

## FOOD AND WATER-BORNE DISEASE

A major route into the human body for disease bacilli is through the mouth by way of contaminated food and drink. This is particularly important since such contamination will tend to increase, all else being equal, as human beings live in more crowded conditions, fouling their water supplies and increasing the danger of food pollution.

### **Dysentery.**

I start with that wide class of enteric diseases, often carried through water-borne infections, which are often termed 'dysentery'. They lie on the borderline between epidemic and endemic disease. Usually the various diseases are endemic, but there may be epidemic outbreaks. There are two major branches of dysentery, bacillary and amoebic.

Dysentery is of major importance in most non-western societies, as anyone who has spent time in a Third World country today knows. Crosby describes how 'enteric infections have 'unquestionably' killed 'more humans in the last few millenia than any other class of diseases, and are still doing so.'<sup>1</sup> It is estimated that in some tropical areas, more than fifty per cent of the population carry amoebic dysentery.<sup>2</sup> If we take just amoebic dysentery 'In 1981, it was estimated that there were about 480 million infected people in the world: 290 million in Asia, 80 million in Africa, 90 million in the Americas, and remarkably, 20 million in Europe.'<sup>3</sup> Another guess was that some 750 million people, or a quarter of the world's population, suffered from dysentery in 1963.<sup>4</sup> It is particularly dangerous for young children and many infant deaths are caused by de-hydration. It is often difficult to distinguish these from other deaths, so that the whole category has been lumped under the term 'pneumonia-diarrhoea complex'. It is estimated that in many developing nations, and probably up to the end of the nineteenth century in a number of western cities, this complex was 'implicated in at least half of all infant deaths and a high proportion of deaths of children aged between 1 and 5 years.'<sup>5</sup> One estimate suggests that, on average,

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<sup>1</sup>Crosby, *Ecological*, p.208

<sup>2</sup>Merck, *Manual*, 826

<sup>3</sup> Kiple (ed), *Diseases*, 569

<sup>4</sup> Harding, *Epidemiology* (xerox), 146

<sup>5</sup> Kunitz, *Speculations*, 352

a child in a developing country will suffer two months of diarrhoea per year.<sup>6</sup> 'On average, a rural Gambian child suffered from gastro-enteritis for 13.1 per cent of the time, i.e. on about one day in eight...'<sup>7</sup> The effects of such diarrhoea, often caused by dysentery, are very considerable. 'Powander has calculated an average loss of 0.6g. of protein/kg/day during most illnesses, but this rises to 0.9g./kg./day with diarrhoea. At this rate of loss it is easy to understand that when diarrhoea occurs chronically over several weeks or even months, children can become irredeemably wasted.'<sup>8</sup> Schofield concludes that '...data from other parts of the developing world confirm diarrhoeal disease to be the most important cause of child morbidity and mortality.'<sup>9</sup>

If we turn to pre-industrial England, Wrigley notes that 'Dysentery has been little noticed in earlier discussions of crisis mortality in England', though 'On the continent dysentery has more readily been acknowledged as a major source of crisis mortality.' He believes that 'The seasonal pattern of local crisis mortality that emerges...suggests that they (intestinal infections)..may also have been major killers in the pre-industrial period' in England. (659<sup>10</sup>) This is supported by Clarkson's account. 'In London and the provincial towns dysentery was a regular summer visitor, and was an important cause of death among children.'<sup>11</sup> Creighton had noted that dysentery seems to have increased as a problem in seventeenth-century England.<sup>12</sup> Certainly it was believed at the time that 'Diseases of the Stomach and Intestinal Tube, are very universal and frequent maladies in both sexes, and throughout all orders and ages.'<sup>13</sup> There is considerable evidence for its virulence. Basing the estimate on the causes of death given in the Bills of Mortality, it is estimated that 'In London during the years 1667-1720, that is, after

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<sup>6</sup> Figures quoted in Dasgupta, *Inquiry*, 405

<sup>7</sup> Schofield, *Decline* (xerox), 134

<sup>8</sup> Schofield, *Decline* (xerox), 136

<sup>9</sup> Schofield, *Decline* (xerox), 134

<sup>10</sup> Wrigley, Schofield, *Population*, p.659

<sup>11</sup> Clarkson, 51

<sup>12</sup> Creighton, *Epidemics*, i, pp. 412-3: see the whole of ii, ch. viii for an account of dysentery in England.

