

B

h. J. 1913

61692 (68)

A FEVER OF UNCERTAIN ORIGIN

OCCURRING IN SOUTH AFRICA.

IAN D. DICKSON.

M.B., Ch.B. Ed. 1909.

FEBRUARY 1913.



A FEVER OF UNCERTAIN ORIGIN
OCCURRING IN SOUTH AFRICA.

During the course of a year's work in a large general practice in the Transvaal, I have been struck by the great number of febrile conditions which exist undiagnosed, unclassified, and unnamed.

I have chosen for the subject of my Thesis a disease which appeared to me definite and unmistakeable and I have collected and examined as many cases as possible, gathering therefrom a number of facts, which will enable me to write a general description of the disease.

I have been greatly assisted in my work by the kindness and courtesy of the Officers of the Royal Army Medical Corps stationed here, who have permitted me to examine all patients suffering from this and similar diseases, admitted to the Military Hospital, and to study the records of all cases admitted to the Hospital during the past few years.

The number of cases met with in general practice is comparatively few, and the difficulties of accurate clinical investigation are such that, but for this assistance, I would have been unable to collect material for a Thesis upon this subject.

DEFINITION. An acute fever of uncertain origin and unknown pathology, characterised by a short incubation period, a period of continuous fever accompanied by severe headache and general pains, and by a definite erythematous maculo-papular eruption.

HISTORICAL. For many years medical practitioners in the Transvaal have been acquainted with the disease which I am about to describe, but they have not distinguished it from other and better known diseases. It is diagnosed as Influenza, or Typhoid, or Paratyphoid, while some have classed it with Dengue or other tropical fevers.

Army Medical Officers have written papers which refer to the disease, classifying it among the Para-typhoid fevers, but it is now classified by them under the heading "Pyrexia of Uncertain Origin". It is usually referred to as "Potchefstroom fever", taking its name from the town in which it is most prevalent.

For the sake of convenience I will in future refer to the disease by the latter name.

GENERAL DESCRIPTION. The disease usually commences with three or four days malaise and anorexia which are sometimes accompanied by headache and pains in the back and limbs.

On the fourth or fifth day the symptoms become much more marked. There may be a slight rigor and occasionally vomiting, after which the temperature rises rapidly to 103° or 104°, the pulse rate remaining comparatively slow. The headache becomes very severe, usually frontal in type, while the patient complains of pains behind the eyes, pains at the back of the neck, in the lumber region, in the joints of the arms and legs, and in the calf muscles.

On about the third or fourth day, that is, when the symptoms become acute, an extensive and well defined rash appears, usually developing first on the thighs, and then rapidly spreading over the trunk and limbs, including the palms of the hands and the soles of the feet. The eyes are congested and the face is suffused, but the rash does not usually appear on the face.

The rash may be said to consist of discrete, tawny red spots, about 4 m.m. in diameter, maculopapular in variety, slightly raised and not disappearing on pressure.

The tongue is furred and moist and the throat is sometimes slightly sore.

The patient is very much prostrated and he lies in a dull, heavy, listless state.

The pains and headache respond fairly quickly to treatment, but the fever remains high with slight morning remissions until the 10th. or 12th. day when it falls by rapid lysis or by crisis.

After this the patient has a remarkably rapid convalescence; he is able to take full diet almost at once and in a few days he is up and about again in perfect health.

I have never seen a case which had a relapse.

The rash usually persists for from 16 to 20 days after the commencement of the illness.

SPECIAL FEATURES AND SYMPTOMS.

MODE OF ONSET. Usually this is gradual, commencing with three or four days malaise and anorexia which are followed by a sudden accentuation of symptoms on the fourth day. In other cases there are no premonitory symptoms, the disease commencing suddenly with a chill, headache, and vomiting.

GENERAL APPEARANCE. The patient usually lies like a log in a state of marked prostration, his face suffused, his conjunctivae injected and his pupils moderately dilated. His face wears an expression of pain, he holds his head and moans.

FEVER. The course of the fever is usually distinctive.

There is generally little or no fever during the stage of invasion, but when the acute symptoms commence there is a sudden rise of temperature to 104° or 105°, and this temperature is maintained with morning remissions of one or two degrees until from the 9th. to the 12th. day, when the temperature falls by rapid lysis or by crisis, rapid lysis being more common.

There is occasionally a short post-critical rise.

I append some typical charts.

No. 1 shows resolution by crises on the 9th. day.

Nos. 2 and 3 show resolution by lysis on the 9th. and 10th. days.

Nos. 4 and 5 show resolution by crisis with a slight post-critical rise.

No. 1.

DISEASE.

Notes of Case.

Name {

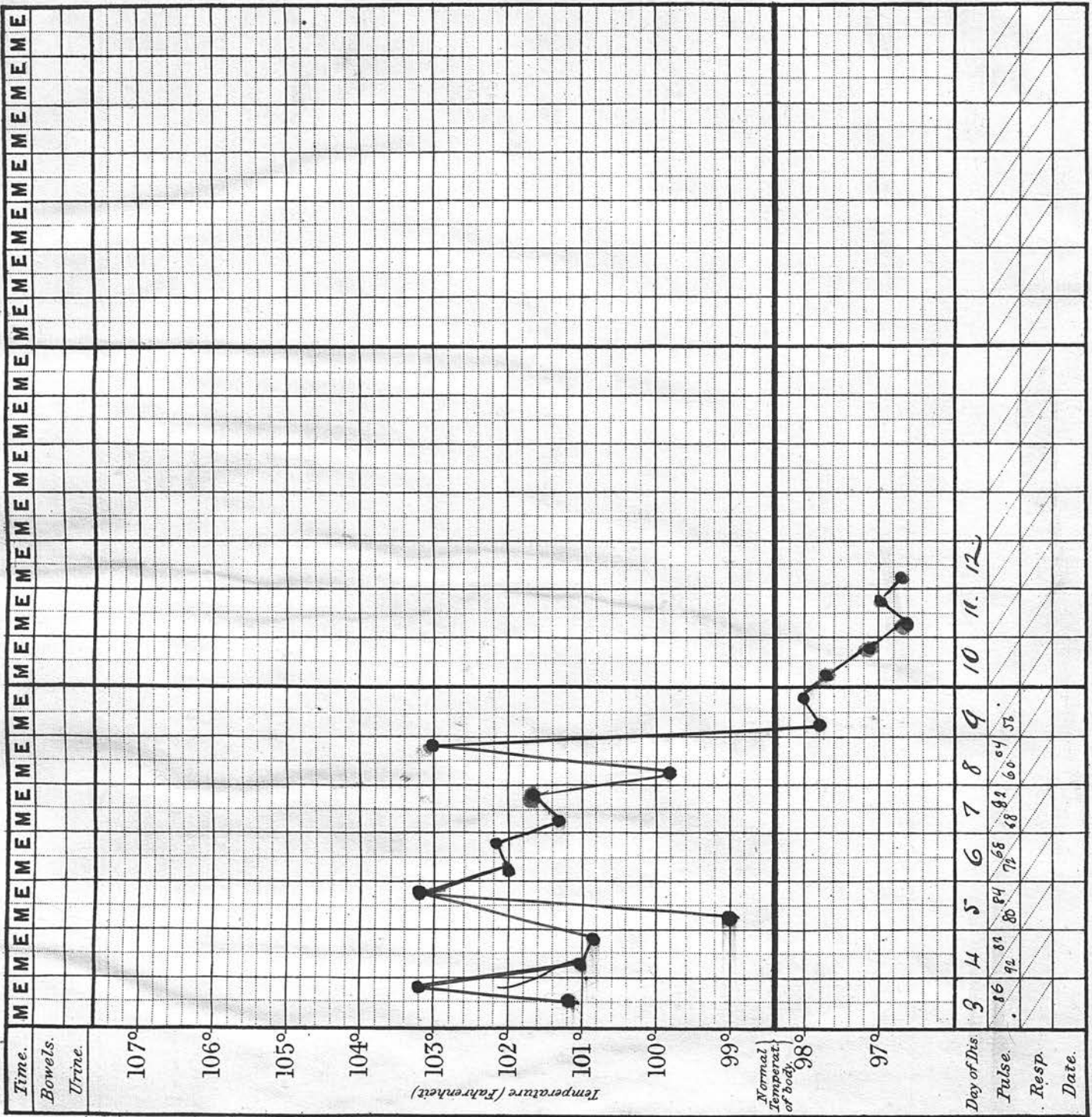
Age

Diet

Case Book No.

Date of admission.

Result



No 2.

DISEASE.

Notes of Case.

