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<thead>
<tr>
<th>Title</th>
<th>Institutional epidemic of encephalitis lethargica</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author</td>
<td>Edington, Alexander Daniel</td>
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<tr>
<td>Qualification</td>
<td>MD</td>
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<tr>
<td>Year</td>
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Thesis scanned from best copy available: may contain faint or blurred text, and/or cropped or missing pages.

Digitisation Notes:

- some pages are not numbered; numeration of cases 11 to 16 missing in original.
Institutional Epidemic of Encephalitis Lethargica

by

Alexander Daniel Edington

B.Sc. M.B. A.B.

1925
Institutional Epidemiology of Encephalitis lethargica

Geographical Situation:

The magistracy division of Harat, designated Harat’s River, which I served in my official capacity as District Surgeon, a District Health Office is situated on the low uplands of that colony, approximately midway between the bushveld heights and the coast. The population consists roughly of 2000 Europeans, 2000 Indians, and 13,000 Jutes.

Meteorological Conditions:

The average rainfall varies from 40 to 60 inches per annum in different localities. This difference is due to the moisture laden wind that brings the moisture with which condenses in the form of rain upon the rising slopes, whereas, but the plateaus running inland are often quite dry, while a distinct two miles away may have a three days steady rain or mist.

These conditions cause the well-known “mist belts” between two of which Honrain lies.

The Village of Honrain:

The seat of the Resident Magistrate
has an altitude of nearly 4000 feet, its temperature varies from F. 17 to F. 106 in the shade and it is distant from Bantul 90 miles by rail.

The village may be described as a semicircle with the courthouse & attached gaol as the centre of the diameter, which is represented by the river Umgeni.

Stanitch Gaol: (Plan attached).

This institution in which the epidemic occurred has one European gaoler and 3 or 4 native wardens, more or less trustworthy.

During the period of the epidemic, which lasted four months there were no less than three European Gaolers in charge for varying periods, and their differing grades of intelligence and capabilities was remarkable.

The gaol was built to accommodate 23 prisoners of Bantus, Asiatics of mixed origin with 4 cells one of which was kept for females, another cell was kept for Europeans.

The cells occupied by the colored prisoners are infested with lice, but lice & fleas are unknown as cell prisoners are
examined on admission and submitted to energetic treatment before being allowed to enter a cell.

The floors (wooden) are scrubbed daily with a cresol solution, & the interior walls are whitewashed weekly with lime & daub, though, despite this, lice are found in the walls, but the ceiling is the main harborage of these parasites; since this epidemic we had been successful in keeping the gas that treated by hydrocyanic acid gas.

The accommodation power of this building had often to undergo severe stretching as we have had on occasions over 100 patients under lock & key, never less than 48 for the twelve months preceding this outbreak. Such a state of affairs was pre-eminentily suitable for the incubating and perpetuation of any epidemic.

The kitchen for a specific reason merits mention: the staple article of diet is maize porridge, and this is cooked in large three legged pots on a fire built into the hall, but a great quantity of smoke escapes into the kitchen blackening the walls, ceiling internally & door lintel.
I may remark that many adverse reports have been penned about the above condition, but the prevailing financial stringency precluded improvements.

**History of Epidemic**

On July 16, 1920 a发布 prisoner at Maimanga reported sick in the afternoon with a temperature 104. The patient a well tried and trusting man isolated him promptly. The only feature was a sharp attack of bronchitis on the third day. This quickly subsided and the patient was fit again in 10 days.

In August 2 more cases reported sick and a further case the following day. All other cases typical cases of influenza, the temperature ranging from 103 to 105.5. Smears from throat showed B. Pfeiffer & Pneumonia. They were all isolated and considered as having pneumonia. Dr. J. E. D. and Dr. J. A. P. thought it had to be handled promptly.

Twenty seven days later, four further cases appeared, there were evidently severe cases and reminded one of the pandemic which so severely affected the natives, but pulmonary symptoms were practically absent.
with difficulty they could stand either.

