This thesis has been submitted in fulfilment of the requirements for a postgraduate degree (e.g. PhD, MPhil, DClinPsychol) at the University of Edinburgh. Please note the following terms and conditions of use:

- This work is protected by copyright and other intellectual property rights, which are retained by the thesis author, unless otherwise stated.
- A copy can be downloaded for personal non-commercial research or study, without prior permission or charge.
- This thesis cannot be reproduced or quoted extensively from without first obtaining permission in writing from the author.
- The content must not be changed in any way or sold commercially in any format or medium without the formal permission of the author.
- When referring to this work, full bibliographic details including the author, title, awarding institution and date of the thesis must be given.
Beriberi on Christmas Island with special reference to diet

by

William MacDougall MA (Aber) MCHB (Ed.)
Contents

General Considerations
  Climatic, meteorology
  Terrain of the Island
  page 7

Population
  page 6

Cost of living, sanitation, water supply
  page 9

Types of the Disease
  page 16

Some theories as to cause of Beriberi
  page 23

Conditions prevailing in 1904
  page 33

Deaths from Beriberi in 1904-1905
  page 35

Admissions to Hospitals & Deaths
  1901-1905
  page 37
Probable Causes of death rate
in 1904 – Page 38.

Food supply at Hospital – 43

Food supply at Cootie lines
scaling sheds – 48

Observation dispensing – 49

"Curd Rice at Cootie lines" – 59

Observation with Curd Rice
to 30 Cooties at Hill
Cootie Lines – 61

Cases affected by Beriberi – 63

Portable Latrine Pits – 66

New Cases and Relapses – 69
Influence of Rainfall

Scurves and Brittany

Accumulation of affected

Recent observations on

Bribery and Curan Rice

Treatments

Appendix I Photographs

Appendix II Tables and Data

Index by topic

For month and year

1904 - 1907

References
Christmas Island is situated in long. 105° 49' E and lat. 10° 25' S. The situation is climatically considered strongly insular, being about 200 miles south of the Western part of Java. It is sheltered from the excessive rainfall of the East Indian Archipelago brought by the Easterly Trades which are greatly drained of their moisture by the time Java is passed. It is also outside the Cyclonic region of the Indian Ocean only one such storm being recorded since 1901, viz. that on 9th February 1904.

The highest temperature recorded was 94° 1' on 25th January 1903 and the lowest, 66° 9' on 16th September 1902 - a range of 27° 2'. The mean annual temperature is 80° 9. The mean is under 80° in the three months - July, August, and September, but is about 80° during
the other months of the year.

The greatest variation of the temperature of Christmas Island is 20° or thirty, and the least about 5°.

Wind:—The most frequent wind is from the East or South East and may be said to blow fairly constantly for about 9 months. The wind falls to its minimum force in January, February, and March, and it is during these months that storms from the North West are expected. These NW. winds having traversed a vast stretch of ocean, bring heavy rains with them.

The Climate of Christmas Island has been described by Dr. Carl Andrews, as being "both pleasant and healthy," the weather being during the greater part of the year much like that of a hot, dry English summer, tempered nearly always by a steady sea breeze from the E.S.E. Which is generally fairly cool, and keeps the temperature very even day and night.
Mean Temperature in °F. = $\frac{\text{Max.} + \text{Min.}}{2}$

<table>
<thead>
<tr>
<th>Year</th>
<th>Jan.</th>
<th>Feb.</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1901</td>
<td>40.4</td>
<td>48.4</td>
<td>47.4</td>
<td>45.3</td>
<td>50.3</td>
<td>51.3</td>
<td>50.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>1902</td>
<td>52.3</td>
<td>39.7</td>
<td>41.6</td>
<td>52.2</td>
<td>51.6</td>
<td>51.1</td>
<td>46.7</td>
<td>54.3</td>
<td>50.0</td>
<td>51.4</td>
<td>51.0</td>
<td>50.9</td>
<td>Mean</td>
</tr>
<tr>
<td>1903</td>
<td>52.9</td>
<td>44.5</td>
<td>52.8</td>
<td>51.4</td>
<td>50.9</td>
<td>51.3</td>
<td>50.6</td>
<td>50.0</td>
<td>48.6</td>
<td>50.0</td>
<td>51.5</td>
<td>51.2</td>
<td>Mean</td>
</tr>
<tr>
<td>1904</td>
<td>51.1</td>
<td>50.3</td>
<td>51.7</td>
<td>50.0</td>
<td>55.7</td>
<td>59.6</td>
<td>54.0</td>
<td>56.0</td>
<td>56.6</td>
<td>50.6</td>
<td>50.0</td>
<td>50.0</td>
<td>Mean</td>
</tr>
<tr>
<td>1905</td>
<td>50.0</td>
<td>50.0</td>
<td>52.5</td>
<td>52.0</td>
<td>51.7</td>
<td>52.2</td>
<td>54.0</td>
<td>52.0</td>
<td>52.1</td>
<td>52.3</td>
<td>50.7</td>
<td>50.9</td>
<td>Mean</td>
</tr>
<tr>
<td>1906</td>
<td>52.7</td>
<td>46.2</td>
<td>52.0</td>
<td>51.5</td>
<td>50.1</td>
<td>50.2</td>
<td>52.0</td>
<td>51.5</td>
<td>54.4</td>
<td>54.2</td>
<td>52.3</td>
<td>50.9</td>
<td>Mean</td>
</tr>
<tr>
<td>1907</td>
<td>51.5</td>
<td>50.0</td>
<td>51.4</td>
<td>51.3</td>
<td>50.5</td>
<td>55.5</td>
<td>54.3</td>
<td>56.1</td>
<td>52.0</td>
<td>51.7</td>
<td>50.0</td>
<td>50.8</td>
<td>Mean</td>
</tr>
</tbody>
</table>

Monthly Rainfall in Inches

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1903</td>
<td>4.4</td>
<td>0.6</td>
<td>0.3</td>
<td>0.5</td>
<td>1.0</td>
<td>1.6</td>
<td>1.0</td>
<td>1.9</td>
<td>1.0</td>
<td>1.1</td>
<td>0.9</td>
<td>0.1</td>
<td>8.9</td>
</tr>
<tr>
<td>1904</td>
<td>2.1</td>
<td>1.8</td>
<td>0.9</td>
<td>2.0</td>
<td>1.5</td>
<td>2.0</td>
<td>1.0</td>
<td>2.0</td>
<td>1.0</td>
<td>1.5</td>
<td>1.5</td>
<td>0.5</td>
<td>11.8</td>
</tr>
<tr>
<td>1905</td>
<td>0.0</td>
<td>0.7</td>
<td>0.8</td>
<td>0.7</td>
<td>1.5</td>
<td>1.2</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>10.4</td>
</tr>
<tr>
<td>1906</td>
<td>1.0</td>
<td>0.3</td>
<td>0.2</td>
<td>0.5</td>
<td>1.0</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>10.5</td>
</tr>
</tbody>
</table>

Days of Rain in : -

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1903</td>
<td>4</td>
<td>1</td>
<td>9</td>
<td>22</td>
<td>6</td>
<td>13</td>
<td>4</td>
<td>9</td>
<td>14</td>
<td>18</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>1904</td>
<td>4</td>
<td>12</td>
<td>11</td>
<td>22</td>
<td>15</td>
<td>16</td>
<td>7</td>
<td>17</td>
<td>15</td>
<td>17</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>1905</td>
<td>3</td>
<td>11</td>
<td>13</td>
<td>14</td>
<td>16</td>
<td>10</td>
<td>9</td>
<td>14</td>
<td>7</td>
<td>15</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>1906</td>
<td>11</td>
<td>10</td>
<td>16</td>
<td>17</td>
<td>15</td>
<td>10</td>
<td>14</td>
<td>17</td>
<td>18</td>
<td>13</td>
<td>15</td>
<td>16</td>
</tr>
</tbody>
</table>
I have not the records for 1907-8 but the year 1907 was a dry year, the total rainfall being about 66 inches. The year 1908 to August was wet, over 80 inches having fallen when I left the Island.

Christmas Island is about 30 square miles in extent, but has not yet been completely nor accurately surveyed. It rises to about the height of 1100 feet at its highest point, rising abruptly from the sea level to the Central Plateau on the left. It is irregularly covered by great trees and tropical undergrowth except where clearing has been done. There are no swamps anywhere on the Island and the Anopheles mosquito is unknown. The Island was leased to the Christmas Island Phosphate Co. Ltd. in 1897 and in 1899 the first barges of Phosphate were shipped.
Soon after the Company began operations in 1878, Beriberi broke out amongst the Chinese Coolie Labourers. For 10 years before this time there was a Malay Settlement on the Island consisting of a few Andon negroes of the Coast Kachip Islands and a company of about 35 Malayo Javanese, engaged in the cultivation of Coconuts, Palms, Coppers, Javanoes, &c. There is no record of any Case of Beriberi having occurred until the arrival of the Chinese Coolies.

Cook's House was built on the shore at Kupi Point near on the North west aspect of the Island, but the house was ill built and overcrowded, so soon the House became unsanitary. The Water Supply was obtained from wells sunk behind the Settlement. The water was of fair quality, but contained too much Chlorine, and was presently discoloured. The Supply was insufficient.
No qualified Medical man was appointed until 1900 and it was not until April 1901, when DR Fiddly was appointed Medical Officer, that proper records were kept. As will be seen from the Table appended, Beriberi was at that time of the nature of a Scourge.

In 1901 there were 229 deaths from Beriberi alone - the constant cause of death of the population being then only 5,000.

In 1902, 96 deaths from Beriberi occurred.

In 1903 = 60

In 1904 = 92

In 1905 = 12

In 1906 = 17

In 1907 = 5 and in 1908 = 7

(6 July & August)

Population

The population which has been fairly constant for the past three years number 1150 and consists of

1. Cookies
   1. Smiths
   2. Lautahis.

2. Inkango (Carpenters, Blacksmiths, Vitudum - a Captain Clerk Cookie)
(3) Cocks.
(4) Mandoes or Weaver.
(5) Heat men.
(6) Syllam Boys — Europeans' Servants.
(7) Europeans.

Europeans number 16.

Chinese: 1050
- Cantonese
- Khocks
- Hok. Kins
- Immigrants

Malays: number about 30.
Sikhs (Police & Watchmen) = about 40.

The new comers (Si Kocks) are obtained
from Singapore. New Depot keepers.
They are all new comers to Singapore.
also, being brought in Colle vessels from
Rangoon. The labour on Batavia
Island is Contract Labour. The
Contractors select the locals who
are carefully examined by a
Doctor & those selected have thir
Contracts ratified and signed by
a Government Official at the Chinese
Protection at Singapore.
The contractor provides the apprentice with a suit of clothes, shoes, blanket, food and a certain amount of tobacco. The Phosphate Company provides sleeping, medical accommodation, hospitals, medicines, medical offices and dressers on arrival at Christmas Island. The clothes are all carefully examined by the Doctor who rejects newly or in any way unsuitable men. Those returned to China at the election of the Company. When the apprentice has worked for 300 days he becomes a handker or Contract expired man and may elect to stay on at higher wages or he may return to Singapore. As will appear it is amongst the apprentice particularly that Brilir is ripe although all working costs are liable to get it. Influenza or antiague seldom contracts the crew. Cooks seldom get it. Boys never. Contract Brilir or Malay soldier.
I have never seen any sign of Tabilui among Europeans & have only had the case among the Sicb population.

Mr. Durham suggests that Mr. Clarke the District Officer on the Island in 1802 himself observed the disease - a statement which I think is sufficiently

doubtful.

The Military Houses at the Settlement of Duyi Foih house, consist of Twenty nine houses arranged in a street. Each house is separate from the other by a distance of twenty five feet. The site is airy, dry, & near the sea - about 60 yards from the shore cliff edge. The ground consists of fissured Coral limestone rock incompletely covered by soil and natural drainage is good. There is no standing water seen after the heaviest of rains.