Name {

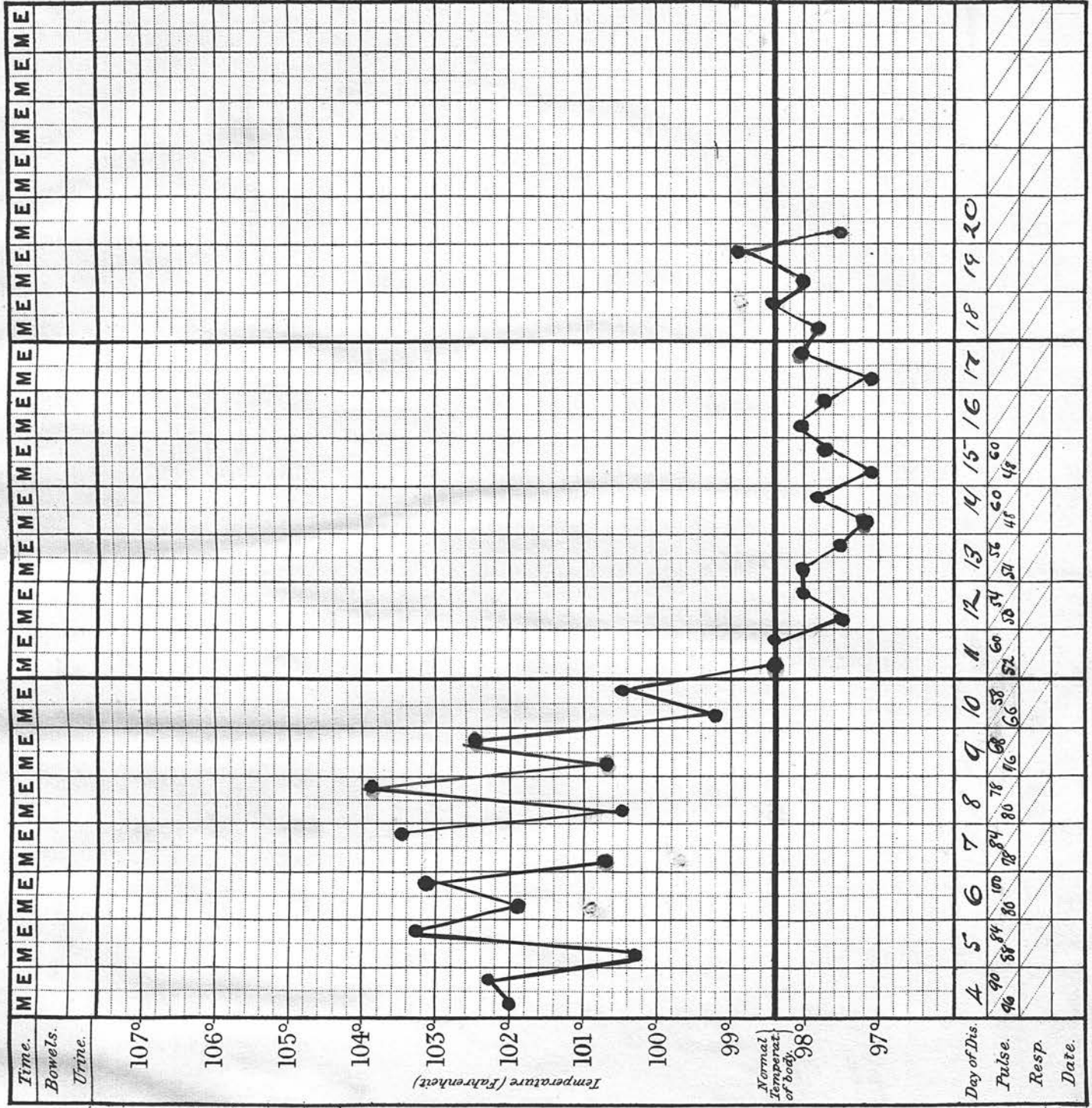
Age

Diet

Case Book No.

Date of admission.

Result



No. 3.

DISEASE.

Notes of Case.

Name {

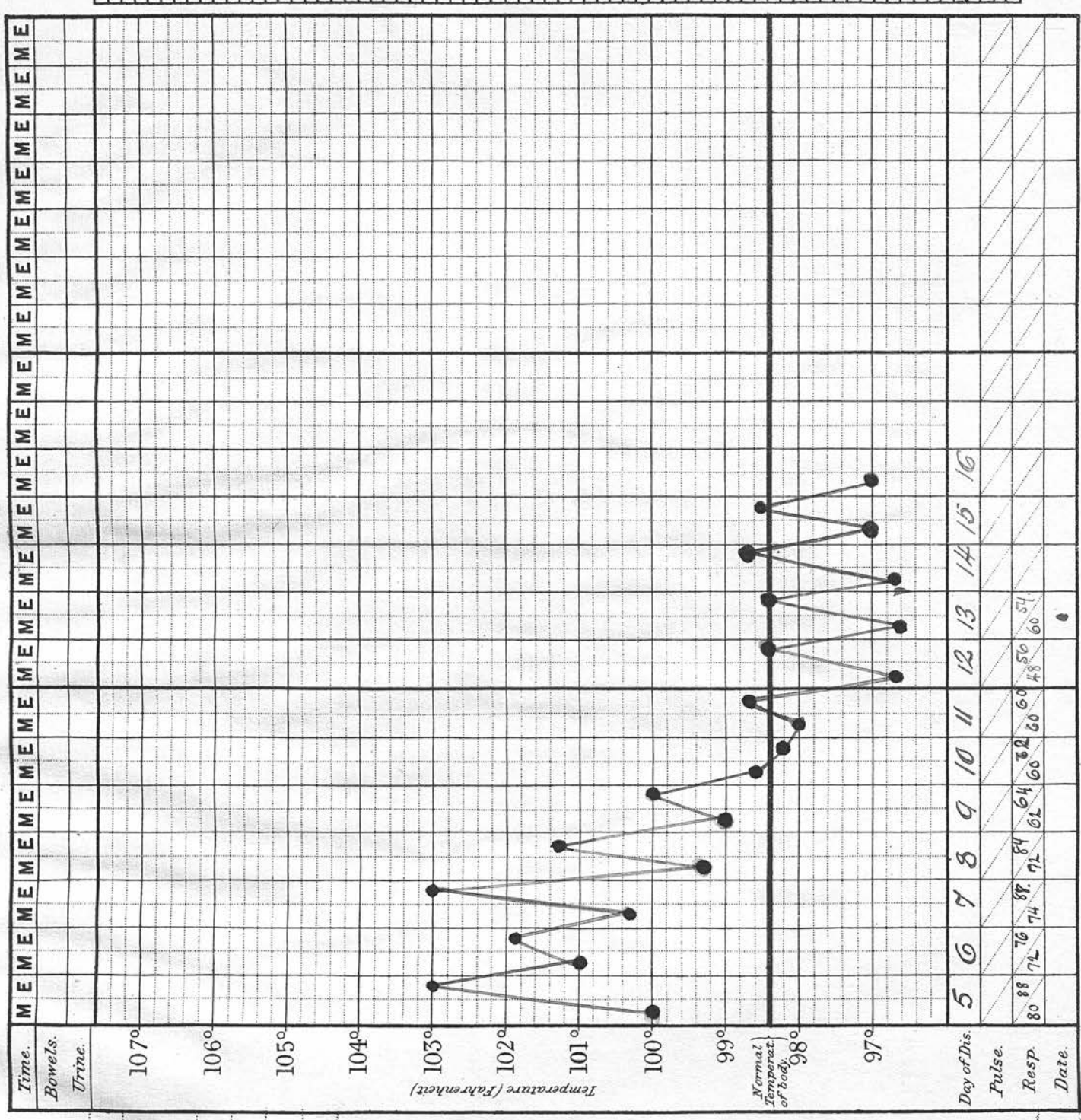
Age

Diet

Case Book No.

Date of admission.

Result



No 4.

DISEASE.

Notes of Case.