<sup>13</sup> Black, *Arithmetical*, 157

the final outbreak of plague, deaths from intestinal infections accounted for between one-fifth and one-third of all deaths. They were highest among infants, infantile diarrhoea being probably the most common single cause of deaths among babies.<sup>14</sup> Landers writes that 'Gastric disease, apparently linked to deficient water supplies, seems to have been a major killer of older infants and "weanlings" throughout the period and before the latter part of the eighteenth century it may also have claimed many lives among the newborn.'<sup>15</sup> These very high proportions of deaths caused by intestinal infections are supported by figures from other countries; in Sweden in the late eighteenth century, for instance, 'intestinal infections emerge as the fourth most important cause of death...'<sup>16</sup>

One of the most significant facts is the apparent rapid decline of dysentery in eighteenth century England. Instead of the growing cities leading, as one would have expected, to rising rates of contamination, it would appear that at some point the mortality from dysentery began to drop. In the middle of the eighteenth century, Black noted that 'dysentery and bloody flux' were beginning to decline in London.<sup>17</sup> Heberden in 1807 stated that 'we are entire strangers' to many of the 'bowel complaints' which caused such high mortality in the seventeenth century. Earlier, in 1796, he had noted that several diseases, including 'dysentery', 'have so decreased, that their very name is almost unknown in London...'<sup>18</sup> and one which set England off from its neighbours where, as in northern France or Highland Scotland, dysentery was much more of a problem.<sup>19</sup> As we saw, Malthus thought that, along with the disappearance of bubonic plague, the decline of dysentery was the most important reason for a decline in mortality rates. Place wrote that 'In the latter half of the seventeenth century, the dysentery caused the death of 2000 persons annually in the metropolis; its prevalence gradually decreased during the last century, and the disease itself is now almost extinguished as a fatal disease. Only fifteen are stated to have died of it in the year 1820.'<sup>20</sup> Kunitz has noted that '...during the second half of the eighteenth century...the pneumonia-diarrhoea complex also appears to have begun to decline in North-west

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<sup>14</sup> Clarkson, 52

<sup>15</sup> Landers, *Age Patterns*, 58

<sup>16</sup> Walter and Schofield, *Famine*, 65

<sup>17</sup> Black, *Arithmetical*, 164

<sup>18</sup> Quoted in Marshall, *London*, 70, 330 note 111

<sup>19</sup> Post, *Food Shortage*, pp.262-3

<sup>20</sup> Place, *Illustrations*, p.250

Europe.<sup>21</sup> If this is indeed the case, and if the apparent fall in both maternal and infant mortality in the eighteenth century proves to be correct, we may be within sight of one of the most important changes in mortality patterns. He provides a detailed analysis of the bills of mortality to show the decline of dysentery, which showed a particularly marked decline from the decade 1730-1740.<sup>22</sup> Creighton criticizes some of Heberden's interpretations, arguing that while dysentery had indeed decline, the decline was earlier than Heberden thought and the evidence other than the bills of mortality which Heberden based his conclusions on.<sup>23</sup> Reasons for this must lie in environmental health, in 'the safe disposal of faeces...a safe water supply...hygienic handling and adequate cooking of foodstuffs.'<sup>24</sup>

We would expect dysentery to be particularly virulent in Japan with its vast urban and semi-urban areas and the well-documented use of human manure on the rice fields. Again there is some evidence for early epidemics. The earliest Japanese reference to dysentery is an account that mentions an epidemic in Kyoto in the eighth month of A.D. 861.<sup>25</sup> Epidemics of the disease, called *sekiri* or 'red diarrhoea' were noted in 861, 951 and 947, according to Hattori.<sup>26</sup> Further outbreaks occurred in the eleventh to thirteenth centuries, usually coinciding with other epidemics.<sup>27</sup> Yet, after that, as the population grew, the disease became less, rather than more, common. Thus, we are told that 'severe, large-scale epidemics seem to have been fairly rare in the early modern period. Fukikawa mentions only seven epidemics of diarrheal diseases for the Tokugawa period in his chronology of epidemics in Japan.'<sup>28</sup> Thus dysentery was present, but seems to have been under control. At the end of the period there was an outbreak right at the end of the nineteenth century. Thus Griffis writes of 1899, 'During this year, also, dysentery raged throughout the empire, there being nearly 9000 fatalities out of 45,000

<sup>21</sup> Kunitz, *Speculations*, 353

<sup>22</sup> Heberden, *Observations*, pp.34-5, 40-1.