Still he was very drunken on attempting to walk. They were sweating so profusely that I asked the gardener why he had bathed them. Paul case 8 was the milder but all of them miltatated & depurated an unusually.

Adam case 9 a half bred or colored patient survived surely. It took nearly 5 months to recover. At this stage I began to look.*

Ascend at my diagnosis of influenza although I found B. Pfeffer in them all. Therefore sent samples of serum of all four for investigation of virid. both Felix and metriosis reactin. All were reported negative.

This made my diagnosis once again between the eyes.

Notice case 7 a July was the first to fix our attention; after a period of coma lasting seven days he began to take his food willingly when offered, but any attempt to move brought on violent convulsions of head neck & left arm. His Wasserman reactin was negative and a lumbar puncture produced clear fluid
under slightly increased pressure, lymphoepithelial sheen slight increase. Humoral function repeated on same patient did not relieve any of the symptoms.

Speech returned slowly & frequently at first many words were used others upset him immensely. The feature between which convinced me that we were now dealing with Encephalitis lethargica was DBsystasia with slight ptosis, the ptosis was markedly increased on making any effort. Myotonia of the left deltoid associated muscles was present.

During the month of September at varying intervals from other cases occurred, all of them suffered from delirium tremens.

I should here state that no beds were available, & one only nursing attendant had convulsions, & he had to "break in" and train as nursing attendant, and to anyone who has worked with new arrivals this will appeal. Solution was carried out as far as possible, the attendants and the sick being housed in different cells which were sprayed and washed out daily.
The large gaol of Portmaneypoint refused to accept any prisoners from our prison and I was told that my action in closing the gaol to new prisoners was unwarranted.

In my endeavours to limit the epidemic all prisoners had to undergo drill in nasal doucheing and gargling. The Department of Public Health advised me not to use prophylactic doses of any vaccine. During the month of October the third European gaoler, who was appointed permanently, through some excess of misguided zeal and lack of intelligence mixed some of the newly convalescent patients in the one large cell with the rest of the prisoners. In this cell they were very badly crowded.

My extreme displeasure seemed to astound this gaoler who looked upon my methods as disturbing to the ordinary routine to which he had been accustomed.

His attitude received a severe stricture from the magistrate and a further one from the Department of Prisons which made things much easier for me, but I could not succeed in my plea for a further change of gaoler.
The result of this man's chlorine experiment was interesting if disastrous, as within 48 days we had 13 sick in our hands all very ill with temperatures between 104.5 and 106, except one who was subnormal. All showed signs of cerebral irritation. Two died after a short illness, one 7 days, the other 2 days: this latter one showed great swelling of all the salivary glands standing out like melons. His temperature was subnormal throughout & post mortem it was found that the salivary glands only revealed Staphylococi.

Any attempt to stop the entry of fresh prisoners into the prison was attended by exaggerated criticism from the Department of Prisons. Prolonging any post mortem long wars might horrify our inmates, especially as those, who were on demand for High Court trials were carefully examined and found to be healthy and subnormal in temperature, were transferred to that institution, where they all developed serious illness, five of them died. One of our prisoners (he learned) died a few days after discharge.

There were many railway construction camps
in our district from these compounds I have treated members of every tribe in S. Africa but excluding the Congo, & Rhodesia, Nyassaland. Such a polyglot community made examination and interrogation a matter of difficulty.

This last sudden incidence of 13 caused me to transfer the hospital cell into the largest, but I had to insist upon the cell door remaining open all night much to the chagrin of our misguided gasters.

To add to our troubles, we were now blessed with a female prisoner who immediately developed a temperature due to influenza. Fortunately within three days I was able to isolate her entirely as she was fit within a day.

We then received a visit from an inspecting magistrate who was thunderstruck at our condition and as a result of his visit we encountered few difficulties from the central office. Two of our warders fell victims, one our chief was unfit to resume duties for over 3 months. After this we had occasional cases but chiefly among attendants or cooks, indeed the last few cases of the epidemic consisted solely of cooks and one of our convalescent
patients who was given duty in the kitchen developed a relapse, this was the only case of recurrence or relapse.