There is a cement door to each house which is raised on wooden piles, so that the ground floor
CROSS SECTION

END ELEVATION

FRONT ELEVATION

Floor Level

Ground Level
of the houses are off the ground by a distance which varies from about 14 feet on the upper storey to about 8 feet on the lower storey that next the sea.

The floor area is 36 feet x 16 feet and height to middle of roof is 11 feet. The walls are of wood & the roof of double attap. The outside walls are tarred once every 12 months. The windows are whitewashed every 6 months & I have recommended that they be whitewashed more frequently.

Along the fronts & back of the houses (depending on the site of the street) runs a well built amount drain.

At the front elevation of the house (or also at back) and for a short distance at the end the walls do not reach the roof. The bottom of each wall does not quite reach the floor thus being an air space of from 6 to 9 inches at each board
of the flooring is separated from the collar by a人社ible interval. This choice together with the very considerable distance between the floor and the cement base keep the air in constant circulation and naturally fresh and sweet.

Each house was built to accommodate 21 men, but so far as I know I never allowed more than 17 men to sleep in a house.

The houses are only used for sleeping or resting in, the food is taken there. The kitchen is only provided with two stoves and kettles.

There are cellular quarters of similar character on Phosphatic Hill - about 900 feet above sea level for the accommodation of 250 men.

The accompanying illustrations show help to Selimiye.
Sewerage:

Latrines - Three large latrines are provided for the "Settlement" Cookie lines and two for the "Hill" lines. These are flushed out and disinfected with Jeyes fluid daily. Each pan is emptied into the deep water at the cliff edge, which then flushed and disinfected. On the hill the pans are emptied into the incinerator, where all solid refuse is reduced to ashes. At the Settlement, all solid refuse matter is emptied into the sea which is at the cliffs, about 10 fathoms deep, and less than a quarter of a mile out, is over 100 fathoms deep in the channel, there is found little else than fresh water. These are flushed out freely every morning and disinfected with a strong solution of Jeyes' fluid.

Each Cookie house is washed out daily and four Cookie houses are washed and disinfected with Jeyes' fluid daily.
The Malay quarters, situated at the other end of the bay, are similarly treated.

The patients are washed out & sprayed with disinfectant once a week;

in tents out daily: the bed boards are

also sprayed with Jacid Fumit (or a solution

of perchloride of mercury or mercuric

acids)
every day.

I wish to emphasize the excellence of the sanitation of the Island.

In view of the fact that Leptospirosis has been ascertained at a specifically infected surrounding or to Diet, one kind or another.

The Banan District Officer of the Islands has informed me that the arrangements for cooties, as to houses, sanitation, pond to ear the best they have ever seen and as these cooties have had larger redness y Cooie

known in the Federated Malay States

amongst the unhappy among sugar

& rubber plantations, their words are

of considerable value.
I myself have experience of Chinese living in the Singapore area and know that certainly these cannot compare for general cleanliness with the Christian Hind livings.

The present Chinese living have been in residence for nearly eight years now. They were built at the time of the very severe outbreak in British in 1901.

Water Supply-
For the first few years water was obtained from wells behind the European Settlement at Flying Fish Cove. The supply was limited and the water at times a little brackish. This supply is still in use but is now only used to supplement the pumping supply to the Chinese.

For the past five years a good and plentiful supply has been obtained from Springs on the East Side of the Island, whence it is pumped to settling and distributing tanks near the settlements. There is no limit.
to the amount the coals may be
at the bunking tanks, which are
opened at 5 p.m. every evening
and during the loading of ships, also
at 11 A.M. The coals do not
heat in the tanks, but throw the
water over them by means of "choppers."
About 30 gallons per day per
man are allowed for all
purposes.
The water is somewhat hard, tho'
percolating through the sediments, but
is of very high quality — the
report of the Government Analyst
in Singapore stating that it is of the
highest grade of Potable water, containing
no impurities.
The various tanks and collecting reservoirs
are kept scrupulously clean
so as not to furnish any of the medical
officers to see that water supply
sanitation are in the best possible
state of efficiency.
Bernani may be regarded as the chief disease of the Malay Peninsula and archipelago. It is also found in Burma, Assam, China (mainly confined to sea ports), Japan, the Philippines, Formosa, West Africa, West Indies and Brazil. It is fairly frequently seen in the larger European ports, but always those having a close connection with the East.

The symptoms very greatly for convenience several clinical types are described.

1. The Remittent form - Measles of the Disease is very gradual and the patient hardly inconvenience at all. He may have a slight feeling of "ill-being", slight gastro-intestinal disturbance, palpitation, or he may take more than accustomed for food. There is rarely headache.

He then begins to have a feeling of weight in the legs, a more pronounced diminution of locomotion, or any kind, he tires quickly of his palpitation and the heart. There is also a complaint...
of pain or uneasiness in the thighs,
numbness which may be due either to
the stomach or to the heart.

Numbness of the feet is complained of
gradually increases. The joints of
the forearms are also affected in the
same way, in many cases.

There is slight cyanosis of the
skin, a sensation of tingling in the
nerves of the calf, especially, is noticed.

so that on squeezing these muscles
the is a considerable (not varying)
amount of pain.

There is also frequently a diminution
or loss of the knee jerk at this
stage in this form, but at the
very start of the disease there is
generally exaggeration of this sign.

There is generally also a slight
amount of Edema of the
legs, which disappears in a day
or two under treatment.

Pain has often been described as
an initial symptom of E.P.V.

Gerard of the Pressed Malay Vale
Civil service is incident on this symptom, which he finds in about 50 per cent of his cases. Schmade & others also describe febrile & catarrhal symptoms. It is to be remembered that Edward's observations are made on a country where Malaria & filariasis are worst are nile. There is no malaria in Christmas Island although there are a few cases yearly of a slight fever lasting about 48 hours. There are about 20 such cases annually. I have not observed them as a symptom of Beriberi.

Of our 800 cases observed, 40 cases showed a rise of temperature, which passed off within 48 hours. All other cases showed no initial fever, & I therefore conclude that initial fever is not a constant symptom of the disease. The case on Christmas Island came to
The doctor in the highest locations.

The doctor attends at the dispensary

gets patients at 6 AM and 8 PM
to see and admit to hospital if necessary.
New cases, he sees the very start

of encephalitis symptoms. And it is
at the beginning of this form

that most of the Christmas Island cases are caught.

The prognosis of this form is very favourable.

The Atrophie Form — generally

begins like the Ruminicentary.

The weakness of the legs increases

quickly rapidly in the hands

and arms generally become affected

with paralysis. The body, face

posing, tongue and face may become

affected. There is great

sensitiveness to pressure of the

muscles. The paralysed

limbs become greatly emaciated.

There is drop foot and drop wrist.
There is no oedema.
Atigabie Bawule - Durbar N. 4. Doctors c 6 months.

Same case at 12 yrs 18 months.
(At Hospital 3½ years.)
is weakness of the heart & palpitation on any exertion, but it is not serious & heart failure need not be feared.

The patient may lie almost useless for years, but recovery takes place slowly & gradually. I have seen cases which lay almost waste for 2½ years & at the end of 3½ years was sent back to China able to walk slowly with the aid of a stick if it is true, but able to look after himself.

A photograph of this case is shown after he had been in hospital about 18 months & at 2½ months (example page). The prognosis in this form thus far is good; favourable provided always that in his general weakness, some other disease does not attack the patient.

The 'jet' form: In this form there may be no paralytic
symptoms. This is always edema beginning generally in the lower limbs but spreading rapidly until the whole body is affected. The patient presents a bloated swollen appearance. There is effusion into venous cavities of the pericardic are always anisms an excess of fluid. There is palpitation of the heart. Distress of breath. Weakness and discomfort at the side of the chest. Frequently vomiting - a bad symptom. There is no albumen in the urine but there is a great diminuition in the amount excreted as in the amount of urine excreted. The disease may remain in this state for a week or two, but if the patient is to get better, a great secretion of urine begins - absorption takes place everywhere in the patient becomes easy and comfortable. This is noted that the legs are wasted thin or weak as in the Atrophy
The prognosis in this case is much grave and at least 20 per cent die.

IV. The Acute, Pernicious or Cardiac Form:—

Edema may now appear at any time. Heart symptoms prevail—palpitation, oppression in the chest area, vomiting is common. Shortness of breath which goes on to a condition of great distress. The eyes become an unusually wide open; the pupils are dilated; the whole aspect one of great anxiety. Then an increasing pain, palpitation, oppression in the chest area, and in the stomach. The pulse from being at first full and bounding becomes thin and small, rapid until it is incompressible.
The face becomes cyanotic, the limbs cold, & death ensues.
It is seldom that recovery takes place in the cardiac form:
for at any time the 'Hil' form may become cardiac & death is the result.
The great majority of the deaths which occurred in 1807-1808
(n. 1807 all cases) were of the acute cardiac type. Reference will
be made to this later.
The above classification is that of Schembechler which appears to me to
be useful, rational & correct.

Some theories as to cause of the disease:
1. Manson's view is that it is a gum disease: that the gum resides in the
pit or in the houses and surroundings of Beriberi spots; that it thus
distributes a poison which, on being absorbed by man, produces neuritis.
This is the same way that alcohol does:
ke soil or surroundings are the injected
medium: the man residing on or in those is poisoned, not infected.

The germ is in the soil, house or ship and produces some kind of toxin. There is this toxin, being inhaled or swallowed, by the man, produces in him a specific reaction."

15. Here an epidemic from a specifically infected surroundings. On pages 9-14, I called attention to the sanitary arrangements, etc., to those who have passed this section.

In view of this, it is not improbable that Manson's view is the correct one.

2. Hamilton Wright states that it is due to a specific organism that remains dormant in certain localities but having gained entrance to the body by the mouth it multiplies locally (in the stomach or small intestine chiefly), gives rise to a local lesion and produces a toxin that, gaining the general circulation, acts on the peripheral termini-aetiologia of both affright and affright ordinary and alike neurons because a
bilateral symmetrical atrophy, and that finally the organism escapes in the pieces to live again amongst misplaced. He looks upon Beriberi as an acute infectious disease, of a short period, numbing, which runs a definite course of 3 to 6 weeks, leaving the patient paralyzed. The symptoms belong Post Beriberi Residual Paralysis, which persists after the specific virus has ceased to act.

H. Bright stated that he had isolated the germ of Beriberi which lies in the pyriform end of the stomach and duodenum. He attempted inoculation experimentally and post mortem, which failed. He always found a scar of esophagus in the stomach and duodenum a month this characteristic to Beriberi; it is common to find the carotid in the post mortem room among all the patients who have died, have died with acute gastric and cardiac symptoms giving rise to vomiting and diarrhea, these facts probably accounting for the hyperacidity. In many cases the whole stomach is

...
tract is swarming with parasites — notably the round worm & Co.,
frequently found a considerab. degree of congestion & redness for the
whole length of the intestines.

The fact that it is always acute cases
as a rule or those chronic cases which
take on an acute form, makes it
probable that the acute & congestion
are due to vomiting rather than
to a specific germ. Hamilton

Knight nor any cannot have had
any opportunity of examining on
the first modern table a sample

Peruvian form. At all events
this is reason to doubt that the
infection "indicates beyond all doubt
the local action of a specific organism.

Knight also indicates that Bubier
is a "real" disease, but the condition
prevailing on Christmas Island will
hardly bear this out, and Braden
has shown that Yami, noticeably the
Atlantic tribes in the States, rarely if
ever contract the disease from this cause.
3. Durham’s Theory - suggest that Bubal is communicated from Farms to Farm more or less directly or through Families as an actual Infection.

That this Infection is not of the nature of a Reptilacercus (paras at Post mortem, organs found sterile) but to a Surface condition about the upper air passages. From the observation of the throats of a number of patients it is conjectured that the redness which is seen

Helm., especially in Early Cases, may be intimately connected with the Disease .... The second cause

support this (as e.g. Myelitis + Diphtheria) also the prominecy of the new Corns to Suffer.