Name {

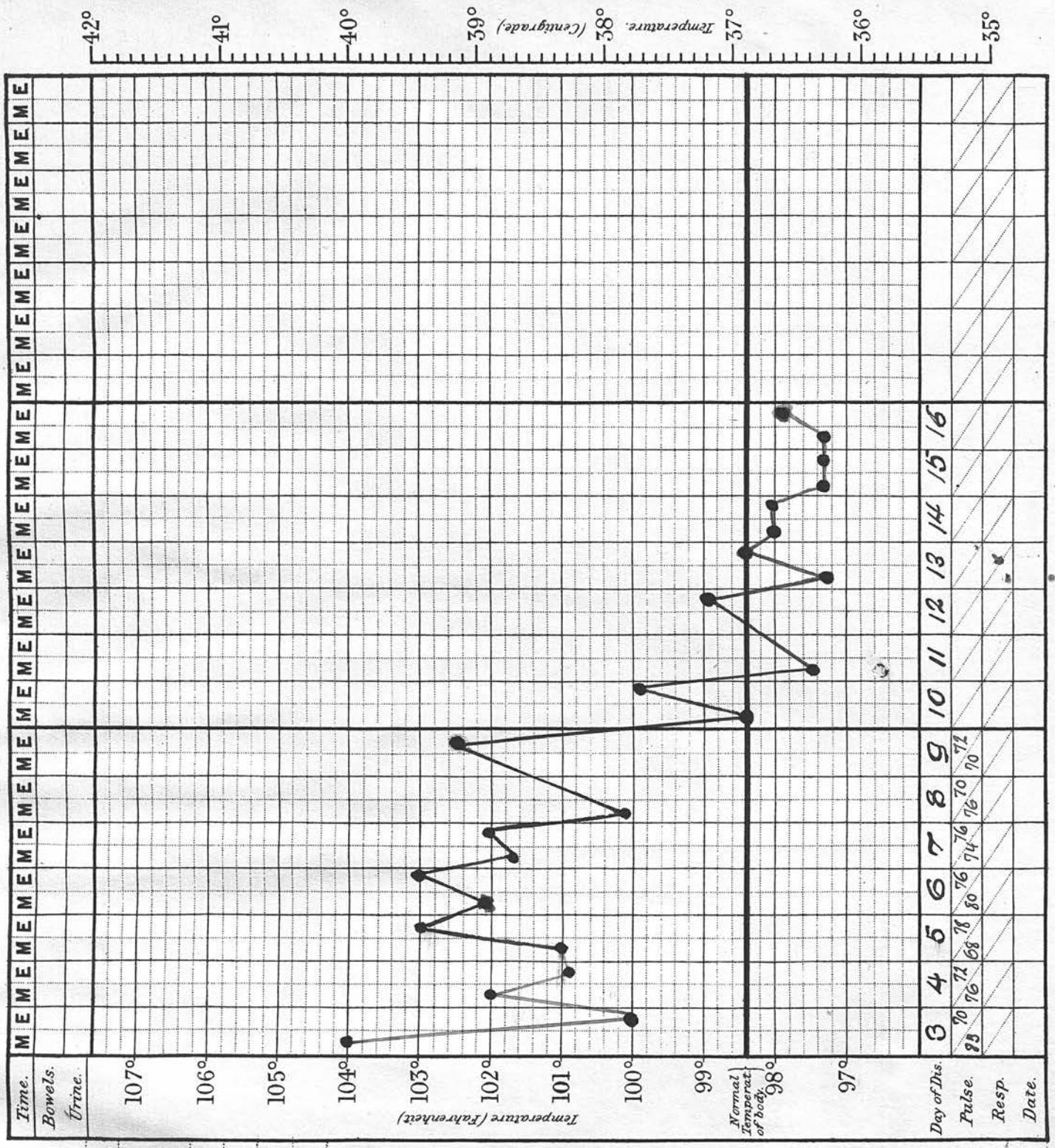
Age

Diet

Case Book No.

Date of admission.

Result



No 5.

DISEASE.

Notes of Case.

Name {

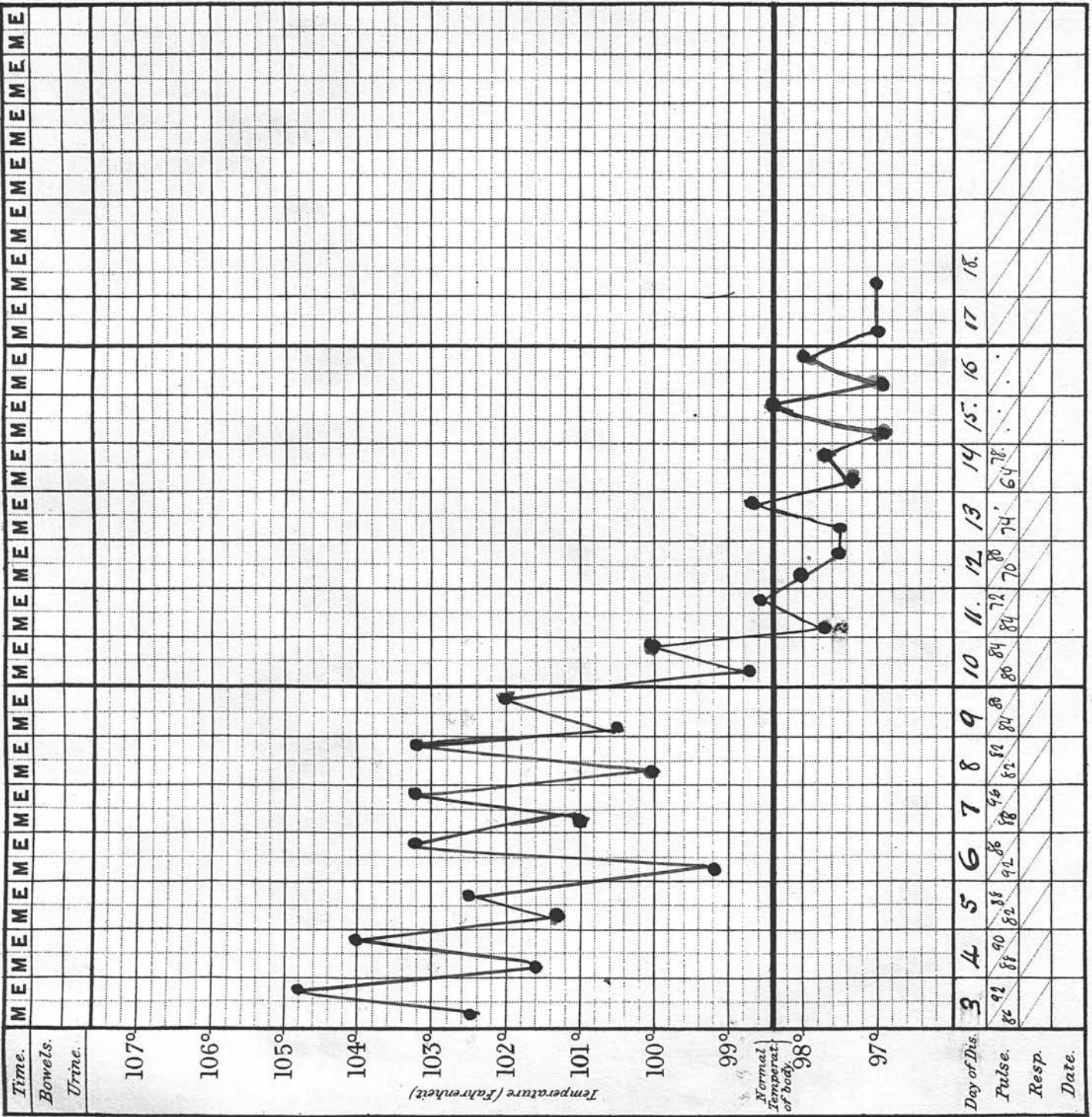
Age

Diet

Case Book No.

Date of admission.

Result



It will be noted in all these cases that the pulse rates are low in comparison with the height of the temperature.

INTEGUMENTARY. The skin is usually hot and dry, but sometimes the patient perspires freely.

The appearance of the rash coincides with the rise of temperature, and we note that the rash is most profuse when the temperature reaches its fastigium.

The eruption usually develops first on the thighs, rapidly spreading over the trunk and limbs, involving the palms of the hands and soles of the feet. I have never seen spots in the mouth.

The rash does not appear in crops, but when it has once developed it remains throughout the course of the disease, gradually fading away after the temperature has fallen to normal.

In no case have I seen that "fine, irregular dusky red mottling, as if below the surface of the skin some little distance, and seen through a semi-opaque medium" as is described by Buchanan in his article on Typhus fever.

The rash is composed of discrete maculo-papular spots from 2 m.m. to 4 m.m. in diameter and of a

tawny red colour.

The papula is slightly raised above the surface of the macula which surrounds it, and on pressure the macula fades but the papula does not disappear.

In some cases the rash is very profuse, in others there are only about 200 or 250 spots.

The face is always flushed, but there are usually few if any spots upon it.

The conjunctivae are injected.

CIRCULATORY. The blood shows no marked change from that of health.

There is no reduction in the number of red corpuscles and the haemoglobin is normal in amount. The white corpuscles are not increased in number nor does one find the leucopenia which is so marked in Typhoid cases.

In some patients there is a slight reduction in the number of white corpuscles, but my lowest count was 5800.

There is a slight relative increase in the number of lymphocytes.

DIFFERENTIAL COUNT.

Polymorphonuclear Leucocytes	62%
Small Lymphocytes	30%
Large mono-nuclear Leucocytes	5%
Eosinophil Leucocytes	3%

I have been unable to study the viscosity of the blood.