As all these cases occurred during the height of summer it was interesting to note how at the end of a hot day (100-104 in the shade) the temperature gallow showed an increase of about 2 degrees.

The last cases of this series showed a declining severity. Indeed resembled ordinary influenza.

**Etiology** The cases which constitute this series consisted entirely of male adults, ranging from 20 to 45 years of age. No information could be deduced from their ages, occupation or trade.

The disease is due to some unknown micro-organism, which cannot be found in either the blood or the encysted spinal fluid.

Infection is definitely demonstrated by the sudden incidence of a group of cases after submitting them to close association with convalescent cases.

One predisposing factor that was found was in the smoke of the kitchen which accounted for 5 cases and one relapse.

The nursing attendants (6) suffered.

Although I am unable to eliminate the tito
of bugs, yet attendants named elsewhere fell sick while other inmates did not.

Taking these preceding observations into consideration, we are entitled to presume that the respiratory passages constitute the chief source of infection, that any factor which might cause nasopharyngeal irritation, modifies the normal resistance to the passage of the virus (kitchen smoke). In this series of cases the early & latest individuals resembled ordinary influenza.

Clinical Signs & Symptoms

The manifestations of encephalitis lethargica are distinctly different from the classification of symptoms present great difficulties. The descriptive term "lethargica" refers to a definite apathy progressing on to lethargy, coma which is a frequent feature of the disease.

The classification as introduced by Marchand is comprehensive.

I. Cases of general disturbance of the functions of the central nervous system without localisation.

II. Cases of general disturbance of the functions of the central nervous system, but which in addition have various localisations in the central nervous system.
The mild or so-called abortive cases.
Onset: In most cases the onset is rapid without any premonitory signs. We had no cases which commenced with unconsciousness or apoplexy.

Headache is the most prominent early feature followed by stiffness and vomiting, usually when repeating with the temperature is high. This elevation of temperature is usually sudden. Rigors are not uncommon & profuse perspiration is frequent.

General malaise & asthenia is always present, associated in a few cases with neuritis of face or arm.

The mental state is frequently dulled & myoclonus is sometimes noticed early. Incoordination of lower limbs associated with tenacious grip is also noticed at the beginning of a few cases.

Incubation.

The incubation period as demonstrated to us was from 3 days upwards. 10 cases developed definite symptoms three days after exposure. 3 further cases developed two days later. These 13 cases we know were exposed to infection.
Symptoms in the Defied Disease:

The most constant feature was pyrexia (only two cases failed to show fever). Usually, the temperature was high (104° to 106°) the higher fever was not uncommon nine cases reached 107°. Coincident with this temperature, profuse sweating was frequent.

Respiratory System:

Increased rapidity of respiration was usually met with, but it was commensurate with the temperature. Pulmonary symptoms were noticeable by their complete absence.

Circulatory System:

The pulse rate was increased throughout. Soft cardiac murmurs were present in practically every case, especially in mitral or aortic areas. To begin with, we thought that endocarditis was developing, but all cases eventually cleared up during late convalescence.

Digestive System:

Vomiting was noted in 7 cases but it occurred early in the illness. Constipation was frequently present, but it certainly was not obstinate. The tongue was always coated with a
definite white fur which rapidly became thicker and darker. So definite was this that the mouth toilet & scraping of the tongue was a nursing duty specially attended to.

Only in one case were the salivary glands markedly swollen, this case showed no temperature.

Skin:

Owing to the dark pigmented skin, many rashes may have been missed, but oedema was frequent and later some desquamation. Hemorrhagic nasals were only noticed 4 times. One case showed intense impaction of salivary ducts of nose & adjacent cheek.