In the case of such a disease one would expect to see the symptoms, which is not the case in Bubal.

St. Peterkaring and Wurthe found case of various kinds of some Cases Baccilli to those same they
assigned the cause of Beriberi. The results of experiments upon animals were unsatisfactory and unconvincing and the animals either gave no evidences of neuritic symptoms, or if they did also gave types of other disease - abscesses or other infective diseases. This is the common experience of all those observers who have attempted to create Beriberi in animals by means of culture inoculation. Blood serum experiments have also failed.

Dr. Gerard in his Essay on Beriberi states that he believes that the bacillus causing the disease is got from the blood of acute Beriberi or was got by him allus; that absolutely isolated - because of the imperfect methods employed.

I am credibly informed by Mr. Allan late District Officer Christmas Island and a personal friend of Dr. Gerard that Dr. Gerard has given up his belief in the above thing.
The following are Yokocho Hiyoshi:

The following are Yokocho Hiyoshi:

Okiyo no (1983)

1984

1236

1236

883

892

563

5545

30

33

46

49

2.64

3.96

S. Shinozuka Seminar Report on Yokohama —

a Survey of Athletic Plans. — The Rise

of the Shanghai Municipal Police

in the Mid-1930s

— A. Ishii, skilling the place in

the city, as they were an important

part of the police force, and their

activities were considered vital to

the city's security.
<table>
<thead>
<tr>
<th>Year</th>
<th>No. Cases</th>
<th>Administered</th>
<th>Deaths</th>
<th>Cases New</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1884</td>
<td>718</td>
<td>209</td>
<td>8</td>
<td>1.11</td>
<td></td>
</tr>
<tr>
<td>1885</td>
<td>41</td>
<td>25</td>
<td>25</td>
<td>nil</td>
<td></td>
</tr>
<tr>
<td>1886</td>
<td>3</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
<td></td>
</tr>
</tbody>
</table>

And during that date Barihas has been abounded from the Japanese army or heretical reed. Nearly the number died: the percentage of the force affected by Barihas = 0.04, 10 cases in 11,000 on the average.

6. Bradford's Theory — That Barihas is due to a poison conveyed in Rice, that this poison is generated in or upon the raw grain (padi), by some agent which grows with, or subjugates, attacks it; which is able to spread not only upon the living corn (as Epiphraga or parasitae) but also in the separated seed, or Rice, as Sporopha. Therefore it follows that Rice, if properly protected from free of the fungus, would be harmless & if properly protected could remain so.
but if contaminated in any way
might become Toxic.

all raw Rice (pari) derived from
or used in areas where Bacillus
occurred hence liable to be
Toxic.

Toxicity depends on:

1. Quantity and virulence of the germ
   officially present in the Padi.

2. The manner in which the raw
   Grani - organisms & nutrients
   light standing - mumps and
   darkness favouring growth of
   mould or fungus.

3. Age of Grani - The fungus, or
   its toxins increases per time.

   a. Mode of preparation of Granie
   from Pari.

   b. Storage of rice after cleaning.

   c. Length of storage of Rice
      after cleaning.

Three kinds of Rice used:

1. Fresh Grani newly stripped
   with envelopes Approprated
   for daily use. It is hulled.
by lightly pounding in a wooden mortar, immersed inverted before cooking. Then the starchy layer is destroyed - therefore not procissible.

2. "Uncurred" Rice (bran). This is the original white "jain" or "random" rice used in Malaya. It is entirely stripped of its nutritious starchy layer also to a greater extent than in the "Irish" variety. It has been exposed to no preserving process; therefore it is "uncurred." It is unpared or unashed therefore it is a food for any poison or fungus.

3. "Curried" Rice. This is first soaked and parred in the husk but not the seed. Due it is hullled. It is then steamed and the starchy layer is retained.

Bradford's statement is that "uncurred" rice gives rise to Bubri - Curried rice does not.
At the time of my arrival on Christmas Island the Rice Theory as long in the forefront was in abeyance. The authorities seemed to be agreed at least on this that Rice eating was not the cause of Beriberi. I therefore allowed Rice as part of the Hospital diet. There seems to be good reason why patients should not get this almost easily digested food.

The Rice supplied to Hospitals & to "working cookies" is the ordinary "Siamese" or white Rice of Malaya & is the same as Bradden's "uncured" variety. But the death rate did not diminish but rather increased until the month of October 1904 and I was almost in despair as to what to do.

I recall the excellence of the Sanitarium conditions on the Island, the good and abundant water supply. I am satisfied that the error for the increased sickness death rate, lay...
outside things sanitary. Thus 16 (160)
no overcrowding in the houses, for
although each house was built for
21 sleepers. It is to be remembered that
there is also a continuous circulation
of fresh air through the house) I
limited the number to 14 and
allowing for hospital patients from
this number there was not often
more than fifteen men in each
house over all.

At the close of October J. F. Chapman
came to the Island as District officer
from Negri Sembilan J.M.S. to him,
when he found the State of affairs as
regards Beriberi, informed me of Dr.
Brand's views. He Sant Lunard,
while was the cause of Beriberi and
that Indian (Negapatan) Rice
was harmless to cooks.

On November 4th I changed the
dieting cutting out Rice altogether
and almost immediately a great
improvement occurred.

There was a death (1818) on the 5th,
another or the 6th, also on the 7th and 15th. — Their cases being beyond hope in any case — a after that not another until January 18th, 1905.

Deaths from Berilin at C. Island 1904 and 1905.

<table>
<thead>
<tr>
<th>Date</th>
<th>1904</th>
<th>1905</th>
<th>1905.</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>7</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>February</td>
<td>10</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>March</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>April</td>
<td>12</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>8</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>3</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>9##</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>August</td>
<td>12##</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>September</td>
<td>8###</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>October</td>
<td>14</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>November</td>
<td>4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>December</td>
<td>-</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>92</td>
<td>12.</td>
<td></td>
</tr>
</tbody>
</table>

Exactly the same addicts travelled as to work, sanitation, was strictly in 1905.
in 1904.

In September 1904, I was surprised to see sleeping mats might have done some harm in the disease; therefore all patients' mats were burned and each man got a new one from the Phosphale Company. As patients came to hospital after that, the mats were sprayed by the doctor or myself and any who least bit dirty were washed and a new one given out. Should the mat happen to be new or clean—it was disinfected by steaming in a solution of perchloride of mercury—washed and aired in the sun. This method of mat distribution goes on still.

The burning of the mats did not decrease the death rate at all.

Brandon has pointed out the fact well known to officers in the Tients, that the Tamil is the more susceptible of the two races; he indicated that were the disease in any way the result of Diet or infection, the Tamil, as
The lives in Malaya can not possibly escape it. But the Tamil does not yet Britishise quite as his British surroundings and manner of life. So long as he eats Curd or Patrailed Rice.

The following tables give the results obtained on Christmas Island—the later results being due, in greater part at least, to a rice-fee deemed in Hospital.

<table>
<thead>
<tr>
<th>Year</th>
<th>Admissions to Hospital</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1901</td>
<td>680</td>
<td>229</td>
</tr>
<tr>
<td>1902</td>
<td>693</td>
<td>95</td>
</tr>
<tr>
<td>1903</td>
<td>591</td>
<td>60</td>
</tr>
<tr>
<td>1904</td>
<td>943</td>
<td>92</td>
</tr>
<tr>
<td>1905</td>
<td>544</td>
<td>12</td>
</tr>
<tr>
<td>1906</td>
<td>370</td>
<td>14*</td>
</tr>
<tr>
<td>1907</td>
<td>269</td>
<td>5*</td>
</tr>
<tr>
<td>1908</td>
<td>200</td>
<td>4*</td>
</tr>
</tbody>
</table>

* Three (3) Cases complicated by acute dysentery and one by acute Bright's Disease.
The Colli population in 1901 averaged about 800 as a constant population. In 1908 there were from 960 to 1000 working colliers. Shitahs and Kautahs engaged in the mining, shipping etc. of phosphate & lime.

The death rate among Contractor's Colliers in 1901 according to the government report was 475.57 per 1000 per annum. (Golol Population)

The death rate per 1000 per annum in 1907 was 12.274. The death rate per 1000 Contractor's colliers only was 13.44. The average month of these being throughout the year 1893.

The year 1904 from the first January to be a bad year. There were 30 deaths up to the middle of April when I took charge, with increased cases incidence over the previous year.

During the months of April, May, June & July a large number of sickies were sent down from Singapore wishing to keep alive the numbers of admissions.
This year extended their labours greatly, growing a large quantity of potatoes over the output of 1903. A large amount of jungle clearing, home building, road-making, was begun and more cooies were required. In consequence of the great demand for cooies the class grotic so to physique it was poor. Many of those who arrived in the mid months of 1904 after never to have been sold to the Island. Being at that time unacquainted with the Chinee cooies or with the condition of life prevailing, some were returned as undesirable.

Another point is that many men were working on the hill who ought to have been admitted to hospital - the reason being that when they were admitted it was with well marked Bacilli + in many cases they were admitted only to die.

I am very associated with Dr. Siddy
for a few days before he left the island we saw nearly one hundred outpatients daily including perhaps 20 or 30 who complained of Berlei symptoms. Many of these showed little sign of the disease and Dr. de Witty led me to believe that the men were probably malingering. As a result, I am afraid many cases of true berlei in the initial stages were sent away, to develop the disease rapidly, to be admitted at a later period with their suffering greatly increased by many cases to die. For four years now I have believed the condition when he mentioned "numbness" terminus in the legs discomfort in Epigastrium loss of appetite etc whether he was telling the truth or not he was taken into hospital and treated there for at least three weeks. There is no doubt many
am actively in the art of malingering. Especially the opium smokers,
and doubt many were treated as
Bilirini cases who were of this class,
but it paid well in the end. As
I indicated above, we see Bilirini
in the very first & few on Christmas
Island - a time when it is extremely
difficult to say whether the man is
ill or not - & when one must
be a good judge when backed
by the nature of the disease -
and I承认 it is the duty of
a Medical Officer situated as I
was, to admit these cases to hospital.
The local managers of companies
are frequently a source of trouble -
they must have men & object
to the admittance of apparently
trivial complaints into hospital.
I have not had this experience -
but I know that in many instances
in the States, when the hospital
is in charge of native doctors
are visited occasionally by a
Doctor, that the manager practically
made, who is to be admitted to the
cases are to be discharged from
the hospitals. This sort of thing
occurred on Christmas Island
at the latter part of 1901 during
the absence in Singapore of Dr.
Giddie, when the then manager
discharged 60 men from hospital
many of whom were only able to walk
a short distance. From:
H. W. on enquiring into heart symptoms,
A good man was discharged.
The error of course was disastrous.
Since 1902 there has been no
danger of any such proceeding.
The conditions, then, in 1904 were
not favourable to many
new-comers. Too bad work
or much Sunday work at the
debarking-point, so that the crews
did not get sufficient rest; food
poor, in quality and quantity, the
consequently — all these tended to
keep up the death-rate.
Since 1904 this has been great.
and steady improvement. The death rate has fallen to less than 2% of the cases treated. The cases themselves have diminished by about 70% in percentage. On November 4th, 1904, the food supplied to hospital patients was as follows:

6 AM —

- Bowl of Macaroni and Sugar

- Hot Milk toil Baritonis

9 AM —

- Pullet with small salt fish

- or Vermicelli with small salt fish

11:30 AM —

- Green Peas or beans

12 Noon —

- Milk to Baritonis

2 PM —

- Break China tea

4:30 PM —

Beans

Onions

Potatoes

Sweet Potatoes or Yams

Pears

Salt Fish

Condiments

Monday, Wednesday, Friday, and Saturday.
4.30 PM.