<sup>23</sup> Creighton, *ii*, p.774

<sup>24</sup> Clegg, *Man Against*, 217

<sup>25</sup> Jannetta, 148

<sup>26</sup> cited in Kiple, *Diseases*, 379

<sup>27</sup> *ibid*, 382

<sup>28</sup> Kiple (ed), *Diseases*, 387

cases.' Griffis then goes on to say, 'Happily in this instance that which caused woe and death became the occasion of a great triumph in science and the healing art, for Dr. Kitasato, pupil of the illustrious Dr Koch, of Berlin, discovered the bacillus of dysentery.'<sup>29</sup> The Japanese bacteriologist Kiyoshi Shiga isolated **S.dysenteriae** in 1898.<sup>30</sup>

If we take the period between the seventeenth and mid-nineteenth century in Japan, we obtain a rather surprising impression. Griffis noted that 'diarrhoea' was 'common, though not strikingly so...'<sup>31</sup> Isabella Bird and other travellers did not mention stomach upsets either in themselves, or as prevalent in the population. The most extreme statement comes from Morse, writing mainly of the vast city of Tokyo in the 1870s'. He noted that 'those diseases which at home are attributed to bad drainage, imperfect closets, and the like seem to be unknown or rare...', and indeed 'dysentery' is 'never known here.'<sup>32</sup> He repeats this extraordinary fact later: the 'severer forms of bowel complaint, such as dysentery and chronic diarrhoea are very rare.'<sup>33</sup> This has been noted again recently: 'Even dysentery...was not the killer of children that it was in the West in the nineteenth century.'<sup>34</sup>

The low incidence of dysentery in Japan is also attested to by one of the ablest of foreign doctors, Pompe, in the middle of the nineteenth century. 'For abdominal disease, the climate is very salubrious; I have never seen endemic diseases of the digestive organs in Japan.' The situation was entirely different from that in China. 'In nearby Shanghai, however, they are found quite frequently and in the most malignant varieties.' Pompe put this down to the swampy, half-saline water of Shanghai, and the temperature. He felt that 'If the patients come to Japan before it is too late, they soon recover without having to use much in the way of medicine; the climate here is the main medicine. If there were direct steamship traffic with Java, Japan would be an excellent sanitarium for dysentery patients.'<sup>35</sup> So

<sup>29</sup> Mikado, 657; this may be the 'big epidemic' which is referred to by Takashi in his novel Soil (p.173).

<sup>30</sup>4 le (ed), Disease, 606

<sup>31</sup> Griffis, Mikado, 570

<sup>32</sup>i, 23

<sup>33</sup>i, 39

<sup>34</sup>Hall (ed), Cambridge History, iv, 698

<sup>35</sup>Pompe, 110

extraordinary are these remarks that the editors of his work write that 'Pompe's statements on dysentery are difficult to understand, because acute outbreaks of dysentery were and continue to be a major medical problem in Japan.'<sup>36</sup> There were indeed occasional outbreaks of dysentery, but they appear to have been uncommon and limited. A doctor slightly after Pompe, Willis, wrote that 'In one village I found an epidemic of dysentery prevailing; great numbers of people had died of the disease. It was attributed to the badness of the season. It was confined to one district.'<sup>37</sup> Otherwise he never mentions dysentery as a problem.

