflexes were present, equal and active. The superficial reflexes gave a normal response. His serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	85 per c.mm.
	Protein	140 mg.
	Lange	555554321

He received twice weekly intramuscular injections of two grammes of tryparsamide.

On 30.4.27 he requested his discharge as he felt fit to work and he feared he would lose his job. He was, therefore, discharged to the care of his wife. His condition then was slightly better though he remained self satisfied and overactive. His memory was still distinctly impaired. Thereafter he attended once weekly and received an intramuscular injection of four grammes of tryparsamide. On 21.5.27 he had completed his first course of forty grammes and had resumed work. He was much more in touch with his surroundings and was discharging his duties satisfactorily. He talked rationally and coherently though somewhat elated. There was no change in his physical signs. His serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 20 +
	Cells	++
	Protein	++
	Lange	4432100000

He did not attend again until 25.8.27 when he reported that he had felt fairly well until two weeks ago when he began to feel rather muddled at his work. He was losing confidence in himself and felt apprehensive about the future. He also complained that his eyesight was not so good as formerly. Ophthalmoscopic examination showed signs of optic atrophy in each eye which had the characters of a primary atrophy. In view of this it was considered inadvisable to give further treatment by tryparsamide meantime. The question of malarial treatment was discussed with him and his wife and her consent obtained.

He was readmitted to hospital and inoculated on 26.10.27 with 3 c.cs. of malarial blood which was given intramuscularly. At that time he was mildly depressed and very apprehensive about the future. He feared that he would not be well enough to resume work again. His memory was still markedly impaired and he could not recall when he was discharged from here nor how long he had been able to work after his discharge. He was correctly oriented in all spheres though rather vague about dates. On simple arithmetical calculations he still failed. His grasp of general information was quite good but he easily got confused. Physically he showed distinct tremors of hands and he had unequal, irregular, Argyll Robertson pupils. The deep and superficial reflexes were still present, equal and somewhat exaggerated. His serological reactions were :

Blood	W.R.	+ 13 +
C.S.F.	W.R.	+ 8
	Cells	5 per c.mm.
	Protein	40 mg. %
	Lange	negative.

The course of his malarial fever was as follows :

2.11.27	temperature	105.6
4.11.27	"	103.6
6.11.27	"	104.2
8.11.27	"	104.8
10.11.27	"	104.4

12.11.27	temperature	105
14.11.27	"	103.8
15.11.27	"	103.6
17.11.27	"	103.8

Quinine sulphate grains ten three times a day was given on 19.11.27 when he had had ten rigors.

He was discharged from hospital on 24.12.27. His condition then was much improved. He was more active and cheerful but still got easily muddled. His memory for recent events was still impaired considerably and he found great difficulty in performing simple calculations. There was distinct improvement in his physical state and he was putting on weight.

On 26.2.28 he returned to the out-patient department. He had been working for six weeks and was very much better. His memory was distinctly improved and his wife reported that he seemed normal again.

Nothing further was heard of him till 24.10.28 when in reply to an enquiry he again attended here. His wife then stated his behaviour was normal, and he had been promoted to be head salesman in his store. On examination he was somewhat overactive and self satisfied. He declared he felt fine and never felt better. Apart from this mild degree of euphoria he conversed rationally and intelligently. His memory for both recent and remote events was quite good and his speed on arithmetical calculations surpassed mine. His physical signs remained unchanged from the previous examination. His serological reactions then were :

Blood	W.R.	negative
C.S.F.	W.R.	+ 8
	Cells	3 per c.mm.
	Protein	20 mg %
	Lange	negative.

With a view to rendering negative these findings he was advised to continue treatment. There were still signs of optic atrophy and it was decided therefore to give him

stabilarsan. He received three injections of 0.3 gm. and after the third he developed a well marked reaction. He had an extensive urticarial rash and complained of having been sick and vomiting. He was, therefore, given a rest for one month. He then received another injection of 0.3 gm. when he had the same reaction. I, therefore, decided to give him further tryparsamide and he commenced a course on 16.1.29. Since then he has received twenty-one injections of three grammes and there have been no untoward results. His sight has been tested frequently and has remained good. The last injection he received was on 12.6.29 at which time he was re-examined. His wife reported his behaviour was normal and his stomach was his only trouble. He had been working regularly as head salesman and discharged his duties satisfactorily. His physical condition was quite good but he complained of epigastric pain and occasional nausea and vomiting. Nothing could be made out abnormal in abdominal examination and a test meal gave normal findings. Mentally he showed marked improvement. He was still rather elated and self satisfied but his insight was good. He conversed rationally and intelligently. His memory was good and he was correctly oriented. He still showed some tremors of his hands and tongue. There was no sensory abnormality. His gait was steady and Romberg's sign was absent. There was no abnormality of speech made out. He had unequal, irregular Argyll Robertson pupils. The deep and superficial reflexes were present and reacted normally. His serological reactions were :

Blood	W.R.	negative.
C.S.F.	W.R.	+ 8
	Cells	3 per c.mm.
	Protein	20 mg. %
	Lange	negative.

He was going on holiday so treatment was discontinued. On 4. 9.29 his wife reported he had been admitted to the infirmary complaining of severe abdominal pain. A duodenal

ulcer had been diagnosed by X-ray examination. He was very unhappy and desired to come here. This was arranged and he was admitted on 6.9.29. His physical state then was extremely poor and he was very emaciated. He complained of severe pain in his abdomen and back. His abdomen was rather distended and there was generalised tenderness but nothing definite was made out by palpation. A test meal again gave negative results. He was too weak to have an X-ray examination at the general hospital. His bowels did not move regularly and observation showed alternating constipation and diarrhoea. He was examined by the consulting surgeon and arrangements were made for him to be admitted to King's College Hospital. There he became very distended and a laparotomy operation was performed. This revealed a cancerous growth arising from the splenic flexure with secondary growth throughout his abdomen. Nothing further was done. He gradually became weaker and died on 3.10.29

A post mortem examination was held. The brain was ~~not~~ obtained intact for more detailed examination. This has not ~~been~~ yet been completed by the pathologist.

Examination of the abdomen showed extensive cancerous growth throughout the organs.

Comment : A case of general paralysis of the euphoric type whose mental symptoms had been present for two months before treatment. He was treated with malaria and tryparsamide. Of the latter he received the equivalent of thirty-four injections of three grammes and showed marked clinical and serological improvement up to the time of his death from carcinoma of the alimentary tract. It was interesting to note that following his first course of tryparsamide he developed a primary optic atrophy, and that later to stabilarsan he showed a marked reaction. Later injections of tryparsamide had no untoward effects.

Case 34. C.J.H. Admitted 7.3.27 Occupation Traveller, Age 47.

Patient had been married twenty years and has one child, aged twenty, alive and well. His wife had one other pregnancy which terminated in a miscarriage. He was reported to have enjoyed good health until he joined the Army. While serving in the East he contracted dysentery and this has continued to trouble him at irregular intervals. He was said to have been demobilised in 1917 on account of pulmonary tuberculosis. He denied ever having contracted venereal disease but admitted having exposed himself to infection frequently. There was no history of any of his relatives having suffered from any nervous or mental disorder.

He had always been cheerful, energetic, ambitious and made friends very easily. In his present position he had been employed twenty years and was considered a very capable worker. His wife stated that he appeared perfectly well until two weeks ago when he was noticed to be rather irritable and he became very easily upset. A week ago he was promoted at his work to a post which he had been very keen on getting. Since then he has been very talkative, excitable and at times very emotional.

On admission he was in a state of excitement. He was very garrulous and expressed numerous grotesque delusions of grandeur. He had many schemes to make money. One of these alone was to bring him £40,000. He was quite satisfied as to the possibility of carrying out these ideas although they were most fantastic. He was very overactive and his attention was difficult to retain. There was no evidence of hallucinations. His emotional state fluctuated considerably and within a few minutes of being happy and elated he would

for no apparent reason, dissolve into tears. His memory for both recent and remote events was impaired, but he was correctly oriented. His general physical condition was fairly good. There were only slight tremors of his tongue noted. There was no sensory loss, but his gait was somewhat unsteady and there was slight Rombergism. He had equal, irregular, Argyll Robertson pupils. His deep reflexes were present, equal and active. No response was obtained from the abdominal reflexes. His plantar reflexes were flexor in type. His speech was fairly clear and he enunciated the test phrases alright. His serological reactions were :

Blood W.R. + 40 +
C.S.F. W.R. + 40 +
Cells 80 per c.mm.
Protein 130 mg.%
Lange 555554321

He received twenty-two injections of two grammes of tryparsamide. These were administered intramuscularly twice weekly, and the course was completed on 10.6.27.

During that period he showed no mental improvement. He was very restless and would not remain in bed. At times he became very noisy and abusive. He continued to express his grandiose delusional ideas. He had innumerable schemes to make money and promised each of the staff several thousands of pounds. He desired to go to the House of Commons, to speak there, as he believed he alone could solve the country's difficulties. There was no evidence of hallucinations. His memory remained impaired but he was correctly oriented. He was still very unstable emotionally. Frequently he interfered with the other patients and he was very difficult to manage. The physical signs remained unchanged. Three days after his first course of tryparsamide was completed he climbed over the fence and went home. He refused to return. He was excited and noisy and could not be managed at home so he was admitted as a voluntary boarder to Bethlem Mental Hospital. The

following notes, as to his condition there, were obtained from the Medical Superintendent. His condition on admission corresponded to that found in this hospital.

The serological findings on 20.6.27 were :

Blood W.R. + 40
C.S.F. W.R. + 40
Cells 40 per c.mm.
Noguchi ++
Lange 5544321000

20.7.27 He remained overactive and was difficult to manage. He was somewhat dictatorial and frequently he upset the other patients. He was very deluded and talked incessantly about his abilities and his wealth. Today he was inoculated with malaria. Three ccs. of infected blood were injected. The following rises of temperature and rigors occurred :

29.7.27	temperature	101.6°
31.7.27	"	104
1.8.27	"	105
3.8.27	"	104.8
5.8.27		104.8
7.8.27		105
8.8.27		103.4
9.8.27		105
10.8.27		104
11.8.27	quinine was administered today.	

No antisyphilitic remedies were employed.

On October 24th 1927 he had improved so much that he was allowed home on one month's leave. At the end of this period his wife reported he had been "quite normal". He appeared to be rather talkative and somewhat too genial, but, he discussed his illness with a good degree of insight, although he could remember nothing of his phases of excitement. The only abnormal physical signs then elicited were a sluggish reaction of the pupils on accommodation, no reaction to light, and slight tremors of his tongue. He was discharged on 30.10.27.

Nothing was heard of the patient until 30.10.28. Several enquiries had been sent to his relatives but were not acknowledged, so a social worker paid a visit. She found that he had remained well, and that he had been regularly

employed at his old job since February 1928. In his wife's opinion he was now quite well, mentally. He had had a recurrence of his old tubercular trouble and at the time of the visit he was attending King's College Hospital as an out-patient. His wife promised to try to persuade him to come to hospital to see me.

On 3.11.28 he attended the out-patient department. He looked well and he was bright and cheerful. He stated, however, that he was not feeling quite so well as he had done and that recently he had had a rather severe haemorrhage from his bladder. He told this, smiling all the time, and did not appear to appreciate the seriousness of the situation. His conversation was rational and his grasp of current events and general information was adequate. He had been regularly employed for eight months as a traveller for a large warehouse. His work was quite responsible and he apparently discharged it successfully. There was marked improvement in his memory which was now quite good for both recent and remote events. He had a fair degree of insight into his illness and the nature thereof. Of the acute manic phases he had no clear recollection. Arithmetical calculations he did with ease and quite correctly. His physical condition was fairly good. There were no tremors of his hands or tongue. His gait was steady, and there was no Rombergism. He has equal, irregular pupils which did not react to light and only reacted sluggishly on accommodation. The deep reflexes were present, equal and somewhat exaggerated. The superficial reflexes were normal. His speech was quite clear. A specimen of his blood was taken. He agreed to come into hospital later for further examination. The blood W.R. was + 40 +.

He did not return as arranged, nor was any reply obtained to any enquiries sent to him and his relatives.

The social worker visited the home again in November 1929. She was not welcome on this occasion. The wife was seen and she stated that they were endeavouring to forget about her husband's illness and consequently they did not desire to hear from the hospital. It was pointed out that the interest displayed in him was for his own benefit and it might be that he should have further treatment. Thereafter she became more amenable. It was learned that he had remained well and his wife saw nothing abnormal in his behaviour or conversation. To her he appeared normal and he was working regularly. His physical state had improved considerably and he had had no recurrence of his bladder trouble. She stated that he was unwilling to attend the hospital again. He was invited to come but he had not done so.

Comment : A case of general paralysis of the manic type whose symptoms had been present for two weeks prior to treatment. He was treated with malaria and tryparsamide. ~~very little~~ ~~of the latter~~ he received twenty-two injections of two grammes. ~~his irritability.~~ He showed marked clinical improvement. No serological examination was made after his fever. A serological examination was made after treatment by tryparsamide and prior to his having malaria. This showed slight improvement. He has been included in the group enjoying a good remission.

Case 35. P.K. Admitted 11.4.27 Occupation Salesman Age 48.

Patient had been married eighteen years and had one child aged fifteen, alive and well. His wife had had no other pregnancies. He had enjoyed very good health and his wife was not aware that he had had any illness whatever. He denied ever having had syphilis or any other venereal disease. There was no history of any nervous or mental disorder in the family.

His present illness began about eighteen months ago when he had to give up work. The first symptoms were difficulty in speaking and a weakness of the right arm and hand. Thereafter he gradually deteriorated. He became very childish in manner and behaviour. He would frequently burst out laughing for no apparent reason, and became most irritable if he were crossed in anything. During the past few months he became more disinterested and apathetic, and his speech was very indistinct. He was very forgetful and this increased his irritability.

On examination he was fatuous and very childish. He could give no account of his illness and his memory for both recent and remote events was considerably impaired. He was disoriented for time, place and identity. Simple arithmetical calculations he was unable to do and to take seven serially from one hundred was beyond his ability. He showed marked deterioration. Physically his condition was poor. He showed marked tremors of his hands, tongue and face. It was impossible to test his sensation as he could not cooperate sufficiently. His gait was steady and his speech was very slurred. He had small, equal, irregular, Argyll Robertson pupils. The deep and superficial reflexes were present, equal and active. The serological reactions

were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	100 per c.mm.
	Protein	175 mg. %
	Lange	5555554321

His relatives were anxious for him to have malaria but his general state was considered too weak and it was decided to give him first an intensive course of tryparsamide. This was given in twice weekly doses of 2 grammes injected intramuscularly. His course was completed on 14.7.27, by which time he had received twenty-two injections.

His mental state remained unchanged. He alternated between states of euphoria and apathy passing readily from one to the other. In his dull apathetic state he was very resistive and frequently impulsive, attacking the other patients and the staff. He was unable to converse rationally and was frequently faulty in his habits. He showed no interest in his personal appearance and frequently exposed himself. There was no change in his physical signs. The serological reactions after this course of treatment were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	30 per c.mm.
	Protein	125 mg %
	Lange	5543211000

On 3.10.27 he was inoculated with malaria, three c.cs. of infected blood being injected intramuscularly. His physical condition had improved distinctly and he had put on weight. Mentally there was no change. The following are the details of his fever.

13.10.27	temperature	102.8
15.10.27	"	101.2
17.10.27	"	104.2
19.10.27	"	104.2.
21.10.27	"	105.6
23.10.27	"	104.2
25.10.27	"	106.2.
27.10.27	"	104.8
29.10.27	"	105.2
31.10.27	"	105
2.10.27	"	104.8

He had his eleventh rigor on 2.11.27 and quinine was (sulphate) administered on that date; five grains were given three times daily. He reacted to the fever quite well and his physical condition caused no anxiety.

He showed no improvement as the result of treatment. At times he was very excitable, noisy, and abusive towards the staff and other patient. His language was very obscene and he was very resistive. In his habits he was very degraded and it was found impossible to retain him here so he was discharged on 13.12.27. There was no change in his physical signs. His serological reactions after this course of treatment were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	50 per c.mm.
	Protein	125 mg. %
	Lange	5554321000

His wife arranged for him to go to Camberwell House Mental Hospital and he was admitted there on 13.12.27.

In reply to an enquiry on 11.10.28 the medical superintendent of that hospital reported that the patient's illness appeared to be progressing. He was extremely restless most of the time, and very destructive. In his habits he was very faulty. He had been unable to do any useful work since his admission there.

In reply to an enquiry sent recently it was reported that he had gone steadily downhill. He was unclean in his habits and there was progressive dementia. There was no record of his having had any further treatment nor of any further serological examinations having been made. He died on 22.7.29.

Comment : A case of general paralysis of the simple type who did not come under treatment until eighteen months after

onset of his illness. In spite of treatment by malaria and the equivalent of fifteen injections of three grammes of tryparsamide he showed no improvement clinically, and only very slight improvement serologically, there being a diminution in the number of cells and the percentage of protein together with a slight diminution in the intensity of the Lange curve. He died three years and nine months after the development of the first symptoms.

Case 36. J.J.B. Admitted 2.5.27 Occupation Police Constable Age 42.

Patient had been married fourteen years but had no children. So far as his wife knew he had always enjoyed good health. She noticed a change in him after he was discharged from the army in that he seemed more irritable and got upset rather easily. He resumed duty as a police constable and continued as such until the onset of his present illness. There was no history of any nervous or mental disorder in the family.

His wife dated the onset of his present illness to six months previous to his removal to the mental hospital in 1925. He became forgetful, and began to talk about how rich he was, and that he did not require to work. The climax came when he refused to obey the superintendent of the police and became abusive. He was examined by the police surgeon and his admission to the infirmary was recommended.

He was admitted to Banstead Mental Hospital on 7.3.25 and the following notes are extracted from their clinical records.

7.3.25. He was euphoric and expressed numerous grandiose ideas. He stated he owned much property worth many thousands of pounds. He did not require to work but did duty as a police constable merely as a hobby. His memory for both recent and remote events was grossly impaired and he was disoriented for time and place. His general physical health was poor. He had unequal pupils which reacted sluggishly to light. The deep reflexes were present, equal and somewhat exaggerated. The superficial reflexes were normal. His speech was very slurred. Romberg's sign was negative.

The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	150 per c.mm.
	Protein	150 mg%.
	Lange	555554321

15.10.25. There was no change in his condition and it was decided to treat him with typhoid vaccine. The following were the doses he received and the temperature reactions :

	<u>Typhoid vaccine</u> <u>injected intravenously</u>	<u>Temperature</u> <u>reaction</u>
20.10.25	50 millions.	103.4°
28.10.25	100 "	103.6
3.11.25	150 "	102
11.11.25	200 "	101.2
17.11.25	250 "	100
24.11.25	250 "	no reaction.

6.12.25 He felt much better, talked more rationally and ceased to express his delusional ideas. He was less tremulous.

22.2.26 He was distinctly better and displayed a much greater interest in his surroundings. He was slow in speech and this was very slurred. He was sociable, and played games. He had some insight and believed that there was something wrong with him when he came here. There was no change in his physical signs. He was discharged under section 79 "relieved" to the care of his wife who was anxious to have him home.

On his discharge from Banstead he was advised to attend the out-patient department of Maudsley Hospital which he did on 8.3.26. He was then somewhat fatuous and contented with his lot. He hoped to start work as soon as he could get a job. He did not appreciate his illness. His memory was impaired for recent and remote events but he was correctly oriented. There was no evidence of delusional ideas but in his outlook he was unduly self-satisfied. On simple arithmetical calculations he failed completely. He showed marked tremors of hands, face and tongue, and his speech was very slurred. There was no sensory impairment and his gait was steady. He had equal, irregular Argyll Robertson pupils. The deep reflexes were present, equal and exaggerated and the superficial reflexes were normal.

He attended at irregular intervals until 20.9.26 when he ceased to come. During that period no further change was noticed in his condition. He remained mildly fatuous but showed no evidence of delusions or hallucinations. He had no insight and his physical signs remained unchanged. Nothing was heard or seen of him until 25.4.27 when his wife brought him back here. She reported that he had been fairly well until a week ago. He was able to assist in the home and garden but had not had any outside employment since leaving Banstead over two years ago. He had become more forgetful and his speech was more slurred. Five days previously he had wandered away from home and was found two days later by the police on Epsom Downs in a very dazed state so she considered it advisable to have him re-examined.