The blood pressure is low, 110 to 120 m.m. of mercury.

A characteristic of this disease is that the pulse rate is very low even when the temperature is high. From my list of cases it will be seen that with temperatures of 103° or 104° the pulse rate seldom rises above 100 and the average is usually from 75 to 85.

The pulse is full, regular, low tension and occasionally dicrotic.

I have not been able to obtain any pulse tracings.

The heart is not enlarged and the heart sounds are as in health.

In two cases I have noted Phlebitis occurring in the Saphenous vein.

ALIMENTARY. There is complete loss of appetite.

The tongue is moist, the dorsum covered with a thick white fur, the tip and edges being red. The gums have a healthy appearance. There are no spots inside the mouth.

The patient does not complain of abdominal pain or tenderness. The abdomen is neither prominent nor retracted. There is no tympanitis.

Constipation is a marked feature in nearly every case. I have never seen a case in which there has been any tendency to diarrhoea.

The stools have rather an offensive odour. The vertical dullness of the liver is not increased.

In two cases there was tenderness over and slight distension of the gall bladder.

HAEMOPOIETIC SYSTEM. There is no enlargement of the glands.

In no case have I seen any Splenic enlargement due to this disease. Patients in whom some slight enlargement was noted were always malarial subjects.

The microscopic characters of the blood have been dealt with under the circulatory system.

RESPIRATORY SYSTEM. Epistaxis has been noted on several occasions in the initial stages, but the haemorrhage has never been severe.

Bronchitis is frequently present in a slight degree. In my cases there was only one in which the Bronchitis was severe.

There is occasionally some nasal catarrh.

URINARY SYSTEM. The Urine is usually of a clear, dark, amber colour. The reaction is acid. The specific gravity is usually about 1022.

The chemical reactions are generally as in health.

In some cases there are traces of albumen, and granular casts may be found microscopically.

Some observers have found the Diazo reaction present in some cases, but I have never been able to obtain it.

NERVOUS SYSTEM. Severe headache is one of the worst symptoms of the disease. Usually the pain is frontal, but sometimes it is occipital, and this, combined with pain in the muscles at the back of the neck, may lead one to suspect meningitis.

Photophobia is an almost constant symptom, and

there is usually pain in the eye muscles which causes the patient to adopt a fixed stare.

The eyeballs are tender on pressure.

In several cases I noticed that the tendon reflexes were exaggerated.

I have never found Kernig's sign to be present.

Insomnia is a very frequent complication, and is generally due to the severe headache and to the pains throughout the body.

Delirium is seldom present and when it does occur it is usually of the mild, muttering type.

The patient lies as a rule in a listless, apathetic state and he resents any noise and any necessity for talking or movement.

LOCOMOTORY SYSTEM. Stiffness and pain in the back and limbs are present in every case. There is usually considerable pain in the wrist joints and in the small joints of the hands, but there is never any redness nor swelling of the affected joints.

There is frequently pain in the knee joints and in the large majority of cases the patient complains of severe pains in the calf muscles. I have heard it described as being similar to the pain which one

experiences after running a long distance when out of training.

Another man told me that he felt as if he had been beaten and kicked all over.

COMPLICATIONS. In my cases the only serious complications have been Bronchitis and Phlebitis.

I have seen notes on two cases in which there was severe pain over and distension of the gall bladder.

ETIOLOGY.

GENERAL PREVALENCE. This disease seems to be most prevalent in the Transvaal, especially in the towns of Potchefstroom and Pretoria. It also occurs in Johannesburg.

I know that cases are occasionally met with in Bloemfontein in the Orange Free State.

I cannot find any description of the disease in any of the South African Medical Journals, but in spite of that I believe that it shows itself in Natal and the Cape Colony. I found my belief upon the fact that it appears to be mentioned in these

districts in the "Medical History of the War in South Africa", although it is never definitely diagnosed nor named there.

I have never seen nor heard of cases in Great Britain.

It is possible that the disease is present, unrecognised, in most sub-tropical climates.

SEASON. The disease occurs in the summer months: in this country from October to March.

Summer is the rainy season here and is the time at which we are most troubled by flies and mosquitoes.

The following table is compiled from my list of cases showing the number in each month:-

January	7	July	1
February	5	August	3
March	4	September	2
April	1	October	6
May	2	November	12
June	0	December	7

SEX AND AGE. Young adult males seem to be most prone to the disease. Women and children are also

attacked. My youngest patient was seven years of age. I also had one of ten and one of twelve. My list of cases shows a decided predominance of males, but that is accounted for by the fact that most of my recorded cases were seen in the Military Hospital and were drawn from the garrison stationed here.

RACE. I have never recognised the disease in a coloured person nor can I find any records of cases among natives. The fever certainly attacks newcomers to the country more readily than those who have lived here for some time.

IMMUNITY. One attack generally confers immunity.

I saw one man showing all the signs and symptoms of the disease except for the fact that he had no rash.

He had had a definite attack of the disease with a well defined rash at the same time last year.

I was told of a similar case of supposed recurrence.

Inoculation against Enteric does not give immunity, nor does a previous attack of Typhoid.

BACTERIOLOGY. Up to the present time no specific organism has been isolated in connection with the disease, nor have any blood parasites been found.

The blood has been examined for parasites in nearly all the cases that I have recorded, but always with a negative result: similarly the blood has been subjected to the agglutination tests with B. Typhosus and B. Paratyphosus β also with negative results.

In a paper on "Paratyphoid Fevers in South Africa" appearing in the Royal Army Medical Corps Journal for May 1911, Major J.G. McNaught describes this fever and states that in thirty cases which he saw the blood was submitted to a bacteriological examination similar to the above and with the same negative result.

He concludes that:-

"these cases form a distinct class by themselves, their clinical features distinctly differentiating them, and the failure to isolate bacilli from the blood militating against their inclusion in the coli-typhoid group."

We must therefore class this disease with other diseases such as measles and mumps, presumably

organismal in origin, but in which as yet no specific organism has been isolated.

MODES OF CONVEYANCE. This disease does not seem to be very infectious although it has the appearance of belonging to the infective fevers.

Cases are always isolated in the Military Hospitals, but I have never heard of any one isolating them in private practice, nor have I heard of a patient infecting others.

On the other hand a few months ago three men suffering from this disease were admitted to the Military Hospital within a few days of each other: they were all from one bungalow and they all slept near each other.

On another occasion two men were admitted from one bungalow within a few days of each other both suffering from "Potchefstroom fever".

I also saw two children in the same house at the same time suffering from this disease.

The above cases make it appear as though there was either infection from one another or that there was a common source of origin of the disease.

However although these bungalows were each

occupied by about 30 men, and although in the case of the children there were several other children in the same house, there was no further spread of the disease in either case.

In none of the other cases noted was there any history of infection from other patients, nor did these patients infect others.

I have no record of any nurse, attendant, or doctor becoming infected from a patient.

FOOD POISONING. There is no evidence that the disease has any relation to the ingestion of certain foods or to the toxins contained in certain decomposing foods.

INSECTS. Some observers have thought that the infection might be conveyed by insects. In the article mentioned previously on "Paratyphoid fevers in South Africa" by Major McNaught he states that, in several cases he ascertained that patients had been bitten by ticks two or three days before the onset of the symptoms, and he suggests that the tick may have conveyed the infection.

In my cases four have volunteered the statement

that they have been bitten by ticks two or three days before admission. In one of these cases the bite had been on the arm and had caused a slight lymphangitis and enlargement of the axillary glands: in another case the bite was on the jaw where it produced a boil.

Although these men stated that they had been bitten by ticks, on cross examination none of them could be certain that a tick was the offending insect.

In this country we are all attacked almost daily by various insects, so that a history of having been bitten can be obtained in any case of any disease.

Under these circumstances one must constantly bear in mind the possibility of a parasitic origin, but at the same time one must not lay too much stress upon it.

As I said before this disease is more prevalent among newcomers to the country than among the older residents. It is well known that a certain immunity to the effects of the attacks of insects is acquired after residing here for about a year, and as the disease is more prevalent among newcomers than among the older residents this would in some way point to a parasitic origin of the disease.

It must however be remembered that in no case has

a parasite been discovered in the blood.

Human Tick fever, which has been described in this country and in America, bears no resemblance to this condition.

I may mention that the Anopheles mosquito is uncommon in this district..

MORBID ANATOMY. As no deaths have been recorded from this disease we have had no opportunity for studying the morbid anatomy.

VARIATIONS. I have seen several cases of a disease in which the signs symptoms and duration were similar to those in the fever which I am describing, except that in these patients there has been no skin eruption.

It is difficult to say in the absence of any bacteriological data whether these were cases of "Potchefstroom fever" or of some other disease such as Influenza.