It would indeed be an extraordinary fact if, when population doubled and massive cities grew after the seventeenth century, dysentery was all but absent. Yet this seems to be the case. In the **Cambridge History of Japan** it is reported that 'Yakazaki's analysis of the Tokugawa and early Meiji literature suggests that severe large-scale dysentery epidemics were uncommon during the Edo period...' (151)<sup>38</sup> A detailed analysis of a particular region supports the view that dysentery in its various forms was unimportant. The Hida records provide a clear example of what can only be inferred from descriptive Japanese source materials - that dysentery epidemics were rarely a major cause of high mortality in the late Tokugawa period. Relative to other causes of death, diarrheal diseases were unimportant, and epidemics were rare. Children under age 5 were those most likely to die of dysentery, but even in this age group other causes of death were much more important.<sup>39</sup> Although a good deal may be concealed, it is difficult not to agree with Jannetta that 'it seems likely that Japan had lower mortality from enteric diseases than other premodern societies.'<sup>(REF XXX)</sup>

### **Typhoid.**

Another bacillary disease, typhoid or enteric fever, is similarly passed through human excreta into the water system, or through food, especially milk.<sup>40</sup> Thus 'Control of typhoid fever depends on maintaining a separation between sewage and drinking water. In certain areas of the world, as many as 3 percent of adults may be shedding **S. tyhphi**. Thus with poor sanitation, the population is continuously exposed, and the disease is constantly present.'<sup>41</sup> We are told that 'Three-quarters of the world's population live in

<sup>36</sup>ibid

<sup>37</sup>Cortazzi, Willis, 130

<sup>38</sup>Cambridge History, p.151

<sup>39</sup>Jannetta, Epidemics, 154-5

<sup>40</sup>Roberts, Hygiene, 358; Kiple (ed), Diseases, 1071

<sup>41</sup>Kiple (ed), Diseases, 1071

areas where typhoid is endemic, and 1 out of every 300 of the world's population contracts the disease each year. One million persons die of it annually, mostly children.<sup>42</sup> The global incidence is reckoned to be some '15 million cases of typhoid fever each year.'<sup>43</sup>

The disease was very prevalent in western countries until the middle of the nineteenth century. For a long time it was thought that the disease was spread by the smell of miasma; it was only in the 1840s that 'the Englishman William Budd virtually inaugurated the science of epidemiology by his demonstration that typhoid was spread from infected individuals to new hosts by means of water and food.'<sup>44</sup> From then on sanitary improvements dramatically lowered the infection rates. 'Where pure water and food can be assured, typhoid transmission is minimal. Solely by improvement of sanitary conditions in the past century in developed countries, the incidence of typhoid fever has declined from 1 in 200 to 1 in 250,000.'<sup>45</sup> As a result of improved drainage, there may well have been low exposure to typhoid in late Victorian England.<sup>46</sup>

We might have expected the large and crowded cities of Japan to be very susceptible to this disease. Yet we are told, 'typhoid seems not to have been a problem'.<sup>47</sup> Morse believed that "typhoid" was "rarely epidemic."<sup>48</sup> Jannetta surveyed the evidence and found a number of outbreaks of dysentery, but none are certainly typhoid. That of 1829 is the most likely to be a form of typhoid, paratyphoid B, another variety of the deadly salmonella infections.<sup>49</sup> The word for typhoid is of foreign origin, **chifusu** and the earliest reference to the disease found by Fujikawa in his 'History of Diseases in Japan' was in

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<sup>42</sup>Kiple (ed), *Diseases*, 1071

<sup>43</sup>ibid, 1073

<sup>44</sup>Kiple (ed), *Diseases*, 1075

<sup>45</sup>Kiple (ed), *Diseases*, 1074

<sup>46</sup>Guha, *Decline*, xerox, 106

<sup>47</sup>in Hall (ed), *Camb. Hist.* iv, 698

<sup>48</sup>Morse, *Japan, Day by Day*, i, 39

<sup>49</sup>Jannetta, 149

1862, and that was in a translation of a Dutch book in that year. Further research is needed, but it does look as if typhoid was far less serious in Japan than in other large and crowded nations and indeed may have been absent until very late.

(Note: cholera is included for completeness sake. In the pruned version of the book it could be omitted, as occurring too late...)