On examination he was still rather self satisfied and appeared indifferent to his incapacity to get work. He kept on repeating that he was quite able to work alright and he was quite well. He was disoriented for time and place and his memory both recent and remote was very poor. He could not

give any account of his recent wandering. Simple arithmetic he was quite unable to do and he failed completely to take seven serially from one hundred. His physical condition was rather poor. He showed marked digital, lingual and labial tremors. His gait was somewhat unsteady but Romberg's sign was negative. There was no impairment of sensation. He had unequal, irregular, Argyll Robertson pupils. The deep reflexes were equal and somewhat exaggerated. The superficial reflexes were normal. His speech was very slurred and he failed completely on the test phrases. He was admitted to hospital for serological examination and the findings were :

25.4.27	Blood	W.R.	+ 40 +
	C.S.F.	W.R.	+ 20 +
		Cells	100 per c.mm.
		Protein	150 mg.%
		Lange	555555432.

He was thereafter given a series of injections of tryparsamide. These were administered in four gramme doses intramuscularly at weekly intervals. Unfortunately he developed an abscess at the site of one of his injections and this had to be drained. This series of injections was completed on 28.7.27 when he had had the equivalent of fifteen injections of three grammes. His physical condition showed some improvement and he was putting on weight. His mental state was one of euphoria but there were no definite delusions of grandeur. Insight was entirely lacking. His memory was still impaired but he was correctly oriented. The physical findings on 28.7.27 were :

	Blood	W.R.	+ 40 +
	C.S.F.	W.R.	+ 40 +
		Cells	50 per c.mm.
		Protein	120 mg.%
		Lange	5543211000

He failed to reply to any enquiries and so he was visited by the social worker. As a result he attended here on 8.11.28 His condition then showed little change from what

it was when last examined here. He was still fatuous and unduly self satisfied, but no evidence of delusional ideas was made out. His memory for recent events showed slight improvement and he was correctly oriented. He had not been able to do any regular active work but had been employed aiding in the household duties and working in the garden. There was no change in his physical signs. The serological findings on 8.11.28 were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 8
	Cells	10 per c.mm.
	Protein	50 mg. %
	Lange	3332211000

He was advised to continue treatment and on 8.8.29 he had received twenty seven additional injections of three grammes each. His wife reported that he seemed to her distinctly better. He had been unable to do any work and appeared contented to sit reading at home. He was quiet and easily manageable. If crossed, however, his language became most obscene. Further specimens of his blood and cerebro spinal fluid were examined on 18.9.29 and the results were :

Blood	W.R.	+ 13
C.S.F.	W.R.	+ 8
	Cells	5 per c.mm.
	Protein	35 mg. %
	Lange	negative.

He continued to attend at weekly intervals and has since received twelve injections. His improvement was maintained. His wife reported he had acted as watchman on a new building scheme for a few months but this was now finished and he was at home again. Apart from a degree of irritability he seemed much better. He was quiet but still had rather grandiose ideas. On examination he was still fatuous and unduly self satisfied. He stated he had been working regularly as a plasterer for which he received four pounds per week. His wife denied this absolutely. He felt

fine and had no complaints to make at all. His memory for both recent and remote events was still impaired but showed improvement from the last examination. His grasp of current events and general knowledge was poor. According to the Binet Simon tests he had a mental age of eight years and ten months. He was correctly oriented in all spheres. Simple calculation he was unable to do and he made many gross errors in attempting to take seven serially from one hundred. His general physical condition showed improvement. There were still tremors of his hands and tongue. No sensory abnormality was made out. His gait was steady and there was no Rombergism. The pupils were unequal, irregular and Argyll Robertson in type. The deep reflexes were equal and somewhat exaggerated. His superficial reflexes were normal. The serological reactions were :

Blood	W.R.	+ 13
C.S.F.	W.R.	+ 8 +
	Cells	6 per c.mm.
	Protein	45 mg. %
	Lange	5432110000

Comment : A case of general paralysis of the euphoric type whose mental symptoms were present thirteen months before treatment. He was then treated with protein shock and thereafter showed clinical but little serological improvement. He has since received the equivalent of fifty four injections of three grammes of tryparsamide and the serological improvement is now quite marked. He has been included in the partially remitted group.

Case 37. H.H. Admitted 2.5.27. Occupation Messenger Boy Age 16

Patient was the third child in a family of five. Between the birth of the second and third children his mother had four still-born children, and two others who only lived fourteen days. The other children enjoyed good health. His parents emphatically denied ever having had venereal disease. There was no history of nervous or mental disorder in the family.

The boy had been a full time child and his birth was normal. When nine weeks old he was found to have "paralysis of both shoulders". This was treated successfully at one of the general hospitals. He walked and talked at one and a half years and started school at the age of five. Nothing was noted abnormal in his behaviour or work there, and he was considered clever. The only neurotic trait noticed was that he was a "bed-wetter" until he reached the age of 12. He left school at the age of fourteen having reached the top standard and a school report obtained since the onset of his illness stated that he was considered an average scholar. He started work thereafter as a message boy and gave satisfaction. A year ago he complained of difficulty in seeing and was taken to an eye hospital where optic atrophy was diagnosed in one eye. The mother was told that he would not see with that eye again, but no further investigations were made.

He appeared to have been working well and feeling quite fit until three months ago when he began to complain of headache and a feeling of lassitude and weakness. He became dull and did not display the usual amount of interest in what was going on. His memory appeared to be becoming very defective and this chiefly affected recent events. It became

so bad that he had to give up work two weeks ago and since then he has become more apathetic.

On admission he was dull and had a very heavy expression. He lay in bed quietly and showed no interest in his surroundings. Insight was lacking and he declared that there was nothing wrong with him. His memory for remote events was quite good and he could give a detailed account of his school days and subsequent experience as a message boy. His recent memory was very poor. The day after admission he had no idea how long he had been here and he was disoriented for time and place. He frequently mistook identity and a few hours after seeing me stated he last saw me two years ago. Arithmetical calculations he could do quite well and he took seven serially from one hundred. He displayed a certain degree of apathy but this was more apparent than real. His physical condition was not good and he appeared younger than his years. He showed sexual infantilism. There were distinct tremors of hands and tongue. No sensory abnormality was noted. His gait was steady and his speech definitely slurred. He had unequal, irregular Argyll Robertson pupils. The visual acuity of his left eye was 6/6 but he was completely blind with the left and could not appreciate light from dark. He had a well marked optic atrophy in this eye and his right disc was also somewhat pale. The deep reflexes were all present and exaggerated. The superficial reflexes gave normal responses. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	90 per c.mm.
	Protein	130 mg. %
	Lange	5555432100

The ophthalmic surgeon reported that he had a beginning optic atrophy in his right eye and an advanced atrophy in his left. The appearance of the right eye was that of a degenerative process. There were signs of old choroiditis

and exudate in the vitreous. In the left there had been an antecedent inflammation as well.

After discussing these signs with the oculist, and in view of the fact that his relatives did not desire him to have malaria, it was decided to give the patient tryparsamide and he received 19 injections of two grammes intravenously.

During his stay here he was at times troublesome. He was easily upset and would often behave in a childish, sulky manner. He was most irritable and got into trouble with other patients. Emotionally he was very unstable and would frequently burst into tears for no obvious cause. It was considered he could attend as an out-patient and so he was discharged on 30.5.25.

His series of injections were completed on 22.9.27 but there was no change in his condition. His parents still refused to give permission for treatment by malaria. He was readmitted for lumbar puncture on 25.1.28 His parents then stated that he had been much better, and had been employed with his father delivering errands. He was less irritable. On examination he was still very childish but appeared to display a little more interest in his surroundings. He was still easily upset and his recent memory was markedly impaired. His serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 4 +
	Cells	8 per c.mm.
	Protein	60 mg.%
	Lange	negative

26.2.28. Permission was obtained from his relatives to treat him with malaria and he was today inoculated with infected blood (benign tertian) three ccs. being given intramuscularly. The following are the particulars of his course of malaria.

<u>Date.</u>	<u>Highest temperature reached.</u>
4.3.28	104.8°
5.3.28	101.8
6.3.28	104.6
8.3.28	105.2
10.3.28	102
12.3.28	104.8
13.3.28	100
14.3.28	104.2
15.3.28	102.2
16.3.28	104.2
17.3.28	101.4
18.3.28	104.4

He was allowed to have twelve rigors and then quinine sulphate was given in ten grain doses three times a day.

2.5.28. He made a good recovery from his malaria and his physical state was satisfactory. He remained, however, subject to variations in mood, was easily upset, when he became noisy and had temper tantrums. On the whole these had been less frequent. His memory for recent events appeared to be somewhat improved. There was no change in his physical signs.

His serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 3 +
	Cells	6 per c.mm.
	Protein	25 mg %
	Lange	negative.

He was advised to continue treatment and he attended as an out-patient weekly for intravenous injections of tryparsamide when he received three grammes in each dose.

7.3.29. He had had fifteen injections in this series. His mental condition remains unchanged from last report. The blood and cerebro-spinal fluid were re-examined today and the findings were :

Blood	W.R.	+ 20 +
C.S.F.	W.R.	+ 8
	Cells	8 per c.mm.
	Protein	35 mg.%
	Lange	2221110000

24.4.29. He had attended weekly for six months and was very

anxious to have a period of rest. Since last report he had had seven injections of three grammes, The serological findings were again estimated and were :

Blood	W.R.	+ 20 +
C.S.F.	W.R.	+ 3 +
	Cells	5 per c.mm.
	Protein	25 mg.%
	Lange	negative.

9.5.29. His injections had been discontinued since last report. Today he attended complaining of his left eye which was painful and he had a well marked interstitial keratitis. Thereafter he attended weekly and received a course of stabilarsan consisting of five injections of 0.3.gr. and four injections of 0.6 gr. within three weeks the inflammatory condition had subsided and it did not spread to the other eye. This course of injections was completed on 7.8.29. He ceased to attend thereafter until 27.11.29 when he was re-admitted for one night for re-examination.

His mother reported that his improvement had been maintained. He was much less irritable and got on well with the rest of the family. As to working he assisted his father doing errands but he was unable to do regular active work. On examination he was distinctly better than before treatment but he still remained facile and childish. His memory for recent and remote events was fairly good. Arithmetical calculations he could do and he took seven serially from one hundred. Insight was lacking. His grasp of general information and of current events was poor. According to the Binet Simon tests he had a mental age of ten years and six months. His general physical condition was improved and he had put on weight. He still showed distinct tremors of his hands and tongue. There was no sensory abnormality. His gait was steady and Romberg's sign was negative. His speech was still definitely slurred. He had unequal, irregular Argyll Robertson pupils. With his

Case 38. W.J.F. Admitted 19.5.27. Occupation Labourer Age 46.

Patient had been married fourteen years and had five children alive and well. His wife had had other four pregnancies. One terminated in a miscarriage, and the other three children died in infancy. As far as his wife knew he had always enjoyed good health and had had no serious illnesses. He contracted syphilis in 1906 for which a chemist prescribed and he had no other treatment. There was no history of any of his relatives having suffered from nervous or mental disorder. He had always been addicted to alcohol rather heavily.

His wife had noticed him become rather dull and forgetful for several months prior to the onset of his acute symptoms one week ago. These followed upon a seizure when he became unconscious for several minutes. Later that day he became very excited and could not be restrained. He rushed into the street and threatened to shoot the passers-by. He was very violent and this led to him being removed to the infirmary. From then he was admitted to Hanwell Mental Hospital on 19.8.24. He was then excited and very restless. He talked incessantly but was unable to keep to the point and could not give an account of his illness. He stated there was nothing wrong with him and he felt quite well. His conduct was irrational and he was always interfering with the other patients. He was completely disoriented and his memory was grossly impaired. Physical examination showed marked tremors of his hands, tongue and face. His pupils were unequal, irregular and did not react to light. The deep reflexes were all exaggerated. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	150 per c.mm.
	Protein	175 mg. %
	Lange	5555554320

He remained in this excited, restless, noisy and impulsive state for several months. He then subsided and became much quieter and more rational in conversation and behaviour. His memory especially for recent events was poor. Thereafter he gradually improved and was transferred on 18.2.25 to Claybury Mental Hospital for treatment with malaria.

On admission there he was reported as being fairly well in touch with his surroundings and was able to give quite a good account of himself. His memory was improving and he was correctly oriented for time and place. His physical signs were unchanged. The only additional feature recorded was that his speech was definitely slurred.

5.3.25 He was inoculated with two ccs. of malarial blood today.

24.3.25 He had his first rigor today.

5.4.25 Today he developed conjunctival jaundice and the fever was stopped. Three grains of quinine were given. His fever developed again on 22.4.25 and he was allowed to have further rigors until 1.5.25 when the fever was stopped by administration of quinine in ten grain doses three times daily.

5.6.25 He was unduly self satisfied and optimistic. He displayed a great indifference to his state of health and had no insight whatever.

10.6.25 Blood W.R. + 40 +
C.S.F. W.R. + 40 +
Cells 50 per c.mm.
Protein 125 mg.%
Lange 5555432100

23.7.25 He was discharged today "recovered" to the care of his wife.

Since his discharge from Claybury in 1925 he had been at home. Altogether he had only worked for four months and stated that he could not find any employment. He felt fairly well till about a month ago when he became rather dull and morbid. He attributed this to his domestic worries and

inability to get employment. As he appeared to be getting more depressed his wife brought him here for advice.

On examination his mental state was one of mild depression but no evidence of delusional or hallucinatory ideas were made out. He complained of vague bodily pains for which no physical basis could be found. He was rather garrulous but could give a coherent and intelligent account of his personal history and was quite in touch with his surroundings. His memory for recent and remote events was fairly good and he was correctly oriented in all spheres. His grasp of general information was not very good but corresponded to the average of his social class. Physical examination showed slight tremors of his outstretched hands but none of his tongue. There was no sensory loss and his gait was steady. He had unequal pupils which were very sluggish in their reaction to light but reacted actively on accommodation. His deep reflexes were present, equal and somewhat exaggerated. The superficial reflexes were normal. No abnormality was noted in his speech. His serological findings were :

Blood	W.R.	+ 20
C.S.F.	W.R.	+ 20
	Cells	50 per c.mm.
	Protein	100 mg.%
	Lange	5555421000

To obtain the specimen of cerebro spinal fluid he was admitted to the wards for one night. The following morning he had a seizure in which he lost consciousness. This lasted a few minutes and his pulse was imperceptible. He was, therefore, retained in hospital.

A series of injections of tryparsamide in four gramme doses at weekly intervals were given. These were given intramuscularly. Although he never actually developed

an abscess he frequently complained of stiffness and there was tenderness localised to the site of the injections.

He was retained in the hospital for ten days and then discharged to attend for injections as an out-patient.

10.8.27 His first course of tryparsamide was concluded on this date, he having received the equivalent of sixteen injections of three grammes. His mental state had improved and he was more active and cheerful in his outlook. He was somewhat hypochondriacal and rather facile. He described his various aches and pains with his usual garrulity. He had been working for the past few weeks as a labourer on a canal barge. There was no change in his physical signs. His serological reactions then were :

Blood	W.R.	+ 20
C.S.F.	W.R.	+ 20
	Cells	20 per c.mm.
	Protein	66 mg.%
	Lange	2211100000

Thereafter nothing was heard of him until 11.10.28 when in response to an enquiry he attended the out-patient department. He stated he had been working since he last attended here until ten weeks ago when he was dismissed on account of lack of work. He was rather fatuous and very garrulous, and always hoped to get work in the next few days. There was no evidence of delusional or hallucinatory ideas and he showed no further impairment to his condition when last examined. Physical examination showed slight tremors of his hands and tongue. There was no sensory abnormality and his gait was steady. His pupils were equal, irregular, and Argyll Robertson in type. The deep reflexes were present, equal and all were exaggerated. The superficial reflexes were normal.

His serological reactions were :

Blood	W.R.	+ 20 +
C.S.F.	W.R.	+ 8
	Cells	3 per c.mm.
	Protein	30 mg.%
	Lange	4443221000

He was advised to continue treatment and he had attended regularly since receiving injections of three grammes of tryparsamide intravenously. He was able to continue at his work though this tended to be irregular owing to climatic conditions and the state of unemployment. His outlook was always rather unduly optimistic but when he obtained employment he appeared able to retain it till the work was completed.

By 30.7.29 he had received thirty-six injections. His condition both physical and mental had improved somewhat but did not differ materially from the last report. His serological reactions then were :

30.7.29	Blood	W.R.	negative.
	C.S.F.	W.R.	negative.
		Cells	4 per c.mm.
		Protein	25 mg.%
		Lange	negative.

In view of these findings his injections were discontinued. Three months later he was invited to attend for re-examination which he did. His relatives reported great improvement in his condition and apart from a tendency to geth rather easily tired, he appeared normal. His work was as regular as might be expected from its nature. He was a labourer in the building trade and was engaged until each job was completed. His behaviour was normal and his habits were clean.

He talked rationally and intelligently. It might be said he was rather garrulous and self-satisfied and he was unduly optimistic. There was no evidence of delusional ideas and he had good insight into the nature of his illness. His memory for both recent and remote events was good and he

gave a good account of his past history. He was correctly oriented in all spheres. His grasp of current events and general information was adequate considering his social level. According to the Binet Simon tests he had a mental age of $13\frac{4}{12}$ years. He tended to rush at the various tests without first considering what he should do. His general physical condition was satisfactory. He still showed slight tremors of the face, hands and tongue. His gait was steady. He had small, equal, irregular Argyll Robertson pupils. The deep reflexes were all equal and exaggerated. His superficial reflexes were normal. His speech was clear and he managed the test phrases easily. The serological findings on 30.11.29 were :

Blood	W.R.	negative.
C.S.F.	W.R.	negative.
	Cells	3 per c.mm.
	Protein	25 mg. %
	Lange	negative.

Comment : A case of general paralysis of the manic type treated by malaria and tryparsamide. Two years after treatment by malaria he showed clinical improvement, and only very slight serological improvement. After receiving fifty-two injections of tryparsamide his serological reactions were normal. He was included in the group enjoying a good remission.

Case 39. H.L.H. Admitted 2.6.27 Occupation Butler. Age 32.

Patient had been married several years, and had two children alive and well. His wife had one other pregnancy which terminated in a miscarriage. Apart from an attack of "shingles" in 1925, his wife was unaware of him having had any illness whatever. He denied ever having had any venereal disease, or having exposed himself to infection. There was no history of any nervous or mental disorder among his relatives.

His present illness began a week ago. For some months previously his wife had noticed a change in his manner. He had gradually become very irritable, which was quite foreign to his previous disposition. Apart from this, however, she noted nothing abnormal until a week ago. Ten days ago their house was entered by burglars, and he was very much upset at the time. Two days later he was noticed to be becoming very restless, and since then this restlessness had become more marked. He talked constantly about burglars, and believed that his house was continually in danger of being ransacked by them. He was unable to sleep at night, and became unmanageable at home.

On admission he was very restless and overactive. He talked incessantly, chiefly about burglars, and stated they would take away his belongings. His attention was very difficult to retain. He appeared to be fairly well oriented, but his memory, especially that for recent events, was not good. His prevailing mood was one of elation but varied considerably. During the interview he suddenly dissolved into tears for no very obvious reason. Arithmetical calculations he was unable to perform. His general physical condition was fairly good. He showed distinct tremors of his tongue and hands. There was no sensory abnormality. His gait was steady, and there was no Rombergism. His pupils were equal,

but reacted very sluggishly to light, whereas on accommodation their reaction was brisk. The deep reflexes were all present, equal, and somewhat exaggerated. The superficial reflexes were normal. His speech was definitely slurred. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	190 per c.mm.
	Protein	150 mg. %
	Lange	555554400

It was decided to treat him with tryparsamide, and he received twice weekly injections of two grammes. The day after his admission here he became very excited and noisy. He rushed about his room and was very difficult to manage. Emotionally he was very unstable, and displayed a great tendency to burst into tears suddenly, even when he was excited and restless. This state of excitement persisted, and he began to express numerous delusions of grandeur. He stated that he was one of the world's best pugilists, and that he had millions of pounds. He promised to buy up the hospital and make large monetary gifts to the staff. He was on the whole very noisy and abusive.

9.7.27. He remained very troublesome. He was noisy and overactive. Frequently he interfered with the other patients and was impulsive towards the nursing staff. Large doses of sedative were required to control him. He was very deluded, and was constantly speaking of the millions of pounds he possessed. He was disoriented for time and place. His memory was considerably impaired. His mood varied considerably from day to day, and very often from hour to hour. Frequently he would burst into tears and weep bitterly. There was no change in his physical signs. It was impossible to retain him here, and he was discharged to the care of his relatives on 9.7.27. He had received altogether nine injections of two grammes of tryparsamide.

His relatives arranged his admission to Peckham House, and he went there after he was discharged from here. The following notes were extracted from their clinical record.

Admitted on 9.7.27 in a noisy, excited, and very restless state. He expressed numerous delusions of grandeur and he had untold wealth. He was very unstable emotionally. The physical signs corresponded with those found on admission here. They agreed to continue his course of tryparsamide and this was completed on 13.9.27, when he had received twenty-two injections of two grammes.

There was then no change in his condition. He was very noisy and abusive. He upset the others, and frequently became impulsive. His language at times was very obscene. On 25.11.27 he was inoculated with malaria. Six infected mosquitoes were allowed to feed on him.