Sunday, Tuesday & Thursday -

Beans
Onions.

Yams or Potatoes (sauer)
Ordinary Potatoes
Salt Vegetables
Pork.

During the months of April - December inclusive, the Wild Pigeon, Cephalophus, rhadinus, is allowed to be caught by licensed Pigeon catchers. Half the supply sent to the hospitals. The pigeons make very excellent soup which is supplied to Biri Biri patients.

Fresh vegetables are also provided to the inmates at the 11 & 5 o'clock meals on 3 to 5 days of the week. The gardens are being expanded year by year until shortly a good supply of fresh green vegetables will be available daily.

Fruit: Bananas & Papaya (papam)
as also provided 5 bananas daily or tinned pineapples occasionally.

Brandy was also provided by the company for beatui patients but for the past 3 years I have practically given up the use of
in the surtnie treatment of British.

Food supply to the working Cooks at eating sheds:

The quantities per day per man are as follows:

- Rice 20 ozs.
- Pork 4½ ozs once weekly.
- Dried fish 3 ounces
- Beans 1½ ozs 3 ounces
- Jam + weak Palace 6 ounces.
- Lard ½ ozs.
- Prawns 2 ounces.
- Bran fish + flour
- Cake 2½ ounces.
- Vermicelli 1 ounce.
- Macaroni 2 ounces.
- Onions 2 ounces.
- Fresh Vegetables 2-6 ounces.
Pawpaws are lit.

Pawpaws are not grown all over the Island. No restriction is placed on the natives as to helping themselves. They are used ripe as a fruit, but may be used in the green state as a vegetable. This fruit is perhaps the best of all fruits obtainable in the Malay archipelago & the free eating of it among our cooies has had an undoubted value.

Meals are provided at the hours of 5.30 AM, 11 AM, 1 & 6 PM.

As examples of the farreaching sort of the food I take two days in the week one being a "Pork" day.

<table>
<thead>
<tr>
<th></th>
<th>5.30 AM</th>
<th>11 AM</th>
<th>6 PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>Rice</td>
<td>Rice</td>
<td>Rice</td>
</tr>
<tr>
<td></td>
<td>Smoked fish</td>
<td>Green Peas</td>
<td>Beans</td>
</tr>
<tr>
<td></td>
<td>Vermicelli</td>
<td>Prawns</td>
<td>Potatoes</td>
</tr>
<tr>
<td></td>
<td>Sweet Potatoes</td>
<td>Prawns</td>
<td>Yams</td>
</tr>
<tr>
<td></td>
<td>Green Vegetables</td>
<td>Sallets</td>
<td>Prawns</td>
</tr>
<tr>
<td></td>
<td>Green Vegetables</td>
<td>Potatoes</td>
<td>Green Vegetables</td>
</tr>
<tr>
<td></td>
<td>Am.</td>
<td>Am.</td>
<td>Pm.</td>
</tr>
<tr>
<td>-------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Thursday:</td>
<td>6:30</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>Rice</td>
<td>Rice</td>
<td>Rice</td>
<td></td>
</tr>
<tr>
<td>S. Potatoes or Game</td>
<td>Vermicelli or Macaroni or Orzoni</td>
<td>Pork</td>
<td>Prawns</td>
</tr>
<tr>
<td>Small Salt fish</td>
<td>Orzoni</td>
<td>Orzoni</td>
<td>Green vegetables</td>
</tr>
</tbody>
</table>

This story is much more liberal than obtained from 16th November 1909, especially with regard to pork other than Rice. I limited the quantity of Rice which kept was almost unlimited, but yet with the 20 ounces per man, this is a large quantity left over which goes to feed Pigs. For to Rice is brought to the Island by every trip of the S.S. Islander 15 or once in 14 days. Though occasionally there may be a delay for 20 days or so owing to bad weather, or ships occupying the Discharging berth, and about 2 months' stock is kept on hand.
well to try to limit the stocks to
the "least possible" because
of the fact that it degenerates quickly.
No. 3 Kingdom Siam Rice is at
least not so well prepared and
clean as here a few months
ago usually.
Every consignment which arrives is
taken to the quay (value) and arranged
with the date of arrival clearly
marked on cards on the bags so
that at once it can be seen that
the age of the rice is, that is how old.
Of course that is as regards
the Island — we have no knowledge
as to how long it lay on stock or
in stores, but all consignments are
examined by the medical officer
and an attempt made to get the freshest
possible shipped.
All salt fish is continuously being sorted &
dried to prevent contamination from
the introduction of moisture.
It will be seen that arrangements as to Housing, Food,
Ward Supply & Sanitation are good.
Being impressed by the anger of Dr. Braddon by the promising results obtained on the Island in 1906, I tried to obtain some experimental proof of the theory that in the Piee lay the cause of Baylari. And let me state here that at that time I had not heard of Dr. Horace's observations in Borneo for Tijkmami in Japan.

A large airy sanitary fruit-house was built, with a 'pum' extending from it. The house was 12 feet square and from 4 to 9 feet high to a sloping roof. The room was 12 feet wide and about 15 feet in length. Great care was exercised as to cleanliness. 50 healthy fruit were isolated in this small compartment. They were fed, beginning on the 25th February 1906, on rice, rice, rice, rice and rice. The only other food they got was whatever they could pick up in the gravel of the run or no other food was known in. Water was supplied.
apparently unaffected until the
beginning of the third week of April
when it was noticed that one foot
showed symptoms of weakness in
the legs. This weakness got gradually
worse, until the bird placed its
legs wide apart to seek a broad base
for walking "lifted high" exactly
as in a case of paralytic Babesia.
The temperature did not rise.

On 27th April there was total
paralysis of the limbs. On 28th April
the general condition appeared to be
disappointingly better, but the paralysis
was still complete. Breathing time
became quicker and the general weakness
increased. The bird died on 2nd May.

An examination of the peripheral
nerves of the leg showed\n
regenerative changes

Nerve N° 8 and N° 3, showed exactly
the same sequence of symptoms
about a week after the first, but
instead of allowing them to die,
The experiment was stopped short of complete paralysis. They were allowed outside the run and given all kinds of food, past, peas, beans, green stuff etc., except Kingari rice. They recovered completely and in six weeks there was no sign of neuritis about them.

Fowl No. 4 showed the same line of symptoms exactly beginning on 10th May as in this case also the experiment was stopped when paralysis of the limbs was well marked. As in the case of No. 2 and 3 complete recovery took place.

Fowl No. 5 showed no paralytic symptoms and on being liberated on 15th May appeared to be quite strong and healthy except for a "thinning" in condition. This was a large, strong male bird of no doubt his Amba Physique. This former garrance helped him to withstand the disease.
About the same time four guinea pigs were isolated and fed on Kinship rice (cooked) but were given a quantity of green food daily. They resisted any signs of meningitis, or Bubonic symptoms for a longer period than the fowls, but within three months one pig showed symptoms of general weakness or lassitude. Paralysis of the hind legs was present but not so marked as in the case of the fowls, there was distinct pyrexia and oedema. There was no rise in temperature at any time.

Death was sudden a few days after the onset of the symptoms of this case might be compared to a case of Acute Bubonic. Beyond the signs of symptoms there was apparently no other disease. There was no Reptile poisoning nor abscess formation. The internal organs were not crossed except to the extent of congestion.

One month later another guinea pig died.
in a similar way. After this the observation was stopped.

III. Four fowls were isolated in a smaller pen at the same time as experiment No. 1 (white fowl). They were fed on Padi beans, teas, green stuffs and scraps of all kinds. In 6 months no symptom whatever suggesting Beriberi or any kind of polyneuritic arose.

IV. Four fowls were isolated in the same pen as first mentions, on 15th October 1906, and were fed on Indian Rice milled at Siam (Rangoon) 15. on Gourd or Parboiled Rice. The conditions being exactly similar to experiment No. 1. The observation was kept up for 6 months and no symptoms of disease arose.

At the same time, Oct 15th, 14 fowls were isolated in another run.
and Experiment No. 7 was repeated & within three months all fruits had died showing symptoms of necrosis.

About 40 Chinese pigs are sent to the Island per 83 Islanders from Singapore every trip. They are kept in a well built cement fenced house, open everywhere, with a roof, & divided into a series of pens into which a 3 pigs are put. The pens are cleaned & flushed out daily by a cook who also breaks the ice to attend to the pigs & pigs.

The food supplied consists of scraps of all kinds but mainly the remains of the rice pans after the cooks have been served & also the sweepings of the rice in the kitchen pots.

It has frequently been reported to me that a pig has died & I have been requested to see if the flesh is
good food or not. In the first mention communication nothing was definite. Was our only one.
This led me to inquire whether it was not possibly a form of Beriberi which was the cause of the death of the animals, owing to the large excess of rice eaten.
I have kept one hen set apart for my use, with 2 fowls. These were fed on large quantities of rice but little else. The poultry kept clean and well.
Both animals developed weakness of the limbs, difficulty in walking which increased until they were apparently unable to keep themselves; while at this stage they used become on the legs being a face in one and the legs only in the other. Breathing was quickened to the point of distress or death occurred in both. At no time was there any rise in temperature observed.
malarial revealed any similar condition to that found in "nek" cases of Barihe.

- rig. increase of fluid in lungs, especially right side, engorgement of skin, bloody emlitoes, and small hemorrhages.

The lungs were congested.

The spleen showed some engorgement.

The examination revealed no other illness than the decline of the chief cause out of the world.

The same fever and symptoms have been observed from time to time during the past 25 years, and it is highly probable that the cause of death is the eating of the infected rice.

All these observations accord with me of the view that the rice is used on the Island and was at least an important contributing factor in the cause of Barihe.

vi. on October 10th 1906 Indian rice.
Kling, Nishatnam, or Parboiled Rice or "Cured" Rice was supplied to the whole staff of working convicts (not terminal patients) at the 6/3-
meal, with the idea that if they look kindly to it it would not raise any objections to eating it, we aimed to place the whole convict population of the Island on Cured Rice, for a period of at least 3 months.

The object was at once defeated by the fact that the rice was very badly cooked, sloppy and rather evil-smelling, so that many convicts refused to eat it, stating that unless the ordinary rice was served Supplies they refused to go to work next day.

A few grumblers and malcontents soon had the majority on their side, with the result that I or the District Office were told as a result that the ordinary Sam Rice was still ready.

This "Cured" or Parboiled Rice is brownish in color, glazed grain, especially
When cooked, it is dusty and less well cleaned has a heavy earthy smell, rather like the smell of wheat. Altogether quite different in appearance and in taste from the ordinary "Forward Rice of the East."

The Chinese Contract's Manager was rather difficult to persuade as to the necessity of attempting the observance, because he thought their Banian on the Island was in a quite satisfactory state. I couldn't rid myself of the suspicion that no attempt was made to properly clean or prepare the Curried Rice for this last meal.

Mr. Murray, the European Manager, was also not very encouraging, he pointed out that the Christian Island Company was this to make money, he was not going to ruin this business by introducing food of which the natives objected that they were free men in this respect and that I must not give them food which
They objected. I was therefore advised to stop any attempt such as was aimed at.

However, I introduced Curd Rice at this time (October 1906) into the Hospital dietary.

The course there, where it was better cleaned & prepared, &c. &c., with relish, proved that it was good food & that there should be no delay in introducing this food into the diet. I was able to trace the disease in a number of cases. The results were so good that it was decided to continue Curd Rice.