### **Asiatic cholera.**

Cholera is a particularly painful and unpleasant epidemic disease. Its symptoms are graphically described in a nineteenth century Encyclopedia as follows. 'Cholera is a specific disease characterized by violent vomiting and purging, with rice-water evacuations, cramps, and collapse; tending to run a rapidly fatal course. After some premonitory symptoms characterized by malaise, depression, and slight diarrhoea, cholera commences by purging, to be soon followed by vomiting and painful cramps in the stomach and limbs...The discharges downwards are extremely copious, and they soon become colourless and turbid...In the second stage there is profound collapse...the patient lies motionless and apathetic, except when tormented by cramps, which are of frequent occurrence. The surface temperature of the body falls to 95oF or even lower. The pulse becomes almost imperceptible, and the respirations are shallow and rapid, the air expired being cold, and the voice a hollow, husky whisper. The nervous system suffers severely, and muscular prostration is well marked. The features assume a leaden or livid hue; they are pinched and shrunken. The nose becomes sharp and pointed, the cheeks hollow, and the eyeballs, which are often bloodshot, sink in their sockets, and are nearly hidden by the half-closed lids. The surface of the body, especially the extremities, is bluish, wrinkled and shrivelled, and bathed in a cold, clammy sweat. For a time the mind is clear but inactive; in fatal cases, however, stupor sets in, followed by coma; thirst is intense...a relapse may take place and certain complications and sequelae follow. The most dreaded of these are suppression of urine, uremia, and fever, often closely resembling typhoid. Disease of the kidneys, inflammation of the lungs, ulceration of the cornea, abscesses all over the body, and haemorrhage from the bowels may also occur.'<sup>50</sup>

Cholera is caused by **Vibrio comma (V.cholerae)**, 'a short, curved, motile, aerobic gram-negative rod.'<sup>51</sup> It is spread through the infection of water and food contaminated by the excrement of patients. Thus 'it will usually be possible to avoid cholera...if only cooked food and boiled water are taken.'<sup>52</sup> Cholera is endemic in several parts of Asia, but it became epidemic and spread over much of the world in four great waves in the nineteenth century, starting from India. There is currently a seventh world

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<sup>50</sup>Chambers' Encyclopedia, s.v. cholera

<sup>51</sup>Merck, Manual, 819

<sup>52</sup> Burnett, Infections, 162



pandemic of cholera, which began in the 1960s, though the old virulent form is being replaced by a milder bacteria.<sup>53</sup> There are suggestions that it had a far more ancient origin and visited Europe from at least 1500 A.D.

From the middle of the nineteenth century it became endemic in England and other western countries and caused many hundreds of thousands of deaths. It was serious even in non-epidemic years. As Greenhow wrote in the mid-nineteenth century, 'Although cholera was most fatal in the years of epidemic visitation it seems never to have been absent from the country, for cases are annually registered in most of the more populous places.'<sup>54</sup>

What was the position in Japan? We might have expected cholera to be a particular menace in the ancient and great cities of Japan. As Ewald argues, 'Once such a virulent pathogen evolved, the highest density of people infected with the pathogen should occur in the cities with the most extensive contamination of wells. The older, larger cities should meet this condition more frequently than the younger, smaller settlements; the older drains and wells would have been more prone to cross-connections, and larger cities would have been most able to maintain a steady rate of infections and deaths repelling potential inhabitants.'<sup>55</sup> In fact an analysis of the Japanese pattern shows that 'Japan's geographic position and trading policies provided a highly effective barrier against this destructive disease.'<sup>56</sup> The first great pandemic started in India in 1817 and spread to America and Europe within a year. Yet it only reached Japan in its final year, in 1822, and was confined to western Japan.<sup>57</sup> The second world cholera outbreak did not reach Japan, for Japanese sources '...make no mention of an epidemic resembling cholera in 1831...'<sup>58</sup> As Jannetta states, given the fact that this was one of the major epidemic diseases of the nineteenth century, that it was very easily transmitted, and travelled all over the rest of the world, that it 'failed to travel the relatively short distance between India

<sup>53</sup>Schofield, Decline (xerox), 118,124; Ewald, Infections, 72

<sup>54</sup> Greenhow, Papers, 97

<sup>55</sup> Ewald, Infectious (xerox), 78

<sup>56</sup> Jannetta, 157

<sup>57</sup>Jannetta, 159; though Alcock, Tycoon, 190 mentions memories of an outbreak in 1818

<sup>58</sup>Jannetta, Epidemics, 161

and Japan during those years (i.e. 1825-1837) is remarkable.<sup>59</sup> In the third pandemic in the 1850's, again cholera did not reach Japan until the last years of the outbreak, in 1858. Thus 'until the very end of the Tokugawa period, Japan was spared the serious epidemics of cholera to which other regions of the world were repeatedly exposed.'<sup>60</sup> Certain forms of cholera may never have reached Japan at all; for instance Morse wrote in the 1870's that '**cholera infantum** are never known here...'<sup>61</sup> It was not until 1822 that the disease was first given a name, the foreign onomatopoeic term **korera** or **korori**, according to Fujikawa.<sup>62</sup>