On 16.12.29 he had his first rigor. On 19.12.29 he had had four rigors. His general condition was poor, and his pulse was rapid and weak. Quinine was given and the fever subsided until 10.1.29, when he had another rigor, his temperature rising to 103°. Quinine was again administered, and he had no recurrence of fever.

He remained noisy and excited until his fever developed. Thereafter he became much weaker physically and rather confused. He remained so until two weeks after the fever was discontinued, when he began to improve. He was quiet and amenable, and steadily improved thereafter. On 14.1.28 he was reported as being very much better. He conversed rationally and intelligently, and displayed an active interest in the ward. His memory was much impaired, and he had an amnesia for his acute phases. His insight was lacking. The tremors of his hands and tongue were still present. His pupils were very sluggish in their reaction to light, and the deep reflexes were all equal and active. The serological findings

on 11.1.28 were :

Blood	W.R.	+ 40
C.S.F.	W.R.	+ 40
	Cells	5 per c.mm.
	Protein	40 mg. %
	Lange	5543110000

He was discharged on four weeks leave from 14.1.28

24.2.28. He reported to-day, and his improvement had been maintained. He was discharged recovered.

Nothing further was heard of him until October, 1928, when, in reply to an enquiry, he stated that he was feeling very well and had resumed duty three months after leaving hospital. At first he found that rather trying, but he experienced no difficulty with it now. As he lived in the country it was impossible to get him to attend for re-examination.

In February, 1929, his employer wrote stating that the patient was very well. He was bright, cheerful and active, and discharged his duties satisfactorily. In his employer's opinion he was normal. It was suggested, in reply, that he might attend here were he visiting London.

Nothing was heard of him until November, 1929, when another enquiry was sent. It was then learned that his improvement had been maintained. He had been regularly employed since last he wrote, and he felt quite well. He was unable to attend the hospital for re-examination.

Comment : A case of general paralysis of the manic type, whose mental symptoms had been present one week prior to his admission here. He showed no improvement after treatment with the equivalent of fifteen injections of three grammes of tryparsamide. He was thereafter inoculated with malaria. He showed clinical and serological improvement, and has been included in the group of those enjoying a good remission.

Case 40. J.B. Admitted 7.6.27 Occupation Motor-loader Age 51.

Patient had been married nineteen years, and had four children, all of whom were alive and well. Between the birth of the third and fourth children his wife had a miscarriage. He enjoyed good health until 1921, when he had a perforated gastric ulcer. Operative measures were successful and he made a good recovery. In 1925 he attended the Brompton hospital for diseases of the chest, and was ordered into the country for four months. He denied ever having had any venereal disease. There was no history of any nervous or mental disorder in the family.

He had retained his present position for twenty-five years, and was considered to be an honest, trustworthy, and energetic worker. According to his wife, his present illness began about eight months ago, when he became very forgetful. Thereafter he became indifferent about his work, and would turn up to it at irregular times. Since then he had gradually deteriorated, and prior to coming here he had become very childish, and had lost all sense of decency. Frequently he was faulty in his habits. He was said to be very talkative and to stutter considerably.

On examination he was very garrulous and mildly euphoric. He declared he was quite fit and there was nothing the matter with him. There were no delusions of grandeur, nor any evidence of hallucinations. His memory for both recent and remote events was exceedingly poor. He could not tell me what month this was or what year it was. Simple arithmetical calculations were beyond him, and he failed completely to take seven serially from one hundred. He had no insight. Physical examination showed distinct tremors of his hands and tongue. There was no sensory impairment. His gait was steady, and Romberg's sign was negative. His pupils were equal and regular,

but reacted very sluggishly to light, the right being even less active than the left. The deep reflexes were all present and equal. Those of the lower limbs were brisk, while those of the arm were rather sluggish. His superficial reflexes were present and reacted normally. His speech was markedly slurred. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	150 per c.mm.
	Protein	160 mg. %
	Lange	555554400

He attended as an outpatient and received as such two injections of three grammes of tryparsamide, then five injections of four grammes intramuscularly at weekly intervals.

On 30.7.27 his wife reported that he had become too difficult to manage at home. He was very talkative and restless, especially at night. He was at times incontinent and soiled himself but appeared quite indifferent. He was therefore admitted to the hospital. Shortly thereafter he became very restless and noisy. He was at times very abusive, and was completely disoriented. His memory remained very poor. He continued to receive weekly injections of four grammes of tryparsamide intramuscularly. Unfortunately he developed an abscess at the site of one of his injections. This was tapped and a purulent haemorrhagic fluid was obtained. From this a staphylococcus was cultured. The abscess was thereafter drained.

His first course of tryparsamide was completed on 19.9.27, by which time he had received the equivalent of eighteen injections of three grammes. His mental condition then showed no improvement. He was at times restless and noisy, and had auditory hallucinations. He carried on conversations with imaginary people, and frequently endeavoured to carry out their instructions, thereby disturbing the other patients. He showed considerable deterioration.

14.11.27. As his condition showed no improvement it was decided to treat him with malaria, and he was inoculated, intramuscularly, to-day with four c. cs. of blood from another patient. The particulars of his course of malaria were as follows :

27.11.27	temperature	102
29.11.27	"	103
1.12.27	"	103.2
3.12.27	"	104.8
4.12.27	"	103.6
6.12.27	"	104.2
7.12.27	"	105.8
8.12.27	"	104.8
9.12.27	"	104.8
10.12.27	"	105
11.12.27	"	104.2

On 11.12.27 he had had eleven rigors, and quinine was administered in ten grain doses three times daily. His general condition then was rather poor.

25.12.27. His mental condition remained unchanged. He had auditory hallucinations and could hear his wife calling to him. Frequently he wanted to go to her. On the whole he was rather sullen, and showed marked intellectual impairment. His physical condition was improving satisfactorily.

15.1.28. His condition showed some improvement, and he had displayed no evidence of hallucinations during the past ten days. He was still fatuous and garrulous. His memory remained very poor, and he had no insight. He was very anxious to go home, and his wife was anxious to give him another trial, so he was discharged to her care on 15.1.28. At that time his physical signs were unchanged. His serological findings then were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	5 per c.mm.
	Protein	60 mg. %
	Lange	5555543210

He was to continue to attend the outpatient department but failed to do so. No reply was received to any letters of enquiry sent to his relatives. A social worker therefore visited on 15.11.28, and ascertained that he had been keeping

fairly well, but that he met with an accident a few days previously which necessitated his admission to one of the general hospitals. He had been doing irregular work since his discharge from here. The relatives would endeavour to get him to attend here as soon as he was fit.

As nothing further had been heard of him, he was again visited in November, 1929. His wife stated he was much better. A year ago he was in one of the general hospitals suffering from wounds on his face due to being run over by a motor. He made a good and rapid recovery. Since then he had been working three days a week on his former job, that of a motor-van loader. He did not complain at all, and would work all the week were such possible. Otherwise he was quiet, somewhat reserved, and well-behaved. His memory was said to be bad, and he was very forgetful. His speech was slurred, and at times he had difficulty in expressing himself. He was easily irritated by the children, but was quite tractable. His wife thought he would attend hospital again as, in her opinion, he needed a "herve tonic". Another appointment was made for him, but this he failed to keep. A further effort is being made to get him to attend here.

Comment : A case of general paralysis of the simple type, whose symptoms had been present for at least eight months prior to treatment. He was treated with malaria and tryparamide. Of the latter he received the equivalent of eighteen injections of three grammes. He has shown clinical and slight serological improvement, and has been included in the group of patients enjoying a partial remission.

Case 41. J.J.K. Admitted 27.6.27 Occupation Bus-driver Age 41.

Patient had been married fifteen years, and had one child, aged thirteen, alive and well. His wife had had no other pregnancies. All his life he had enjoyed good health, and his wife was not aware of him having had any illness whatever. Twenty years ago he acquired a chancre for which he received no treatment. There was no history of any of his relatives having suffered from nervous or mental disorder.

The onset of his present illness was very insidious. For some months his relatives had noticed a change in him in that he was more irritable and more easily upset than formerly. He was able to continue at work till four months ago, when he was discharged because of inability to keep awake there. At the same time he was noticed to be very forgetful, and since then he has gradually deteriorated. He was said to have been at times peculiar in conduct, very extravagant, and in many respects very childish.

On examination he was rather fatuous and self-satisfied. He reiterated that he was all right and that there was nothing the matter with him. He had no insight whatever. He did not express any delusional ideas, nor was there any evidence of hallucinations. He very easily got muddled, and his memory for both recent and remote events was very poor. He was disoriented for time and place. Simple arithmetical calculations he failed to do, and he was quite unable to take seven serially from one hundred. His physical state was not good, and he was rather undernourished. He showed marked tremors of tongue and hands. There was no sensory abnormality made out. His gait was somewhat unsteady, but Romberg's sign was negative. His speech was very slurred. He had small, unequal, irregular, Argyll-Robertson pupils. His deep and superficial

reflexes were present, equal and active. His serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 8 +
	Cells	90 per c.mm.
	Protein	145 mg. %
	Lange	5555543210

It was decided to treat him with tryparsamide. He received two doses of two grammes, but on 3.7.27 he climbed over the fence and went home.

During his stay here he was very childish in his behaviour, and was easily pleased. He appeared content to lie in bed, and showed little interest in anything. He maintained that he was all right, and there was nothing the matter with him. His memory was grossly impaired, and a few days after coming here he stated he had been here several months.

After going home he steadily became worse. He accused his wife of going out with other men, and this led to him assaulting her. Thereafter he was removed to the infirmary, and admitted to West Park Mental Hospital on 12.7.27. The following notes have been extracted from their clinical record.

12.7.27. He was very childish, and at times prone to be expansive. He showed a marked degree of emotional instability, laughing and crying with equal facility. He claimed to be in the best of health and never felt better. The physical signs found agreed with those recorded when he was admitted here.

16.7.27. He was inoculated with three c.cs. of malarial blood.

5.8.27. He had had ten satisfactory rises of temperature, and quinine was administered. There was no record of the highest temperature reached with each rigor, or of the days on which the rigors occurred.

12.12.27. He remained extremely childish, garrulous, and grandiose, and had no insight into his condition. His physical health was improving.

4.1.28. He has had seven injections of tryparsamide. He complained of dimming of eyesight and consequently he received no further tryparsamide.

1.2.28. He remained childish and self-satisfied. He declared he never felt better in his life. He was working quite well and was very anxious to get home. His wife requested his discharge and this was granted under Section 79 of the Lunacy Act. There was no change in his physical signs. His serological findings then were :

C.S.F.	W.R.	+ 4 +
	Cells	5 per c.mm.
	Protein	50 mg. %
	Lange	2211100000

Nothing was heard of him from the day he climbed the fence until November, 1928. No notice had been taken of any enquiry sent to his wife, so a social worker paid a visit. As a result of this he was persuaded to attend the outpatient department. His wife reported that she took him out of West Park in February, and that since then his condition had not changed. He had attempted to work, and succeeded in getting many jobs in the building or carpentering trade. He was a carpenter prior to taking up bus-driving. These jobs he only held for three or four days, and then was dismissed on account of his difficulty in speaking or slowness at work. .

On examination he was still facile and self-satisfied. He spoke of his inability to retain jobs and could not understand why, as he believed he was as good at his work as the others. His memory was still distinctly impaired, but he was correctly oriented in all spheres. There was no evidence of delusions or hallucinations. His physical signs remained unchanged. His speech was markedly slurred, and at times one had great difficulty in making out what he said. His serological reactions then were :

10.11.28.	Blood	W.R.	+ 13
	C.S.F.	W.R.	negative
		Cells	5 per c.mm.
		Protein	35 mg. %
		Lange	4432110000

He was advised to continue treatment, which he agreed to do, and attended weekly, when he received intravenous injections of three grammes of tryparsamide. After he received fourteen injections his serological reactions were again determined and were :

6.5.29.	Blood	W.R.	negative
	C.S.F.	W.R.	+ 8
		Cells	4 per c.mm.
		Protein	50 mg. %
		Lange	5543221100

He still continued to attend, and received eleven further injections, the last of which was given on 12.10.29, when his blood and cerebro-spinal fluid were re-examined and the results were :

Blood	W.R.	negative
C.S.F.	W.R.	negative
	Cells	3 per c.mm.
	Protein	20 mg. %
	Lange	negative

In view of these findings his injections were discontinued for two months, at the end of which period he was re-examined.

His wife reported that he had improved considerably. He behaved well, and his habits had been quite good. With regard to his work, he was still somewhat slow but he was improving in this respect. He had retained his last job three months until the building was completed. His memory and speech she thought were also better.

Examination showed distinct improvement in his condition. He talked rationally and coherently, and there was no evidence of any delusional ideas. In his outlook he was, however, somewhat childish and rather self-satisfied. His memory for both recent and remote events was distinctly better, and he was correctly oriented in all spheres. His grasp of general information was not very high. On the Binet Simon tests he attained a mental age of eleven years and nine months. He failed on simple arithmetical calculations, and was unable

to take seven serially from one hundred. The degree of insight which he showed as to his condition was good. His general physical state had improved. He showed distinct tremors of his tongue, but none of his fingers. No sensory abnormality was made out, and his gait was steady. With regard to his speech, this remained indistinct, but was complicated by the fact that he stuttered a lot and had done so all his life. His pupils were irregular, unequal, and Argyll-Robertson in type. His deep reflexes were all equal and active. The superficial reflexes were normal. His serological reactions on 15.12.29 were :

Blood	W.R.	negative
C.S.F.	W.R.	negative
	Cells	4 per c.mm.
	Protein	20 mg. %
	Lange	negative

Comment : A case of general paralysis of the simple type, whose symptoms had been present at least four months before treatment. He was treated with malaria and tryparsamide, receiving of the latter thirty-three injections of three grammes. His condition showed clinical and serological improvement. He has been included in the group enjoying a good remission.

Case 42. F.C. Admitted 7.8.27 Occupation Collector Age 29.

Patient was the fourth eldest in a family of twelve. He was unmarried. His previous health had always been good, and he had not had any serious illnesses. When seventeen years of age he developed a chancre which was followed by his hair coming out very badly. He received medicine from his family doctor for a short period and he believed he was thereafter clear of the disease. The medicine was taken by the mouth and he received no injections. None of his relatives has suffered from nervous or mental disorders.

His present illness began three months ago, when he became very nervous and tremulous. This has gradually become more marked, and he had to give up work a month ago. He became dull and indifferent. He then became very forgetful, and would wander off. Frequently he would lose himself and would be brought home by the police. He lost all interest in his appearance and was quite indifferent.

On admission he was dull and disinterested. He did not show any motor retardation, and walked about the ward aimlessly. He showed no interest in his personal appearance. His habits were frequently faulty and he would micturate openly in the ward. When spoken to he would frequently give no reply, and he resented being disturbed. He did not express any delusions, nor was there any evidence of hallucinations. His memory, especially for recent events, was very poor, and he was unable to tell me when he had come here or what he had done the previous day. He was disoriented for time and place. Simple calculations he was quite unable to do. Physical examination showed very marked tremors of his hands, face and tongue. There was no evidence of sensory impairment, and his gait was steady. His speech was distinctly slurred, and he failed on the test phrases. His pupils were unequal,

regular, and very sluggish in their reaction to light, whereas they reacted briskly on accommodation. The deep reflexes were present, equal and active. The superficial reflexes gave a normal response. His serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 20
	Cells	86 per c.mm.
	Protein	140 mg. %
	Lange	555554321

It was decided to treat him with malaria and trypar-
samide. The latter was administered twice weekly, two grammes
being injected intramuscularly in each dose. He had his
first injection on 4.8.27. On 26.8.27 he developed an abscess
at the site of his injection, and this had to be opened and
the pus evacuated. Consequently he was not inoculated with
malaria till 14.9.27, when five c.cs. of infected blood were
given intramuscularly. The following are the particulars
of his fever.

22.9.27	temperature	105.4
25.9.27	"	104.4
27.9.27	"	101.2
28.9.27	"	106.6
30.9.27	"	102.8

After he had had five rigors his general condition
appeared very poor. His pulse was soft and rapid, rate
130 per minute, and his respirations were shallow. It was
decided to cut short his fever, and quinine sulphate, in doses
of ten grains three times a day, was given. There was no
further rise of temperature, and his physical condition there-
after improved rapidly again.

He showed no change in his mental state till about
two weeks after his fever had subsided, when he became more
talkative, and displayed a more active interest in the ward.
Thereafter he steadily improved, and became a useful worker.
His memory remained impaired, especially that for recent events.
Throughout his fever he received his injections of trypar-
samide with no deterrent effect.

His condition varied considerably. Some days he was bright and active, others he became more depressed again and was quite morbid. He was very anxious to get home for Xmas, and was discharged to the care of his relatives on 24.12.27. His first course of tryparsamide had been completed, and he had received twenty-one injections of two grammes. At that time his mood was still variable, but his depressed phases were not so deep and were more transient. His memory was improving considerably, but there was no change in his physical signs. He was to attend the outpatient department.

He did not reappear till 2.2.28. When seen then he was much improved. His relatives reported that he rarely now became dull, and that he was much better. He took an active interest in everything, and was very anxious to start work. This he was allowed to do, and was to report in four weeks' time.

He was re-examined on 1.3.28, when the improvement previously reported was found to have been maintained. He was active and cheerful, and was employed daily as a collector. This he found somewhat difficult, especially the making up of his returns at night. His memory, both recent and remote, was much better. His grasp of general information and current events was quite good. He still showed marked tremors of his hands, face and tongue, and his speech was distinctly slurred. The pupils were equal, regular, and still very sluggish in their response to light. The deep and superficial reflexes were present, equal and active.

Nothing more was heard of him until October, 1928. Enquiries were sent on two occasions, but he did not reply, so the social worker visited. Thereafter he attended the outpatient department. He was then distinctly better, and his relatives reported that he had remained active and cheerful since his last visit. He conversed rationally and intelligently,

and stated he found no difficulty with his work. His memory was good, but his speech was still somewhat slurred and hesitant. The physical signs were unchanged, except that his tremors were just a little less marked. His serological reactions then were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 8
	Cells	8 per c.mm.
	Protein	35 mg. %
	Lange	4444321100

He was advised to continue treatment, which he agreed to do. He attended regularly each week, and received three grammes of tryparsamide intravenously. After he had had ten injections his serological fluids were re-examined and were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 8 +
	Cells	12 per c.mm.
	Protein	40 mg. %
	Lange	4443221000

He continued to attend here regularly, and on 24.7.29 he had received twenty additional injections. His improvement was maintained, and his health was good. The serological findings then were :

Blood	W.R.	+ 20
C.S.F.	W.R.	+ 4 +
	Cells	2 per c.mm.
	Protein	45 mg. %
	Lange	3322111000

He was anxious, if possible, to have a rest during the summer, and this request was granted. On 17.10.29 he attended again after having had a rest for three months, and, prior to continuing his injections, his serological fluids were re-examined and the results were :

Blood	W.R.	+ 13
C.S.F.	W.R.	negative
	Cells	3 per c.mm.
	Protein	15 mg. %
	Lange	negative

The attempt to render completely negative his serological findings is being continued, and he attends weekly

for injections, when he still receives three grammes intravenously. His present condition is as follows.

He has been employed regularly since February, 1928, and earns about three pounds per week on a commission basis. The work does not worry him at all, and he finds no difficulty in doing it. He talks rationally and intelligently, and his grasp of general information and current events is quite good. On the Binet Simon scale he attains a mental age of twelve years and five months. His memory, both recent and remote, is good. His physical condition has improved considerably. He shows no tremors of his hands or tongue. The pupils are equal, regular, and now react quite well to light and on accommodation. The deep reflexes are present, equal and active. The superficial reflexes are normal. His speech is somewhat slow, but there is no slurring, and he manages the test phrases without difficulty.

Comment : A case of general paralysis of the simple type, whose symptoms had been present for three months prior to treatment. After treatment by malaria and the equivalent of forty-four injections of tryparsamide he showed marked clinical and serological improvement, and has been included in the group enjoying a good remission.

Case 43. W.W. Admitted 15.8.27 Occupation Butcher Age 29.

Patient had been married two years and his wife was at present eight months pregnant. He had enjoyed very good health all his life. He did well at school and left there when he was fourteen years old. In 1916 he joined the Navy, and shortly thereafter acquired a chancre. For this he received a few injections at the time. He left the Navy in 1924, and went to be with his brother whom he told of having acquired syphilis. The brother stated that he took the patient then to the Lock hospital, and that he attended for treatment every Tuesday evening for three years. Two years ago he was advised by the authorities there that he could marry.

His present illness has developed within the past six months. He was in partnership with his brother in a butcher's business, and about six months ago they sustained a bad financial loss. This seemed to upset him, and since then he has entirely changed in manner. Two months ago his brother noticed that he was giving extra weight and the wrong change to customers. Gradually he has become more apathetic. He would tell customers that they had not got the meat desired rather than cut it off. He sat about staring vacantly around him. At times his conduct was very peculiar, and a week ago for no apparent reason he chopped off the head of the family cat.