Nervous System

Lethargy in a variety of forms was seen, it varied from stupidity and apathy to definite coma was observed in 22 cases. Some patients answer questions very slowly, others showed irritation on being aroused while others lay comatose urinating and defaecating unconsciously. Two cases suffered from deafness, but so may say that cerebration is very slow
and the intelligence dulled.
Delerium was never wild only occurred
during the height of the pyrexia. No
definite hypothermia was noted.
Two definite cases of optic neuritis were
seen one healed completely but the
other healed with impaired vision.
Ptosis, myasthenia, strabismus, eclipsis
were all seen; two patients used to
hold one eye closed in order to see clearly,
these symptoms were always found when
the disease was established.
Complete facial paralysis was never
seen, but several cases showed unilateral
and bilateral paralysis.

Articulation: In two case the use of
wrong words was noted, one case found
difficulty in pronouncing the words
and almost stammered but he
healed eventually. Two cases slurred
t heir words badly.

 Twitching was noticed in facial,
elevators, spectral muscles yet was
also noted in the tongue. Myoclonus
was seen twice in abdominal muscles.
in the left barrel.

Sherrigh was present in two cases and one showed spasmodic contraction of the diaphragm without bicornus, his fits of any kind were reported.

The Parkinsonian type of features was not outstanding, but it must be remembered that we are dealing with natives, their features often become expressionless when they are ill.

The fustian gait was seen first when a patient in the bed was amusing with native laughter. Trying to reach the bed, he rose slowly to his feet, started unsteadily in his way, breaking into a fast trot, only to collapse. The author saw this in two other cases but it was not a symptom which he searched for.

One definite point is that no other similar cases of illness occurred in the district outside the gash.

Pathology:

...was able to hold postmortem examination upon both cases which died and was unable to find sufficient cause to account for death.
The internal organs were practically normal, the liver showed slight degeneration in one case. In both cases, the brain appeared congested, increased cerebrospinal fluid was apparent. No haemorrhages were demonstrated in the brain substance.

All blood smears were negative, and with 8 samples of blood culture was attempted without result. The same number of samples of cerebrospinal fluid rendered like result.

7 samples of cerebrospinal fluid were injected into 4 guinea pigs and three rabbits. Two of each were killed after a lapse of 6 weeks but no information was obtained.

19 different cases were lumbar punctured, in each case the fluid was under slightly increased pressure. In all lymphocytes were present, few other cells were found and we did not find polymorphonuclear leucocytes in abundance as we expected.

The spinal Wasserman reactions were tested for in 16 of 65 cases respectively and all were negative.
Diagnosis:

The diagnosis of Encephalitis lethargica presents many difficulties, although the typical symptoms encountered during an epidemic render it under such circumstances a matter of comparative ease.

During the initial stages the malady may easily be taken for influenza or typhoid, the latter may be excluded by blood test or blood culturing, but the exclusion of influenza depends upon the subsequent development of symptoms.

In the later stages there are many cerebral conditions with which it may be confused. Chief of these is Tuberculous meningitis. To distinguish these, examination of the cerebrospinal fluid affords useful evidence.

It may be confused with cerebral haemorrhage or cerebral tumour, including gangrene and here the difficulties are increased and reliance must be placed upon the history and spiritual sequence of symptoms.
Prognosis:

We are unable to give from this series the ominous outlook which the descripts, mainly beacuse a large proportion were mild cases, also because there is the unsurmountable obstacle of following up the after history of native convicts. It is also possible that the negroes many be less susceptible to the virus.

It has to be recognised that recovery is protracted and the convalescence tedious & extreme caution must be exercised in making any prognosis.

Treatment:

In the early stages when pyrexia and delirium are present salicylate quin and with phenazonium or bromide of potash are useful, where restlessnes was present chloral was helpful.

Urotropin has found to be of great service. It was interesting to note how master ordtvis remarked that it was "strong medicine" & suggested its use in certain cases.

Intramuscular injections of this drug were used but oral administration was found so satisfactory.
Summary. We are dealing with an infectious disease with an incubation period of three or more days. As the epidemic is circumvented by the gash males the infection is limited.