About the month of November the same year I gradually added a quantity of Curd Rice to each Rice pail at the Cook's kitchen. Withdrawing a little quantity of Alkaline at the same time. Thus -

Each Rice pail contains 32 Katies (a Katie is 1½ lb). I began by substituting 4 Katies Siam Rice.
and adding 4 Katrina's portion of rice to each pan. That is, the cooking
cooking was taking 4/ "Cured" or "Parboiled" Rice in the daily rations.
In two months later another 2 Katrina's were subtracted and 2 Katrina's
portion of rice added at the time of my departure. The same & Cathi
ate to portion of rice in each meal of rice. No objection
to this method was made by the Cookies: it is hoped that in time
we shall be able to give help
and help Cured "Cured" Rice to the
working Cookies.
It is quite not possible to say, to
what extent this intermingling of
rice has been beneficial, but that
it made for "good" is I think
undoubted when it is recalled
that no evil results have arisen
from the use of parboiled rice in
hospitals, the result on diets,
the fact that "Jemila" takes parboiled
rice, however get "Barley'
VI. Observations on Coories.

The Coorie Lines on Phosphatic Hill are built to house 250 workmen - not including overseers, managers, etc. When it was found to be impossible to put the Coories on parboiled rice, I arranged with 30 men - including British & Chappoos - in the proportion of 2 of the former to one of the latter - to promise to come to the Hospital Quarters on the Hill for their meals, instead of to the eating sheds. They agreed to abstain from eating Lian Rice & to eat Curd Rice. My dresser, Mr. Corlaff, is a thoroughly trustworthy man & he supervised their meals at every meal time. I also requested him with the attendants to police the Coorie Lines in the evenings to see that these men were adhering to their bargain. It is to be remembered that the Rice was very carefully cooked, & had no evil smell. I also that for nearly a year the
Costie had been accustomed to it in the hospital.

The men apparently kept to their unit and managed perfectly by eating rice. At the same time, it is not absolutely certain that any man was abstaining.

Several of the men had had Bahari formerly viz. 5ittance & 3 lanterns.

The result of the observations was as follows:

<table>
<thead>
<tr>
<th>30 Men from Port Arthur Rice.</th>
<th>Result at 4th g:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 month</td>
<td>2 mos</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>No Cases</th>
<th>No Cases</th>
<th>Case</th>
<th>No Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahari</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15 occurred admitted from 30 men in 4 months.

In the same time - 4 months - out of the remaining 220 men on the hill, or rather 210, because there were 10 men in hospital when the observations...
pneumonia. There were admitted to hospital 21 cases of Beriberi in one case, ni 10 as against one ni 30.

The observations on the cause of the disease were not rigorously controlled, but the results were highly satisfactory as were our Braden's observations in September.

Table showing races affected by the disease:

<table>
<thead>
<tr>
<th>Naturality</th>
<th>Year</th>
<th>Average Population</th>
<th>Beriberi cases</th>
<th>Total Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese</td>
<td>1901</td>
<td>600</td>
<td>670</td>
<td>229</td>
</tr>
<tr>
<td></td>
<td>1902</td>
<td>656</td>
<td>693</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>1903</td>
<td>732</td>
<td>591</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>1904</td>
<td>765</td>
<td>973</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>1905</td>
<td>944</td>
<td>544</td>
<td>12</td>
</tr>
<tr>
<td>Malay</td>
<td>1901</td>
<td>20</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1902</td>
<td>20</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1903</td>
<td>30</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1904</td>
<td>38</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1905</td>
<td>45</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Nationality</td>
<td>Year</td>
<td>&quot;Total for&quot;</td>
<td>Beri Beri</td>
<td>Beri Beri</td>
</tr>
<tr>
<td>-------------</td>
<td>------------</td>
<td>-------------</td>
<td>-----------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Jan - Nov.</td>
<td>Nov 1st Dec.</td>
</tr>
<tr>
<td></td>
<td>1902</td>
<td></td>
<td>Jan - March</td>
<td>March - Dec.</td>
</tr>
<tr>
<td></td>
<td>1903</td>
<td></td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>1904</td>
<td></td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>1905</td>
<td></td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Bengalis</td>
<td></td>
<td></td>
<td>18</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>1903</td>
<td></td>
<td>24</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1904</td>
<td></td>
<td>26</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1905</td>
<td></td>
<td>34</td>
<td>1</td>
</tr>
<tr>
<td>Europeans &amp;</td>
<td></td>
<td></td>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td>Eurasians</td>
<td>1901</td>
<td></td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>1902</td>
<td></td>
<td>17</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>1903</td>
<td></td>
<td>17</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>1904</td>
<td></td>
<td>17</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>1905</td>
<td></td>
<td>20</td>
<td>4</td>
</tr>
</tbody>
</table>

*In November another 36 Tumils arrived in *
Daro until March.p: amie half yster had Puio.
All the Tamils sent to Xanoa Island were fed on ordinary Siam Rice.

D.H. Clayton the District officer at that time remarks - "that this may perhaps be accounted for by the fact that the men (Tamils) are fed by the Company given away poor Diet of Fish without the proper condiments with which to cook it."

Dr. Purchas remarks that the Tamils got the same riz as the Malays, the Tamils suffering severely from Beri-beri - the Malays not at all so. He includes "Diet" as a cause of the disease in this case.

Clayton remarks on the poverty of the Diet supplied to these men so it is probable that they are freely thar surely of the Rice supplied 13. Rice to which they were unacustomed, which was not prohibited: So that it is still compatible with the Rice given to say that Diet had something to do with these men acquiring Beri-beri.
The above table shows markedly the limitation of the disease to Rizas, Sataps, Chinese, Malayo Indians, Bengalis - one sixth acquired the disease.

Europeans, Eurasians - never.

---

Table showing Duration of residence on Christmas Island (Protea Island) period before acquiring Beriberi.

<table>
<thead>
<tr>
<th>Beriberi acquired after residence on the Island of</th>
<th>1905</th>
<th>1906</th>
<th>1907</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 week</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>2 weeks</td>
<td>2</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>3 weeks</td>
<td>5</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4 weeks</td>
<td>7</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>5 weeks</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6 weeks</td>
<td>5</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>2 months</td>
<td>18</td>
<td>21</td>
<td>7</td>
</tr>
<tr>
<td>3 months</td>
<td>40</td>
<td>31</td>
<td>11</td>
</tr>
<tr>
<td>4 months</td>
<td>37</td>
<td>19</td>
<td>13</td>
</tr>
<tr>
<td>5 months</td>
<td>76</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>6 months</td>
<td>28</td>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td>Months</td>
<td>1905</td>
<td>1906</td>
<td>1907</td>
</tr>
<tr>
<td>--------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>1</td>
<td>15</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>20</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>10</td>
<td>15</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>5</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Over 12</td>
<td>37</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>289</td>
<td>197</td>
<td>118</td>
</tr>
</tbody>
</table>

This Table shows the result of three years' observation and it will be seen that the period of least resistance to the poison of Beriluari begins about the 8th week, increases greatly during the 12th, 14th, 16th, 18th and 20th months diminishing somewhat during the 22nd and 24th month. Further as time goes on, this bears out the observations of Traeger in Selangor, Broadman in Negri Sembilan, Ellis in Singapore, etc. Ellis informs me that recent experiments he can state definitely.
that it is at the beginning of the 8th week that Beriberi shows itself in the large majority of cases.

It is to be remembered that it is the Sinhalese or newcomer who is mainly attacked. He comes to the Island under Contract to work for one year – leaving out Sundays and public holidays. He has to pay off an advance of money which has been obtained from the Agent in Ceylon or Brindisi. His fare is also deducted against him upon arrival. For this first year, he only receives 2½ dollars per man for working 8½ hours a day (The dollar is value 2½d). The Knisford has little opportunity of adding to his daily by purchase as to Lancet or face laborers have. As a result heindulges largely in the Rice supplied – he probably never has had so good a supply before – and nearly he sets a large quantity of the poison.
Table showing New Beriberi Cases and Relapse cases  

<table>
<thead>
<tr>
<th>Year</th>
<th>New Cases</th>
<th>Relapse</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1905</td>
<td>259</td>
<td>255</td>
<td>514</td>
</tr>
<tr>
<td>1906</td>
<td>194</td>
<td>172</td>
<td>366</td>
</tr>
<tr>
<td>1907</td>
<td>118</td>
<td>151</td>
<td>269</td>
</tr>
</tbody>
</table>

New cases are in 1907 less than Relapses for the first time - a fact which seems to me to be significant of improvement.

Figures for 1908:

- 1st January to 30th June: 173 new Beriberi cases treated
- 30th June to 30th September: 86

Relapses + Remissions = 88.

It is possible that the Cured Rice introduced into the food is
having a beneficial effect in keeping down beriberi, but such a statement cannot be 100% made.

Influence of Rainfall:

Yerdumana states that it is notorious that beriberi is always more prevalent in the rainy months of the year.

Peter Katinga and Kadinga also held the view that beriberi is worse during the rainy season.

Perpendicular, however, believed that the rainy season has no influence on the incidence of beriberi.

Hamilton Wright makes it a question of monsoons. It makes one that during the first month at least of the South West or Drier Monsoon, fewer cases develop the disease. See Table on opposite page.
Monthly Rainfall in inches at Christmas Isl.

<table>
<thead>
<tr>
<th>Year</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>1904</td>
<td>81</td>
<td>7</td>
<td>22</td>
<td>7</td>
<td>4</td>
<td>16.5</td>
<td>1</td>
<td>4.2</td>
<td>1.0</td>
<td>1.0</td>
<td>10.9</td>
<td>5.2</td>
</tr>
<tr>
<td>1905</td>
<td>10</td>
<td>6.7</td>
<td>3.6</td>
<td>11.8</td>
<td>6.3</td>
<td>3.7</td>
<td>4.8</td>
<td>1</td>
<td>3.1</td>
<td>1.2</td>
<td>11.4</td>
<td>4.6</td>
</tr>
<tr>
<td>1906</td>
<td>6.4</td>
<td>4.8</td>
<td>1.4</td>
<td>9.9</td>
<td>6.6</td>
<td>2.4</td>
<td>3.7</td>
<td>8.3</td>
<td>13.3</td>
<td>12.4</td>
<td>2.5</td>
<td>6.3</td>
</tr>
</tbody>
</table>

- Wet year
- Dry year
- August year

Admissions to Hospital during same period + Rainfall (Bribie).

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>1904</td>
<td>0.1</td>
<td>4.1</td>
<td>6.4</td>
<td>4.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1905</td>
<td>0.9</td>
<td>3.8</td>
<td>4.8</td>
<td>3.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1906</td>
<td>3.6</td>
<td>4.2</td>
<td>10.4</td>
<td>3.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.6</td>
<td>5.6</td>
<td>9.9</td>
<td>2.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.1</td>
<td>5.1</td>
<td>3.7</td>
<td>2.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.9</td>
<td>3.2</td>
<td>1.3</td>
<td>2.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.2</td>
<td>2.2</td>
<td>12.4</td>
<td>2.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.9</td>
<td>6.6</td>
<td>2.3</td>
<td>2.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- From 12 July '06 list does not include care at Rawo Colliery, Phosphate Hills. Add average 3 4 cases from month to month.
- Data as given.
From this table it will be seen that there is considerable irregularity in the rainfall from figure alone, which makes difficult to arrive at. May 1904 showed the enormous rainfall of 24.7 inches. The case resembles more from 44 in April to 12 in May, dropping to 80 in June with rainfall at 14.4 inches.

July shows 166 admissions with rainfall of 16.5 inches. But apart with the largest admissions has only 1 inch of rain for the whole month.

October shows 99 admissions with 1 inch rain.

November 52 admissions with 10.9 inches rain.

The year 1905 was a dry year although only came to 60 inches falling during the year. April, July, November & December were the wettest months with other than the highest numbers of admissions for the year, but only by a few figures of one except November.
The year 1906 shows July with the greatest number of admissions and the smallest rainfall for the year. So that one concludes that rainfall has little or no effect on the case incidence. But it is noticeable that cases are more severe in symptoms during continued wet weather. This is much more common present in cases of foot, elbow, and knee oedema or in cases of cutaneous hemorrhage as more common.

