

## **Beri-beri in Japan. Alan Macfarlane**

Equally important was the spread of a curious wasting disease which was finally traced to a particular inadequacy in the diet. This was beri-beri, or **Ka-Ke** as it was known in Japan.

It is worth exploring this topic in a little more detail as an example of the fact that the methods of preparation of food for consumption and the balance between different food-stuffs are as important as the absolute quantities eaten.

Chamberlain noted that one of the three diseases which 'make most havoc' in Japan is 'kakke'. It appears that the oldest record of this disease is in 744 A.D.<sup>1</sup>, but it was only in the nineteenth century that it became of major importance. This was described by Wernich, working in Japan in 1877 as 'a murderous endemic plague'.<sup>2</sup> Guggenheim suggests statistics of rates 'in various Japanese garrisons' which amounted to '14% in 1877, 38% in 1878, and even as high as 23% to 40% in the Japanese Navy in the years 1878-1883.'<sup>3</sup> Griffis in the 1870's called 'kakke' 'leg-humour' and suggested it was 'peculiar to Japan'.<sup>4</sup> Isabella Bird gave further details. She noted that 'In the two villages of Upper and Lower Innai there has been an outbreak of a malady much dreaded by the Japanese, called **kak'ke**, which, in the last seven months, has carried off 100 persons out of a population of about 1500, and the local doctors have been aided by two sent from the Medical School at Kubota.' She then proceeded to describe its symptoms. 'Its first symptoms are a loss of strength in the legs, "looseness in the knees", cramps in the calves, swelling, and numbness. This, Dr. Anderson, who has studied **kak'ke** in more than 1100 cases in Tokyo, calls the acute form. The chronic is a slow, numbing, and wasting malady, which, if unchecked, results in death from paralysis and exhaustion in from six months to three years.'<sup>5</sup>

Chamberlain gave a detailed account of it. 'Kakke is the same disease as that known in India and the Malay peninsula under the name of beri-beri, and may be defined in popular language as a sort of paralysis, as it is characterised by loss of motive power and by numbness, especially in the extremities.' It 'attacks with special frequency and virulence young and otherwise healthy men - women much less

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<sup>1</sup>Kiple (ed), *Diseases*, 374

<sup>2</sup>quoted in Guggenheim, *Nutrition*, 227

<sup>3</sup>ibid

<sup>4</sup>Griffis, *Mikado*, 580

<sup>5</sup>Bird, *Tracks*, 149

often, scarcely ever indeed except during pregnancy and after childbirth. Children of both sexes enjoy almost absolute immunity.' He noted that 'till about fifty years ago, it was confined to a few ports of the Pacific coast of Japan and to some large cities in constant communication with those ports, such as Kyoto; and in all these localities, barracks, schools, and prisons were the places most affected.<sup>6</sup> Although he had identified it as beri-beri, it is clear that beri-beri at that time was still thought of as a contagious or infectious disease. 'Whether kake is indigenous or imported, is a question that cannot yet be answered; but the latter alternative seems the more probable, as the first mention of it occurs only two hundred years ago.'<sup>7</sup>

Mrs. Fraser in 1891 gave the following early account of the growing knowledge of a link to diet. She went to a hospital and Dr Hashimoto 'explained to me the evolution of that extraordinary disease **kakke**, which seems to be a purely Japanese ailment. The muscles of the legs become useless, without any symptoms of paralysis, and gradually waste away, leaving the limb cold and shrivelled. The disease attacks men, and hard-working men more than any other class of the community, and is frequent in districts where the people live on rice alone as their staple food. My **amah** tells me that in her province, where a kind of rough oatmeal is mixed with the food, the disease is almost unknown. The soldiers suffer from it a good deal; but it is hoped that the meat diet lately introduced in alternation with the native rice and fish food will do much to overcome the weakness.'<sup>8</sup>

The discovery of the connection between white rice and beriberi was currently being made by Japanese and Dutch scholars.<sup>9</sup> A detailed account of beriberi shows how the disease works. It is strongly connected with a rice diet.<sup>10</sup> The conventional wisdom among some scholars of Japan is that it is the milling of the rice that caused the problem. 'Obviously, in retrospect, the cause was an increase in the eating of polished rice, resulting in thiamine deficiencies.'<sup>11</sup> 'White, or polished, rice was considered the highest quality, and this tended to be eaten in cities.' This led to the 'Edo affliction' as it was known,

<sup>6</sup>Chamberlain, *Things*, 269

<sup>7</sup>Chamberlain, *Things* 269

<sup>8</sup>Fraser, *Letters*, ii, 331-3

<sup>9</sup>Davidson, *Nutrition*, 137, 281

<sup>10</sup>Guggenheim, *Nutrition*, ch.9

<sup>11</sup>Rozman, (eds), *Transition*, 455

which disappeared when people went back into the countryside.<sup>12</sup> The attraction of industrial milling is obvious, not merely in terms of the 'whiteness' of the rice, but the saving on labour. It is therefore not surprising that mechanical rice mills have spread among the rice-eating people. The housewife is relieved of domestic labour, at no financial cost, since many mills are content to retain as their fee the bran removed, which is sold as cattle fodder. Mills can produce a highly refined rice, almost devoid of vitamins as Table 15, 5 shows.<sup>13</sup> In contrast, if rice is pounded by the traditional methods, using a foot-operated pounder in the village, it normally retains over half of the outer layers of the grain, thus conserving the greater part of the vitamins. Home-pounded rice is essentially a high-extraction cereal grain and a satisfactory source of B vitamins.<sup>14</sup>

That the problem may not only have lain in the milling, but also in the washing, is suggested by others. It is well known that heavy washing of rice was linked to the question of milling. Thus we learn that 'In northern China, Korea, and Japan, the rice hulls were traditionally removed before shipment in order to reduce bulk. When the rice reached the cities, it was so crawling with weevils that the subsequently highly-milled rice was covered in weevil juices and thus often treated with talc. Cooking procedures called for the rice to be thoroughly washed several times. The first washing alone removed half of the thiamine.'<sup>15</sup> This ties up with 'Experiments conducted under cooking conditions common in south India showed that half the thiamine and nicotinic acid that escaped the mills might be thrown away as domestic waste.'<sup>16</sup> Certainly a very heavy and exclusive diet of milled white rice, which was particularly common in Tokyo (Edo) where the rice rents were paid to the daimyo, is the root of the problem. Those who then try to work particularly hard, labourers, soldiers and others, as was observed, suffer acutely from the thiamine deficiency. The fact that women and children were largely free of the disease could be explained either by the fact that they had a more mixed diet (perhaps including more of the important radish), or that they did less physical exercise in the cities, or both. The particular susceptibility of women around childbirth is worth noting.

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<sup>12</sup>Hanley, in *Cambes, Hist.* 4, 683

<sup>13</sup>Davidson, *Nutrition*, 169

<sup>14</sup>Davidson, *Nutrition*, 169

<sup>15</sup>Kiple (ed), *Diseases*, 607

<sup>16</sup>Davidson, *Nutrition*, 170