He was quite willing to come into hospital, but a few hours afterwards when the nurse turned her back he walked out and went home. His brother brought him back the same evening. He appeared quite indifferent, and offered no reason for his behaviour. He was dull and disinterested; lay curled up in bed and resented being disturbed. Frequently he would not speak if spoken to. When he did so his replies were in monosyllables. There was no evidence of delusions or hallucinations.

His memory for recent events was fairly good, but that for remote events was distinctly impaired. He was correctly oriented for time and place. On simple arithmetic he made many mistakes which he did not appreciate. He was quite unable to take seven serially from one hundred. Physical examination showed distinct tremors of his hands and tongue. His gait was steady, and no sensory abnormality was made out. His speech was somewhat slurred, and he had great difficulty in repeating the test phrases. The pupils were unequal, irregular, and very sluggish in their reaction to light, whereas on accommodation they reacted briskly. The deep and superficial reflexes were normal. His serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	50 per c.mm.
	Protein	90 mg. %
	Lange	5555543210

A course of tryparsamide was commenced on 22.8.27. He received intramuscular injections of two grammes twice weekly. On 31.8.27 he was inoculated with malaria, 2.5 c.cs. of infected blood being injected intramuscularly. The following are the details of his fever.

8.9.27	temperature	102.2
10.8.27	"	105.4
12.9.27	"	105
14.9.27	"	104.8
16.9.27	"	105
18.9.27	"	107
20.9.27	"	104.2
22.9.27	"	102
24.9.27	"	101
26.9.27	"	102
28.9.27	"	101
29.9.27	"	105.2
1.10.27	"	106.6

He had thirteen rigors and during those his physical state caused no anxiety. Quinine was administered on 2.10.27. Throughout the fever he continued to receive his injections of tryparsamide with no untoward result.

After admission he became very resistive, restless, and at times very noisy. He refused food and had to be

on one occasion tube-fed. He was very abusive to the patients and nursing staff, and his language was very obscene. When his fever developed he became quieter and more amenable, though still dull and rather apathetic. His first course of tryparsamide was completed on 12.11.27, by which time he had received nineteen injections of two grammes. His condition then was distinctly improved. He talked rationally and coherently. He displayed a greater interest in the ward, and desired to help the other patients. Emotionally he remained rather unstable, and he fluctuated greatly. His memory for remote events was still impaired. Insight into the nature of his illness was lacking. The physical signs showed no change. His relatives were anxious to have him home, and he was discharged to their care on 12.11.27, to return in two months for re-examination.

22.1.28. He returned to-day. His brother reported that he had started work in one of their shops, and was helping successfully. He showed a tendency to want his own way, and if crossed became unduly irritable and emotional. His memory showed distinct improvement, and he conversed quite rationally and intelligently. He was just a little self-satisfied, and was desirous of taking up his former duty, that of buying meat for the business. There was no change in his physical signs. His serological reactions were :

Blood	W.R.	+ 13 +
C.S.F.	W.R.	+ 40 +
	Cells	6 per c.mm.
	Protein	110 mg. %
	Lange	555554321

Thereafter nothing was heard of him until, in reply to an enquiry, he attended the outpatient department on 21.10.28. His brother then stated that he was much improved, but was rather suspicious. He was rather prejudiced against the brother, and stated the latter employed a subterfuge to get him into hospital. He was rather lacking in initiative,

but for two months previously he had been doing the market work, buying meat, etc., and did this quite well. On examination he was active and cheerful. His conversation was logical and he expressed nothing irrelevant. He denied any suspicions regarding his family or the hospital, and was quite willing to continue treatment if necessary. In his physical signs he still showed tremors of his hands, but his speech was quite clear, and he managed test phrases easily. His pupils were unequal, irregular, and very sluggish in their reaction to light. The deep and superficial reflexes remained unchanged. His serological reactions then were :

Blood	W.R.	+ 13
C.S.F.	W.R.	+ 8 +
	Cells	5 per c.mm.
	Protein	45 mg. %
	Lange	555432100

He was advised to continue treatment, and he has attended regularly since for injections of tryparsamide. These he received in three gramme doses injected intravenously. On 2.8.29 he had received thirty-two injections, and it was decided to give him a period of rest. His condition then was distinctly improved. The relatives reported that he was much more active and displayed a keener interest in the business. He had been purchasing, during the past year, all the meat for their branches, and to his brother he appeared restored to his normal. His serological reactions then were :

Blood	W.R.	negative with 0.5 c.c.
C.S.F.	W.R.	+ 8 +
	Cells	5 per c.mm.
	Protein	50 mg. %
	Lange	5443321100

He was very anxious to have a period of rest, so this was granted, and he was to report again in three months which he did. His relatives reported that they saw nothing abnormal in his behaviour. He worked regularly and efficiently, and displayed an active interest in things around him. On examination he was bright, active and cheerful. He talked

intelligently, and his grasp of current events and general knowledge was adequate, considering his social class. His insight was good, and he was willing to continue treatment should such be necessary. He desired to avoid having a relapse. According to the Binet Simon tests he had a mental age of thirteen years and nine months. His memory for both recent and remote events was quite good. He did arithmetical calculations correctly and with ease. There was considerable improvement in his general condition. He showed no tremors of his hands or tongue. His gait was steady, and there was no Rombergism. His speech was clear. He had unequal, irregular, Argyll-Robertson pupils. The deep and superficial reflexes were present, equal and active. The serological findings on 15.12.29 were :

Blood	W.R.	negative
C.S.F.	W.R.	+ 8
	Cells	10 per c.mm.
	Protein	45 mg. %
	Lange	5554321100

Comment : A case of general paralysis of the simple type, whose symptoms had been present for at least six months prior to treatment. He was treated with malaria and tryparsamide. Of the latter he has received forty-five injections of three grammes. He showed marked clinical and serological improvement, and has been included in the group enjoying a good remission.

Case 44. C.E.T. Admitted 18.6.28 Occupation Traveller Age 44.

Patient had been married sixteen years but had no children. His previous health had always been good, though he had been heavily addicted to alcohol for many years. He had been employed in his present capacity for twenty-five years, and was considered a competent worker. He denied ever having suffered from any venereal disease or of ever having exposed himself to infection.

His present illness began four months ago, when he had a seizure and was unconscious for a short time. Thereafter he was noticed to be overactive and unreliable, though prior to this his work was highly respected. He was a traveller and recently made a round of his customers. On returning he stated he had received a large number of fresh orders for several thousand pounds. This surprised the firm and they wrote to confirm the orders, only to find that they had not been placed. Within the past few weeks he had become very extravagant, and had ordered a new car although he had no money to pay for it.

On admission he was overactive and euphoric. He was very garrulous and talked at length of his capabilities and had numerous schemes for the benefit of the universe. He expressed the idea of starting a memorial to a policeman recently killed in London and believed he could raise enough money by his own efforts. His memory for both recent and remote events was fairly good, and he was correctly oriented. Simple calculations he found difficult to do, and he was unable to take seven serially from one hundred. Emotionally he was unstable, and he had no insight into his present state. His physical condition was good. He showed fine tremors of his hands and tongue, but these were not marked. There was no sensory abnormality, and his gait was steady. His

pupils were equal, and reacted quite well to light and on accommodation. His deep reflexes were present, equal and somewhat exaggerated. The superficial reflexes gave a normal response. His speech was somewhat slurred, and he failed on the test phrases. The serological reactions were :

Blood	W.R.	+ 20 +
C.S.F.	W.R.	+ 20 +
	Cells	60 per c.mm.
	Protein	60 mg. %
	Lange	5443321000

It was decided to treat him by malaria, and infected mosquitoes were allowed to bite him on 7.7.28. He did not develop malaria, however, and he was inoculated on 31.7.28 with three c.cs. of malarial blood. This was injected intramuscularly. As he had failed to develop any pyrexia on 20.8.28 he was re-inoculated with three c.cs. of infected blood from another patient. This was injected intravenously. The following are the particulars of his fever.

27.8.28	temperature	104
28.8.28	"	104.6
29.8.28	"	104.4
30.8.28	"	104
2.9.28	"	104.4
3.9.28	"	102.6
4.9.28	"	105.2
5.9.28	"	104.8
6.9.28	"	105.4
7.9.28	"	104

On 7.9.28 he complained of pain in his left side. His spleen was palpable and the fever was discontinued, he having had ten rigors. Quinine sulphate in ten grain doses three times a day was given.

His mental condition prior to the development of the fever remained unchanged. He was euphoric and readily became excitable. He talked incessantly of his powers and capabilities. He would have liked to spend the day playing the piano. He declared he could play it very well indeed and he had never been taught music. Actually his playing was an infliction on anyone near. He was very overactive and would not stay in bed. He turned summersaults in the

garden and would attempt to balance several chairs on his head, etc. He wrote long letters to bookmakers, putting on big bets, and continued to elaborate great schemes whereby he would benefit mankind. His mental reaction was manic in type.

After the fever developed he was much less excitable, but he still remained self-satisfied. Treatment by trypar-samide was started on 6.9.28, and he received thereafter three gramme doses, intravenously, at weekly intervals. On 20.10.28 he was discharged from hospital to attend weekly for injections. His relatives found difficulty in meeting his fees here, and he had to leave. His condition then was much improved, though he was still rather overactive and self-satisfied. He had ceased to express his former schemes for benefiting the world, and talked more rationally and coherently. Insight into his condition, however, he did not possess, and he could not understand why his firm should have recommended him to come here. His memory for both recent and remote events was quite good, and he was correctly oriented. He was still unable to do simple arithmetical calculations, and after giving a reply would state that his answer must be wrong but he could not rectify it. He took three minutes to take seven serially from one hundred, and made two errors. There was no change in his physical signs.

He started work in November, 1928, in the warehouse, as his firm refused to allow him to go meantime as a traveller. This meant a diminution in salary, and he was rather disgruntled. He was advised to continue treatment and show to his employers that he was able for his former job.

On 20.12.28 he was still working regularly, apparently doing satisfactorily. He was still very pleased with himself, and did not see why he should continue to have his injections. His insight was still lacking. His speech had improved and

he now spoke quite clearly, and had no difficulty with the test phrases. He had received fifteen injections of three grammes of tryparsamide, and his blood and cerebro-spinal fluid were re-examined. The findings on 20.12.28 were :

Blood	W.R.	+ 20 +
C.S.F.	W.R.	+ 20 +
	Cells	6 per c.mm.
	Protein	35 mg. %
	Lange	4433210000

He resumed his injections on 4.2.29, and attended regularly until 3.6.29, when he had received eighteen further injections. A vacancy had arisen at his work and he had been promoted first assistant. He was disappointed he had not been put in charge of the department and blamed the works doctor and the hospital for this. He had no insight into his condition, and was quite impervious to reason. His memory was good for both recent and remote events, and he was correctly oriented. He could now perform simple calculations easily, and took seven serially from one hundred without error. His grasp of general information and knowledge of current events was quite good. According to the Binet Simon tests he had a mental age of thirteen years and three months. Physical examination still revealed tremors of his tongue, but none of his hands. Sensation and gait were normal. The pupils were equal, and reacted to light and accommodation. His deep reflexes were somewhat exaggerated, but equal on both sides. The superficial reflexes gave a normal response. Unfortunately it was impossible to get him to come into hospital that his blood and cerebro-spinal fluid might be re-examined. He refused to have any further injections.

Nothing having been heard from him since he last attended on 3.6.29, an enquiry was sent to his wife on 9.12.29. She stated that he had remained very well, and had been promoted to his former position of traveller. He was then in Ireland. He still felt his case had been treated wrongly, and she doubted

if he would attend hospital again, but she would try to persuade him to do so when he returned.

Comment : A case of general paralysis of the manic type, whose symptoms had been present at least four months prior to treatment. He was treated with malaria and tryparsamide. Of the latter he received thirty-three injections of three grammes. He showed clinical and serological improvement. He has been included in the partially remitted group.

Case 45. B.A.C. Admitted 13.7.28 Occupation Solicitor Age 53.

Patient had been married twelve years, and had one child, aged eight years, alive and well. His wife had no other pregnancies. While never very robust, he had enjoyed good health until 1914, when he was said to have had a mild attack of pulmonary tuberculosis. He made a good recovery, and there had been no recurrence. He contracted syphilis fourteen years ago and received treatment, consisting of medicine, and injections over a period of two years. None of his relatives has suffered from nervous or mental disorder. Three years ago his wife had to undergo a serious operation, and this caused considerable worry.

His present illness began six months ago, when he became more irritable and his wife noticed he was very forgetful. This loss of memory gradually became more marked and he had to give up work. He could not remember dates or names, and his clients were all losing confidence in him. Recently he was said to have become indifferent and unduly self-satisfied.

On admission he was mildly euphoric. His mood was happy and he showed no concern about his present state. He declared that he never felt better in his life and that there was nothing the matter with him. There were no delusions of grandeur, nor any evidence of hallucinations. His memory was very poor for both recent and remote events. He was disoriented for time, but not for place. He realised his trouble as due to syphilis which he admitted having contracted fourteen years ago, and appeared quite indifferent. His general physical condition was poor. He showed distinct tremors of his hands, but none of his tongue. There was no sensory abnormality, and his gait was steady. He had unequal, regular pupils, which reacted sluggishly to light, whereas their reaction on accommodation was brisk. His deep reflexes were equal and active. The superficial reflexes gave a normal response. His speech was clear, and he managed the test phrases satisfactorily. The serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	88 per c.mm.
	Protein	150 mg. %
	Lange	555554321

He was inoculated on 27.7.28 with four c.cs. of malarial blood injected intramuscularly. The following are the particulars of his fever.

7.8.28	temperature	104.8
9.8.28	"	105
11.8.28	"	103.2
13.8.28	"	102.2
14.8.28	"	102.8
15.8.28	"	102.8
17.8.28	"	105.4
18.8.28	"	105.4
19.8.28	"	103.4
20.8.28	"	104.8

On 20.8.28, after he had had ten rigors, quinine sulphate was given, in ten grain doses, three times a day.

He remained overactive and euphoric, and always maintained he was very fit. At times he was dictatorial,

and was very easily upset. Emotionally he was very unstable. During his fever he became very confused, was very restless, and frequently endeavoured to remove his clothing. After his fever had been stopped he remained self-satisfied and very garrulous. Treatment with tryparsamide was commenced on 1.9.28, when he received three grammes intravenously. His relatives were very anxious to have him home, and he was considered fit to leave hospital provided he was kept under observation. He was therefore discharged on 20.9.28. At that time he was still rather euphoric and very easily got excitable. His mood was happy, and all his replies to questions were accompanied by a very fatuous smile. His memory was still very poor, more especially for recent events, though that for remote events was also impaired. He was correctly oriented for time and place. Simple arithmetical calculations he could do, but he made several errors in taking seven serially from one hundred. Physical examination still showed distinct tremors of hands, unequal pupils which reacted sluggishly to light, and active deep reflexes. The other physical signs were unchanged. He was to continue with his injections.

31.1.29. He had received fourteen injections of three grammes of tryparsamide, and he was readmitted to hospital for one night for examination. His wife reported that after his discharge from here he was overactive and easily got excited, consequently she had to keep him very quiet. He had retired from business and was living quietly at home, spending his time gardening and motoring. She had noticed a distinct improvement in him during the past month.

On examination he was still somewhat fatuous, and declared that he never felt better in his life. He talked rationally and coherently, and there was no evidence of any delusional ideas. His memory showed some improvement, though

he was still vague regarding dates and gave only approximate answers. He was correctly oriented. Arithmetical calculations he did more easily. Physical examination showed distinct tremors of hands to be still present. There was no sensory impairment, and his gait was steady. His pupils were still unequal, and reacted sluggishly to light. The deep reflexes were present and active, and the superficial reflexes gave a normal response. His speech was quite clear. The serological reactions were :

Blood	W.R.	+ 13 +
C.S.F.	W.R.	+ 8 +
	Cells	10 per c.mm.
	Protein	55 mg. g
	Lange	5555432100

He was advised to continue treatment, which he was quite willing to do. He attended irregularly for the next series of injections and these were not completed till October of this year. At that time he had received a further fourteen injections of three grammes.

His wife then reported that he was much better. He took a greater interest in things around him and in his personal appearance. She thought his memory was much better. As to work, she stated that he had retained a trusteeship in a brewery and attended the weekly meeting of the trustees. Otherwise he confined his attention to gardening and motoring. On examination he was still rather self-satisfied and very garrulous. His use of the superlative in all his statements was very marked. There were no delusions of grandeur, and he conversed rationally, but he smiled rather fatuously throughout the interview. His memory showed distinct improvement for both recent and remote events. He was correctly oriented, and simple arithmetical calculations he did rapidly. He took seven serially from one hundred without any error in thirty-five seconds. His grasp of general knowledge and current events was fairly good, but it did not reach that

degree expected of a man in his social position. According to the Binet Simon tests he had a mental age of seventeen years and nine months. His physical state had improved considerably. There were no tremors of his hands or tongue made out in examination. Sensation and gait were normal. His pupils were equal, and reacted quite well to light and on accommodation. His deep reflexes were present and active. The superficial reflexes were normal. His speech was quite clear. The serological reactions then were :

Blood	W.R.	+ 20	} some blood present
C.S.F.	W.R.	+ 20 +	
	Cells	20 per c.mm.	
	Protein	45 mg. %	
	Lange	0000001223	

Comment : A case of general paralysis of the euphoric type, whose symptoms had been present for six months prior to treatment. Following upon malaria and twenty-eight injections of three grammes of tryparsamide, he showed distinct clinical and serological improvement. He has been included in the partially remitted group.

Case 46. C.H.H. Admitted 7.8.28 Occupation Engine-fitter Age 55.

Patient had been married thirty years, and had three children alive and well. His wife had one other pregnancy before the birth of the youngest child, which ended in the birth of a still-born child. His health had always been good, and he had had no serious illnesses. He was always partially deaf in his right ear. Within the past three years his left ear had also become affected and he was now very deaf. Fifteen years ago he contracted a chancre and received medicine from his doctor. The treatment only lasted one month. Both his wife and his daughter suffered from epilepsy. Ten years ago his wife was a patient in Devizes Mental Hospital for six months, suffering from depression. She was said to have made a good recovery and there had been no recurrence.

His present illness began two years ago, when he was off work for three months on account of weakness and shooting pains in his legs. Thereafter he was able to resume duty, but he had difficulty in walking and picking his feet off the ground. He was able to continue at work till two weeks ago. His mental symptoms appeared to have developed about three months ago, when he became dull and apathetic. He lost interest in his work and showed a distinct change in his demeanour. He very easily got muddled, and he became forgetful. In his personal appearance he ceased to take the interest he had displayed previously.

On admission he was rather dull and showed little interest in his surroundings. He answered questions when asked, but otherwise volunteered little information. He appeared easily pleased, and accepted things as they came. His memory for remote events was quite good, but that for recent events was distinctly impaired. He was unable to

do simple arithmetical calculations, and in attempting to subtract seven serially from one hundred he made many errors, such as, ninety-three, eighty-six, seventy-eight, ninety-two, eighty-four, etc. He was asked to repeat the cowboy story and he gave a very absurd rendering of it. He showed no appreciation of these mistakes. His physical condition was poor. He showed marked tremors of face, hands and tongue. There was no impairment of the sensation of touch, heat, or pin-prick, but there was a loss of deep muscle sense in his lower limbs. His gait was ataxic, and Romberg's sign was present. The eighth cranial nerves were affected, rendering him thereby deaf. Speech was not involved, and he enunciated test phrases clearly. His pupils were unequal, irregular, and reacted very sluggishly to light, whereas on accommodation their reaction was brisk. The deep reflexes of the upper and the lower arms were equal and somewhat exaggerated. His superficial reflexes were normal. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	90 per c.mm.
	Protein	110 mg. %
	Lange	555543210

He was inoculated on 30.8.28 with three c.cs. of malarial blood. This was given intravenously. The following are the details of his fever.

7.9.28	temperature	104.6
10.9.28	"	101.8
11.9.28	"	104.4
13.9.28	"	104.4
15.9.28	"	104.6
17.9.28	"	104.2
19.9.28	"	105
21.9.28	"	101.4
22.9.28	"	104.4
24.9.28	"	104

On 24.9.28, after he had had ten rigors, quinine sulphate, in ten grain doses three times a day, was given. He had no recurrence of the fever. Thereafter his physical

condition rapidly improved again. Throughout his fever he received weekly injections of tryparsamide. These had no deterrent effect on the fever. Two weeks after the fever subsided his mental condition began to show improvement. He became more cheerful, started to read the paper, and was more willing to talk. The weakness in his legs caused him considerable difficulty, and he was unable to walk without assistance. Fränkel's exercises were practised. At the time of his discharge, on 15.11.28, he was able to get about very much better, and walked without a stick. His mental condition had steadily improved, and he was much brighter. He assisted in the ward work, and was a keen worker in the occupational department. His memory for recent events showed some improvement, but was still impaired. He had great difficulty in doing simple arithmetical calculations and became easily muddled. There was no change in his physical signs. His relatives were unable to afford his maintenance here and he was discharged on 15.11.28. As he lived in the country arrangements were made for him to receive his injections from his family doctor.