The general health of the population, especially of the colored class, is in one in all sorts of weather. It is as good, if not so good, as this applies to the New Cemex class. Particularly the Rankin knows how to take care of himself better. Climatic oedema lasting for a day or two if treated in hospital.
Diarrhea is as common at this time. Old cases of Beriberi can also more readily show signs of a recurrence of the disease in the wet weather. New cases whose feet just have not completely recovered and as at all recovered, show in some cases symptoms of its recurrence. These cases are carefully looked for and are admitted to the hospital. Some may complain of no other symptom. Generally, 2 weeks or 10 days in hospital is sufficient for this class of cases.

So that no very definite conclusion can be come to as to the evil influence of rainfall in so far as the figures make it appear—but there is increased anxiety and vigilance necessary during continued wet weather.
Tables showing that suits are Newmen as the next forms at Basukis. The Cookie Lines are numbered 1 to 39—even numbers on one side, odd numbers on the other. The numbers start at the 'Kings.' End after Mrs. near the East Side Gambling Halls. These houses at the 'Central' and are the most popular and Luntche's or free labourers consequently the suits are housed mainly in these houses toward the other end of the Lines.

A weekly report has been kept of Basukis admissions from each house since November 1904. No other houses are examined to supply 150 cases to the Hospital. It was required into at once extra disinfection and cleaning was performed, but still it is seen that the supply of cases came from the 'Suits' houses.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Int.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: House No. 4 has always been a sickly house, mainly...
<table>
<thead>
<tr>
<th>No.</th>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td></td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>29</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td></td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>4</td>
<td></td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td></td>
<td>4</td>
<td>2</td>
<td></td>
<td>8</td>
<td>3</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td></td>
<td>2</td>
<td>1</td>
<td></td>
<td>3</td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td></td>
<td>3</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td></td>
<td></td>
<td>4</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>36</td>
<td></td>
<td>1</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

No. 39 was partly occupied at this line by Caputella (makara) - 4 six Corrida.
<table>
<thead>
<tr>
<th>Date</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>22</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>22</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>2</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Month</td>
<td>Jan</td>
<td>Feb</td>
<td>Mar</td>
<td>Apr</td>
<td>May</td>
<td>Jun</td>
<td>Jul</td>
<td>Aug</td>
<td>Sep</td>
<td>Oct</td>
<td>Nov</td>
<td>Dec</td>
</tr>
<tr>
<td>-------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>25</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td></td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>28</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td></td>
<td>4</td>
<td>2</td>
<td>1</td>
<td></td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td></td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td></td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td></td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As he has made no. 4 horse, the 1st at last 2nd, he always has a black horse. No. 39 mice 1907. Has been a white horse (mainly white). No artisans being named this year.
The various occupations of the inhabitants of the Island are:

- Mining & Quarrying
- Loading ships at loading point
- Sardine boats
- Seaweeders
- Seaweeders
- Scaffolding and rigging
- Phosphate from the arable system
- Thephosphate to the "Phosphate Plant"

"Waterfall" on the east side of the Island where costers are engaged in cutting and helping at the "V. Pumping Station".

- Blacksmiths & fitters
- Cleaning and mending Roads throughout the Island

- Prisoners

The following Tables show the state of health and the prevalence of Colds and other diseases among the workers and residents of the Island.
<table>
<thead>
<tr>
<th>1906</th>
<th>1907</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining</td>
<td>303</td>
</tr>
<tr>
<td>Loading</td>
<td>92</td>
</tr>
<tr>
<td>Woodcutters</td>
<td>4</td>
</tr>
<tr>
<td>Sawyers</td>
<td>-</td>
</tr>
<tr>
<td>Scaffold</td>
<td>13</td>
</tr>
<tr>
<td>Hospital Attendants</td>
<td>-</td>
</tr>
<tr>
<td>Waterfall Streams</td>
<td>1</td>
</tr>
<tr>
<td>Carpenters</td>
<td>-</td>
</tr>
<tr>
<td>Blacksmiths</td>
<td>-</td>
</tr>
<tr>
<td>Cleaning people</td>
<td>114</td>
</tr>
<tr>
<td>Prisoners</td>
<td>8</td>
</tr>
<tr>
<td>Malay Batin</td>
<td>2</td>
</tr>
</tbody>
</table>

By far the greater part of the stumpage is removed in the course of loading, raising or scaffolding or clearing. The situation is such that they are far away from the supervision of the authorities. They make it a point to live well. They are practically never without
substantial addition to their meals in the shape of pigeons. They rear poults as这般： it is evident to me at least, that the more of these poults they see the better they will be in physical condition therefore fitter to resist disease.

The woodcutters also have unlimited opportunities of obtaining pigeons. These pigeons are in great numbers at the tops of tall trees. A corbie goes up the tree armed with a long stick at the end of which is a running noose. Here at the top corner the pigeons—there are rarely two so frightened as to fly away—he simply slips the noose over the pigeon's head and pulls—in this way may obtain so many as he needs from the trees in a very short time. 

Beside the woodcutters, great numbers
of the other cooks pouch
these birds. I thought they are
purified by the Magistrate (I have
previously placed that only
one licensed pigeon catcher is
allowed on the Island: so he is
limited to a catch of 100 birds
per week). One hundred a week
will never be missed - this and
many thousands of birds: so it is
to the benefit of cooks & rest of
the crew, a source of this excellent food.
The laga's, Clarey & cooke - the
pummi smoking crew especially -
has no generally sufficiently to
supplement his food supply in
this way. And the pummi smoker
is the man most prone to
diseases of all kinds.
out of 14 scavengers - always
RAMKHUD & well paid men,
I have never had a case of illness
in 1 1/2 years.
The same surely applies to Hospital
attendants or drivers - Their men
I was in hospital & the Chinese attendants — not the messers. One had quarters of his own. I have had about 25 different men. Generally Lantchho, but have had one or two Sinakah among them. Aino Caw, two Bazilani among them. Among these men too there has been influenza. They have contracted the disease in Christmas Island and have recovered & have subsequently been accepted to hospital attendants — a cured pest — & in no case has killed them.

Two Malay beaten in 1906, one in 1906 — names consequently were attacked. One of the men was a confirmed Opium smoker — a degenerate Malay, and has had previous Bazilani in Jutia.

The Rice supplied to Malays on Christmas Island is the ordinary Rice (unarten Rice): but the Malay is much better paid than the Cookie on the large supplements his Siatay; he
d+i largely y Curries. eggs. fish
this amused food. & plenty pork
fish. & he does not injure
himself by hard work. The
Asiatic contract Babi is
a wiz. But in such a community
and in such conditions that
will be exceptions to Babi
and attacks some from time to time.

Many however, among whom I noted
in Penang, have
proved that the Malay ni his
native Kampung or Village. His
his food is "fresh" rice. Every
prepared each day by his
women fulkto,
house contracts Babi.
It is only when you go
town to the sea in ships or to
the port or to outstations where
rice is kept in store for
months, that the
Malay get Babi.

Carpenters & Artisans generally do
not get Babi. They are well
paid & well fed men. Limiting their rice
eating late & other foods, as eggs,
toasts, mixed foods, fish, milk &c.
Durham has pointed out that
the Antigonish houses on Christmas
Island were the only houses
never 'disinfected' & they do not
get Beriberi. The houses are
exactly the same in construction
as the cookie house & in
the line, viz: house No. 2 + house
No. 6.

One Chinese Clerk in the employ of the
Company contracted the disease in
1905 & was invalided to Singapore.
He subsequently returned to the Island &
for about 3 years past had been in
Good Health. This man had suffered
from Beriberi in Singapore in
1902. For many months preceding his
attack in 1905 he had been living
a very irregular life visiting the brothel
almost every night & I conclude, not
paying sufficient attention to his food. I
know that he did not live so well as
the other clerks in the same quarters.
1. It is possible that these circumstances had some effect in establishing the disease.

2. A recent experiment on Rice and Bari-bari by at the Kumaon Lunatic Lunatic Asylum & hearing at Broadmoor Hospital is reported by Dr. W. Hitches.

The summaries:

1. Amongst 120 patients on incurred Rice there were 43 cases of Bari-bari (2 committed with the disease) and 18 deaths.

   Amongst 123 patients on Curried Rice there were 2 cases of Bari-bari both these had the disease on admission.

2. Ten lunatics actually suffering from Bari-bari has put on a diet of Curried Rice and all recovered.

   Of 26 patients suffering from Bari-bari who was not put on a curd rice died 18 died.
3. None of the 16 patients suffering from beriberi who were placed on a diet of Curd Rice had a relapse.

Of the 16 patients suffering from beriberi who were transfused to a curd rice diet, 16 died during the first attack, and the remaining 10 also developed beriberi again with the exception of 2 who were discharged being no longer miserable.

4. Some patients who had been on a diet of Curd Rice for more than five months and were apparently healthy, were transferred to a diet of Un- 
curd Rice. Two of these patients developed beriberi within 3 months."

At the beginning of his experiments Dr. Heber did not believe that Rice had anything to do with the cause of Beriberi, he rejected the idea.
fed on Curd Rice to suffer to the same extent as those fed on Uncurd or Silled Rice, or that the result would be a refutation of the Theory. Therefore he provided separate cooking utensils plates etc. for each set of patients, so that there should be no contamination of the Curd Rice with the poison that is supposed to be present in the Uncurd Rice.

She therefore concludes that:

1. Uncurd Rice is either directly or indirectly a cause of Paratyphoid fever.

The actual cause being either:

1. A poison contaminating the Rice.

2. Deficiency of Protein matter - the disease being due to nitrogen starvation.

3. Uncurd Rice does not form a sufficiently nutritious diet specially to the patient's system, specially liable to invasion by a specific organism which is the actual cause of typhoid fever.
The following table of observations on Parboiled and Siam Rice feeding were supplied to me by Dr. Withnell, the Medical Officer of the Civil Medical Office in the Straits Settlements: They refer mainly to the years 1905 to 1908.

I have seen, in his authority, that Dr. J. Ellis, Surgeon of the acting C.M.O., that the benefit of Parboiled Rice is evidenced in much greater degree during the years 1906, 1907, and 1908.

<table>
<thead>
<tr>
<th></th>
<th>Parboiled Rice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Period</td>
</tr>
<tr>
<td>A. Lunatic Asylum</td>
<td>Dec. 05</td>
</tr>
<tr>
<td></td>
<td>Nov. 05</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Prison Hospital</td>
<td>Dec. 04</td>
</tr>
<tr>
<td></td>
<td>Oct. 05</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sept. 05</td>
</tr>
<tr>
<td></td>
<td>December 05</td>
</tr>
<tr>
<td></td>
<td>January 06</td>
</tr>
<tr>
<td></td>
<td>February 06</td>
</tr>
<tr>
<td></td>
<td>March 06</td>
</tr>
<tr>
<td>Location</td>
<td>Period</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------</td>
</tr>
<tr>
<td><strong>A. Lunatic Asylum</strong></td>
<td>26. 5.05</td>
</tr>
<tr>
<td></td>
<td>3. 11.05</td>
</tr>
<tr>
<td><strong>B. Prison Hospital</strong></td>
<td>Dec. '02</td>
</tr>
<tr>
<td></td>
<td>Oct. '04</td>
</tr>
<tr>
<td><strong>B. Tan Jeck Seeg (pancreas)</strong></td>
<td>June '04</td>
</tr>
<tr>
<td></td>
<td>Dec 05</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Period</th>
<th>Cases</th>
<th>Deaths</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Penang:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. General Hospital</td>
<td>July '05</td>
<td>19</td>
<td>2</td>
<td>10.52</td>
</tr>
<tr>
<td></td>
<td>Dec 05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>A. Lock Hospital</strong></td>
<td>July '05</td>
<td>-</td>
<td>3</td>
<td>12.55</td>
</tr>
<tr>
<td></td>
<td>Dec 05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>B. Panam Hospital</strong></td>
<td>July '05</td>
<td>186</td>
<td>24</td>
<td>21.42</td>
</tr>
<tr>
<td></td>
<td>Dec 06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>B. Prison Hospital</strong></td>
<td>Aug '05</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dec 05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>A. Bukit Mertajam</strong></td>
<td>July '05</td>
<td>13</td>
<td>4</td>
<td>53.80</td>
</tr>
<tr>
<td></td>
<td>Dec 05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Place</td>
<td>Period</td>
<td>Cases</td>
<td>Death</td>
<td>% of</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------</td>
<td>-------</td>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>General Hospital</td>
<td>Jan '05</td>
<td>10</td>
<td>3</td>
<td>30.0</td>
</tr>
<tr>
<td></td>
<td>June '05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lock Hospital</td>
<td>Jan '05</td>
<td>5</td>
<td>2</td>
<td>40.0</td>
</tr>
<tr>
<td></td>
<td>June '05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sumpur Hospital</td>
<td>July '04</td>
<td>147</td>
<td>64</td>
<td>46.95</td>
</tr>
<tr>
<td></td>
<td>Oct '04</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prison Hospital</td>
<td>Jan '05</td>
<td>38</td>
<td>4</td>
<td>10.52</td>
</tr>
<tr>
<td></td>
<td>July '05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Berak Ma'ajam</td>
<td></td>
<td>54</td>
<td>21</td>
<td>38.88</td>
</tr>
</tbody>
</table>