I am strengthened in my opinion that these should come under another category by the fact that one of the patients had had an undoubted attack of "Potchefstroom fever" in the previous year.

My opinion is not shared by other local observers

who include these cases with others under the general heading of "Pyrexia of Uncertain Origin".

DIAGNOSIS. One's ideas and conceptions with regard to Typhoidal diseases are ever broadening and becoming more complex. It is only since 1898 that we have recognised Paratyphoid fever as a clinical entity and since then other febrile conditions have been reclaimed from the common ruck of "Typhoid".

South Africa is the home of these fevers.

In the "Medical History of the War in South Africa" I find the following:-

"Certain so called "anomalous" fevers prevail throughout the country. These are variously named "Typho-malarial fever", "Cape fever", "South African Typhus" and are apparently taken as synonymous. We have also "Kimberley fever" "Camp fever" and generally "Low fever".

"Typho-malarial" fever it may be assumed is invariably enteric fever, although not of a classical type."

I believe that the fever which I have described was probably included in the first group, although I

am of opinion that it has no relation either to Typhoid or to Typhus.

The sudden onset and the rash recall Dengue fever, but Dengue fever is very contagious, has distinct joint complications, and has a distinctive course showing two separate fever periods each with its characteristic rash.

The severe headache and pains at the back of the neck sometimes suggest meningitis but this can easily be differentiated by means of spinal puncture.

Some observers have thought that it might be a variety of Phlebotomous or Sand fly fever which occurs in Malta, Egypt, and other countries; but although it is possible that the disease may be caused by a sand fly yet the duration and symptoms of Phlebotomous fever are not those of "Potchefstroom fever".

In Phlebotomous fever the febrile state does not usually last for more than three or four days and never for twelve or fourteen, and one does not find the characteristic rash which is so constant in cases of "Potchefstroom fever".

Malta, or Simple Continued Fever, or Undulant Fever as it is now usually called, is fairly prevalent in this part of the country; but to one who is familiar

with the symptoms of "Potchefstroom Fever" there should be no difficulty in differentiating between the two.

A glance at the temperature charts of the two diseases will at once show a very marked difference.

In Undulant Fever the temperature has a maximum of 103° and it may either remain there or there may be morning remissions of three or four degrees. This febrile state may last for many weeks or months, and relapses are common. In "Potchefstroom Fever" the stage of pyrexia is limited to 12 or 14 days.

Another great difference is that in Undulant Fever there is an increased rate of heart's action not at all in proportion to the degree of fever, whereas I have pointed out that in "Potchefstroom Fever" we find the reverse.

In Undulant Fever there is no rash except occasionally subcutaneous haemorrhage or purpura.

Influenza occasionally has a great similarity to our disease, but in many ways it is quite different. In the first place a rash is uncommon in influenza, and when a rash does occur it is accidental rather than essential or specific.

The Influenza rash is usually of the fleeting erythematous type resembling either measles or

scarlatina; occasionally we have petechiae, sometimes papular sweat rashes, and more frequently herpetic eruptions.

I have never seen in a case of Influenza a rash which bears any resemblance to the characteristic maculo-papular eruption of Potchefstroom Fever.

Again with Influenza one usually has a considerable amount of bronchial catarrh and also a weak and rapid pulse, neither of which are characteristic of Potchefstroom Fever.

Convalescence is always slow and prolonged, complications and sequelae are frequent in Influenza while in Potchefstroom Fever we have a remarkably rapid convalescence and complications are rare.

Many diseases are mistaken for Typhoid Fever, but with a little care one cannot fail to diagnose Potchefstroom Fever from the most atypical Typhoid.

In the first case Widal's test is invariably negative in our disease, secondly the eruption bears no resemblance to the eruption of Typhoid nor does it appear in crops, and thirdly the stage of pyrexia is very much shorter in our disease than in Typhoid.

One might cite many more differences such as in abdominal symptoms, in pains and in cardiac symptoms,

but the three main differences which I have mentioned and the rapid recovery in Potchefstroom Fever will be sufficient to differentiate it from Typhoid.

Paratyphoid Fever is in itself rather an indefinite disease so that it is difficult to contrast it with another. One must place most reliance upon the fact that the agglutination test with B. Paratyphosus ^B is invariably negative in cases of Potchefstroom Fever. In Paratyphoid we can usually obtain cultures of B. Paratyphosus from the blood, faeces, and urine which cannot be obtained in our disease. Again Potchefstroom Fever differs from Paratyphoid in its peculiar rash, its pains, the absence of abdominal symptoms, and in its characteristic pulse.

When spots appear in Paratyphoid they are usually rose coloured, somewhat larger than in Typhoid and they disappear on pressure.

Typhus Fever is unlooked for in these times, and if as has been said, its symptoms have become very much modified in recent years, it is possible that it might pass unrecognised.

Potchefstroom Fever does undoubtedly bear a great resemblance to Typhus, but we associate Typhus with insanitary surroundings, ill nourished people, great epidemics, and high death rates, all of which are

foreign to our conception of Potchefstroom Fever.

Dirt and insanitary surroundings do not seem to predispose in any way to our disease, in fact they seem to have the opposite effect. I have seen remarkably few cases among the poor class Dutch, most of my cases being among the troops, who are well housed and fed, and among the better class white people.

Typhus is probably the most contagious disease that we know: a greater proportion of Doctors and Nurses have lost their lives through its infection than through any other. On the other hand we have little evidence of Potchefstroom Fever being a contagious disease. I have never known a nurse or attendant to become infected, and only in one or two instances have people living in the same house developed the disease.

I will tabulate the chief symptoms of the two diseases, the more easily to compare and contrast them.

TYPHUS FEVER.

Incubation 12 days or less.

Invasion with chills or a rigor.

Headache, pains in back and legs.

Maximum temperature 3rd. day.

Pulse full and rapid.

Tongue furred, white and dry.

Face flushed, eyes congested.

Vomiting often a distressing symptom.

POTCHEFSTROOM FEVER.

Incubation short, probably 3 to 4 days.

Invasion frequently similar

Similar, but with pains in wrists, small joints of hands, definite pains in calf muscles, photophobia and pains behind eyes.

Usually 2nd. or 3rd.

Pulse slow.

Tongue furred and moist.

Similar.

Vomiting scarcely ever present.

TYPHUS FEVER.POTCHEFSTROOM FEVER.

Delirium often present from onset.	Delirium rare.
Eruption developing 3rd. to 5th. day.	Similar.
Sub cuticular mottling of skin.	Sub cuticular mottling never present.
Papular rose spots changing to petechiae.	Spots always hyperaemic never haemorrhagic.
Slight leucocytosis.	Tendency to leucopenia
Highly contagious.	Not contagious.
Symptoms aggravated in second week.	Symptoms become less in second week.
In severe cases death from exhaustion at end of 2nd. week.	No deaths recorded.
In favourable cases crisis at end of 2nd. week.	Disease usually terminates at end of 2nd. week by rapid lysis, occasionally by crisis.

Taking all these differences into consideration, the predisposing causes, the infectivity, the incubation periods, the eruption, the pulse and the general severity of the two diseases, I am of opinion that this disease bears no relation to Typhus Fever.

BRILL'S DISEASE.

In the New York Medical Journal for January 1898 N. E. Brill A.M., M.D., Professor of Clinical Medicine in the Collage of Physicians and Surgeons, Columbia University, New York, noted 18 cases of a "disease recurring in Spring and Autumn very like Enteric Fever, but markedly differing from it in certain characteristics."

In the "American Journal of Medical Science" April 1910 under the heading "An acute Infectious Disease of Unknown Origin" he describes a disease having a distinct clinical entity entirely separate from Typhoid from Typhus or from any other disease known to him. He cites 221 cases occurring in the Mount Sinai Hospital, New York, between 1896 and 1910.

Potchefstroom Fever bears the closest resemblance to the fever which he has described.

Brill defines his disease thus:-

"An acute infectious disease of unknown origin and unknown pathology, characterised by a short

incubation period (4 or 5 days) a period of continuous fever accompanied by intense headache apathy and prostration, a profuse and extensive erythematous maculo-papular eruption, all of about two weeks duration, whereupon the fever abruptly ceases either by crisis within a few hours or by rapid lysis within three days when all symptoms disappear."

This almost exactly describes "Potchefstroom Fever" although I would hardly describe it so boldly as an infectious fever.

He then gives a general description of the disease:-

"After three or four days malaise, loss of appetite, nausea and headache the disease begins abruptly with a chill: then vomiting occurs, pains in the body and back and occasionally epistaxis. The headache becomes intense and there is great prostration. The temperature rises rapidly reaching its maximum in three or four days, with very slight diurnal remissions.