On 8.2.29 he had received fifteen injections of three grammes of tryparsamide, and he attended for re-examination. His wife reported that he was much better, and that he was more cheerful and sociable. He was much less irritable than formerly. His pains were distinctly less, and he could get about more easily. On examination he was bright and cheerful. He conversed rationally and coherently. His memory for recent events had improved, and he was correctly oriented. Simple calculations he did correctly, but he made several errors in taking seven serially from one hundred. The errors on this occasion he was able to appreciate. His grasp of general information and knowledge of current events was good. His general physical condition was much better

and he had put on weight. His physical signs showed no change from the previous examination. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	15 per c.mm.
	Protein	70 mg. %
	Lange	5555432110

He was anxious to resume work and this he was advised to do, and also continue his injections.

On 14.6.29 he had had a further series of fifteen injections, and he was readmitted for examination. The relatives reported that his improvement had been maintained. He started work after the last examination and had been able to continue thereat. He was much brighter, and had displayed again his former interest in reading. On examination he was much more alert than previously. He talked rationally and coherently. His grasp of general information and of current events was quite good. On the Binet Simon tests he attained a mental age of thirteen years and one month. His memory for both recent and remote events was quite good. He remembered clearly his coming here and the disinterested, apathetic state he was in then. He still found difficulty with simple arithmetical calculations, and he made several errors in taking seven from one hundred. He was told the cowboy story again, and his rendering of it was quite good. His physical state was definitely improved. The tremors of his hands and face were absent, but he still showed some tremors of his tongue. There was a loss of deep muscle sensation in his legs, but cutaneous sensibility was not impaired. His gait was ataxic, and Romberg's sign was positive. He found it easier to walk with the aid of a stick, though he could get about unaided. The pupils were unequal, irregular, and Argyll-Robertson in type. The deep reflexes of upper limbs were present, equal and active. The knee and ankle

jerks were completely absent. The superficial reflexes were normal. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	4 per c.mm.
	Protein	50 mg. %
	Lange	4444322110

He was very anxious to have a rest from his injections. It was suggested that these might be discontinued for two or three months but that thereafter he must resume treatment. Nothing further was heard of him until December, 1929, when his doctor wrote saying that the patient was continuing treatment. He was willing to come here for re-examination in January of next year. Meantime his improvement had been maintained, and he was working regularly.

Comment : A case of tabo-paresis, whose mental symptoms had been present for three months prior to treatment. He was treated with tryparsamide plus malaria. Of the former he received twenty-eight injections of three grammes. He showed clinical and serological improvement thereafter, and has been included in the group of those enjoying a good remission.

Case 47. Mrs. P. Admitted 25.9.28 Occupation Waitress Age 34

Patient was married twelve years ago, but her husband was killed one year later in the Great War. She had no children. Her previous health had been very good, and she had not had any serious illnesses. She denied ever having had any venereal disease or rash, etc. Her father was killed at a railway crossing in the country. He was of a worrying type, and it was doubtful if his death was really accidental. Apart from this there was no history of nervous or mental disorder in the family.

In August, 1927, she accidentally fell and sustained an abrasion on her left shin, which turned septic, and she was in bed for some weeks. She felt rather unsteady after that, but was able to continue at her work. Her mental symptoms appear to have developed within the past three months, though she was able to continue at her work till five weeks ago. She became dull and very emotional. She would start weeping on the slightest provocation and often without adequate cause. Then she became forgetful, and could not serve her customers. She had great difficulty in adding her bills, and the cashier could not read her writing. If anyone came against her at all as she was carrying a tray she would let it fall. Since stopping work these symptoms have gradually become more marked. At times she had great difficulty in putting her words together, and her conversation was incoherent.

On admission she was dull and depressed. Her emotional state varied considerably and rapidly. Within a short period of being dull she would become cheerful. This state would last a short period, then she would relapse into tears for no apparent reason. She did not express any delusions, nor was there evidence of hallucinations. Her memory for both recent and remote events was very poor, and during the

interview she would frequently ask what we were talking about. Recent memory was impaired to a greater degree than remote. She was correctly oriented for time and place. Simple arithmetical calculations she was unable to do, and she failed to take seven serially from one hundred. Her general physical state was poor. She showed marked tremors of her hands and tongue. There were areas of anaesthesia on the inner aspect of her legs. Her gait was unsteady, and Romberg's sign was present. Her pupils were equal, regular, and reacted sluggishly to light. The deep reflexes of the upper limbs were present, equal, and somewhat exaggerated. Those of the lower limbs, the knee and ankle jerks, were completely absent. Her superficial reflexes were normal. Her speech was slow and distinctly slurred, and her writing was very tremulous. The serological reactions were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 8 +
	Cells	45 per c.mm.
	Protein	80 mg. %
	Lange	5555543210

It was decided to treat her with tryparsamide and malaria. The former was administered intravenously in three gramme doses. On 19.10.28 she was inoculated with three c.cs. of malarial blood, given intravenously. The following are the details of her fever.

5.11.29	temperature	102.4
7.11.29	"	104
8.11.29	"	103
9.11.29	"	103.2
11.11.29	"	103
13.11.29	"	105.4
14.11.29	"	102.4

On 14.11.29, after having had seven rigors, her general condition appeared weak, and the fever was brought to an end by giving quinine bihydrochloride in five grain doses three times a day. Thereafter she rapidly improved again.

Her mental condition remained unchanged until about three weeks after the cessation of her fever, when she began

to display a greater interest in her surroundings, and she was somewhat more stable emotionally. Thereafter she steadily improved. She became a willing worker in the ward, and to her improvement the occupational class contributed greatly. Her relatives were anxious to have her home, so on 9.2.29 she was discharged, to attend weekly for her injections of tryparsamide. On the whole she showed distinct improvement. She was more steady in her walking, and had more confidence. Mentally she was more alert and cheerful. Her memory still remained very poor for both recent and remote events, and she was still unable to do simple calculations. The tremors of her hands and face were less marked, but otherwise her physical signs showed no change. The serological findings then were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 8 +
	Cells	6 per c.mm.
	Protein	55 mg. %
	Lange	5555543210

She attended at weekly intervals for her injections. On 15.6.29 she had received thirty-four injections of three grammes and was very anxious to be given a period of rest. Her improvement was maintained, and she was distinctly brighter and more active. She assisted in the housework and felt she would soon be able to resume duty. She was still somewhat unstable emotionally, and frequently gave way to weeping. Of this weakness she was quite well aware. She talked rationally and coherently, and her grasp of general knowledge and current events, though still rather poor, appeared much better than previously. Her tremors were less marked. The pupils were unequal, and reacted sluggishly to light, whereas on accommodation their reaction was brisk. The knee and ankle jerks were absent. She was advised to report here again at the end of three months.

She did not attend again until an enquiry was sent her on 1.12.29. Her relatives then reported that she was much

better. She had resumed work and appeared to do it satisfactorily. On examination she was bright and cheerful. When asked why she had not returned for examination she stated that she expected to hear from the hospital when she was to return. She had been working for six months. At first she found work difficult, especially the reckoning up of bills, but this did not trouble her now. The only complaint she had to make was that she still felt at times that she would start weeping again. This she was controlling better. She conversed intelligently and showed that she was well aware of current events and well in touch with her surroundings. According to the Binet Simon tests she had a mental age of eleven years and nine months. Her memory for both recent and remote events was quite good. Arithmetical calculations she performed somewhat better than formerly, but she failed to take seven serially from one hundred. Her general physical condition had improved considerably, and her weight had increased. Her gait was much steadier, but there was slight Rombergism. There were no tremors of her hands or tongue. Her speech was clear and she enunciated quite well the test phrases. The pupils were unequal in size, irregular in outline, and sluggish in their reaction to light, whereas their reaction on accommodation was quite brisk. The deep reflexes of her arms were present, equal, and somewhat exaggerated. The knee jerks and ankle jerks were absent. Her superficial reflexes were normal. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 8
	Cells	10 per c.mm.
	Protein	45 mg. %
	Lange	5543221000

Comment : A case of tabo-paresis whose mental symptoms had been present for at least three months before treatment. She was treated with tryparsamide plus malaria. Of the former she received thirty-four injections of three grammes. She showed marked clinical and slight serological improvement. She has been included in the partially remitted group.

Case 48. S.H. Admitted 29.11.28 Occupation Engineer Age 35.

Patient had been married six years but had no children. His wife had been pregnant on three occasions but each had terminated in a miscarriage. As far as was known his health had always been good and he had had no serious illnesses. He denied ever having had venereal disease but admitted having exposed himself to infection on many occasions. None of his relatives had suffered from any nervous or mental disorder.

The first symptoms of his present illness began nine months ago when he became very forgetful. He went to take a job in Basingstoke and a fortnight later returned to London quite unexpectedly and had forgotten all about Basingstoke. Since then he had gradually become worse. He would sit about for hours, was very dull and apathetic and would frequently burst out weeping. In his manner and behaviour he was said to have become very childish and he had lost all interest in his personal appearance. He had done no work for three months.

On admission he was very dull and apathetic. His replies to question were relevant but frequently very childish, and accompanied by a fatuous smile. His memory was markedly impaired, more so for recent than for remote events. He was correctly oriented for time and place. Emotionally he was unstable and passed rapidly from being cheerful to being morbid and irritable. Any arithmetical calculations involving attention he was unable to do and he could not take seven serially from one hundred. He failed to grasp the seriousness of his condition and had no insight whatever. His physical condition was fairly good. He showed marked tremors of his hands and tongue. His gait was steady and Romberg's sign

was absent. There was some blunting of cutaneous sensibility to touch and for prick over his nose and on the inner aspect of his legs. His pupils were equal and reacted to light and accommodation. No response was obtained from his knee and ankle jerks. His abdominal and plantar reflexes were normal. His speech was slow and slurred and he failed on the usual test phrases. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 20 +
	Cells	85 per c.mm.
	Protein	75 mg. %
	Lange	5555543210

It was decided to treat him with tryparsamide plus malaria so he received at weekly intervals intravenous injections of three grammes of the drug. On 6.12.28 he was inoculated with malaria, three ccs. of infected blood being injected intravenously. The following are the particulars of the fever.

<u>Date,</u>	<u>Highest temperature reached.</u>
15.12.28	103.2°
17.12.28	102.6
19.12.28	104.6
21.12.28	104.8
22.12.28	104.8
23.12.28	105
24.12.28	104
25.12.28	103.4
26.12.28	105
27.12.28	105
29.12.28	102.2

On 29.12.28 he had had eleven rigors and thereafter his fever ceased spontaneously, No quinine had been administered. During his fever he had auditory hallucinations and could hear the voice of his brother-in-law. He stated that his brother-in-law was accusing him of smoking too many cigarettes and was telling the other patients that he (patient) did not act as chauffeur to the British Ambassador. He became very restless and aggressive. During the fever his physical condition caused no anxiety. His mental state progressed. Emotionally he

alternated between laughter and tears. Frequently he was noisy and very abusive and aggressive. He became very suspicious. He accused the other patients of talking about him and quarrelled frequently with them. As he showed no improvement he was re-inoculated on 26.2.29 with malaria (benign tertian) four ccs. of infected blood were injected intravenously. He failed to develop any fever. He remained very noisy and abusive and his language was frequently obscene. He threatened the other patients and came to blows with them as he thought they were talking about him. Frequently he refused his food because the injections he received were blocking his "back passage". His memory was very poor and he was disoriented for time and place.

On 17.4.29 his mental condition was unimproved. He was very suspicious, noisy, abusive and aggressive. Insight was entirely lacking. He was inoculated today with quartan malaria, four ccs. of infected blood were given intramuscularly. He failed thereafter to develop any fever.

As he showed no improvement and remained in the same suspicious, noisy and aggressive state he was discharged on 3.6.29. He was then deluded and had auditory hallucinations. He stated he could hear the other patients talk about him, and of them he was very suspicious. Frequently he attacked one or other of them. He asked repeatedly to be allowed to go to work as he was perfectly fit. With regard to his inability to take food, this, he stated, was due to his back passage being occluded as a result of the treatment he had had. His memory, both recent and remote, was much impaired. The present year he stated was 1918, and he had no idea how long he had been here. Simple arithmetical calculations he could not do. He still showed marked tremors of his face, tongue and hands. It was impossible to test adequately his sensory distribution as he would not cooperate, but there was a definite impairment of

sensation to painful stimuli (pin prick) over the inner aspect of his legs. His gait was unsteady and there was slight Rombergism. The pupils were equal, regular and reacted sluggishly to light. whereas their reaction on accommodation was brisk. The deep reflexes of his arms were present and active. His knee and ankle jerks were absent. The superficial reflexes were normal. His speech was still slow and definitely slurred. The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	28 per c.mm.
	Protein	65 mg. %
	Lange	5544321100

He was admitted to Long Grove Mental Hospital on 11.6.29 and the following notes were extracted from their clinical record.

11.6.29. He was mentally confused and frequently answered questions in an irrelevant manner making very absurd and fatuous remarks. He had a fixed delusion regarding his bowels and was consequently difficult with his food. He was aimlessly restless and showed emotional instability. He was devoid of insight and believed he went to the Maudsley for punishment. The physical signs found corresponded with those detailed above.

7.8.29 He remained unchanged self-satisfied and unduly cheerful. He frequently repeated stereotyped phrases and his speech was very slurred.

10.12.29 There was no improvement in his mental state, rather the reverse and he showed signs of marked deterioration. He was very rambling in his speech and very restless. His habits were frequently faulty.

Comment : A case of tabo paresis whose symptoms had been present for at least nine months before treatment. He was treated with malaria and tryparsamide. Of the latter he received eighteen injections. He showed no improvement and is now in a mental hospital.

Case 49. C.P. Admitted 29.11.28 Occupation Motor Driver. Age 28.

Patient had been married six years and had one child, alive and well. His wife has had no other pregnancies. His previous health has been good and he had had no serious illnesses. He joined the Army during the war when he was fifteen years old, and a year later, twelve years ago, he contracted a chancre in France. He stated that he had had three courses of treatment by injection. Two years ago he attended one of the general hospitals to have a blood test and thereafter he had another course of salvarsan. In his own family there was said to be no history of nervous or mental disorder. His wife was undergoing treatment here suffering from an attack of depression.

His present illness appeared to develop three months ago when he began to be very extravagant in his talk. He told his fellow workers that he was related to a millionaire and was about to inherit a large sum of money. This he stated would be devoted to the benefit of mankind. One day at his work while talking to the foreman he burst into tears though a short time previously he appeared quite happy. Since then he had become very grandiose and there was nothing he could not do. A week ago he went up to a policeman and told him he was going to commit suicide. No notice was taken of this and he was later found throwing stones through a shop window.

On admission he was elated and euphoric. He talked at great length of his abilities and how he was about to possess a fortune. He had great schemes for acquiring money. He was about to introduce new patents to revolutionise motor engineering and the money he received he would give away. His memory for recent events was very poor and he could

only give a very rambling, disjointed account of his recent behaviour. His memory for remote events was less impaired. Simple calculations he was unable to do. Emotionally he was very unstable and during the interview he several times dissolved into tears. Shortly thereafter he became quite cheerful again. His general physical condition was rather poor, and he was undernourished. He showed marked tremors of his hands, and tongue, but his speech was not affected. There was no sensory abnormality and his gait was steady. He had unequal, regular, Argyll Robertson pupils. His deep reflexes were present, equal and somewhat exaggerated. The superficial reflexes were normal. The serological findings were :

Blood	W.R.	+ 20 +
C.S.F.	W.R.	+ 8 +
	Cells	40 per c.mm.
	Protein	75 mg. %
	Lange	555554332

It was decided to treat him with tryparsamide plus malaria. He received his first injection of tryparsamide on 3.12.28 and thereafter at weekly intervals, three grammes were given intravenously. On 10.12.28 he was inoculated intravenously with 3 ccs. of malarial blood. The following are the details of his fever :

24.12.28	temperature	103.2°
26.12.28	"	103
28.12.28	"	103.8
30.12.28	"	104.8
1. 1.29	"	105.6
3. 1. 29	"	105.2
5. 1.29	"	104.4
7. 1.29	"	104
9.1. 29	"	103
11. 1.29	"	100.6

Having had ten rigors he was given quinine sulphate in ten grain doses three times a day. Thereafter he had no further fever.

His mental condition prior to the development of the fever did not show any improvement. He became very noisy

and aggressive. His language was very foul and he abused the other patients and the nursing staff. He lost all sense of decency and in his habits he was most faulty. He became very excited one day, when he found he could not obtain cigarettes on credit, although of his own wealth he had no doubt. He suffered from retention of urine and had to be catheterised. There was no stricture. It was only with difficulty that he was retained here pending the incubation of his fever as he was so noisy, aggressive, and frequently attacked the nursing staff.

After his fever developed he became much quieter and more amenable. He was, however, very easily upset and would then start weeping without adequate cause. After his fever had been discontinued, and he felt more comfortable, he was distinctly better. He ceased to have outbursts of excitement, and he conversed intelligently. He showed an active interest in his surroundings and began to read the papers. A week later he began to get up during part of the day and he was a willing worker, anxious to assist. He was still very unstable emotionally and his memory was poor. He was discharged as an in-patient on 2.2.29 and was advised to attend weekly for his injections.

On 8.8.29 he had received thirty-one intravenous injections of three grammes of tryparsamide and he was re-admitted for examination. His relatives reported that he was much better. He behaved normally and had not repeated any of his former ideas of grandeur. He had been actively employed for five months as a motor driver in the Ministry of Health, and was giving satisfactory service.

On examination he was bright, cheerful and much more stable emotionally. He conversed rationally and intelligently and had good insight into his illness. His grasp of general information and his knowledge of current

events was in keeping with his social level. His memory for both recent and remote events was quite good. Simple calculations he did accurately but he made several errors in taking seven serially from one hundred. His physical signs were unchanged from the previous examination. The serological findings were :

Blood	W.R.	not examined.
C.S.F.	W.R.	+ 20
	Cells	10 per c.mm.
	Protein	55 mg. %
	Lange	5544321100

He was advised to continue treatment and did so until 26.10.29 when he complained of difficulty in micturition. This became greater and he became unable to pass any water so he had to be admitted to the infirmary. There he required to be catheterised. This weakness of his bladder improved and he was discharged. His work was that of a motor cyclist under the Ministry of Health. He was advised to give this up and find work which would offer him more protection. He, therefore, obtained employment driving a motor car and this work he had been doing satisfactorily. His social circumstances were poor. His wife was undergoing treatment in hospital suffering from an attack of depression and he had to be responsible for the child. His mental condition was very much better. He was bright and active. He talked rationally and intelligently. His grasp of general information and knowledge of current events was adequate considering his station in life. According to the Binet Simon tests his mental age was thirteen years. His memory for both recent and remote events was good. Arithmetical calculations he did quite well. He still showed slight tremors of his tongue but none of his hands. His gait was steady and there was no Rombergism. He had unequal, regular, Argyll Robertson pupils. The deep reflexes were present, equal and active. His superficial reflexes were normal. He had received altogether

forty-one injections of three grammes. The serological reactions on 15.12.29 were :

Blood	W.R.	negative.
C.S.F.	W.R.	+ 20
	Cells	15 per c.mm.
	Protein	45 mg.%
	Lange	2221110000

Comment : A case of general paralysis of the euphoric type whose mental symptoms had been present at least three months prior to treatment. He was treated with tryparsamide plus malaria. Of the former he received forty-one injections of three grammes. He showed marked clinical and serological improvement, and has been included in the group enjoying a good remission.

Case 50. J.C. Admitted 12.12.28 Occupation Ashphalt Worker Age 45.

Patient had been married many years but had no children. As far as his wife knew he had always enjoyed good health and had had no serious illnesses. He was always considered a good worker and he had held his present position for many years. He denied ever having had syphilis or other venereal disease. There was no history of any of his relatives having suffered from any nervous or mental disorder.

His present illness began about three months ago. His wife then noticed that he was very forgetful. He became rather careless in his habits but no notice was taken of his behaviour until four weeks ago when he began to act in a very irresponsible manner. He would walk across the road irrespective of the traffic, and frequently narrowly escaped injury. His doctor was consulted, because of this queer behaviour, and he advised a holiday. He returned to business

one week ago. There, for no apparent reason, he would burst out crying. The climax came two days ago when he made advances to one of the typists. She resented this and he chased her round the office. He was thereupon given the alternative of the police court or resigning. His doctor then advised his admission here.