Three major reasons for the relatively light mortality from cholera, and the fact that it does not seem to have become endemic, may be put forward. Firstly, as with plague, the deliberate use of the sea as a **cordon sanitaire** is important. 'The Japanese had known for centuries that epidemic diseases came into the country on foreign ships.'<sup>63</sup> The fact that cholera was brought in from outside when the quarantine no longer worked is shown by the comments of visitors about the likely origins of two of the largest outbreaks.

That of 1858 was graphically described by two separate observers. Sir Rutherford Alcock suggested that Japanese cleanliness and good climate, 'failed...to give them immunity from the devastating cholera, which the United States' frigate Mississippi is said, I believe correctly, to have brought over - a first fatal fruit of the treaty and their extended relations with foreigners!' This outbreak 'swept away many thousands from their cities; they say 200,000 from Yeddo alone.'<sup>64</sup>

Pompe, treating the sick in Nagasaki on the south western tip of Japan described the events and the reactions thus. 'In July 1858 the American man-of-war Mississippi brought cholera from China. Since 1822 nothing had been heard in Japan of this dread disease. There were many victims, and the people were in despair when faced with this calamity. They attributed it to the opening of the country to foreigners, and their attitude toward us occasionally became hostile.' He then reported that 'By the end

<sup>59</sup>Jannetta, 163

<sup>60</sup>Jannetta, 172

<sup>61</sup>Morse, i, 23

<sup>62</sup>History of Diseases, ch.6

<sup>63</sup>Jannetta, 168

<sup>64</sup>Alcock, Tycoon, 189/90

of October the epidemic left us; it went in a northe astern direction across the entire country; thousands of victims died.' The following summer of 1859 'we again received the unwelcome visit of cholera, which that year also claimed many victims. The population accused the foreigners of having purposely poisoned the drinking water, and they accused the doctors of being unwilling to put an end to the disease because it was to their advantage. The government was blamed for the (alleged) fact that the hygienic measures that were taken actually helped to spread the disease. Many complaints were directed against me.'<sup>65</sup>

An outbreak in 1890 was graphically described by Sir Edwin Arnold. "'Korera-byo" as the Japanese style the Asiatic cholera, has severely visited the Southern littoral of this Empire during the present hot season. We have been losing, even in our lightly visited capital, sixty to eighty citizens a day by the pest; but Tokio has not suffered nearly so much as Nagasaki and Osaka.'<sup>66</sup> Arnold explained that 'Cholera does not appear to be endemic in Japan, as in India and other countries; but comes over here every year, more or less, from infected Eastern ports. This season it was China which exported the plague to us. A steamer came in from Shanghai with undetected cases on board; they landed at Nagasaki, and very soon afterwards the disease began to spread, chiefly in the quarter of the city originally attacked.' Attempts were made to contain it. 'Nagasaki was isolated, as far as was possible. Ships coming thence to Yokohama had to go into the quarantine ground, and railway trains were inspected and disinfected...'<sup>67</sup> Arnold believed that this outbreak had been contained and 'it looks as if Japan may be quit this year of the penalty of her neighbourhood to China with a death-tribute of not more than 20,000 lives.'<sup>68</sup> A further outbreak in 1895 was described by Hearn. 'It followed the returning armies of Japan, invaded the victorious empire, and killed about thirty thousand people during the hot season.'<sup>69</sup>

Given a population of upwards of thirty million people in the middle of the nineteenth century, crowded into massive cities and a densely populated countryside, it is very surprising that most of the outbreaks were confined to a matter of thousands. The control of cholera, like that of dysentery and typhoid, is considerably affected by a set of practices concerning personal cleanliness and sanitation. It seems likely that certain customs and habits of hygiene and waste disposal were of central importance in containing the outbreaks once they had reached Japan.