During the fastigium the patient lies quietly moaning with a facial expression of pain shown by his

contracted brow. The eyes are dull, the conjunctivae congested, the face flushed especially over the malar bones. The patient is drowsy, his senses are dulled and he resents being disturbed. The tongue is usually coated and moist, occasionally it is dry and furred. The skin is hot and dry. The headache continues intense. On the sixth day a rash appears commencing on the abdomen and back and spreading to the thorax and neck, occasionally the hands and feet are involved but not the face. The rash is dull red slightly raised and does not disappear on pressure. It may fade slightly on pressure, but the colour returns on the pressure being removed. The bowels are constipated. The pulse is full and slow and not so rapid as the pyrexia would lead one to expect: it is soft and low tension and often dicrotic.

The symptoms remain until the 12th. day when they all subside and the patient feels perfectly well. There is a quick convalescence.

The urine is scanty and high coloured and occasionally albuminous. Delirium is exceptional. In a few cases there is rigidity of the neck and

Kernig's sign may be elicited."

With the exception of one or two statements one could not have a better description of Potchefstroom Fever.

In my cases the maximum temperature has been reached on the same day or on the day following the acute onset, and not on the third or fourth day. Of course Brill may be counting from the commencement of the period of invasion.

Vomiting at the onset has not been very common in my cases. I have never seen Kernig's sign present in this disease.

Brill then proceeds to give an analysis of the symptoms.

I will tabulate them in order to compare his description with my observations on Potchefstroom Fever.

BRILL'S DISEASE.

POTCHEFSTROOM FEVER.

Sex 34 males to 16 females. Probably similar.

Period Summer.

Similar.

Age 20 - 40 youngest 17.

Children also affected
youngest aged 7.

BRILL'S DISEASE.

Contagion. No evidence of being directly communicable.

Treated in general ward.

In 221 cases no two members of a family have fallen.

Subsequently saw four in one family.

Food Poisoning no evidence.

Incubation. From sudden onset to 14 days average 4 to 8 days.

Onset may be sudden or gradual.

Epistaxis in three cases.

Headache a pronounced feature, at times agonising.

Kernig's sign occasionally noted.

Prostration a marked symptom.

POTCHEFSTROOM FEVER.

Similar.

Similar.

Seldom longer than 4 days.

Similar.

Similar.

Similar.

Kernig's sign never seen.

Similar.

BRILL'S DISEASE.

Skin hot and dry. Rash appears between 5th. and 8th. day. Does not come out in crops. Spots last throughout disease. Spots 2 to 4 m.m. in size uneven in contour irregular or oval. In 3 cases distinctly petechial suggesting Typhus. Occasionally attacks palms of hands and soles of feet. Never seen on face. Rash unlike Typhoid generally abundant.

Labial herpes in 3 cases.

Pulse 86 to 100.

Eyes suffused and conjunctivae injected.

POTCHEFSTROOM FEVER.

Similar in essentials. Skin occasionally moist. No cases noted with petechial spots. Usually attacks palms of hands and soles of feet.

Labial herpes never seen.

Similar: usually somewhat slower.

Similar.

BRILL'S DISEASE.

Temperature begins to rise at onset reaching fastigium on 2nd. or 3rd. day from onset then averaging from 103.6° to 104.2°

Remissions of about 1° between morning and evening.

Remains high to day before crisis when precritical rise to 105° or 106° may occur.

Resolution by crisis or rapid lysis.

Tongue at first moist and coated with white fur - tip and sides red. Remains so except in cases of hyperpyrexia where it may become dry and brown.

Constipation marked.

Tympanitis not a feature of the disease.

POTCHEFSTROOM FEVER.

Usually reaches fastigium on same day or day after onset of acute symptoms.

No precritical rise noted, but sometimes postcritical

Resolution usually by rapid lysis.

Similar except that I have no records of cases with hyperpyrexia nor with dry brown tongue.

Similar.

Similar.

BRILL'S DISEASE.

Spleen frequently enlarged.

Mental symptoms.- usually apathy. Delirium seldom present - never assumes active type, but generally muttering character.

Blood.- Average white blood cell count higher than in typhoid. There is not the tendency to leucopenia which typhoid blood shows.

Urine.- Occasional trace of albumen. Diazo reaction not infrequently obtained.

Agglutination reactions.- In 221 cases not a single positive reaction to Widal's test.

Agglutination tests in some cases with various

POTCHEFSTROOM FEVER.

Spleen seldom enlarged.

Similar.

Similar.

Similar.

I have never obtained the Diazo reaction.

Similar tests and results.

BRILL'S DISEASE.

(Agglutination
reactions continued)

paratyphoid bacilli - with
several colon strains and
with Gärtner's bacillus:
the results were all
negative.

Bacteriology.- Evidence
of infection by recovery
of offending organism is
entirely wanting. Have
altogether failed to
isolate specific organism.

Complications.- Bronchitis
common. Broncho-pneumonia
in 3 cases. Serous
meningitis in 4 cases.
Phlebitis once. Otitis
media once. Cystitis twice.

Duration about 14 days.

POTCHEFSTROOM FEVER.

Similar.

Bronchitis and Phlebitis
only corresponding
complications.

Similar.

Brill then proceeds with his differential diagnosis in which he distinguishes his disease from Typhoid, Typhus, Meningitis and Influenza.

He says that in the case of an epidemic of Typhus it would be impossible to say that these cases which he has described were not Typhus. After contrasting the two diseases he points out that it is unlikely that Typhus could have become so modified as to have lost its "notoriously epidemic character and to be deprived of the grave nervous symptoms, and its toxæmia so as to be a nonfatal disease."

He concludes thus:-

"But with Typhus fever as the Great Masters of Medicine have taught, and as I have seen it such a conception would be unjustifiable: therefore I believe the disease not to be Typhus Fever."

Having established the fact that it is a distinct disease, with such a definite clinical picture that it cannot escape recognition, he discusses the advisability of giving it a name; finally deciding that he prefers not to name it but to call the attention of the profession to the disease.

A close comparison of the fever occurring in America described by Brill, and the fever which is prevalent in South Africa and which I have referred to as Potchefstroom Fever, will show that in all the essentials they are identical. The differences are only such as might occur between any two observers of the same disease in different patients.

The conclusion is forced upon one that the disease which prevails here, which our medical men have been acquainted with for many years, but have not known, is that disease which was described by Dr. Brill in New York and which is called by his name.

PROGNOSIS. Is invariably good.

TREATMENT. There is no specific treatment. Rest in bed with low diet during the febrile stage is advisable. Salicylate of Soda or Aspirin gives relief from the pains and if these do not relieve the headache Phenacetin will often have the desired effect.

Quinine does not exert any influence upon the disease.

Constipation, Insomnia, Photophobia and other symptoms must be treated as they arise.

SUMMARY.

In the foregoing pages I have endeavoured to describe a disease which prevails in South Africa, but which is seldom recognised as a distinct entity; being usually classified with other more common and better known diseases.

I have given a general description of the condition and then I have dealt with the special features and symptoms of the disease.

I have pointed out how the chief features such as the onset, the height and duration of temperature, the pulse, the definite pains and headache, the rash and coated tongue, the sudden cessation of symptoms and rapid recovery are constant in almost every case.

I have shown how the Bacteriological investigations have invariably met with negative results.

I have shown that this disease bears no relation to Typhus, to Typhoid, to Influenza or to any other disease for which it might be mistaken.

I have given extracts from a paper in which Dr. Brill describes an exactly similar disease occurring in New York, and I have concluded that this is probably the same disease as that described by Brill and that it should be called by his name.