On admission he expressed himself as being very pleased to be here. He liked the ward, the food, the other patients and the staff. He was very childish in manner, and behaviour. He stated that there was nothing at all the matter with him, and he had come merely to please his relatives. He was quite unable to give any account of his recent activities. His memory for both recent and remote events was very poor and he was disoriented for time and identity. He expressed vague delusional ideas regarding a patent he has devised which would revolutionise the world. His conversation was, however, very disjointed and frequently he became quite incoherent. He had auditory hallucinations and carried on conversations with imaginary people. He was on the whole facile and distinctly fatuous. Simple arithmetical calculations he was quite unable to do. His general physical condition was very poor. He showed marked tremors of his hands, face and tongue. His gait was unsteady and Romberg's sign was present. He had unequal, irregular, Argyll Robertson pupils. The deep reflexes were all present and equal. His superficial reflexes were normal. His speech was very slurred and he failed completely on the test phrases.

The serological findings were :

Blood	W.R.	+ 40 +
C.S.F.	W.R.	+ 40 +
	Cells	90 per c.mm.
	Protein	100 mg.%
	Lange	555554321

Although from the history his condition had only manifested itself three months before admission, he presented

the picture of an advanced general paralytic. It was decided nevertheless to treat him with tryparsamide plus malaria.

On 3.1.29 he was inoculated with malaria, three ccs. of infected blood were injected intravenously. The following are the details of his fever :

<u>Date.</u>	<u>Highest temperature reached.</u>
17.1.29	102.2°
21.1.29	101.8
23.1.29	104.6
25.1.29	104.2
27.1.29	105
29.1.29	104.6
31.1.29	103.8
2.2.29	104.6
4.2.29	105.4
6.2.29	105.6

Having had ten rigors his fever was stopped on 6.2.29 by giving quinine sulphate in ten grain doses three times a day. Thereafter he had no recurrence of fever. Throughout his fever, tryparsamide was administered with no untoward effects.

His mental condition showed no improvement. He became dull and confused. He was hallucinated and frequently carried on conversations with these voices. He showed evidence of considerable deterioration. In his habits he was frequently very faulty. Following upon his fever he was very weak. His pulse was soft and rapid. He had suffered from bronchitis all his life, and his chest was markedly emphysematous. His cough became very troublesome and it was considered advisable to stop his fever after the tenth rigor. Thereafter he did not regain strength. He remained very confused and could not even give his name. Frequently he was very restless in bed. In spite of all possible attention he became weaker. A wave of influenza passed through the ward and he contracted a broncho-pneumonia which proved fatal. He died on 20.2.29. There is no doubt that his death, while not directly attributed to malaria, was nevertheless hastened

thereby. Altogether he had received seven injections of three grammes of tryparsamide. His serological findings prior to death were :

Blood	W.R.	+ 40 +	
C.S.F.	W.R.	+ 40 +	(blood admixture)
	Cells		

Comment : A case of general paralysis of the simple type whose mental symptoms had been present at least three months prior to treatment. He was treated with tryparsamide plus malaria. Of the former he received seven injections of three grammes. He did not regain strength after his fever, but gradually became weaker and death was the outcome.

Summary of the Results.

The efficacy of treatment of any condition is judged by the degree and permanence of clinical improvement thereby produced. In considering the results obtained in the treatment of physical diseases one is accustomed to speak of recoveries in a rather loose sense. One talks of cases with organic heart lesions having recovered, whereas what one really means in most cases is that that degree of compensation has been reestablished which enables the patient to take his part in the world again. In the consideration of general paralysis one hesitates to think of recovery. As has been already stated, any claims of recovery arouse in the minds of most grave doubts as to the diagnosis. In many of the patients under review a marked degree of improvement has been noticed as the result of treatment.

In estimating these results one has to take into account the findings, if any, at the clinical examination, together with the social usefulness of the patient. In consideration of the latter one frequently attaches importance to the patient's ability to work and maintain himself. This criterion is, however, unsatisfactory unless attention is given to each case individually. Much depends on the level to which the patient had attained prior to his illness and the simplicity or otherwise of his employment. Some have been able to resume responsible duties and have discharged them successfully for several years. One feels that several others could be regularly employed if the nature of the work had been less complicated or less responsible. Case No.12 is a good example of this. He is a clergyman who, although much improved, will not be allowed the opportunity of resuming duty. Instead, he has been doing part-time clerical work, and that quite efficiently. One feels that had his vocation

in life been of a more simple and less onerous nature he could have been regularly employed. The other aspect has also to be considered, where patients enjoying a partial improvement only, are able to be employed regularly in routine work. Their interests are few, consequently their attention is not distracted from the work on hand, so that to their employers their output is greater and they appear to be better. Some others, who appear to have made a good improvement, are nevertheless unable to be regularly employed. Psychological investigations are being made to ascertain, if possible, why this should be so. Eighteen patients have been taken from the good remission and the partially remitted groups and have been submitted to intelligence tests. Terman's revision of the Binet Simon tests has been employed, and the findings have been put forward in the respective case reports. There was found to be no correlation between the intellectual equipment and the ability to be usefully employed.

The patients have been arranged in four groups according to whether they enjoy a good remission, a partial remission, are unimproved, or have died. Further explanation of what is implied by each of these terms is required.

Good Remission. In this group have been included those cases who show that degree of recovery, both mental and physical, that enables them to play the part of normal citizens again. It is not inferred that they have completely recovered, though there is no evidence superficially of psychic disorder. A careful examination in some of these cases would show memory defects and defects of the emotional or intellectual spheres. They have completely recovered their former ability to work and have resumed their previous occupations or are regularly employed in a similar capacity. They can adapt themselves to their environment and have made a social recovery.

When examined they are bright and cheerful. As a rule they come readily for examination, though they may be somewhat apprehensive about the interview. They have good insight, and most of them desire to take all precautions against having a relapse. In passing, I would point out that such patients have frequently complained of headache and general malaise after lumbar puncture. This has been more marked the more closely their serological reactions approached normal.

Partial Remission. This group has been further sub-divided into "moderate remission" and "at home stationary". The "moderate remission" group includes those whose degree of improvement is quite distinct but not so good as in the former group. Some in this group have been more recently treated and approach very nearly to the first group. It may be that they will yet attain to this level. Most of them are unable to obtain or retain regular employment. Others, whose duties are simple with little or no responsibility attached thereto, are able to continue thereat regularly.

In the "at home stationary" group the degree of impairment is more marked. They are unable to obtain employment. To their acquaintances they are dull, indifferent, and appear lacking. As a rule they are quiet, docile, and usually employ themselves at home or in the garden.

The difficulty of prolonged treatment in this partially remitted group has been greater than in the group of patients enjoying a good remission. These patients frequently fail to grasp the value of treatment and require to be reminded repeatedly.

Unimproved. This group contains those who have not, as the result of treatment, been able to be retained at home. In this respect a great deal depends on their social conditions

and so they are not quite comparable to the "unimproved" group of workers in mental hospitals. Several of these patients, while unable to be cared for at home, would be able to do useful work in a hospital, and one feels they could probably be included in the stationary group. Others in this group have definitely deteriorated, and all in this group are in mental hospitals. Together with the stationary group they constitute a large social problem, and, like those suffering from some other forms of organic nervous disease, they require care for the rest of their lives.

Deaths. Altogether nine patients in this series of cases died. Six of these died in the terminal stages of the disease, and their death was not associated with or hastened by treatment. One died, during a good remission, from carcinoma of the alimentary tract. Two deaths were associated with the malarial fever. One of these patients, Case No. 25, it will be noted, had been treated with tryparsamide, and showed a partial improvement, but later relapsed. He was not accepted here for malarial treatment but obtained admission to another hospital, and died there within twenty-four hours after a rigor. The other patient, Case No. 50, died two weeks after the fever had been stopped by quinine. The percentage of deaths, then, associated with malaria, was 6 %.

The results of treatment are set out in Table I (a). Of the fifty cases treated, 36 % have enjoyed a good remission, 24 % are distinctly improved, 8 % show slight improvement and are stationary, 14 % are unimproved, and 18 % are dead. Thus 68 % have improved after treatment, of whom in 60 % the improvement is distinct.

Table I (a).

Results of Treatment.

<u>No. of cases</u>	<u>Good Remissions</u>	<u>Partial Remissions</u>		<u>Unimproved</u>	<u>Deaths</u>
		<u>Improved</u>	<u>Stationary</u>		
50	18	12	4	7	9

If to the number of patients now alive, those who died after treatment are added, these being grouped according to their mental condition before death, then the results as found in Table I (b) read : 38 % have had a good remission, 24 % are distinctly improved, 10 % are slightly improved, and 28 % are unimproved.

Table I (b).

<u>No. of cases</u>	<u>Good Remissions</u>	<u>Partial Remissions</u>		<u>Unimproved</u>
		<u>Improved</u>	<u>Stationary</u>	
50	19	12	5	14

The results of the seventeen cases treated by tryparsamide alone are tabulated in Table II (a). Those of the thirty-three cases treated by tryparsamide plus fever are contained in Table II (b).

Table II (a).

Results obtained in cases treated by tryparsamide only.

<u>No. of cases</u>	<u>Good Remissions</u>	<u>Partial Remissions</u>		<u>Unimproved</u>	<u>Deaths</u>
		<u>Improved</u>	<u>Stationary</u>		
17	6	5	1	2	3

Table II (b).

Results obtained in cases treated by tryparsamide plus fever.

<u>No. of cases</u>	<u>Good Remissions</u>	<u>Partial Remissions</u>		<u>Unimproved</u>	<u>Deaths</u>
		<u>Improved</u>	<u>Stationary</u>		
33	12	7	3	5	6

Of those treated by tryparsamide alone, 35.29 % have enjoyed a good remission, 25.41 % show a distinct improvement, 5.88 % show slight improvement, 11.26 % are unimproved, and 17.64 % have died. The number showing appreciable improvement is therefore 60 %.

Of those treated by tryparsamide plus pyrexia, 36.36 % have enjoyed a good remission, 21.21 % are distinctly improved, 9.09 % show slight improvement, 15.15 % are unimproved, and 18.18 % are dead. The number showing appreciable improvement is therefore 57.57 %.

It is, however, not possible to compare these results, on their face value, as representing the relative merits of these forms of treatment. Among those treated by tryparsamide alone may be patients whose general condition is too poor to submit to treatment by fever, as Case No.17, or those whose relatives will not give their consent to treatment by fever, as Case No.13. On the other hand several cases are included in the second group, treated by tryparsamide plus fever, who showed no improvement under, or relapsed after, treatment by tryparsamide. They were removed to a mental hospital where, as a last resort, they were treated with malaria.

In considering the number of these patients who have shown improvement, one is reminded of Osler's (35) comment, in 1905, when writing on the treatment of general paralysis: "Prolonged remissions, which are not uncommon, are often erroneously attributed to the action of remedies." A study

of the number of cases who showed improvement prior to the introduction of these forms of treatment is interesting. As this hospital did not open, for its present purpose, until 1923, it has been impossible to get this information directly, but the literature already published on this aspect is worth attention.

Raynor (36) found that of 1004 cases of general paralysis admitted to the Manhattan State Hospital, eighty-five patients, or 8.5 %, showed improvement, thirty-three of whom had a good remission. He also noted that in more than one half of the cases the remissions were not permanent. Furman (37) found that of 503 cases of general paralysis only twenty-one patients, or 4.2 %, had a spontaneous remission. Mapother and Beaton (38) found that the percentage of spontaneous remissions was between 7 and 8 %. Stoddart (39) quotes the rate for such cases treated in Bethlem Royal Hospital at the end of last century as being 14 %. Kraepelin states that 15.9 % show a spontaneous remission. Meagher (29), in 1927, investigated the subsequent histories of 1173 untreated cases of general paralysis who had been admitted to the English County and Borough Mental Hospitals in 1923 and 1924. He found that the total number who had been discharged from hospital, including those removed against advice, was sixty-six, or 5.62 %. Of these, seventeen were classified as recovered, forty as relieved, and nine as not improved. Twenty-six of these, between 1924 and 1927, had died at home or had been readmitted to hospital. In 1927, of 1173, only 157 were alive, and 1016 were dead. Of the 157 alive, only forty were then outside of a mental hospital. He concluded his remarks by "pointing out that, if taken to represent the cases in this series showing a complete or a partial remission of the disease, they suggest that remissions of more than transient duration are decidedly rare occurrences. A study of these cases of untreated general

paralysis clearly shows that complete recovery must be, if it ever occurs, of extreme rarity."

A comparison of these figures with the results obtained by treatment in this series of fifty cases, of whom 68 % showed some degree of improvement, 60 % of these being quite markedly improved, indicates that the treatment has produced beneficial results. I have tabulated (Table III) the results of treatment reported by other investigators, with an indication of the treatment they employed.

Table III.

Results of treatment reported by other investigators.

	<u>No. of Cases</u>	<u>Year of Publ.</u>	<u>Dur'n. after treatt. in years</u>	<u>Com- plete Remissn.</u>	<u>Im- proved</u>	<u>Unimp'd. or Dead</u>
1. Protein Shock, etc.						
(40) Pilcz	86			8 %	36 %	56 %
(40) Szedlak	25			10 %	53 %	37 %
(40) Jauregg	33			10 %	48 %	42 %
(40) Hauber	36			5 %	26 %	69 %
	Average			8 %	38 %	54 %
2. Arsenic, Mercury, etc.						
(41) Goldsmith	155	1925	2	10 %	20 %	70 %
(42) Finlayson	14	1918	2	10 %	10 %	80 %
(43) Evans and Thorne	14	1916	1-3	8 %	17 %	75 %
	Average			9.3 %	15.3 %	75 %
3. Tryparsamide						
(44) Lorenz	90	1924	½-3	41 %	42 %	17 %
(34) Moore	40	1924	½-2	42 %	16 %	42 %
(45) Kirby and Hinsie	69	1928	2-5	28 %	26 %	36 %

Table III. (Cont.)

	<u>No. of Cases</u>	<u>Year of Pubn.</u>	<u>Durn. after treatt. in years</u>	<u>Complete Remssn.</u>	<u>Im- proved</u>	<u>Unimpvd. or Dead</u>
(3. Tryparsamide)						
(46) Jaenicke and Forman	100	1928	1-4	15 %	23 %	62 %
(47) Menzies	41	1929	4-6	25 %	35 %	40 %
(48) Bunker (collected)	542	1929		35 %		
	Average			31 %	28.4 %	40 %
4. Malaria						
(49) Yorke and McFie	84	1924	2	27 %	33 %	40 %
(50) Driver, Gammel and Karnosh (collected)	2460	1926		27.5 %	25.6 %	46.9 %
(51) Kirby and Bunker	106	1926	5 12-3	34 %	21 %	45 %
(52) Baender	300	1926	3-7	36 %	16 %	48 %
(53) Ferraro and Fong	120	1927	½-3	26 %	35 %	39 %
(54) Gerstman	400	1928	5-11	32 %	13 %	55 %
	Average			30.3 %	23.8 %	45.5 %
5. Relapsing Fever						
(26) Plaut and Steiner	55	1926	1½-5	43.6 %	12.7 %	43.7 %
(21) Petrie	26	1929	2	26.9 %	19.2 %	53.9 %
	Average			35.25 %	15.9 %	48.8 %
6. Rat-Bite Fever						
(27) Solomon, etc.	12	1926	3	too early to evaluate results, but clinical and serological improvement was obtained		

A study of the results obtained by the more recent methods of treatment, including tryparsamide, malaria, and relapsing fever, shows great similarity as to the outcome. On the average, improvement has been obtained in 59.4 % of cases treated by tryparsamide, in 54.1 % by malaria, and in 51.15 % by relapsing fever. A search through the literature was made for reports of cases treated by combined methods of specific and non-specific therapy, but in most reports (Gerstman, Bunker, etc.) these have been grouped with cases treated by one or other method alone. Gerstman (55) has pointed out that the assessment of good results is related to the duration of remissions. With this statement there is entire agreement. It will be noted that the cases he records were treated at varying periods from five to eleven years ago. The period that elapsed between treatment and the publishing of the other reports has been indicated on Table III. All the cases in this series have been under observation for periods of from one to approximately six years. During the past two years the cases of general paralysis treated at this hospital have been selected ones, and the number of patients who have shown marked improvement in that period surpasses the results in this series. As several of this group have been under treatment for less than twelve months, they are not all included in this series.

I have stated that of late the cases admitted for treatment here have been selected ones. The factors which have been considered in such a choice have emerged as conclusions after an analysis of the previously treated cases. Although the period since treatment of these selected cases is too short to say much, the results obtained so far strongly support the findings of this analysis.

The variations in the clinical outcome presented by these cases provoked considerable interest, and various

factors were studied which, it was thought, might influence the outcome. If these factors could be ascertained, it was considered they might be of value as regards the prognosis. The more important points which were considered and which were found to influence the results of treatment were, the duration of the symptoms prior to treatment, the age of the patient, and the clinical form of the illness. Two other points were also considered, the effect of treatment on the neurological and on the serological findings. In this order these investigations will now be presented.

The duration of symptoms prior to treatment.

Considerable difficulty has been experienced in obtaining accurate data as to the duration of symptoms prior to treatment. As Gerstman (54) says: "What we see from the clinical standpoint as initial paralysis is in a biological morphological sense mostly the resultant of a process which has been going on for a period of unknown duration." In most cases the onset is insidious, and a striking feature is the frequency with which relatives record a history of irritability over long periods prior to the development of acute symptoms. In twenty cases the onset was attributed to some fairly definite factor. The mental symptoms in eight of these developed immediately after a seizure or a congestive attack. In two it followed an accident. In each of these two cases the patients were sandwiched between vehicles. Overwork at business during the Christmas rush was said to account for two, and one other became ill following upon a heavy financial loss. The arousing of strong emotional states over the death of relatives or the ill-health of relatives and friends accounted for five others. One developed during pregnancy and one other within a week of a burglary in his house. In the other thirty cases the onset was more insidious and no definite causal factors could be elicited.

In Table IV are tabulated the results of treatment as compared with the duration of the illness before treatment. In this and the subsequent tables the patients who died have been included and they have been grouped according to their mental condition before death. They have been inserted as + so many. In estimating the duration of symptoms prior to treatment I have restricted my enquiries to the first noted change in manner, talk or conduct, of the patient by his relatives. A history of a seizure or congestive attack was given in fifteen cases prior to treatment, but only in eight of these did mental symptoms directly follow the attack. Case No.24 illustrates this point. The patient suddenly lost the power of his leg and arm fifteen months prior to his admission here. These symptoms cleared up within three weeks and he was quite well until thirteen months later. The causal factor then was the illness of his daughter. She was badly injured in an accident, had to undergo a serious operation, and this caused him considerable worry. Thereafter his illness developed. Unless the history of a seizure or congestive attack has been followed directly by abnormal mental phenomena they have been disregarded. This may account, in some measure, for the fact that relatively poorer results are obtained, in this series, of patients who have presented symptoms for over nine months, than those recorded by other workers.

Table IV.

<u>Duration of symptoms</u>	<u>No. of Cases</u>	<u>Good Remssn.</u>	<u>Partl. Impvd.</u>	<u>Remssn. Statly.</u>	<u>Unimpvd.</u>
1/2 month & under	5	5			
over 1 " & " 3 months	14	9 + 1	2		1 + 1
" 3 " & " 6 "	18	5	6	2	3 + 2
" 6 " & " 9 "	5	1	2	1	+ 1
" 9 months	8			2	4 + 2
	50	21	10	5	14

A glance at these figures shows that cases treated within the first few months of showing definite mental symptoms give by far the best results. The chances of improvement diminish with delay in treatment. Of eight cases treated who presented mental symptoms for over nine months, only two have shown a partial improvement, and they are included in the stationary group. It is interesting to note that of the five cases who presented symptoms for four weeks or less, Cases Nos. 17, 18, 31, 34 and 39, four were manic in type, and one was of the simple type, in whom marked loss of memory attracted the attention of the relatives.

This factor no doubt partly explains the greater number of remissions seen in manic and expansive cases, as states of excitement always affect relatives more strongly than those of mere indolence. Consequently, these patients come under treatment at an earlier stage. While early cases appear, therefore, to benefit most by treatment, it is to be noted that two patients, 14 % of those whose symptoms had been present for less than three months, passed into the unimproved group.

These results are found to agree with those of other investigators, irrespective of the type of treatment employed. Most of them, however, find a greater degree of improvement in patients whose symptoms had been present for long periods prior to treatment, but, as already explained, this may result chiefly from the method of reckoning the earliest change.

Gerstman (54) states that, in those cases who had a complete remission, the duration of symptoms prior to treatment varied from a few months to about three years. In cases with incomplete remission of high degree the duration was from six months to three-and-a-half years. In those with incomplete remissions of low degree, and those who did not benefit by treatment, there was a long duration, up to about six years

and even more. He also draws attention to the fact that among the incomplete group there were a number of so-called initial cases.

Ferraro and Fong (53), in an analysis of 126 cases, conclude that old-standing cases of over two years' duration offer less probability of successful treatment.

