The Lancet, 1776. Dr. William Fletcher: Rice and Beri-Beri. [June 29, 1907.]

On the evening of the twenty-second day 20 cubic centimetres of antistreptococcal serum were given per rectum, repeated next day, and again on the twenty-seventh, thirty-first, and forty-first days to thirty-ninth days. During this time the pulse-rate varied between 100 and 130 per minute with profuse sweating and occasional vomiting. On the thirty-fifth evening following delivery I found the abdomen distended, dirty yellow colour, mixed with greyish-purple sloughs of splenic tissue, escaped. A large rubber drain-tube was passed into the cavity of the spleen and stitched to the skin incision. The temperature rapidly fell and in 48 hours was normal and remained so during convalescence, while the pulse-rate soon reached the number and bulk of sloughs that came away were extraordinary, but very little bleeding occurred. The cavity closed at the end of three weeks.

The interesting features of this case seem to be: (1) the spleen was the only organ or part affected; (2) though swollen it never lost its characteristic outline, but ceased to move on respiration; and (3) the large amount of splenic tissue lost in the form of sloughs and yet there are now (May, 1907) no apparent blood changes. I regret that no microscopic or bacteriological examination of the discharge was made, but the stench was so overpowering that a pathologist could not enter the room.

With regard to the pathology of this case it is probable that septic thrombosis of the veins at the placental site took place and from there an embolus was carried through the heart and pulmonary circulation into a branch of the splenic artery. As throwing a light on the reason why the spleen became the "seat of infection" for infective embolism and infarction, a history was given that three weeks previously to the operation. His case is very similar to the one I have described in or around the spleen which subsequently became infected. It is therefore probable that a hæmorrhage, immediate and remote.

The wound was plugged with gauze and uninterrupted recovery followed. It is doubtful whether this patient suffered from enteric fever or whether the abscess followed by dyspnoea and a pleuritic effusion was caused in or around the spleen which subsequently became infected. It is therefore probable that a hæmorrhage, immediate and remote.

The abscess of the spleen was the only organ or part affected; (2) though infected patient with its amount of shock and risks of hæmorrhage, immediate and remote.

Plymouth.

Rice and Beri-Beri:

Preliminary Report on an Experiment Conducted in the Kuala Lumpur Lunatic Asylum.


During the year 1905 an epidemic of beri-beri broke out in the Kuala Lumpur Lunatic Asylum. Commenting in "The Lancet," it reached its height in July and August, declining somewhat towards the end of December. Out of 219 lunatics treated in the asylum during the year 94 persons were affected, of whom 27 succumbed to the disease. The Government rapidly gave its consent and the experiment was commenced on Dec. 5th, 1905. The result up to Dec. 31st, 1906 (i.e., one year and 28 days) was that 34 out of 120 persons fed on uncurved rice suffered from beri-beri and 15 died, whilst among 123 patients dieted on cured rice there were no deaths from beri-beri and only two cases, both of whom were suffering from the disease on their admission to the asylum.

1. By uncured rice is meant the ordinary white rice, sold in the Federated Malay States as Rangoon or Siam rice, which is eaten by all classes except Indians and Malays. This rice after being harvested is taken to the mills, where it is husked and cleaned before being sold to the rice merchants. Cured rice is brownish in colour and forms the staple of diet of Indians and Ceylonese. The great difference between this rice and the uncured variety is that the former is boiled and dried before being sold.

The Malayas keep their rice stored unhusked and milled. The Malays after being soaked and then husked. B. Native Malay rice is stored after being boiled and then husked. C. Except unless otherwise stated the rice in the two parties—the rice of those on cured and those on uncured rice—received the same kind and the same amount of rations. Excreting the rice the food-stuffs for all patients were prepared and cooked in the same kitchen and cooked in the same cooking pots.

2. The lunatics are housed in two exactly similar buildings on opposite sides of a quadrangle surrounded by a high wall. On the 5th all the lunatics were fed on the rice. The 219 lunatics treated in the Kuala Lumpur Lunatic Asylum. Commencing in successful malaria treated by incision and drainage. 3. Mayo Robson in the Medical Annual for 1904, p. 651, refers to a case reported by Dr. G. Riolo in the Riforma Medica of April 24th, 1902, of a splenic abscess complicating malaria successfully treated by incision and drainage. Septicasmia, pysemia, and spleen occurs in the tropics during malaria or yellow fever, nor had she valvular disease of the heart. Abscess of the spleen was the only organ or part affected; (2) though
uncured rice (Siamese) as in 1905. The even numbers were quartered in the ward on the west of the quadrangle and received the same rations as the occupants of the other ward, with the exception that they were supplied with cured (Indian) rice instead of the uncured Chinese variety. The following is the ordinary diet of the lunatic asylum: fresh meat, four ounces four times a week; fresh fish, 5 ounces twice a week; salt fish, 5 ounces once a week; vegetables, eight ounces daily; curry stuffs, 1 ounce daily; and cocoa-nut oil, 1 ounce daily. Uncured rice: Slam, 28 ounces to be supplied as per sample for uncured rice ward; Bengal, 28 ounces to be supplied as per sample for cured rice ward.