Absorption of the infecting virus is assisted by any factor which produces irritation of the respiratory (naso-pharyngeal) mucosa or by repeated inspiration of air polluted by exhalations from either patients or carriers who may be convalescent or recovered, hence adequate ventilation is indicated as a prophylactic measure.

The mortality was low approximately 10% nervous symptoms occurred in over 50% of the cases under review.

Lumbar puncture was not found to ameliorate any of the symptoms, but is useful for the purpose of diagnosis. The blood and cerebrospinal fluid give negative culture results bacteriologically and cannot transmit the disease to the animals tested.
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<thead>
<tr>
<th>Symptom</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>Headache</td>
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<tr>
<td>Furled tongue</td>
<td>43 ..</td>
</tr>
<tr>
<td>Pyrexia</td>
<td>41 ..</td>
</tr>
<tr>
<td>Malaise</td>
<td>38 ..</td>
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<tr>
<td>Vertigo</td>
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<tr>
<td>Lethargy</td>
<td>22 ..</td>
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<td>Seizures</td>
<td>16 ..</td>
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<tr>
<td>Unconsciousness</td>
<td>14 ..</td>
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<tr>
<td>Squint</td>
<td>11 ..</td>
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<tr>
<td>Rigor</td>
<td>9 ..</td>
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<tr>
<td>Constipation</td>
<td>9 ..</td>
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<tr>
<td>Placorse</td>
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<td>Romiling</td>
<td>7 ..</td>
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<tr>
<td>Paries</td>
<td>7 ..</td>
</tr>
<tr>
<td>Hypostagmus</td>
<td>6 ..</td>
</tr>
<tr>
<td>Hypothalamus</td>
<td>6 ..</td>
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<tr>
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<td>Myoclonus</td>
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<td>Speech asability</td>
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<td>Optic neuritis</td>
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<tr>
<td>Intentional tremors</td>
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<td>Submarginal stands</td>
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Temperature Charts:
showing mild influenza at commencement of epidemic
Station: Lions River
Name: Msimango
Age: 30
Sex: M
Race: Zulu

Date of reporting sick: 15.7.21
Date of coming under treatment: 16.7.21
Diagnosis: Influenza

Cured 25.7.21

Remarks:
Case 2
Form P.D. 94.

PRISONS DEPARTMENT.

TEMPERATURE CHART.

No.: 606
Sex: M
Race: Zulu

Date of reporting sick: 2.8.21
Date of coming under treatment: 2.8.21
Diagnosis: Influenza

Remarks:
Station: Limes Prison
Name: Jinderi
No.: 604
Age: 25
Sex: M
Race: Indian
Date of reporting sick: 1.8.21
Date of coming under treatment: 2.8.21
Diagnosis: Influenza
Result (date): 

REMARKS: 

TEMPERATURE CHART.

Day of Dis.
Pulse.
Resp.
Date.
PRISONS DEPARTMENT.

TEMPERATURE CHART.

Name: Masela
Age: 32
Sex: M
Race: Jule

Date of reporting sick: 2.8.21
Date of coming under treatment: 2.8.21
Diagnosis:
Result (date):

REMARKS:

Temperature (Fahrenheit)
**PRISONS DEPARTMENT.**

**TEMPERATURE CHART.**

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<thead>
<tr>
<th>Time</th>
<th>Bowels</th>
<th>Urine</th>
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</table>

**Case 5**

Form P.D. 94.

**Station:** Lions River

**Name:** Shupeni

**No.:** 582

**Age:** 31

**Sex:** M

**Race:** Xosa

**Date of reporting sick:** 3.8.21

**Date of coming under treatment:** 3.8.21

**Diagnosis:** Influenza

**Remarks:**

- **Temperature (Fahrenheit):**
  - 97°
  - 98°
  - 99°
  - 100°
  - 101°
  - 102°
  - 103°
  - 104°
  - 105°
  - 106°
  - 107°