The influence of age.

Of the fifty cases in this series, twenty-four were between the ages of twenty and forty years, and a similar number between forty and sixty years. One case was above sixty, and another was below twenty. The outcome in these two groups has been tabulated in Table V.

Table V.

<u>Outcome</u>	<u>Age group</u>	
	<u>20 - 40</u>	<u>40 - 60</u>
Good Remission	12	6 + 1
Improved	4	6
Stationary	2	3
Unimproved	4 + 2	3 + 5
	<u>24</u>	<u>24</u>

From these figures it would appear that the relative frequency of good remissions was greater in the period between the ages 20 - 40. The number of good remissions in this period was 50 %, whereas the number of good remissions between the ages 40 - 60 was 29 %. With regard to the unimproved group, this is relatively greater for the period 40 - 60 than for the period 20 - 40. The respective figures for these periods are 33 % and 25 %.

These results suggest that the age factor may influence the outcome in that the chances of remission are slightly diminished with the increase of years over forty years of age. This influence, however, is not marked, and would appear to be no greater than one might anticipate. Pönitz (55) quotes Gerstman's explanation of this, namely, that the ability to establish new defences in the body, upon which so much depends in the treatment of general paralysis, can only, at these ages, occur incompletely or in a very unsatisfactory way. Ferraro and Fong (53) quote Jansen and Hutter, who suggest that patients over 55 years of age should not be treated.

The relation of the clinical type to outcome.

The series of cases are divided up according to the clinical picture each presents. This segregation into clinical types, however, is beset with many difficulties and is somewhat arbitrary. In this respect the differentiation between euphoric and manic types is probably the most artificial. Clear-cut cases are easily grouped, but, as Bunker and Kirby (51) have pointed out, it is very difficult to mark off a definite boundary between the euphoric patients, whose expansiveness is frequently accompanied by motor restlessness, and the mildly hypo-manic, whose motor restlessness is a more prominent feature than the expansiveness accompanying it. The clinical state has been reckoned as that shown between admission to hospital and the beginning of treatment, and later changes in the type have been disregarded. For example, Case No. 31 at the time of admission was bombastic and euphoric, whereas later, after treatment, he became dull, depressed, very resistive, and was very difficult with his food. He has been classified as euphoric in type.

In Table VI (a) are detailed the distribution of these fifty cases collectively, in relation to the clinical form and the results of treatment. As before, those who

died after treatment are added and are grouped according to their mental state before death. They are indicated by being preceded with a + sign. In Tables VI (b) and (c), the details are added for each variety of treatment separately.

Table VI (a).

Total number of cases treated.

	<u>Simple Dementia</u>	<u>Euphoric</u>	<u>Manic</u>	<u>Depressed</u>	<u>Tabo- paresis</u>	<u>Juvenile</u>
Good Remissions	7	3 + 1	6		2	
Improved	3	4	2	1	1	1
Stationary	+ 1	2		1	1	
Unimproved	3 + 5	+ 1	1	1	2 + 1	
	19	11	9	3	7	1

Table VI (b).

17 cases treated by tryparsamide only.

	<u>Simple Dementia</u>	<u>Euphoric</u>	<u>Manic</u>	<u>Depressed</u>	<u>Tabo- paresis</u>	<u>Juvenile</u>
Good Remissions	4	2				
Improved	1	3			1	
Stationary	+ 1			1		
Unimproved	1 + 2				1	
	9	5		1	2	

Table VI (c).

33 cases treated by tryparsamide plus fever.

	<u>Simple Dementia</u>	<u>Euphoric</u>	<u>Manic</u>	<u>Depressed</u>	<u>Tabo- paresis</u>	<u>Juvenile</u>
Good Remissions	3	1 + 1	6		2	
Improved	2	1	2	1		1
Stationary		2			1	
Unimproved	2 + 3	+ 1	1	1	1 + 1	
	10	6	9	2	5	1

These figures show that of the 50 cases there were 19, or 38 %, of the simple type, 11, or 22 %, of the euphoric, 9, or 18 %, of the manic, 3, or 6 %, of the depressed, 7, or 14 %, of the tabo-paretic, and 1 juvenile general paralytic.

The most favourable clinical form, and the one offering the greatest likelihood of success in treatment, is the manic. 66 % of these cases are enjoying a good remission. It is worth recording that two of these manic patients showed no improvement with tryparsamide alone over a short period, Cases Nos. 34 and 39. They were later treated with malaria and their excitement did not abate until their fever had developed. The euphoric and simple types are the next most favourable and offer the same number of good remissions, namely, 36 %. Of the tabo-paretics, 28.6 % showed a good remission.

In the improved group there are 22 % of manics, 36 % of euphorics, 15.78 % of the simple type, and 14.2 % of tabo-paretics.

With regard to the unimproved, including those cases who were in the stationary group, only 11 % of manics were found. Of euphorics there were found to be 27 %, and of the simple type 47 %. The tabo-paretics had the relatively high figure of 57 % in these groups.

While, therefore, the number of simple type enjoying a good remission is fairly high, a large percentage are unimproved, and of these, 5 patients, or 26 % of the total number of this type, are dead. An analysis was then made of this group of cases, and it was found that two types of cases could be distinguished. One type was childish, garrulous, mildly elated, self-satisfied and fatuous. All of these were distinctly fatuous. The other variety was characterised by loss of memory, indifference, apathy and irritability. They resented being spoken to, and their replies to questions were

in monosyllables. One patient of the simple type, Case No.5, was admitted to hospital in the terminal stages of the disease and was not further classified. Of the remaining 18 patients of the simple type, there were 12 belonging to the "fatuous" group and 6 to the "apathetic" group. The outcome of these patients is very interesting and is detailed in Table VII.

Table VII.

Outcome of simple type.

	<u>Good Remission</u>	<u>Partial Improved</u>	<u>Remission Stationary</u>	<u>Unimproved</u>
"Fatuous" Group	2	3	+ 1	4 + 2
"Apathetic" Group	5			+ 1

There are thus of the "fatuous" variety 16.6 % enjoying a good remission, 25 % improved, 8.3 % stationary, and 50 % unimproved. Whereas of the "apathetic" variety there are 83.33 % enjoying a good remission and only 16.66 % unimproved.

From these results one is justified in concluding that the most favourable types in order of degree of improvement are :

1. the manic type
2. the euphoric type
3. the simple type
4. the tabo-parctic type

The results recorded by other investigators as to the types which offer the best prospects of success vary somewhat. The majority have found that the manic group offer the best prospects. Bunker and Kirby (51) found

that 67 % of the manic, 55 % of the expansive, and 12 % of the simple attained a maximum therapeutic result. Gerstman (56) found that the majority of cases of good remissions belonged to the simple and to the manic agitated types. The percentage in the simple dementing variety was not less than in the manic. Similarly, with tabo-paresis the occurrence of a good remission was not less likely than in other forms of general paralysis. He formulated two groups according to the outlook for remissions. Those varieties in which the outlook was good were :

1. the so-called initial cases
2. the manic type
3. the simple dementing type
4. cases where congestive attacks were prominent
5. tabo-paretics

Those in which the outlook for a good remission was poor were :

1. far advanced cases
2. galloping or fulminating type
3. juvenile general paralysis
4. senile type

Pilez (57) found that the best results were obtained in the manic and simple varieties, and that the hypochondriacal, pre-senile, and catatonic forms were less favourable. Ferraro and Fong (53) stated that in their experience the best results were obtained in the expansive paranoid form, and that 37.44 % of the good remissions belonged to this type. Next to this were the manic and the depressed varieties.

The neurological changes following treatment.

It has not been possible to consider all of the cases in this series. Some live in the country and consequently they were unwilling to attend here for re-examination. Their relatives and their physicians have been communicated

with, but the replies were not as satisfactory as was desired. In three patients adequate reports could not be obtained, and they have not been included.

Improvement in the neurological concomitant findings have been frequently found in those cases who have improved clinically. They have not, however, been restricted to those in whom the clinical improvement was marked. With the improvement in the mental and physical states there is an improvement found in the muscular tone and flaccidity. Of those who showed distinct improvement, coördination and gait also improved. With regard to reflex responses there were no definite and constant changes found. As a rule those in whom the reflexes were sluggish remained so, and similarly for those whose reflexes were active and somewhat exaggerated. The greater number of patients who showed improvement had active deep reflexes of the upper and the lower limbs. Since treatment, seizures were found in only two patients, Cases Nos. 7 and 38. The former of these died in a seizure. The latter had a slight seizure following upon a lumbar puncture examination made here two years after treatment by malaria. Considering that fifteen cases had had seizures or congestive attacks prior to treatment, a distinct improvement in this respect was noted.

The signs which showed the greatest degree of improvement and were most constantly altered were the speech defects and the tremors so frequently found in this condition. Of 21 patients enjoying a good remission, 7 lost their tremors altogether, while in 6 others they were markedly diminished. Of 10 patients, of the improved group, 3 lost their tremors, while in the other 3 they were markedly diminished. None of the patients in the stationary or improved groups showed absence of tremors, but in some there was improvement in this respect.

Speech was also markedly affected. Thirteen patients of the group of good remissions, and three patients of the

improved group, in all of whom speech had been definitely slurred before treatment, have shown a marked improvement. Their speech now is clear and they can enunciate quite well the usual test phrases. Only one patient of those enjoying a good remission has slurred speech. No definite improvement in this respect was noticed in the other groups.

With regard to the pupillary changes found in these patients prior to treatment, various alterations thereafter were found, but none of these was constant. Improvement in some respects occurred in certain cases, but the findings in others of the same group deviated further from the normal after, than they did before treatment. The reactions to light and accommodation, and the equality and regularity of the pupils before and after treatment, have been tabulated in Table VIII.

Table VIII.

	<u>Reaction to Light</u>						<u>Reaction to Accommodation</u>						<u>Equality</u>				<u>Regularity</u>			
	<u>Before</u>			<u>After</u>			<u>Before</u>			<u>After</u>			<u>Before</u>		<u>After</u>		<u>Before</u>		<u>After</u>	
	<u>A.</u>	<u>S.</u>	<u>I.</u>	<u>A.</u>	<u>S.</u>	<u>I.</u>	<u>A.</u>	<u>S.</u>	<u>I.</u>	<u>A.</u>	<u>S.</u>	<u>I.</u>	<u>E.</u>	<u>U.</u>	<u>E.</u>	<u>U.</u>	<u>R.</u>	<u>Irr.</u>	<u>R.</u>	<u>Irr.</u>
Good Remn.	1	8	10	2	3	14	18	1	0	16	3	0	7	11	8	10	8	11	8	11
Partl. "	1	6	7	2	2	10	14	0	0	12	1	1	5	9	3	11	5	9	5	9
Unimproved	1	5	8	0	3	11	11	3	0	10	4	0	6	8	6	8	2	12	2	12

A = active
S = sluggish
I = inactive

E = equal
U = unequal
R = regular
Irr. = irregular in outline

The alterations in the light reflex were on the whole of a progressive nature. No case who, on the first examination, showed a loss of this reaction, regained it after treatment. Of those patients enjoying a good remission, one originally showed a normal reaction to light, but, after treatment, this reaction was sluggish. In this same group, of those whose reactions were originally sluggish, six showed an alteration.

Two of these thereafter reacted normally to light, but in the other four the light reflex was completely lost. Of those patients who clinically had a partial remission, there were six who originally showed a sluggish reaction to light. One of these, after treatment, reacted quite well to light again, three lost their reaction altogether, and the other two remained sluggish. The reaction to light, of one of the cases in the unimproved group, was originally normal, but after treatment it became very sluggish. Three others in this group, previously sluggish in their reactions to light, became inactive.

The reaction on accommodation became sluggish in two of those enjoying a good remission. It was lost in one of the partially remitted group, and became very sluggish in one other in this group. In one case of the unimproved group this reaction, previously normal, became after treatment very sluggish.

As regards the equality and the regularity of outline of the pupils very little change was noted. Their condition after treatment remained practically unchanged, as the table shows.

With regard to the alterations in the neurological findings reported by other investigators, Gerstman (54) stated that in his series of cases, improvement was most frequently found affecting the speech and writing disorders. The pupillary changes were least affected by therapy. Occasionally sluggish pupils became more active. Pönitz (55) stated that he never found any definite alteration in the size of the pupils or in the light reflex after treatment. Deep reflexes also showed little change and were sluggish after treatment if such was their condition before. Rudolf (58) found improvement in the pupillary reaction to light after treatment in eight cases. Three of these, who prior to treatment showed no reaction, did react thereafter through a small range. Ferraro and Fong (53) found that one of their cases whose pupils reacted sluggishly to light before treatment became active thereafter. They found that speech defects, tremors and coördinations, were most favourably influenced by treatment.

THE EFFECT OF TREATMENT ON THE SEROLOGICAL FINDINGS.

As a further aid towards elucidating the problem of why these cases should react differently, careful investigations were made of the serological findings. These included as a routine practise the investigation of the Wassermann reaction in both blood and cerebro-spinal fluid. The total cell count, the protein content, and the colloidal gold reaction were also estimated in each examination of the latter.

All the serological examinations were carried out in the Central Laboratory of the London County Mental Hospitals. This proved a great asset as most of the cases who showed no improvement after treatment were admitted to one of these mental hospitals following upon their discharge from here. Further specimens could then be obtained and were examined by the same person who made the original examinations. Only in cases nos. 34 and 39 were the serological estimations after treatment made elsewhere. A cell count not exceeding five cells per cubic millimetre and a protein content not exceeding twenty-five milligrammes per cent are considered normal. The Wassermann reactions are expressed quantitatively. For ordinary routine Wassermann tests it is customary to use 1 c.c. of cerebro-spinal fluid. Several investigators in this field (Bunker etc.) have published results in which this amount of C.S.F. formed the maximum concentration they employed. In the investigations made in this series of cases the highest possible concentration of C.S.F. has been employed, namely, that obtained by using 1.5 c.cs. The effect of this has been to obtain in some cases a positive result which would in a greater dilution have been passed as negative. Case No.27 in whom the Wassermann reaction is + 3 exemplifies this. All those whose Wassermann reactions have been recorded as

negative have given a negative finding with this weak dilution and with all other dilutions of the cerebro spinal fluid. Similarly the highest possible concentration of blood serum has been employed by using 0.5 c.c. In routine examinations and in the results published by some other workers only 0.4 c.c. of serum has been employed.

In all these cases the blood and cerebro-spinal fluid have been examined before treatment and have given positive results. I should like to draw attention at this juncture to Case No.18. It will be noted that in 1922 a diagnosis of cerebral syphilis was made while this patient was undergoing treatment in a mental hospital. Unfortunately no examination was made then of his cerebro-spinal fluid. He showed a remission and was discharged from that hospital but four months later he relapsed and was admitted here. He then showed serologically the typical findings of a case of general paralysis although his blood Wassermann reaction had not increased in strength from the examination made when in the mental hospital. In spite of active treatment by tryparsamide plus pyrexia he has failed to show clinical improvement and has never been able to work since then. At present he is under care in a mental hospital and presents the typical picture of an euphoric general paralytic. Incidentally he is the only case of the manic form who passed into the unimproved group. Much has been written recently about the value of serological findings in neurosyphilis. This case is an outstanding example of one where serological examination might have aided greatly the making of a diagnosis.

Of the cases treated by tryparsamide alone a further serological examination was made in the early stages at the end of each course of treatment. The more recently treated cases whose injections have not been given in courses, but uninterruptedly over long periods, have been examined

serologically at the end of three months. One was guided by the degree of improvement, if any, then obtained as to whether the next serological examination would be made after three or six months. The cases treated by tryparsamide plus fever are examined serologically a few weeks after the fever has been discontinued, and prior to their leaving the hospital. Further examinations are made at three monthly and later six monthly intervals. Meanwhile they continue to receive their injections.

In all cases treated by tryparsamide alone, the serological findings after treatment have been obtained except case No.5 who died after he received seven injections of two grammes. Of those treated by tryparsamide plus fever serological findings have not been obtained in seven patients. These are cases Nos. 19, 21, 23, 24, 25, 30 and 34. Case No 25. died during his course of malaria in another hospital. Cases 19, 21, 23, 24, and 34 had their fever treatment elsewhere than in this hospital and serological examinations were not made thereafter. Cases 19, 21, 23, 24, 25 and 34 received treatment by tryparsamide for some time prior to being treated with malaria. Serological examinations were made thereafter, before they received treatment by fever and therefore I have tabulated these results with the group of patients who have been treated by tryparsamide only. This makes for consideration then one group of 24 cases, the results of whose blood and cerebro-spinal fluid after treatment by tryparsamide in varying doses are known and another group of 27 cases whose serological findings before and after treatment by tryparsamide in varying doses plus fever are known. These serological findings I have tabulated in tables IX and X. Table IX contains the results pertaining to the first group and Table X to those treated by tryparsamide and plus fever.

TABLE IX.

SEROLOGICAL FINDINGS OF PATIENTS TREATED BY TRYPARSAMIDE ONLY.

Case No.	BEFORE.				AFTER.			
	Blood	W.R.	C. S. F.	Lange	Blood	W.R.	C. S. F.	Lange.
1	+40+	+40+	80	5555543210.	+40+	+8	5	0011100000.
2	+40+	+40+	100	5555543200.	+40+	+8+	70	5555543320.
3	+40+	+40+	80	5555543200.	+40+	+40+	70	5555543210.
4	+40+	+40+	60	5555542200.	+40+	+40+	10	5543210000.
5	+40+	+40+	100	5555421000.		not estimated.		
6	+40+	+40+	50	5555543210.	+40+	+40+	14	5555543210.
7	+40+	+40+	80	555554321.	+40+	+40+	10	5555432100.
8	+40+	+40+	100	5555543210.	+13	+ 4+	4	3332211000.
9	+40+	+40+	200	555555421.	neg.	neg.	4	0000000000.
10	+40+	+ 8+	80	5555543200.	+40+	+ 8+	5	2223331100.
11	+40+	+20+	100	5555444321.	+40+	+40+	100	5555554321.
12	+40+	+20+	80	5555443221.	+20+	+ 4+	4	1123211000.
13	+40+	+ 8+	90	555555431.	+20	neg.	2	0000000000.
14	+40+	+40+	50	5555543211.	+40+	+ 4+	10	5555432110.
15	+40+	+20+	50	5555554400.	+20+	+ 8	4	4443311000.
16	+40+	+40+	50	5443210000.	+10+	+20+	5	0000000000.
17	+40+	+20+	88	5554432100.	+20	+ 8+	4	0000000000.
19	+40+	+40+	100	5555522000.	+40+	+20+	50	5555532000.
21	+40+	+20+	18	5555543210.	neg.	+ 4	5	0000000000.
23	+40+	+40+	50	5555543210.	+40+	+40+	28	5533221000.
24	+40+	+40+	80	5543211000.	+40+	+40+	blood adm.	5554432100.
25	+40+	+40+	100	5555543210.	+40+	+40	37	443222110.
34	+40+	+40+	78	5555554321.	+40	+40	40	5544321000.

Cases 19,21,23,24,25 and 34 were later treated by malaria. These reactions were made prior to treatment by fever. (See text.)

TABLE X.

SEROLOGICAL FINDINGS OF PATIENTS TREATED BY TRYPARSAMIDE + FEVER.

BEFORE.

AFTER.

Case No.	Dose	Blood.		C. S. F.		Blood		C. S. F.		Lange.
		W.R.	W.R.	Cells c.mm.	Protein mg. %	W.R.	W.R.	Cells c.mm.	Protein mg. %	
18	24x2	+20+	+40+	20	80	+20+	neg.	4	20	0000000000.
20	34x3	+40+	+40+	100	150	neg.	+ 4+	3	20	0000000000.
22	24x2	+40+	+40+	90	125	+40+	+ 8	10	40	4443211000.
26	8x2	+40+	+20+	80	80	+40+	+ 8	40	120	5554432100.
27	33x3	+40+	+40+	100	200	+20+	+ 3+	3	35	0000000000.
28	36x3	+40+	+20+	80	100	neg.	neg.	3	20	0000000000.
29	8x2	+40+	+40+	138	150	neg.	+20+	75	125	5555543210.
30	8x2	+40+	+40+	150	200	+40+	neg.	not estimated.		5555543210.
31	33x3	+40+	+40+	75	125	neg.	neg.	4	25	0000000000.
32	23x3	+40+	+40+	75	130	+40+	+20+	25	50	3322100000.
33	34x3	+40+	+40+	85	140	neg.	+ 8	3	20	0000000000.
35	15x3	+40+	+40+	100	175	+40+	+40+	50	125	5554321000.
36	54x3	+40+	+40+	150	150	+13	+ 8+	6	45	5432110000.
37	35x3	+40+	+40+	90	130	+20+	neg.	2	20	0000000000.
38	52x3	+40+	+40+	150	175	neg.	neg.	3	25	0000000000.
39	22x2	+40+	+40+	190	150	neg.	+40	5	40	5543110000.
40	18x3	+40+	+40+	150	160	+40+	+40+	5	60	5555543210.
41	33x3	+40+	+ 8+	90	145	neg.	neg.	4	20	0000000000.
42	44x3	+40+	+20+	86	140	+13	neg.	3	15	0000000000.
43	45x3	+40+	+40+	50	90	neg.	+ 8	10	45	5554321000.
44	33x3	+20+	+20+	60	60	+20+	+20+	6	35	4433210000.
45	28x3	+40+	+40+	88	150	+13	+20+	20	45	000001223.blood adm.
46	28x3	+40+	+40+	90	110	+40+	+40+	4	50	4444322110.
47	34x3	+40+	+ 8+	45	80	+40+	+ 8+	10	45	5543221000.
48	18x3	+40+	+20+	85	75	+40+	+40+	28	65	5544321100.
49	41x3	+40+	+ 8+	40	75	neg.	+20	15	45	2221110000.
50	7x3	+40+	+40+	90	100	+40+	+40+	blood admixture.		