At the commencement of the experiment all patients showing unmistakable symptoms of beri-beri were removed to the district hospital, which is two miles distant from the asylum. On Dec. 5th there were 59 lunatics in the asylum; of these 29 were put on cured rice and 30 on Siamese rice. The next patient admitted to the asylum was admitted to the Bengal rice ward, and the one admitted after him to the uncured rice ward, the next to cured, and so on alternately to the end of the year.

3. The knee-jerks of all patients in the asylum on Dec. 5th, 1905, were noted on that date and of those admitted subsequently on the dates of their admission. The presence or absence of oedema was noted at the same time.

Patients admitted to Siamese (Uncured) Rice Ward.

Knee-jerks average ....... 86 (21 developed beri-beri).

- absent .......... 12
- impaired ........ 1
- increased + .... 10 (5)
- ++ ...... 4 (2)
- ++++ ... 2 (2)

Two had beri-beri on admission.

22 patients in the Siamese rice ward had some oedema on admission.

Patients admitted to Bengal (Cured) Rice Ward.

Knee-jerks average .......... 79
- absent ........ 26
- impaired ..... 3
- increased + ... 5
- ++ ...... 3
- ++++ ... 3

No two had beri-beri on admission.

33 patients in the Bengal rice ward had some oedema on admission.

4. By June 20th many cases of beri-beri had occurred amongst the patients in the east ward who were eating uncured rice, whereas no cases had occurred in the west ward, the inmates of which were dieted on cured (Indian) rice.

5. In view of the theory so strongly advocated by Sir Patrick Manson that beri-beri is a place disease, it was thought possible that the east ward was infected. Therefore on June 20th the patients were transferred, those on uncured rice being moved to the west ward and those on cured (Indian) rice transferred to the east. From June 20th to Dec. 31st no beri-beri developed amongst the patients on cured rice although they were living in a ward where beri-beri had been rife amongst the lunatics who were fed on uncured (Siamese) rice.

6. From Nov. 3rd, 1905, until April 11th, 1906, all persons showing symptoms of beri-beri were transferred to the district hospital, as it was considered that the benefits would be to those suffering from this disease and also might possibly prevent the spread of it within the institution. In all 15 patients suffering from beri-beri were sent to the district hospital of whom nine died.

7. In April, as no patients on cured rice had developed beri-beri, it was thought that it might benefit those already suffering from the disease to withdraw them from the uncured rice diet and place them on the cured or Indian variety. From April 11th to Dec. 31st ten cases of beri-beri were transferred to the ward occupied by patients on cured (Indian) rice and were supplied with that rice instead of the uncured variety which they had been taking when they developed the disease. All these ten patients recovered.

It is worthy of note that although patients actually suffering from beri-beri were put to live amongst the lunatics fed on cured rice none of the latter developed the disease. This, as far as is goes, is opposed to the theory of Dr. C. W. Daniels that beri-beri is a parasite disease, probably protocol, conveyed by the agency of bugs or rice. Neither does the above result conform to Dr. Hamilton Wright's theory that beri-beri is an infectious disease communicated from patient to patient by means of the excreta. In a separate communication it should be mentioned that in September, 1905, it was noticed that the lunatic asylum was infested with bugs, and at the suggestion of Dr. Daniels some of these were collected and put on monkeys, mice, and guineapigs, from the beri-beri were removed to consume the same rice as the asylum. Later the bacteriologist made an emulsion of some bugs taken from the lunatic asylum and injected it beneath the skin of an orang-outang. None of the animals showed any symptoms of beri-beri. The bugs therefore are not to a great extent got rid of before the commencement of 1906 by means of hot water, sun, perchloride of mercury, and tubes root, but they still are, and, I am told, always have been present in the old building.

8. With regard to the same co-management of the lunatics, the two batches of patients are both fed in the same shed but at different times and at different tables, these patients on cured rice diet commencing their meal when the patients on Siamese rice have finished. The two batches of patients are only separated at night and when eating their meals; at other times they associate together in the courtyard and are employed outside the asylum in working parties. The patients who were sano enough and strong enough physically to be employed in working parties at the asylum enjoyed no special immunity to beri-beri but suffered equally with those patients not so employed. 12 out of 34 persons affected with beri-beri belonged to the outdoor working party.