Malacca:

<table>
<thead>
<tr>
<th>Place</th>
<th>Period</th>
<th>Cases</th>
<th>Death</th>
<th>% of</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durian Banna</td>
<td>Jun '05</td>
<td>239</td>
<td>22</td>
<td>9.2</td>
</tr>
<tr>
<td></td>
<td>Dec '05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prison Hospital</td>
<td>Jun '05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dec '05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jelani</td>
<td>Dec '05</td>
<td>43</td>
<td>4</td>
<td>9.3</td>
</tr>
<tr>
<td></td>
<td>Jan '06</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. On Siam Rice.

### Data:

<table>
<thead>
<tr>
<th>Period</th>
<th>Cases</th>
<th>Deaths</th>
<th>% Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 05</td>
<td>25-2</td>
<td>4</td>
<td>16.2</td>
</tr>
<tr>
<td>May 05</td>
<td>6</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td>June 05</td>
<td>51</td>
<td>24</td>
<td>41.1</td>
</tr>
</tbody>
</table>

A. Durian Dam

A. Prison Hospital

A. Jessi

A = Cases represent total no. treated.

B = Cases represent total number admitted.

Dr. Huy, acting Colonial Surgeon Primary in a recent paper in the Journal of the Malaya Branch of the British Medical Association, states:

"I have never met a case of pellagra in a person who was not an eater of "uncured" Rice. I have never seen a case amongst "Kampung" Malays or between Janil crowds, that people being under normal ambitions' sake
of parboiled or fresh Rice.

Families of Malays are, in this country, immune from Beriberi only so long as they eat cooked or fresh Rice: feed them with uncooked Rice, and that immunity no longer exists.

Beriberi in epidemic form, commonly appearing amongst Chinese, is unknown among Tamil, Malay or Javanese, who are frequently employed in large gangs in remote districts in road and railway construction work and hence suffer the same conditions as the Chinese.

While Gaung and Javanese, Malay, or Tamil coolies are employed side by side with Chinese in opening up the country, the Javanese, Malay and Tamils may suffer from dysentery, diarrhoea, but they do not get Beriberi, whilst the Chinese do get Beriberi: it may be in addition to the above mentioned bowel complaints.
Mr. Daniel's Status in his "Gardens" Vol. 3 page 1 page 57: "It is to race customs, habits or modes of life, than difference in incidence in different Races must be attributed.

The one factor producing this difference in incidence between Chinese, Cochin Chinese and Cochin Chinese of the nationalities in the Straits Ports came to me to be the Custom of former people in eating "Mullah" Rice as opposed to the fresh and so-called Curved Rice common to all other races.

Mr. Semi Lloyd's Agent at Anjar on the West Coast of Java supplied the following information: June in March last year.

He employs about 25 Malayo in his business at Anjar and 13 years he has now had a crew of Bribidi amongst them.

On inquiring as to their food, I was informed
that they ate Rice which was procured from the market as it was required. They were called "Fresh Rice." In 1905 he opened up a considerable trade with neighboring Sumatran ports across the Strait, to get his supplies from Batavia by rail and steamer, but generally by steamer.

His supplies were stored at his Soro ni Aho. Rice formed a large part of the merchandise, but it was the ordinary No. II quality Siam Rice which he reported.

After 6 months of the start of his position, his business began to decline. He noticed that several of his men both on shore and on his Carrying Steamers began to complain of a weakness of the legs, weakness, coldness of the legs, and pain, and then the head - much the same symptoms in fact. In a visit to Christmas Island in 1906, he saw how the men were affected with jaundice and the man that Rice knew the cause of it - he therefore forbade
his men to eat of the Sumi Rice, explaining to them that in this Rice was a poison which made them sick; so that if they continued eating of it they would die. He ordered them to take their own Java Rice as they had formerly done, with the result that for the 9 months between 15 March 1908, he had seen no case of Beriberi among his servants. He had discovered that, for convenience — to save trouble — his men had obtained the Sumi Rice.
The Treatment of Beriberi

To a large extent the Treatment of Beriberi as adopted on Christmas Island has been indicated throughout this paper.

It depends upon the principles of:

1. Cutting off the supply of Bran or "mound" Rice.
2. Giving the patient a long rest in hospital.
3. Believing what the patient says or not trusting the patient whether that patient is malingering or not.
4. Testing the patient's ability to do work without fatiguing or the heart symptoms after the entrance of all other signs of Beriberi—previous to his discharge from hospital.

John I took over in 1904.
measures were carried out at this time, give so efficiently as most of those for which it is not likely that good sanitation has had the effect of reducing the case numbers to death rate to so large an extent as has been done. But sanitary measures must be rigidly supervised. The Medical Officer inspects every corridor house once a week to see that the roof is in good repair, that the bed-boards are clean, that there is no accumulation of clothing hanging about the room, that the sleeping mats are clean, that animals are not allowed to enter and that thorough cleaning is carried out by the cleaning staff. Any repairs necessary are attended to at once. Should any sleeping mat have become dry or burnt it is destroyed and a new one given in its stead. As previously stated, the houses are whitewashed on the inner walls twice a year, and lined outside once a year.
The doctors are not required to be driven to the backing sheds - they arrive back here or move horse a day if they have the opportunity. Every one bakes at least once a day and at the time the ship is loading at the pier, the sheds are opened at 11 am. for the use of the officers.

The medical officer must see that the latrines are properly emptied and disinfected daily - that all return matter from the butcheries & kitchens or is properly burned into the deep wells over the cliffs, or burned in the Incinerator.

Christmas Island may be said to be first class from a sanitary point of view. I know that the Island of the States has a reputation for the Coast arrangements - Sanitation. But yet, although this has improved for 7 years, it has been a bleak spot for Rabitz.
A patient, then, who comes to the dispensary in the morning complaining of epigastric pain, palpitation of the heart, murdered lips and fingers, shallow signs of a little osseous— or he may not have this sign—will be supposed or diminished knee jerk, is at once admitted to hospital.

The first thing to his house is the linio to bring away this mat or blanket or any thing of value. He does not care to have there.

Next his mat or blanket he daily— it is washed thoroughly, disinfected with a solution of peracetic mercury and some disinfectants. Stones in the very daily grown, it is burned on a week one provided.

The patient hands the suit of clothes he is always-mending to the head attendant who gives him a clean "hospital" suit.

These hospital clothes are washed in boiling water thrown in a large washtub, the sheets in disinfectant, wrung out.
Cold clean baths and finally cries
A man through examination now takes place. If the medical officer is satisfied that the man has beriberi he is
sent to Such - but if there is any doubt about the case
is isolated for a few days in the ward next the one for observations
In the latter case at the end of 10 days or so he is, if no adverse symptoms
have meanwhile arisen, sent to work carting wood, breaking rocks,
cleaning up, work generally about the hospital grounds or at the end of two
weeks discharged to work. After he can be sent to
and if ambulatory, but if undoubted Beriberi,
or if starting Acroptic Beriberi,
- all of which work as Ambulatory
Beriberi, the man is sent to bed in the beriberi ward.
A dose of castor oil is generally given as routine treatment - said
formulix by 2 gm. Calomel followed
by a dose 10 hours later of Meprema
Salts.
I usually put a certain number of things class to patients on.  

1. A mixture of Epsom Salt and Oran y Saler.
2. A simple diaphoretic mixture.
3. A mixture of Ammonium Carbonate and Trichlor Etherane.

or 4. No medicines.

This is the treatment for the great majority of cases on Christmas Island and statistics show that there is nothing to choose between them in the mean getting "no medicine" does as well as the getting any of the others.

Rice grown in cut off 15. Siam Rice.  

"Parboiled" or "Parboiled" Rice is allowed and I have never seen a case whose period of recovery was shortened by this procedure. The patient is allowed milk three or four times a day or flour if the case calls for it.
or the patient desires it. The
Milk and is Borden's cream-
ixed to a milk curd icing. (I
when it is used in the British Navy)
This cream or R neutr is allowed also.
Macaroni, semicelli, papar, Rass Broas
Green vegetables, pigeon + pigeon Soup,
Pot Rois weekly + fruit daily.
Shade the be Dyspeptic symptoms
a bismuth mixture is indicated and
a milk diet. Papaya (Pawpaw)
is of great value as a rule in
such cases.

The accommodation here is good.
In hospital 33 days on the
Average. Normally all symptoms
have disappeared within 3 weeks.
Man is then examined having
special regard to heart symptoms.
If normal, is put to work
for a week or 10 days about
the hospital, cleaning, woodcutting,
raek breaking or any other kind of
that time found to become the work.
He is reported to the Committee as fit.
I discharged from hospital to his usual work. If the work during the 10 days he was treated rather too much for his weakness, his heart's action unduly, or if he says he is not fit to go to work he is allowed to remain an inpatient for a further varying period.

The "Nunwevers" is generally an opinion broader, who come to the dispensary in the morning with a very fast heart & looking ill. He is generally admitted— he is an alight at 11 a.m., & then in the course of the day his heart

questions down. The looks very much better. He is discharged in a few days. But the opinion sufficient to a man who is prone to disease, especially to gastro-intestinal troubles. One must be careful in sending them away from the dispensary with simply a box of medicine, or in discharging from hospital.
A record is kept giving the period of a patient's sojourn in hospital, and the date of admission before discharging a man. I give a few instances:

Chung Hong  
Admitted 1804 11.8.04  
Discharged 26.12.04  
Re-admitted 1.2.05  
Discharged 4.4.06  

No further record of British troops on the Island.

Ng Kow  
Admitted 2.5.04  
Discharged 2.6.04  
Re-admitted 2.8.04  
Discharged 23.11.04  
Re-admitted 21.12.04  
Discharged 30.1.05  

Obviously, this man was discharged 160 days on 8.12.04 — he was back in hospital within a fortnight.
Chan Moon came 17. 5. 06
Admitted 18. 6. 06
Discharged 24. 11. 06
No further remedy required.

Lok Han Lam came 5. 2. 06
Admitted 24. 4. 06
Discharged 8. 6. 06

Readmitted 27. 7. 06
J. Discharged 23. 11. 06
Readmitted 6. 12. 06
Discharged 18. 2. 06.
J. Discharged too soon.

In the 'heli' type of this disease, he is much greater anxiety. This class of case is seen on Christmas Island, in some cases, which have been discharged too soon or have neglected to come to hospital until the disease has got a grip of them. These cases are becoming fewer.
A specific mixture of Potassium Arsenate 918
Pen. Nitric gr 8 : Lignum Ammon.
Acet. 31 : Syrup ad 3' to be used as
a thick mixture.