Name	Age	Sex	Date of Admission	Days ill prior to admission	Duration of fever and termination	Maximum Temperature	Day	Minimum Pulse	Average Pulse	Rash and Tongue	Pains	Other Symptoms	Remarks
K.F.	24	M	30/4/12	2 days	10 days Relid Lysis	103° 3 rd		96	86	Rash appeared on 5 th day extending over trunk & limbs, palms of hands & soles of feet.	Severe headache	Constipation Cough, but no physical signs in chest	Inoculated against - Enteric Widal - to B. Typhosus & B. Paratyphosus
P.F.	22	M	2/9/12	4 days	11 days Lysis	103.4° 5 th		96	84	Rash not profuse appeared on 5 th day Tongue white furled	Severe headache Pains in limbs & calf muscles.	Constipation Slight sore throat	Inoculated against - Enteric in 1911 Widal - to B. Typhosus & B. Paratyphosus No parasites found in blood
R.H.	25	M	26/12/11	3 days melain	9 days Lysis	103.2° 3 rd		100	90	Profuse rash all over body appeared on 4 th day. Tongue furled	Frontal headache Pains in limbs	Constipation	Inoculated against - Enteric in 1907 Widal - to B. Typhosus & B. Paratyphosus
C.H.	23	M	23/10/12	2 days	9 days Crisis	103.2° 3 rd		92	76	Rash appeared first on lower extremities later all over body including palms of hands & soles of feet	Severe headache Pain behind eyeballs Pains in limbs	Insomnia Constipation	Inoculated against - Enteric two days before admission. No signs of local reaction. Widal not done.
F.W.J.	20	M	16/2/12	2 days	10 days Lysis	103° 3 rd		98	80	Rash appeared on 3 rd day on trunk and limbs Tongue white & furled, tip & edges clear.	Severe headache	Constipation	Admitted with a boil on l. leg caused lymphangitis & enlargement of glands in the groin. Prob. Boil said to have been caused by a tick. No parasites found in blood. Enteric in India in 1907. Widal - to B. Typhosus & B. Paratyphosus.
A.J.	26	M	24/1/12	3 days	15 days Lysis	103.4° 5 th		90	84	Profuse rash appeared on trunk & limbs on 4 th day. Tongue furled	Severe headache Pains all over body Pains behind eyes	Constipation Insomnia	Inoculated against - Enteric in 1909 Widal - to B. Typhosus & B. Paratyphosus
C.M.	20	M	7/2/12	2 days	9 days Lysis	102.4° 3 rd		100	92	Profuse rash appeared on 3 rd day all over trunk and limbs	Headache. Pains all over body. Severe pains at back of neck.	Constipation	Widal - to B. Typhosus & B. Paratyphosus No parasites found in blood
A.M.	26	M	17/5/12	4 days	12 days Lysis	103° 4 th		108	96	Rash present on admission on limbs, trunk, palms of hands & soles of feet.	Headache	Constipation	Inoculated against - Enteric Widal - to B. Typhosus & B. Paratyphosus
H.S.P.	22	M	28/12/11	5 days	10 days Lysis	103° 6 th		100	88	Profuse rash all over body Tongue furled	Frontal headache Pains behind eyes Pains in limbs	Insomnia	Enteric fever in 1905 Arija on 8 th day. Blood examined but no parasites found. Widal - to B. Typhosus & B. Paratyphosus
G.P.	24	M	1/5/12	3 days	11 days Relid Lysis	104° 8 th		100	84	Rash present on admission. Not profuse	Headache Pains at back of neck Pains in wrists & fingers	Constipation	Inoculated against - Enteric in 1909 Widal - to B. Typhosus & B. Paratyphosus
J.P.	21	M	17/8/12	3 days	11 days Lysis	103.8° 4 th		100	90	Rash appeared on 4 th day on limbs & trunk Tongue furled	Severe headache	Constipation	Inoculated against - Enteric in 1901 Widal - to B. Typhosus & B. Paratyphosus
W.S.	26	M	14/7/12	4 days	10 days Lysis	103° 5 th		84	72	Profuse rash on limbs & trunk appeared on 5 th day	Headache. Pains in back of neck and limbs.	Constipation	Blood not examined
A.S.	23	M	6/9/12	4 days	11 days Lysis	102° 5 th		84	84	Rash present on admission on trunk & limbs	Headache. Pains in limbs and calf muscles	Constipation	Inoculated against - Enteric in 1911 Widal - to B. Typhosus & B. Paratyphosus
A.T.	24	M	4/9/12	4 days	11 days Lysis	104° 5 th		90	84	Profuse rash on admission all over body including soles of feet and palms of hands	Severe frontal headache	Constipation	Inoculated against - Enteric in 1910 Widal - to B. Typhosus & B. Paratyphosus
A.W.	21	M	6/11/12	2 days	10 days Crisis	104° 3 rd		80	72	Rash on lower limbs & slightly on body, present on admission	Frontal headache Pains behind eyes Photophobia Pains in calf muscles	Slight abdominal pain & nausea. No distension Constipation	Widal - to B. Typhosus & B. Paratyphosus

Name	Age	Sex	Date of Admission	Days ill prior to admission	Duration of fever and termination	Maximum Temperature	Day	Maximum Pulse	Average Pulse	Rash and Tongue	Pains	Other Symptoms	Bacteriology and Remarks
H.E.G.	25	M	Nov 4, 1910	4 days fever & malaise	11 days Lysis	103.8°	4 th	106	80	Rash profuse all over body. Present on admission. Tongue furred moist.	Headache. General pains, Tightness of calf muscles.	Constipation	Comes from same jungle as S. admitted the same day with the same complaint. Widal - to B. Typhosus and B. Paratyphosus B. No complications.
G.S.	23	M	Nov 4, 1910	3 days fever & malaise	11 days Lysis	104°	3 rd	108	76	Profuse rash chest, abdomen, arms & legs. Present on admission. Tongue furred.	Severe frontal headache. Pain behind eyes. Pain in calf muscles.	Constipation	No abdominal tenderness, no distension. Widal - to B. Typhosus & B. Paratyphosus B. No complications. This patient had a similar attack in Nov 1912, but had no spots at that time.
A.L.W.	12	F	Jan 15, 1911	3 days headache fever & malaise	11 days Lysis	101°	4 th	100	90	Pinkish rash over body especially lower extremities and soles of feet. Tongue thickly coated.	Slight headache. Pain back & limbs.	Very constipated	Some abdominal pain at onset; but no physical signs. Widal - to B. Typhosus & B. Paratyphosus B.
W.T.	27	M	Jan 3, 1911	3 days malaise	12 days Lysis Subsequent run 4 days	104°	4 th	112	100	Rash profuse. Rather large spots. Present on soles of feet.	Frontal headache. Pains in limbs.	Constipated	Inoculated against Enteric 1907. Previous attack of Malaria. Widal - to B. Typhosus & B. Paratyphosus B. No parasites found in blood. Phlebotomy in L. by cannot subsequent rise of temperature.
H.S.	23	M	Feb 2, 1911	1 day headache	12 days Lysis	103.2°	2 nd	100	80	A few typical spots appeared on 5 th day. Furred tongue.	Headache. Pains in joints.	Constipation	Has had Malaria. No parasites found in blood. Widal - to B. Typhosus.
F.C.B.	27	M	Feb 1, 1911	4 days	13 days Lysis	103.4°	6 th	104	90	Covered with profuse red maculo papular eruption extending to soles of feet. Lasted 16 days.	Headache. Pains in limbs.	Insomnia Constipation	Inoculated against Enteric 1905. Widal - to B. Typhosus & B. Paratyphosus.
J.P.	23	M	Jan 24, 1911	4 days malaise	12 days Lysis	104.4°	5 th	104	88	Profuse rash appeared on 5 th day extending over whole body & to soles of feet. Lasted 7 days.	Frontal headache. Severe pains in limbs.	Constipation	No parasites found in blood. Spleen slightly enlarged. Widal - to B. Typhosus & B. Paratyphosus. Albumen in urine.
C.E.	26	M	Jan 16, 1911	"a few" malaise	11 days Crisis	103.2°		100	86	Profuse rash appeared the day after admission. Tongue furred.	Pains all over body. Headache.		Widal - to B. Typhosus & B. Paratyphosus. No parasites found in blood.
H.V.	24	M	Feb 6, 1911	4 days	11 days Lysis	101.6°	5 th	90	76	Eruption all over body on admission.	Severe frontal headache.	Constipation Insomnia	Has had Malaria. No parasites in blood. Widal - to B. Typhosus & B. Paratyphosus.
C.E.	36	M	Jan 23, 1911	3 days malaise	10 days Lysis	103°	4 th	102	84	A few spots appeared on trunk on 5 th day. Tongue furred & moist.	Pains in all joints & muscles. Frontal headache.	Constipation	No parasites in blood. Widal - to B. Typhosus & B. Paratyphosus.
R.S.C.	33	M	Nov 27, 1910	3 days	11 days Lysis	101.4°	4 th	80	74	Rash appeared on arm, chest, legs & abdomen on 4 th day. Tongue white moist - thickly coated.	Headache & pains all over body. Pains behind eyes.	Constipation Insomnia Photophobia	Onset was sudden with vomiting. No other abdominal symptoms. Previous Malaria. No parasites in blood by Widal + but he had been recently inoculated against Enteric much convalescence. Solid food 2 days after defervescence.
P.J.	24	M	Nov 26, 1910	3 days malaise Anorexia	8 days Lysis	103°	5 th	88	76	Rash appeared on day after admission on arms, chest & abdomen.	Severe headache. Pain in calf muscles. General pains.		Inoculated against Enteric in 1907. Widal - to B. Typhosus & B. Paratyphosus. No blood parasites.
C.M.	22	M	Nov 6, 1910	5 days malaise	9 days Relict Lysis	103.2°	6 th	96	84	Rash not very profuse appeared morning of admission. Tongue white furred.	Severe frontal headache. General pains.	Constipation	Widal - to B. Typhosus & B. Paratyphosus.
A.T.	22	M	Nov 5, 1910	4 days	10 days Relict Lysis	103.2°	5 th	84	74	Spots present on leg, abdomen, chest & arms on admission.	Headache. General body pains.	Constipation	Widal - to B. Typhosus & B. Paratyphosus. No parasites in blood. The four patients R.S.C., P.J., C.M. & A.T. slept in the same room. C.M. & A.T. slept on either side of R.S.C. and P.J. two beds away.
J.L.	22	M	Jan 20, 1911	5 days anorexia malaise	12 days Lysis	103°	6 th	94	80	Profuse rash appeared day after admission. Palms of hands & soles of feet involved. Tongue thickly coated. Rash faded 13 th day.	Severe frontal headache. Pains in limbs, wrist & finger joints. Very severe on day after admission.	Constipation Insomnia	Inoculated against Enteric in 1909. Widal - to B. Typhosus & B. Paratyphosus.