9. The uncured (Siamese) rice supplied to the asylum was of excellent quality (No. 1) and much better than that to which persons of the class from which the patients are drawn are accustomed outside the asylum. No mouldy or stale rice was given. The cured or Indian rice was of No. 1 quality. It was not Province, Siam, or Rangoon rice cured in Penang, but the small, round-grained Indian rice grown in India. The rice was cooked in the usual Eastern manner.

The following is the procedure. It is first washed with cold water in galvanised-iron buckets. It is then thrown into a shallow iron pan or kwali half full of hot water, which is placed over a wood fire. In about 20 minutes the rice has swelled and has taken up all the water (a little earlier in the case of the Siamese rice and later in the Indian variety). It is then stirring round twice with a large spoon or chakor burning and the rice could be soluble in water. Through the course of the experiment at the asylum a separate kwali, or cooking-pot, was used for each kind of rice and no un-supposed to cause beri-beri be soluble in water. Throughout the same way. Later the bacteriologist made an emulsion of some bugs taken from the lunatic asylum and injected it beneath the skin of an orang-outang. None of the animals showed any symptoms of beri-beri. The bugs therefore are not to a great extent got rid of before the commencement of 1906 by means of hot water, sun, perchloride of mercury, and tubes root, but they still are, and, I am told, always have been present in the old building.

10. It has already been mentioned that 10 patients who had been eating uncured rice and had developed beri-beri were transferred to the Bengal rice diet and recovered. The admission of these patients caused some overcrowding in the asylum. The uncured rice ward was therefore scraped out and given to the patients on cured rice, the latter being transferred to the ward occupied by patients on uncured rice ward and put on a diet of uncured rice. These men were not selected in any way, but the first four names on the Bengal rice list were taken. They were apparently healthy and had been on a diet of cured rice since
Dec. 5th, 1905. The following is a list of these four patients and the result of their transfer:—

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Transferred to unured rice</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stilieh.</td>
<td>24/4/06</td>
<td>Remains healthy.</td>
</tr>
<tr>
<td>2</td>
<td>Foo Lim.</td>
<td>7/3/06</td>
<td>Developed beri-beri on 7/3/06. He had had beri-beri 15 months before.</td>
</tr>
<tr>
<td>3</td>
<td>Hee Chong.</td>
<td>27/4/06</td>
<td>Developed oedema and some weakness.</td>
</tr>
<tr>
<td>4</td>
<td>Qual Kiam.</td>
<td>23/8/08</td>
<td>Developed beri-beri 27/8/06 and died on 24/9/06.</td>
</tr>
</tbody>
</table>

No conclusion can be based on the above, the numbers are too small; but one cannot help being struck by the fact that 10 patients suffering from beri-beri transferred to Bengal (cured) rice all recovered, whereas of four apparently healthy men transferred from Bengal to Siamese (uncured) rice two developed beri-beri, one of whom died.

11. At the commencement of the experiment on Dec. 5th, 1905, there were 59 patients remaining in the asylum; 59 of these patients were on a diet of cured rice and 30 remained on Siam rice. From Dec. 5th, 1905, to Dec. 31st, 1906, 30 lunatics were admitted to the Siamese rice ward, 17 of them developed beri-beri; whilst of the 30 remaining on Dec. 5th, 1905, 13 developed beri-beri before Dec. 31st, 1906. During the course of the experiment four lunatics were admitted to the asylum who were already suffering from beri-beri. They were admitted on the following dates:—Dec. 10th, Jan. 23rd, March 19th, and June 6th. Two of these patients were on Siam rice and two on Bengal rice. The majority of the cases of beri-beri occurred amongst lunatics who had been in the asylum for a considerable time.

In all 36 persons suffered from beri-beri. One patient had three attacks and seven on a diet of cracked rice had a fourth attack. Whether the eight patients who were attacked with beri-beri more than once during the experiment actually suffered from a fresh "infection" (if one may use the word in this connexion) or whether the subsequent attacks were of the nature of relapses it is impossible to determine from our lack of knowledge of the actual cause of the disease.

Of the 36 persons who suffered from beri-beri 18 died during their first attack; ten were transferred to the cured rice ward, and all recovered; of the ten patients who remained on Siam rice two were discharged from the asylum before being attacked a second time and eight had relapses.