- **Normal Temperature of Body:** 98°

- **Day of Dis.**
- **Pulse.**
- **Breath.**
- **Date.**
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<th>No.</th>
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<td>Homazke</td>
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Temperature charts showing pyrexia in cases demonstrating symptoms of Encephalitis lethargica.
**Station:** Leiros Peru  
**Name:** Mandrapha  
**No.:** 641  
**Age:** 23  
**Sex:** M  
**Race:** Zulu  
**Date of reporting sick:** 29.8.21  
**Date of coming under treatment:** 29.8.21  
**Diagnosis:** Influenza  
**Result (date):**  
**Remarks:**

**TEMPERATURE CHART.**

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<th>Time</th>
<th>107°</th>
<th>106°</th>
<th>105°</th>
<th>104°</th>
<th>103°</th>
<th>102°</th>
<th>101°</th>
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<th>99°</th>
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<tr>
<td>Urine</td>
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</tbody>
</table>

**Normal Temperature of Body:**
- Day of Dis.  
- Pulse.  
- Resp.  
- Date.
Station: Lions River
Name: Hotco
No.: 626
Age: 37
Sex: M
Race: Basuto
Date of reporting sick: 29.8.21
Date of coming under treatment: 29.8.21
Diagnosis: Influenza
Result (date):

REMARKS:
S deep emaciated
Station: Lime River
Name: Paul Lewis
No.: 612
Age: 29
Sex: M
Race: Guiana
Date of reporting sick: 29.8.21
Date of coming under treatment: 29.8.21
Diagnosis: Influenza
Result (date): 

REMARKS:
Station: Luis Ruiz
Name: Adam Lisoro
No.: 638
Age: 24
Sex: M
Race: Colored

Date of reporting sick:
29. 8. 21

Date of coming under treatment:
29. 8. 21

Diagnosis:
Influenza

Result (date):

Remarks:
PRISONS DEPARTMENT.

TEMPERATURE CHART.

Case 10

Form P.D. 94.

Station: Luois Ruiz

Name: Peto Masango

No.: 656

Age: 30

Sex: M

Race: Zulu

Date of reporting sick:
2-9-21

Date of coming under treatment:
2-9-21

Diagnosis:
Influenza

Result (date):

REMARKS:
Temperature charts:
showing pyrexia in cases which had been exposed to infection.
Station: Lions River

Name: Kotions Madhlula

No.: 743

Age: 30

Sex: M

Race: Zulu

Date of reporting sick: 24. 10. 21

Date of coming under treatment: 24. 10. 21

Diagnosis: Influenza

Result (date): 

REMARKS:
Station: Drim River
Name: Kiti Kthele
No.: 747
Age: 36
Sex: M
Race: Zulu

Date of reporting sick: 24.10.21
Date of coming under treatment: 24.10.21
Diagnosis: Influenza

Result (date):

REMARKS:

<table>
<thead>
<tr>
<th>Time</th>
<th>Bowels</th>
<th>Urine</th>
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<tbody>
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</table>

TEMPERATURE CHART.

<table>
<thead>
<tr>
<th>Temperature (Fahrenheit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Temp. of Body: 98°</td>
</tr>
</tbody>
</table>

Day of Dis.
Pulse
Resp.
Date.
Station: Limo, Peru
Name: Johannes Jacob
No.: 802
Age: 24
Sex: M
Race: Georgia
Date of reporting sick: 24.10.21
Date of coming under treatment: 24.10.21
Diagnosis: Influenza
Result (date): Wed. 2.11.21

Remarks:

Temperature (Fahrenheit)
- Normal Temp.: 98°
- Fever (Fahrenheit):
  - 97°
  - 98°
  - 99°
  - 100°
  - 101°
  - 102°
  - 103°
  - 104°
  - 105°
  - 106°
  - 107°

Day of Dis.
Pulse.
Resp.
Date.
Station: Lirao Princ
Name: Nikolai Shklabu
No.: 744
Age: 40
Sex: M
Race: Zulu
Date of reporting sick: 24. 10. 21
Date of coming under treatment: 24. 10. 21
Diagnosis: Influenza
Result (date):

REMARKS:

TEMPERATURE CHART.