Name	Age	Sex	Date of admission	Days ill prior to admission	Duration of fever and termination	Maximum Temperature	Day	Maximum Pulse	Average Pulse	Rash and Tongue	Pains	Other Symptoms	Bacteriology and Remarks
W.C.	24	M	Jan 26 th 1910	0	10 days Ovis	102.4°	6 th	76	70	Rash appeared on day after admission on arms chest and & abdomen. A few spots on face	Headache Pains in back & in small joints	Pain & tenderness over spleen. Constipation	Some Brachitis on admission. Slight splenic enlargement; inoculated against Enteric 5 months previously. Widal - to B. Typhosus & B. Paratyphosus
E.D.	28	M	Oct-4 1910	2 days	9 days Lym	103.8°	3 rd	72	66	Profuse rash all over body appeared on 4 th day Tongue furrowed.	Very severe headed	Constipation	Widal - to B. Typhosus & B. Paratyphosus. Temperature commenced to fall when rash appeared
P.G.	25	M	Nov 4 1910	5 days	11 days Lym Red-White rise.	103°	6 th	88	80	Profuse rash over whole body, palms of hands & soles of feet on admission	Headache. Pains	Slight cough Insomnia	Widal - to B. Typhosus & B. Paratyphosus Inoculated against Enteric in 1907
W.O'B	40	F	Nov 18 1910	1 day	13 days Lym	103.8°	4 th	88	83	Profuse rash over whole body on 4 th day. A few spots on face Thick white fur	Severe frontal headache. Pains all over body including small joints of hands	Photophobic Constipation Insomnia	Widal - to B. Typhosus & B. Paratyphosus
W.L.	22	M	Oct-24 1910	4 days malaise	9 days Relief Lym	104.2°	5 th	104	75	Rash appeared 4 th day not very profuse	Headache Lumbago Pain in small joints	Constipation	Widal - to B. Typhosus & B. Paratyphosus No blood parasites
S.D.	21	M	Oct-9 1910	6 days	10 days Relief Lym Red-White rise	102°	7 th	64	60	Rash appeared on abdomen and arms on 8 th day	Headache	Dizziness Anorexia Constipation	Not inoculated against Enteric Widal - to B. Typhosus & B. Paratyphosus
P.D.	24	M	Aug 28 1910	6 days	10 days Relief Lym Red-White rise	103°	7 th	100	84	Frontal headache. Pains all over body. Rash present all over body on admission Tongue furrowed	Frontal headache. Pains all over body. Tightness of calf muscles Aching of finger joints	Photophobic Constipation	Not inoculated against Enteric Widal - to B. Typhosus & B. Paratyphosus No parasites found in blood.
W.H.	20	M	Aug 11 1911	4 days	9 days Ovis	104.4°	5 th	84	76	Abdomen, arms and legs covered with rash on admission. Tongue covered with white fur	Frontal headache severe. Aching behind eye balls	Slight- Bronchitis Respirations 36 later 24	Patient had Enteric with Widal + ten months previously. States that he had an attack of fever a year ago lasting 8 days with symptoms similar to present ones but without rash. Widal - to B. Typhosus & B. Paratyphosus. No parasites in blood.
P.G.	27	M	10/12/11	4 days Headache & fever	12 days Relief Lym	103.6°	5 th	90	80	A few spots appearing the day after admission	Headache. Pains in lumbar region, back of neck and behind eyes	Anorexia Constipation	Not inoculated against Enteric Widal - to B. Typhosus & B. Paratyphosus
W.G.B	22	M	30/1/12	3 days	11 days Lym	102.2°	4 th	96	84	Profuse eruption all over body including soles of feet & palms of hands. Rash lasted 14 days after admission	Headache. Pains in calf muscles. Pains behind eyes	Constipation Pain lasting 3 days down front of R. thigh requiring poultices	Inoculated against Enteric in 1909 Widal - to B. Typhosus & B. Paratyphosus
H.B.	29	M	10 Dec 1912	4 days Fever formed skin	10 days Relief Lym	103.4°	5 th	76	74	Rash appeared on day of admission. whole body covered.	Frontal headache Pains in limbs	Constipation	Inoculated against Enteric in 1911 Widal - to B. Typhosus & B. Paratyphosus
J.L.C.	23	M	14/10/12	3 days	10 days Lym Red-White rise	103°	4 th	108	94	Rash very profuse all over body including palms of hands & soles of feet. Rash lasted 14 days Tongue furrowed	Frontal headache Pains all over body Stiffness of all joints especially shoulder joints	Constipation Photophobic Insomnia	Not inoculated against Enteric Widal - to B. Typhosus & B. Paratyphosus
C.C.	24	M	9/11/12	3 days Severe Fever	11 days Relief Lym	103.2°	4 th	86	80	Rash present on admission. First appeared & more marked on legs. Tongue furrowed.	Frontal headache Pains all over body	Constipation Insomnia	Inoculated against Enteric Widal - to B. Typhosus & B. Paratyphosus
W.E.	26	M	20/12/11	5 days	13 days Lym	102°	5 th	84	76	Rash appeared on day after admission and lasted until a week after temperature became normal. Tongue dry furrowed	Headache Fore throat General pains	Insomnia Constipation	Admitted suffering from a boil on the abdominal wall, said to be caused by a fly sting. Inoculated against Enteric in 1907 Widal - to B. Typhosus & B. Paratyphosus
E.E.	25	M	23/1/12	4 days	13 days Relief Lym	102.4°	5 th	100	84	Eruption present on admission, more marked on thighs. Tongue white furrowed.	Severe frontal & occipital headache General pains Pains in calf muscles	Constipation	Inoculated against Enteric in 1907 No parasites in blood. Widal - to B. Typhosus & B. Paratyphosus

Name	Age	Sex	Date of Admission	Days ill prior to admission	Duration of fever and termination	Maximum Temperature	Day Maximum Pulse	Average	Rash and Tongue	Pains	Other Symptoms	Remarks
F.P.	25	M	2/12/12	7 days	12 days Crisis	103.8° 8 th	84	80	Rash present on admission all over body and limbs. Tongue white furled	Lumbar pain. Headache. Pains in back of neck. Pains in calf muscles	Photophobic Constipation Insomnie Abdominal pain	Widal - to B. Typhosus & B. Paratyphosus No Parasites found in blood.
R.J.	24	M	19/11/12	2 days	12 days Crisis	104.8° 3 rd	92	88	Rash appeared on 5 th day on chest, abdomen, legs, palms of hands & soles of feet.	Headache present. Pains behind eyes. Pain in back & legs. Stiffness of calf muscles.	Photophobic Insomnie Conjunctivitis	Widal - to B. Typhosus & B. Paratyphosus
F.C.	27	M	18/12/12	4 days	12 days Lysis	103.4° 5 th	88	84	Rash profuse. appeared first on arms on 3 rd day then legs & trunk. A few spots on face. Tongue moist - white furled	Headache. Pains in limbs & calf muscles. Pain behind eyes	Constipation	Five days before admission patient had a small boil on the fore arm said to be caused by the bite of an insect. Some Lymphangitis Widal - to B. Typhosus & B. Paratyphosus No parasites found in blood.
J.G.A.	20	M	23/12/12	3 days	12 days Lysis	103.6° 6 th	100	94	Rash appeared on chest & abdomen on 4 th day	Frontal headache. Pains throughout body especially in knee joints, wrist joints & small joints of hands.	Constipation	A few days before admission patient was suffering from a boil on the cheek & enlarged glands on the same side of the neck. Widal - to B. Typhosus & B. Paratyphosus No Parasites found in blood
J.B.	16	M	15/1/13	3 days	11 days Crisis	102.5° 4 th	70	64	A few spots appeared on the chest and abdomen on the 4 th day	Severe headache. Pain in lumbar region	Insomnie Constipation	Widal - to B. Typhosus & B. Paratyphosus