12. The mortality of the lunatics on either diet was much the same except with regard to beri-beri:—

<table>
<thead>
<tr>
<th>Cause of death</th>
<th>Number of deaths (Bengal rice)</th>
<th>Number of deaths (Siam rice)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beri-beri</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>Mania</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Other causes</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Dysentery</td>
<td>11</td>
<td>11</td>
</tr>
</tbody>
</table>

**Conclusions.**

13. A. Amongst 120 patients on unured rice there were 43 cases of beri-beri (two admitted with the disease) and 18 deaths. Amongst 123 patients on cured rice there were two cases of beri-beri, and two deaths. B. Ten lunatics actually suffering from beri-beri who were placed on a diet of cured rice all recovered. Of 26 patients suffering from beri-beri who were not put on a cured-rice diet 18 died. C. None of the ten lunatics suffering from beri-beri who were placed on a diet of unured rice had a relapse. Of the 26 patients suffering from beri-beri who were not transferred to a cured-rice diet 16 died during the first attack and the remaining ten all developed beri-beri again with the exception of one who was discharged, being no longer insane. The latter have been lost sight of and whether either of them subsequently relapsed is unknown.

14. In an experiment of this nature the personal factor always comes in question. It may, therefore, not be out of place to state here that at the commencement of the experiment the opinion was held by myself that rice was neither directly nor indirectly the cause of beri-beri. It was fully expected that the patients on Bengal rice would suffer from beri-beri to the same extent as those who remained on the Siamese variety and that the result of the experiment would be a refutation of the rice theory. With this in view precautions were taken to provide separate cooking utensils, plates, &c., for each set of patients so that the upholders of the rice theory might not be able to point to any possibility of contamination of the Bengal rice with the poison which is supposed to be present in unured rice. Contrary to expectation, the result of the experiment, so far as it goes, is to prove the truth of Dr. Braddon's contention that unured rice is the cause of beri-beri. It remains to be proved whether the cause of the disease amongst the eaters of unured rice is a poison contained in the rice or whether it is a specific to which there is an allergic reaction in the human economy which is supplied by the cured rice whilst it is absent in the unured. Takaki and the Japanese school still hold that a deficiency of proteids in the diet is the cause of beri-beri. As yet it has, unfortunately, not been possible to obtain analysis of the two kinds of rice; but when this is done it will probably be found that the cured rice contains a larger quantity of proteid matter than the unured. If this be the case the deficiency of proteid matter in the diet may be the actual cause of the disease, or, what is more likely, the lack of nutriti vematter in the rice may induce a condition in the patient which renders him an easy prey to some external agency—bacterial or protozoal—which is the actual cause of beri-beri. It is well known that insanitary conditions of the body render it specially liable to the attacks of beri-beri, &c., syphilis and the puerperal state.

15. Uncured rice is, either directly or indirectly, a cause of beri-beri, the actual cause being either (1) a poison contained in the rice; (2) deficiency of proteid matter, the disease being due to nitrogen starvation; or (3) unured rice does not form a sufficiently nutritive diet and renders the disease amongst the eaters of uncured rice a poison contained in the rice or whether there is something essential to the nature of abortive attacks. The following record of an examination of the knee-jerks and of the presence or absence of oedema amongst the patients now in the asylum may be of interest. The examination was made on May 19th, 1907. The results were as follows: the knee-jerks of patients on unured rice were absent in 10 out of 37, whereas of those on cured rice all recovered, whereas of four apparent treated to unured rice. Two of these patients developed beri-beri within three months.

Summary.

In an experiment of this nature the personal factor always comes in question. It may, therefore, not be out of place to state here that at the commencement of the experiment the opinion was held by myself that rice was neither directly nor indirectly the cause of beri-beri. It was fully expected that the patients on Bengal rice would suffer from beri-beri to the same extent as those who remained on the Siamese variety and that the result of the experiment would be a refutation of the rice theory. With this in view precautions were taken to provide separate cooking utensils, plates, &c., for each set of patients so that the upholders of the rice theory might not be able to point to any possibility of contamination of the Bengal rice with the poison which is supposed to be present in unured rice. Contrary to expectation, the result of the experiment, so far as it goes, is to prove the truth of Dr. Braddon's contention that unured rice is the cause of beri-beri. It remains to be proved whether the cause of the disease amongst the eaters of unured rice is a poison contained in the rice or whether it is a specific to which there is an allergic reaction in the human economy which is supplied by the cured rice whilst it is absent in the unured. Takaki and the Japanese school still hold that a deficiency of proteids in the diet is the cause of beri-beri. As yet it has, unfortunately, not been possible to obtain analysis of the two kinds of rice; but when this is done it will probably be found that the cured rice contains a larger quantity of proteid matter than the unured. If this be the case the deficiency of proteid matter in the diet may be the actual cause of the disease, or, what is more likely, the lack of nutriti vematter in the rice may induce a condition in the patient which renders him an easy prey to some external agency—bacterial or protozoal—which is the actual cause of beri-beri. It is well known that insanitary conditions of the body render it specially liable to the attacks of beri-beri, &c., syphilis and the puerperal state.