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<sup>65</sup>Pompe, xerox, 101

<sup>66</sup>Arnold, Seas, 536

<sup>67</sup>Arnold, Land and Seas, 536-7

<sup>68</sup>ibid, 543

<sup>69</sup>Hearn, Kokoro, 257

Another reason lies in the efforts made by the Japanese authorities to contain the outbreaks that did occur. The descriptions of these efforts during the last third of the nineteenth century are particularly vivid and provide a useful insight into the very careful regulation of public health in Japan which was an important background factor in its impressive medical history in relation to other diseases as well as cholera.

After a lull between 1822 and 1858, cholera, as we have seen, returned. Pompe was involved in trying to combat it, though he himself caught cholera in this outbreak 'and I almost succumbed just at a time when I was most needed.'<sup>70</sup> I took all possible precautions to check the disease and assisted the government in taking hygienic measures, which were carried out with a great deal of energy. (In such times an autocratic government has a great deal of value). I explained to the physicians the nature and treatment of cholera and gave, of course as much assistance as I could.<sup>71</sup> He then disseminated his experience and knowledge widely over Japan. I ordered the printing of a short handbook in Japanese in which all characteristics of the disease were described, and this booklet was circulated throughout the country.<sup>72</sup>

In the 1870's Edward Morse provides detailed accounts of the measures taken. He noticed cholera outbreaks in several Japanese cities, for instance Satsuma and Kyoto.<sup>73</sup> He noted that cholera victims were hygienically disposed of: 'The bodies that were being cremated were of victims of cholera which was very prevalent in the city.'<sup>74</sup> He was particularly impressed by the government measures. 'The dread word has come that Asiatic cholera has broken out in Yokohama and Tokyo. The foresight and thoroughness of the Government is remarkable. The vast city covers an extent of territory three times that of New York City and there are said to be fifty or sixty thousand jinrikishas, every one of which is compelled to carry a box of chloride of lime. Every morning a servant passes through the corridors and entry-ways of the University sprinkling carbolic acid water on the floors and mats; every Government officer, native and foreign, receives a small vial of cholera medicine made by the regular formula of laudanum, rhubarb, camphor etc. with a paper containing printed directions as to when and how to use

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<sup>70</sup>Wittermans, Pompe, 91

<sup>71</sup>Pompe, xerox, 91

<sup>72</sup>Wittermans, Pompe, xerox, 91

<sup>73</sup>Morse, ii, 153,264

<sup>74</sup>Morse, ii, 338

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On another occasion he described how 'When we arrived at Shizuoka, Province of Suruga, an outbreak of cholera was killing thirty or forty a day. The largest inns were closed, and it was with difficulty that we obtained entrance into one of them. The landlord said that if a death from cholera occurred, it would greatly injure the reputation of his hotel.' On his arrival, 'We were promptly disinfected even before we could get out of our jinrikisha. Everybody seemed to be provided with a simple atomizer, consisting of a tin tube soldered to the top of a small tin dipper, in which was put a weak solution of carbolic acid. We had been sprayed upon at other places as if we brought the infection with us.'<sup>76</sup>

Arnold also provides a useful account of action against cholera. He encountered a 'severe visitation of the hateful malady, which, speaking as an outsider, and from Indian experience, would surely have welled to something terrible but for the perfectly cool, fearless, practical, and enlightened way in which the Japanese authorities do battle with the dreaded foe.' He described their methods thus. 'Their central idea is to isolate every case as it occurs, and, the police being pretty well omnipotent, this is not so difficult here as it would prove elsewhere. At the approach of the enemy the executive and civil authorities laid their heads together, got hospitals ready, appointed medical and administrative staffs, decided on the methods to be adopted as to disinfectants, conveyance of patients, isolation of relatives and houses, and disposal of corpses, and then issued clear instructions in every **ken** and **cho**.'<sup>77</sup>

Hearn, five years later, was to note that there were considerable pressures on people to try to conceal the disease. 'The sanitary law forbids the treatment of cholera in private houses; yet people try to hide their sick, in spite of fines and other penalties, because the public cholera-hospitals are overcrowded and roughly managed, and the patients are entirely separated from all who love them.'<sup>78</sup> The same was noted by Arnold. 'Rich and poor people alike naturally hate to be "spotted", cut off, carried to the hospital, and buried with scanty ceremony after demise; so the rich will pay for concealment and the poor will implore it.' 'Now, the hospital is naturally dreaded. Many Japanese women, and even men...die actually and positively from the depressing fact of being there - good as the treatment is, kindly and brave the nursing, and fearless and devoted the medical assistance.' Consequently, 'the poor people will not proclaim to the doctors the beginning of their attack. They allow the insidious preliminary symptoms to go on, hoping to pull through.' When the doctors are finally called,