Also large doses of Magnesia Sulphate
is given provided the patient is not
vomiting too severely.

3. Belladonna a 1/2 - m 1/8 : St. Aethm.
4. Petrol. h x 1/2 - is given frequently.

If nausea the vomitings - a gastric
sedative is given.

The food is prepared in milk, boil
or roommate or the first week
at least in such a case.

Oedema generally does not
last more than 10 to 14 days
if the patient is going to recover.

Kynochic hypodynamically or
by the mouth alone, or combined
with Digitalis is often very
relaxing.

I have tried\th
ting to the limits
in many of the Oedema\'s cases
but cannot say that it proved of much
pump in. Depleting the fluid any more quickly.
- Not. Careful diet, attention to keeping
bouls fairly loose, a digitalis
mixture with digitalis & strychnia,
is generally sufficient.

But some of the worst cases go on
to the 4th class viz. that is
acute, prostration, mercuric ammonia.
Many also of these cases do not
show any symptoms of diarrhea.
They come to term without gray in the
face, with dyspepsia, great pain
in the heart, profuse & frequent
vomiting.

Very few of these cases recover.
As prostraitia may be called
now. When I arrived at the scene
as much as I was given with
the small that the
illnesses
named it the "meat & nice York
Shire" - "the grave-yard Medicine."
A little less dose may be given
at most or less frequent intervals, but
results are not encouraging. Morphia is often necessary to
relieve the great pain.

Bleeding may be tried—I confess I have not found it of much
use—indeed I hate that these
cases do not recover or
it simply remains for the
Doctor to carry the patient's
part from life to death.

Chlorine mixture I have found of consid-
erable value in the acute treatment
of Burnin. A 12 ounce mixture is
prepared by pouring 30 grs of powdered
potassium chloride into the bottle, then
pouring in 60 minims of strong hydrochloric
acid. Chlorine gas being then liberated, water
is gradually slowly added, making well
with each addition of the water.

In cases of beginning burnin, with some
disinfection of the gastro-intestinal tract,
this mixture given in one or two course
threes is certainly beneficent.
Chlorine must be one of the strong medicines given at the out patient department.


Diaphoretic Mixtures = 43
Quinine = 67
Neysor Sulphate = 65
Acamo. Cola + L'curare = 56
Cipero's Syrup = 80
Rotes. Lardise = 7
Chlorine Mixtures = 36
No Treatment = 90.

During this period 12 deaths occurred altogether.
3 patients were on Diaphoretic Mixtures + Heart Injics.
3 patients were on Quinine mixtures + Heart Injics.
3 patients were on Heart Injics + Morphine.
3 patients visited the dispensary and took no medications first then on Heart Injics + Morphine.
I have drawn attention in this paper to the continuance of life on Christmas Island, to the great diminution of mortality both in cases of the beach rate and I have tried to show that Siam rice has much to do with causing the disease. It may be that we are more favourably placed on Christmas Island than others in the Federated States. The Christmas Island Company has done much to stamp out the disease, but I think probably more than the trading companies of the F.M. & have done. Now in every other supply sanitation generally, the certainty not so efficient as on Christmas Island. They are also faced with malaria, more dysentery and other intestinal diseases than we have. In many cases the Kupapa of the Trading Companies are entirely under the charge of half-caste children.
whose knowledge is not great

more particularly as regards

military measures, or who

are under the thumb of the

local Manager. The manager

must have men to work in

mines or plantations, the result

being that patients are not

admitted in time

and discharged too soon.

If we pay each of them

300 rupees to build fresh

cottages and hospitals and

staff the latter with a qualified

doctor, nurses, attendants,

Assistant Surgeons, 

and Natives, and the

matters recently been taken over

by the British Government; this

will be a great increase in the

development of these countries.

Clinical labour will also

largely increase. If these new

camps are supplied with

good rice, and the other points

and attended to, then they can
family will be tennis. Barrier outbreaks.

I asked photographs re: -

1. Views of the hospital
2.認めぬ青年
Partly Hospital with Dresser's quarters on Phelp's Hill.

Part of European Settlement, Flying Fish Cove.
Death Rate for Live or Population per month for the whole year 1904.

<table>
<thead>
<tr>
<th>Month</th>
<th>No. of Residents</th>
<th>No. of Deaths</th>
<th>Death Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>840</td>
<td>8</td>
<td>9.52</td>
</tr>
<tr>
<td>February</td>
<td>863</td>
<td>11</td>
<td>12.75</td>
</tr>
<tr>
<td>March</td>
<td>828</td>
<td>2</td>
<td>2.41</td>
</tr>
<tr>
<td>April</td>
<td>867</td>
<td>14</td>
<td>16.14</td>
</tr>
<tr>
<td>May</td>
<td>959</td>
<td>18</td>
<td>11.49</td>
</tr>
<tr>
<td>June</td>
<td>947</td>
<td>5</td>
<td>5.27</td>
</tr>
<tr>
<td>July</td>
<td>927</td>
<td>10</td>
<td>10.78</td>
</tr>
<tr>
<td>August</td>
<td>919</td>
<td>12</td>
<td>13.05</td>
</tr>
<tr>
<td>September</td>
<td>945</td>
<td>8</td>
<td>8.46</td>
</tr>
<tr>
<td>October</td>
<td>895</td>
<td>18</td>
<td>16.76</td>
</tr>
<tr>
<td>November</td>
<td>914</td>
<td>9</td>
<td>9.80</td>
</tr>
<tr>
<td>December</td>
<td>960</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>


The Table includes All Deaths.

No. of Bereaved: Deaths, for year = 92.
1906.

<table>
<thead>
<tr>
<th>Month</th>
<th>Population</th>
<th>Deaths</th>
<th>Death Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>980</td>
<td>4</td>
<td>4.08</td>
</tr>
<tr>
<td>February</td>
<td>994</td>
<td>1</td>
<td>1.01</td>
</tr>
<tr>
<td>March</td>
<td>1034</td>
<td>5</td>
<td>4.82</td>
</tr>
<tr>
<td>April</td>
<td>1051</td>
<td>7</td>
<td>6.61</td>
</tr>
<tr>
<td>May</td>
<td>1038</td>
<td>1</td>
<td>0.95</td>
</tr>
<tr>
<td>June</td>
<td>1080</td>
<td>1</td>
<td>0.94</td>
</tr>
<tr>
<td>July</td>
<td>1060</td>
<td>1</td>
<td>0.94</td>
</tr>
<tr>
<td>August</td>
<td>1087</td>
<td>2</td>
<td>1.84</td>
</tr>
<tr>
<td>September</td>
<td>1115</td>
<td>1</td>
<td>0.89</td>
</tr>
<tr>
<td>October</td>
<td>1116</td>
<td>2</td>
<td>1.79</td>
</tr>
<tr>
<td>November</td>
<td>1180</td>
<td>3</td>
<td>2.72</td>
</tr>
<tr>
<td>December</td>
<td>1084</td>
<td>1</td>
<td>0.92</td>
</tr>
</tbody>
</table>

Total deaths = 21, Death Rate = 19.93

March deaths = 7, April deaths = 4

Annual deaths 1905 = 620
Deaths in March = 6, April = 11.
<table>
<thead>
<tr>
<th>Year</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.077</td>
<td>1.069</td>
<td>1.060</td>
<td>1.043</td>
<td>1.043</td>
<td>1.102</td>
<td>1.107</td>
<td>1.124</td>
<td>1.136</td>
<td>1.149</td>
<td>1.146</td>
<td>1.140</td>
<td>31</td>
</tr>
</tbody>
</table>

Deaths:

- Jan: 2
- Feb: 3
- Mar: 6
- Apr: 4
- May: 5
- Jun: 4
- Jul: 2
- Aug: 1
- Sep: 2
- Oct: 1
- Nov: 1
- Dec: 1

Total deaths: 31

Total death rate: 24.96

Births:

- Jan: 1

Total births: 1

Total births in 1906: 1

Total deaths in 1906: 31

Total deaths in 1906: 24.96
<table>
<thead>
<tr>
<th>Month</th>
<th>Pounds</th>
<th>Draft</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>1140</td>
<td>1</td>
<td>0.877</td>
</tr>
<tr>
<td>February</td>
<td>1140</td>
<td>1</td>
<td>0.877</td>
</tr>
<tr>
<td>March</td>
<td>1145</td>
<td>1</td>
<td>0.871</td>
</tr>
<tr>
<td>April</td>
<td>1091</td>
<td>1</td>
<td>0.916</td>
</tr>
<tr>
<td>May</td>
<td>1904</td>
<td>1</td>
<td>0.910</td>
</tr>
<tr>
<td>June</td>
<td>1113</td>
<td>3</td>
<td>2.699</td>
</tr>
<tr>
<td>July</td>
<td>1158</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>August</td>
<td>1150</td>
<td>1</td>
<td>0.869</td>
</tr>
<tr>
<td>Sept.</td>
<td>1156</td>
<td>1</td>
<td>0.861</td>
</tr>
<tr>
<td>Oct.</td>
<td>1164</td>
<td>1</td>
<td>0.869</td>
</tr>
<tr>
<td>Nov.</td>
<td>1181</td>
<td>3</td>
<td>2.640</td>
</tr>
<tr>
<td>Dec.</td>
<td>1174</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Total: 14 = £2.274

Direct from Beni Eri in 1907 = 85.
Books referred to in preparation of the thesis:

Studies from the Institute for Medical Research, 1932.

"On classification and pathology of Beriberi" Vol. 2 No. 2 (H. Knight)

"An inquiry into the etiology and pathology of Beriberi" (H. Wright)

[Miscellaneous notes]

Studies Vol. 4 Part I

"Observations in the Federated Malay States on Beriberi" (C.W. Daniels)

"Beriberi", an essay by P. N. Garrard

An article on "Beriberi" in "Scherzer's "Dizionario della Storia dei Crocifissi""

Manson's "Tropical Medicine"
"Notes on Malaria of Beriberi" by H.E. Durham reprinted from Lancet British Medical Journal 27 Feb. '04.

H.E. Durham - "Notes on Beriberi in the Malay Peninsula and Christmas Island (Indian Ocean)" (Journal of Hygiene, January 1904.)

also printed report by Durham to Christmas Island Police Co.


"On the Probable Cause of Beriberi by a Fungi" (Selangor Government Press 1907.)

"Some papers on the Renal Syndrome" Branch of B.M.A. 1907.
E. H. H. - article on British
medical journals on
Oct. 28th 1906 - fibre
debate making of B.M. Assoc
pe 'pile' or 'pawing' piece
causa y Britani'.

Rakshavin 1 (translated 1
Pally) - on the nature of cane
y Britani'.

E. A. Francesco - 'The Theory of the Causation
1. Britani l a homi convenue
y'Hee i the light of
local reference to the
discur' Journal of
Imperial medicine vol 5 1912.
2. Further observations on the
Ries Theoy of Britani
- analogy to breeders
criticism of certain
experiments at Padok fast
('Selangor Government Press)
Papers which have appeared in the Journal of the Straits Branch of various local medical men.


Meteorological Reports of Christmas Island - compiled by W. E. Anderson & J. C. Douglas, Chemist to the Company.

Reports on Christmas Island by the District Office - Claydon 1902.
Eaton 1902, Chapman 1903, Ridley 1903.
Allen 1903.
Beriberi on Christmas Island
by Mr. Montague

No flax—only 42 in 1000 showed
not of contamination

1. Kind 3 rice—water—stuffed—much gluten left

2. "Korow" rice—White Sam's Rapong
nei—initial stuffed—no gluten left—rice boiled

3. "Ani" nei is first soaked—steam
in the bucket, then rice—then boiled.
3. First soaked, then gluten large
removed

Brodie's theory is that "korneo" rice
sweat rice is "Beri Beri" rice—now just.
p. 88 Summary by Kelib

90: Continental
99: Containing "secured rent"

[MISSING TEXT]

42: Sekt a foot of jeni.