In summarising the serological findings and comparing them with the clinical outcome it was necessary then to disregard eight cases in whom I did not have the opportunity of making serological examinations after treatment. The findings of 42 cases in whom it was possible to correlate the clinical outcome with the serological results are summarised in Table XI.

Table XI.

<u>C.S.F.</u> <u>Findings.</u>	<u>Good</u> <u>Remissions</u>	<u>Partial</u> <u>Improved</u>	<u>Remissions</u> <u>Stationary</u>	<u>Unimproved.</u>
Negative	5	4	-	-
Marked improvement	5+1	3	3	2
Slight "	5	3	+1	6+1
Unimproved.	-	1	-	2
	<u>16</u>	<u>11</u>	<u>4</u>	<u>11</u>
<u>Blood W.R.</u>				
Negative	6+1	1	-	1
Marked improvement	2	2	3	-
Slight "	2	4	-	-
Unimproved	5	4	+1	8+2
	<u>16</u>	<u>11</u>	<u>4</u>	<u>11</u>

These figures show that the cases showing a definite clinical improvement show a high degree of serological change. In evaluating these findings it is essential to remember that all of these cases have been under treatment for periods varying from one to five years. None are recorded in this series who have been under treatment for less than twelve months. The table shows that at this period there is a partial correlation between the clinical and serological improvement in that those cases who show clinical improvement show a concomitant serological improvement. Reference to the detailed clinical records will show that this is not so in the early stages of treatment where clinical improvement almost invariably precedes serological improvement. As time goes on there is a higher correlation between these two.

It is also to be noted, however, that the serological

improvement is not confined to those patients who show marked clinical improvement and is found in some who occupy the unimproved group. The three cases in the stationary group all show marked serological improvement. One of these, Case No.27, as already explained, would, to the routine tests, give normal findings in his cerebro-spinal fluid.

In only three cases of this series was no improvement noted in the cerebro-spinal fluid after treatment. Two of these cases Nos. 3 & 11 who were treated by tryparsamide in the early stages, and only received eight injections of two grammes. The third case No.50 was treated by tryparsamide plus fever. He died within two weeks of his fever being discontinued and consequently the therapeutic value of treatment was not attained. In all patients who have received tryparsamide either alone or plus fever over a reasonable period of time, improvement in the cerebro-spinal fluid has been obtained.

The effects on the cerebro-spinal fluid findings as the result of treatment in twenty-two patients by tryparsamide alone has been summarised in Table XII. Similarly for the twenty-six patients treated by tryparsamide plus fever the results have been summarised in Table XIII.

Table XII.

Summary of the effect on the C.S.F. findings of treatment by tryparsamide only.

<u>Cerebro-Spinal Fluid</u> <u>findings.</u>	<u>No. of</u> <u>cases.</u>
Negative.	2
Marked improvement.	8
Slight improvement.	10
Unimproved.	2
	<hr/>
	22
	<hr/>

Table XIII.

Summary of the effects on the C.S.F. findings of
treatment by Tryparseamide + Fever.

<u>Cerebro-Spinal Fluid findings.</u>	<u>No. of cases.</u>
Negative	7
Marked improvement	7
Slight improvement	11
Unimproved	1
	<hr/>
	26
	<hr/>

One cannot, however, take these results on their face value and deduce therefrom the relative merits of the two forms of treatment. The majority of those in Table XIII, following upon their clinical improvement have been more willing to continue treatment. They have, therefore, in addition to treatment by fever, received on the average many more injections of tryparsamide. Nevertheless, allowing for this, there is no doubt that the effect of treatment on the serological findings is much greater when combined treatment by tryparsamide plus fever is employed, than when the drug alone is used.

The blood Wassermann reaction has been more resistant to treatment. From Table XI one notes that a negative blood Wassermann reaction has been obtained in nine cases, improvement in thirteen others but that in twenty patients this reaction is still very strongly positive and no appreciable improvement has been noted.

These observations show that the most consistent change in the cerebro-spinal fluid is a reduction in the cell count. This change was found in all cases and it occurred early in the course of treatment. If the clinical improvement was maintained the cell count frequently became normal. The protein content is next in order of improvement and this has been followed by improvement in the Wassermann reaction. The colloidal gold reaction is the element most

resistive to treatment. It frequently becomes less intense or changes to the luecic type. There it frequently remains for a long time before it becomes negative. Distinct reduction in the other elements has frequently been obtained with little change in this reaction. No fluid has failed to show a reduction in the pathological findings where prolonged treatment by tryparsamide has been employed. The most resistant pathological change has been the blood Wassermann reaction. In some cases this has behaved peculiarly and has shown surprising improvement. As a rule, however, it has been the most obstinate feature.

From these results one is justified in concluding that as an aid to prognosis the serological changes after treatment are not very valuable. Marked improvement in the serological reactions has been obtained in those who have displayed little clinical improvement, as well as in those who enjoy a good remission. One point that is noteworthy is that those cases, who have had marked clinical improvement, have displayed more frequently serological improvement shortly after treatment than did the others. This improvement chiefly affected the cell count and the protein content. Unexpected improvement is found in certain elements sometimes as the result of a few injections, but considering the whole series, the order of improvement has been the cell count, the protein content, the Wassermann reaction in the cerebro-spinal fluid, the colloidal gold curve, and lastly the blood Wassermann reaction. The serological results have been more marked after treatment by tryparsamide plus fever than after tryparsamide alone.

RESULTS OF OTHER INVESTIGATORS.

The results of an interesting study made by Barbé and Sézary (59) were published in 1924. They examined at frequent intervals the blood and cerebro-spinal fluid of twenty-one untreated cases of general paralysis. Their results showed that little change was found in the Wassermann reaction of the cerebro-spinal fluid, but that the cell count and the globulin content varied considerably at different examinations. They also noted periodic changes in the blood Wassermann reaction.

Treatment by tryparsamide.

Lorenz (33) in 1923 published the first report dealing with the treatment of general paralysis by tryparsamide. In it he claimed that in addition to clinical improvement there was a well marked serological improvement. In 1928 (60) he reviewed the outcome of the cases dealt with in his early reports. He stated that 87% of the cases reported as recovered then had continued so during the past five to six years. He found that serological changes were very constant in these patients though they were not necessarily negative. A positive Wassermann reaction and a positive colloidal gold reaction were found equally frequent with either outcome. In the recovered group 87% showed a change in the colloidal gold curve, at an early stage in their clinical improvement.

Solomon (61) reported that negative serological results were obtained occasionally from a small number of injections. The cell count, the Wassermann reaction, the colloidal gold curve and the globulin content of the spinal fluid were frequently favourably altered. As a rule it required about seventy-five injections of three grammes to produce serological improvement.

Brown and Martin (62) in their analysis of all the available literature, found that up to April 1926, about

2,000 cases of neurosyphilis had been treated by tryparsamide and thereafter reported. There was serological improvement claimed in 75% of all these cases.

Davie (63) observed the effect of treatment by tryparsamide in twelve cases over a prolonged period. He found that serological improvement need not accompany clinical improvement and that the former might occur a long time (eighteen months) after the treatment had been completed. Two of the cases after treatment had a negative Wassermann reaction in the cerebro-spinal fluid. The cell count was reduced and the colloidal gold test weakened or became luetic in type. The blood Wassermann remained positive in all the cases after treatment.

Bamford (64) reported that of 46 cases submitted to treatment by tryparsamide plus malaria all those who showed clinical improvement showed corresponding serological improvement but the converse was not established. The gold curve was little, if at all, affected by therapeutic measures. His investigations demonstrated that serologically tryparsamide was a more potent therapeutic agent than malaria.

Williford (65) reported the findings in eighty-four cases treated by tryparsamide. The spinal fluid became completely normal in six cases and markedly improved in thirty six others. The blood Wassermann became negative in forty-nine cases or 54%; was reduced in 17; remained stationary in 15 and became more positive in three cases.

Bunker (66) reported the serological findings in twenty-three patients who received varying doses from thirty-six to one hundred and sixteen injections of three grammes of tryparsamide. Twelve of these had treatment by malaria, three to twelve months prior to treatment by tryparsamide. Of these cases two gave a negative Wassermann reaction in the cerebro-spinal fluid. In six this reaction was unchanged,

and the remaining fifteen occupied intermediate positions. In his opinion not less than seventy-five injections of three grammes of tryparsamide would seem to be equivalent, in sterilising effect, of a course of fever therapy. He concluded that it required not less than one hundred and certainly not less than fifty injections to bring about any material degree of modification in the Wassermann reaction in the spinal fluid.

Menzies (47) found that of forty-one patients treated by tryparsamide alone serological improvement was obtained in thirty-three patients. Of these only two gave negative findings. His results showed that the findings varied somewhat. There had been periods in others when the serological tests were negative but subsequent examinations showed a return of enough positive features to put the case in one of the other groups. In all patients who enjoyed a good remission there had been a great serological improvement.

Treatment by Malaria.

McAlister (67) in reporting the effect of malarial treatment on twelve cases of general paralysis stated that in his experience the treatment did not modify the laboratory findings.

Grant and Silverston (68) in 1924 reported that in 40 cases treated by malaria an improvement in the Wassermann reaction and in the colloidal gold reaction was obtained in 30%, and that the globulin and cellular content were improved in 20.3%. A negative Wassermann reaction in the blood was obtained in 7.5% and in the cerebro-spinal fluid in 15%. Sixteen cases were given in addition to malaria a course of salvarsan and of these the improvement in the serological findings were (1) deminished cell count 100%; (2) serum, W.R. reduction 68.7%; (3) lowered protein content 46%. Combined alterations of 1, 2, and 3 occurred in 43.7% of the cases.

Nicole & Steele (69) found that in repeated examination of the cerebro-spinal fluid in 25 cases after treatment by malaria, changes indicative of improvement were found in the colloidal gold and the globulin reactions. These changes did not necessarily correspond with the presence or absence of clinical improvement.

Rudolf (70) found that after treatment by malaria 21.7% of cases showed a diminution in the cellular and protein content and that 48% showed a diminution in the Wassermann reaction in the cerebro-spinal fluid. In 12% of these the Wassermann reaction was negative.

Pönitz (55) as the result of his observation on cases treated by malaria noted that the first element to be altered in the cerebro-spinal fluid was the cellular content. If the clinical improvement persisted the cell count approximated to normality. Later one found improvement in the protein content which became negative or only weakly positive. Often the Wassermann reaction in the blood and cerebro-spinal fluid showed improvement and the mastic curve was pushed to the left. He found that if recovery lasted for months or years then as a rule there was a parallel improvement in the serological findings.

Gerstman (71) reported that in the early stages after treatment by fever slight changes of a favourable nature were found in the cell count or the amount of protein but that the other elements of the cerebro-spinal fluid showed slight change. These improved subsequently if the remission endured. He found the Wassermann reaction in the spinal fluid to be the most resistive element and when a relapse occurred the Wassermann reaction and the globulin content were the first to become more positive again. The blood Wassermann he noted was irregular in its behaviour and was often more resistive to treatment than were the abnormal elements in the cerebro-spinal fluid.

He quoted Dattner who examined seventy of the cases treated between 1922 and 1924. He found that :

32 patients clinically improved and 4 patients clinically unimproved gave completely negative serological results.

19 patients clinically improved and 8 patients clinically unimproved gave weakly positive serological results.

2 patients clinically improved and 5 patients clinically unimproved gave completely positive serological results.

In the two cases of the remission group who gave completely positive serological findings there had been signs of a relapse in the interval. The five completely positive, unimproved cases showed a progressive course.

Malamud and Wilson (72) recorded that serological improvement was a general, if not invariable result of the malarial treatment of general paralysis. It occurred apart from the clinical course and the serological improvement occurred slowly, so that the clinical improvement as a rule preceded the serological.

Ferraro & Fong (53) showed that in cases treated by malaria the percentage of serological improvement increased from 15% within the first six months to a maximum of 86% after a period of three years.

Relapsing Fever.

Plaut (26) reported that with treatment by relapsing fever the Wassermann reaction in the blood became weakened or negative in 50% of the cases. In the spinal fluid a similar change was noted in 61%. The cell count usually rose during the fever but thereafter became reduced and in some cases became normal. The protein content and the colloidal gold reaction were favourably influenced. There was nothing to distinguish the cases who received salvarsan in addition to those only subjected to relapsing fever therapy.

From a survey of the serological findings recorded by these investigators one notes a great similarity in the

results, irrespective of the method employed. More marked serological changes appear to be obtained with greater regularity where a combination of specific and non-specific forms of therapy are employed. The cell count and the protein content have been most frequently modified, but it must be remembered that Barbé and Sézary found this to be true also in untreated cases. The majority have found the colloidal gold reaction the most resistive element to treatment. With regard to the Wassermann reaction in the cerebro-spinal fluid this has been favourably altered in most cases. The majority of these workers have also found that the blood Wassermann reaction diminished in intensity at a comparatively early stage. Gerstmann found that in many of his cases this element was most resistant and the results in this series under review support this observation. With regard to the correlation between the serological and the clinical change all are agreed. The clinical improvement as a rule precedes the serological and in the early stages there is a parallelism between the two. Later a partial parallelism exists in that, all cases showing clinical improvement show a concomitant serological improvement. This serological improvement is, however, not confined to those showing clinical improvement and has been found frequently in clinically unimproved cases.

Complications of treatment by tryparsamide.

In this series very few complications have arisen as the result of treatment by tryparsamide. Only in two patients did amblyopia develop. This was only temporary and improved after the drug had been discontinued. It is noteworthy that one of the patients case No.33, after three injections of 0.3 gm. stabilarsan, developed a Herxheimer reaction, and this drug had also to be discontinued. It is noteworthy that after

treatment by malaria he received twenty injections of three grammes of tryparsamide, with no bad effect on his eyes.

It has frequently been reported that the effect of tryparsamide on the optic nerve is markedly deminished after a course of fever.

Several investigators have stated that tryparsamide has unfavourably influenced the development of the malarial fever. This has not been my experience as in no case has the drug prevented the development, or influenced the course of the fever although it has been administered throughout. It will be noted that case No.48 did not re-develop malaria after a second and a third inoculation. This cannot be cited as evidence that the drug was responsible as many patients appear to have developed an immunity after the initial course of fever.

The most serious complications experienced in the treatment of this series has been the development of localised abscesses when the drug has been given intramuscularly. This has already been discussed and need not be further elaborated (p13)

A few have complained of giddiness at the time of injection and one of the earlier patients had a rigor several hours afterwards.

Moore (73) reported that in a series of 241 cases treated by tryparsamide alone visual disturbances were found in 17.8%. The majority of these were transient and only in 2.8% did permanent visual injury result. Solomon (61) found that if a careful examination of the eyes was made prior to treatment and the drug given when there were no signs contra-indicating its use, then the visual complications were not serious. Only one of the patients developed a temporary impairment of vision. Several others complained of mild confusion, headache and nausea, which symptoms all cleared up within twenty-four hours. Reactions of a nitritoid type were seldom found. He had the same experience with regard to abscess

formation as was found in this series.

As already explained in the method of administration a careful examination of the eyes was made in all cases. This consisted of an ophthalmoscopic examination by the ophthalmic surgeon and perimetric tracings of the visual fields if such were indicated, or where any doubt existed. It is worth noting that in Case No.37 no untoward result has followed the administration of thirty-five injections of three grammes of tryparsamide, although, he had a complete optic atrophy in one eye and a commencing atrophy in the other, prior to beginning treatment, two and a half years ago. The atrophy has not advanced.

The complications are apparently considerably deminished if the drug is combined with fever therapy.

Considering these results one is led to ask whether the submission of these patients to prolonged treatment is justified. Some though enjoying a good remission continued treatment until their serological reactions give negative results. I should here draw attention to cases Nos.36 and 38 who respectively seventeen and twenty-five months after treatment by fever showed clinical but very slight serological improvement. As the result of additional treatment since then by tryparsamide they have shown further clinical and marked serological improvement. One of these, case No.38 has given on the last two examinations completely negative serological findings. Case No.20 is also of interest as in April 1926 he showed marked improvement in the cerebro-spinal fluid findings. The reactions then were W.R. + 8 + Cells 10 per c.mm. Protein 35 mg.% and the Lange was negative. A month later he relapsed and was admitted to one of the London Mental Hospitals on 19.5.26. His cerebro-spinal fluid was reexamined. The reactions were W.R. + 8 + Cells 40 per c.mm Protein 70 mg.% Lange 5432100000 showing therefore an increase

in the strength of the Wassermann reaction, in the number of cells, and in the globulin content. I would repeat Dattner's comment on two of the clinically improved group in his series, who retained completely positive serological findings, namely that, they had since treatment shown signs of a relapse.

The matter resolves itself into the consideration of the question as to whether the presence of a positive Wassermann reaction in the blood or cerebro-spinal fluid should be made the object of attack. Opinions on this are divided as has been pointed out by Stokes (74). He quotes Nonne, an eminent neurologist, and Wile, an eminent syphilologist, who contend that serological findings are not conclusive, or even at times, important elements in a decision to continue or to stop treatment. He adds "Do we know at the present day whether it is, after all, for the ultimate best interests of the patient to have his spinal fluid Wassermann rendered negative, his pleocytosis and globulins returned to normal? We do not know, we only infer that it is. We infer that these abnormalities are symptoms of the disease to be removed as part of a restoration to normality if it can be accomplished without too great effort and cost." Poritz (55) suggests that the positive serological findings in those showing only slight clinical defects, may be like a fire which has been damped down and may be expected to burst into activity later. In our present state of knowledge, however, he considers that we are not justified in definitely saying so, and in some cases, the positive findings remain as yet a relatively meaningless feature.

Cases occur in this series and, many such may be found in the literature, who have relapsed while their

serological reactions remained positive. I have been unable to find any reference in the literature to any cases who have relapsed after showing clinical improvement, and negative serological reactions. No such cases in this series have relapsed, but time alone will answer this question. Meantime, it would appear expedient, and advisable to remove, as far as it is possible, the pathological abnormalities found in these patients, and it was with this aim in view that this work was undertaken.

SUMMARY AND CONCLUSIONS.

1. Fifty cases of general paralysis were submitted to treatment by tryparsamide. Seventeen were treated by this drug alone and in thirty three others the drug was combined with fever therapy.
2. Of these 36% have had a good remission; 32% have had a partial remission; 14% are unimproved, and 18% are dead.
3. The effect of treatment is influenced by the duration of the mental symptoms prior to treatment; by the age of the patient and by the clinical type of the illness.
4. The chances of a successful outcome after treatment diminish in direct ratio to the duration of the mental symptoms prior to treatment.
5. The chances of remission are slightly diminished with the increase of years over forty years of age.
6. The most favourable types in order of degree of improvement are the manic type; the euphoric type; the simple type and the tabo-paretic type.
7. The outlook is much better in the simple "apathetic" type than in the simple "fatuous" type.
8. The speech defect and the tremors have been the neurological signs which showed the most improvement as the result of treatment. The changes in the reflexes were slight and inconsequent. The changes in the pupillary reactions were likewise variable. No pupil which was inactive prior to treatment showed a response after treatment.

9. In the early stages the clinical and serological changes do not run parallel. A partial parallelism exists in the later period as all cases then showing clinical improvement show a concomitant serological improvement.
10. The complications resulting from treatment by tryparsamide in this series have been very few. Visual disturbances occur in a small percentage of cases and are sufficiently important to demand a careful ophthalmoscopic examination of all patients prior to treatment. The best method of administration of the drug is the intravenous one. It should not be administered subcutaneously, nor intramuscularly. No bad results have followed upon the extravasation of small amounts into the tissues around the veins. The drug is not cumulative and has been administered regularly at weekly intervals over a period of many months without any detrimental effects.
11. Tryparsamide is a most valuable drug in the treatment of General Paralysis of the Insane and the results obtained in this series are encouraging. It forms a valuable substitute for fever therapy where the latter is contra-indicated, but the most effective method of treatment consists in a combination of tryparsamide with fever.
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