<sup>75</sup>Morse, i, 336

<sup>76</sup>Morse, ii, 245

<sup>77</sup>Arnold, Seas, 539

<sup>78</sup>Kokoro, 257

they are put under great pressure to conceal the truth from the authorities. In Tokyo, the authorities 'made an excellent beginning by severely punishing two medical men who concealed cases of cholera...after which the danger rather was that zealous doctors would call every casual stomach-ache...."cholera".'<sup>79</sup>

Arnold described how all sorts of cures were attempted. 'I gathered everything had been tried. Hypodermic injection of morphia is useful at the beginning, and afterwards good nursing, chafing, chloroform, if the heart will bear it. As much drink as they like, contrary to the old treatment.' Even so, some seventy per cent of those admitted to the hospital died, he reckoned. The main effort was to prevent the disease spreading. He described the use of disinfectant in this process. 'A small ring of people will be collected round a poor fellow lying on the ground, who has been attacked. Inside the ring the policeman, in white clothes, his sword under his arm, note-book in hand, and spectacles on his nose, takes down with unbroken calm the necessary particulars demanded by government.' After all the facts are down, the sufferer is moved and 'where he lay on the ground a pail of whitewash will be directly spilled and spread.'

A house where a person has been afflicted is avoided by all the neighbours. 'You look right through the house, for everything has been thrown open to the winds and rains of heaven. Mats, walls, and shutters have been plentifully and uncomfortably lime-washed, and in their ruined and desolate home are patiently seated a woman and a small boy who must not emerge till their quarantine is complete. Outside the house a little square space of ground is also lime-washed, in the midst of which sits the inevitable policeman...', reading a newspaper. 'Anybody wishing to enter the premises would be accused, and repulsed by him with extreme politeness, and, if politeness failed, with the edge or point of the big sword laid across his knees.'<sup>80</sup> From his comparative experience in India, Arnold concluded that 'Japanese methods admit no interference or nonsense of any kind; and I believe it is entirely due to this rigid system that the cholera has passed from individual to individual without any great leaps and bounds, and that the daily returns are now happily declining.'<sup>81</sup>

Thus, as the cities grew rapidly and Japan opened up to the west and re-organized itself after the Meiji restoration it began to suffer, as did Europe and America, from cholera. Yet as Morse and Arnold suggest, the efforts to control the epidemics through every possible known technique were extremely thorough and the recent appraisal in the **Cambridge History** is in essence correct; 'Cholera was absent until the mid- nineteenth century and then was readily contained.'<sup>82</sup> The relative absence of

<sup>79</sup>Arnold, *Seas*, 539/40

<sup>80</sup>Arnold, *Seas*, 541-2

<sup>81</sup>Arnold, *Seas*, 542

<sup>82</sup>Camb. Hist. iv, 698

cholera not only in Japan, but also on the southern coast of China, in the Yangtse valley, in Java, Malaya and Sumatra, continues to be a puzzle.<sup>83</sup>

### **Conclusion.**

There are two major conclusions, both of them surprising. In England, dysentery started to decline in London and perhaps in other cities in the eighteenth century, just at the time when we would expect it to rise. In Japan, water-borne, faecal, diseases were conspicuously absent. Despite massive cities and dense rural population, dysentery, cholera and typhoid were either absent or largely under control, between the seventeenth and mid-nineteenth century. Both facts require explanation. When we consider the factors we shall need to look at those well known reasons listed by Burnet. 'Decent sewage disposal, pure water supply, pure food laws, control of milk supply and pasteurization, plus the cult of personal cleanliness...'<sup>84</sup> In considering the effects of these and other changes, we will need to remember that in the case of infants, who are most prone to diarrhoea, the sources of infection lie all around and in particular in those who nurse them. A mother or nurse sick with dysentery is very likely to pass it on to the infant.

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<sup>83</sup>May, *Ecology*, 52

<sup>84</sup>Burnett, *Infections*, 106