Conclusions.

15. Uncured rice is, either directly or indirectly, a cause of beri-beri, the actual cause being either (1) a poison contained in the rice; (2) deficiency of proteid matter, the disease being due to nitrogen starvation; or (3) unured rice does not form a sufficiently nutritive diet and renders the patient's system specially liable to invasion by a specific organism, which is the cause of beri-beri.
had been on this diet for a considerable period; in eight of these 16 cases the knee-jerk was absent and in three it was increased, while in five oedema was present. In all those eight cases on Bengal rice in which the knee-jerks were absent they were noted as being absent on admission. Three were canalicular thromboses which had been transferred to a Bengal rice diet after having developed beri-beri whilst on a Siam rice diet. Two had been treated for beri-beri in other hospitals, two gave a history of previous attacks. In one case the cause of reflex is unknown. Since the end of December, 1906, up to the present date (May 19th, 1907) 12 cases of beri-beri have developed amongst the patients on a Siamese uncured rice diet. No patients on Bengal (cured) rice have suffered from the disease. The 12 cases occurred as follows:

<table>
<thead>
<tr>
<th>Duration</th>
<th>Number of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>During the first month of residence</td>
<td>3</td>
</tr>
<tr>
<td>During the second month</td>
<td>2</td>
</tr>
<tr>
<td>During the third month</td>
<td>0</td>
</tr>
<tr>
<td>After residence upon this diet</td>
<td>0</td>
</tr>
<tr>
<td>Relapse cases</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
</tr>
</tbody>
</table>

Thus from the commencement of the experiment in December, 1905 (excluding patients actually suffering from the disease on their admission to the asylum), there have been (41 + 12) 53 cases of beri-beri amongst the patients on Siamese rice and none amongst those on a Bengal rice diet. 

Kuala Lumpur, Federated Malay States.

Medical Societies.

SOCIETY FOR THE STUDY OF DISEASE IN CHILDREN.—The annual provincial meeting of this society was held on the 11th at Bedford, Dr. R. H. Coombs being in the chair. Dr. C. O. Edgerton opened a discussion on Acute Rheumatism in Childhood. He referred to the considerable change which had taken place in the professional view of the age incidence and to the special characters which distinguish the disease in childhood, especially the frequency of relapse cases. He advocated the practice of informing the parents of rheumatic families of the risks involved even in the apparently trivial illnesses of their children. He thought that there was too ready a tendency to apply the term "rheumatism" to isolated events, the nature and origin of which were obscure. He also discussed the prophylactic and specific treatment. Dr. W. Ewart suggested that the glandular condition of early childhood was less prone to favour retardation in the joints and the child could rile himself of disease in the joints and it would find a cure elsewhere. He suggested calomel and antiphlogistic remedies in the treatment of endocarditis. Dr. A. Morison referred to erythema nodosum, which, he said, was not limited to rheumatic subjects; it was generally preceded by tonsillitis at an interval of from 10 to 14 days. He referred to a case in which the disease appeared after a long rest in bed after active endocarditis had passed away, which was frequently done owing to the reappearance of a small fever. Dr. G. A. Sutherland thought that it was a mistake to prolong rest in bed after active endocarditis had passed away, which was frequently done owing to the reappearance of a small fever without any rise of temperature. The view held by Dr. Da Costa that constipation was a frequent cause of post-typhoid pyrexia did not receive support from this and other cases. They usually occurred in those who were of a nervous introverted temperament and were of purely nervous origin. In the second group the fever was of indefinite length, lasting from eight days to one month, during which time the temperature never rose above 37.5° C. Among this group the fever was of a remitting type, suggestive of chronic septicaemia. The general condition showed a progressive wasting and later cardiac weakness. Some were mild and others were very severe infections. The treatment adopted in checking the fever was as speedy a return to full diet as was consistent with safety. Salicylate of soda was found to be of no avail. In one case septic accumulation had occurred before the onset of the secondary fever without any rise of temperature. The view held by Dr. Ewart that constipation was a frequent cause of post-typhoid pyrexia did not receive support from this and other cases. There were six cases of this type, the last being a remarkable case of post-typhoid mitral endocarditis developing nine weeks after the primary fever had abated. It was argued from a similarity of the type of fever in Groups 2 and 3 that the second group could fairly be said to be of septic origin.