"Cotton, Rats and Plague in Japan"

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1. The Third Pandemic of Plague and the Uneven Diffusion of Plague in Japan

Figure 1  Patients of Plague and Cholera (percentages against the total number of patients between 1899-1926)

The third pandemic of plague started in China in the late nineteenth century and engulfed the world. Although Europe saw only scattered cases, countries in Asia and Africa were severely affected. Within Asia and Africa, stark contrast existed in the intensity and the scale of the epidemic. On the one hand, countries like Tunisia, Algeria and Tanzania witnessed the
epidemic only in ports and their vicinities, while in India, China, Egypt, Morocco, Madagascar, South Africa and others, plague penetrated into inland areas and became endemic or entrenched.

Japan fell into the former group, where plague affected only limited areas. Figure 1 represents the regions affected by plague (left) and cholera (right). 2900 patients of plague in Japan concentrated in a smaller number of prefectures, while cholera in the same period affected a larger number of areas. Indeed, more than 70% of patients were discovered in the three adjoining prefectures – Hyogo, Osaka and Wakayama. Cotton imported from India was the culprit for the epidemics of plague in these areas. Kobe was the major port, from which cotton was sent to newly established cotton factories in Osaka, the major centre of industry and commerce in Japan. Small port towns in Wakayama were affected through various goods brought from Osaka. A similar pattern is found in the smaller focus of epidemic, which is Yokohama and Tokyo, which formed the pair of a major port and an industrial and commercial centre. The general outline of the epidemics of plague in Japan is thus clear: cotton industry, which was the major focus of government-led industrialization of Japan, brought in plague to the country through cotton with plague-affected rats or fleas imported from India.
Figure 2  The number of plague-infected rats discovered between 1905–1911

Figure 3

Closer scrutiny both confirms the general picture and reveals twists.
Figure 2 represents the number of plague-infected rats in the epidemic of 1905-12. There is a strong focus of epidemics in Hyogo, Osaka, and Wakayama region. Figure 3 shows that apart from two small outbreaks assisted by the railway in Nara (left in the map) the affected towns were situated along the coast line of the Osaka Bay. (The map is turned upside-down.) Almost all towns affected had a port for domestic transportation of goods. Domestic water-borne traffic which connected small towns with major ports of Kobe and Osaka was the route through which plague diffused in Japan.

Although one of the zones affected represented in Figure 2 was the centre of cotton industry, other areas had little to do with cotton but had connection with Osaka. Otake, one small focus of infection was a centre of paper industry, which imported old clothes as material for paper from Osaka; Kochi had little industry itself but imported goods from Osaka and the outbreak of plague started in labourers at its port.

2. The Local Context – Outbreaks in Mie and Aichi

Figure 4: Number of Plague-Infected Rats in 1916-17

273 = Yokkaichi
7 = Kuwana
45 = Nagoya
37 = Aichi
178 = Handa
16 = Naruiwa
36 = Ohama
20 = Toyohashi
F = Cotton Factory
In 1916-17, another outbreak of plague hit the Mie and Aichi area, which resulted in 101 patients. The major culprit for this outbreak was again cotton. The Tōyō Bōseki Co. (The Eastern Spinning Company) built a dozen of cotton spinning factories around the coast of Ise and Chita bays. Plague affected those factory towns, many of which had also ports. Some rural areas surrounding such factory-port towns were also affected. Yet again cotton and industrialization provided the cause of the outbreak.

Figure 6 A Map of Yokkaichi
A closer scrutiny of the local context reveals that other industries were responsible for the diffusion of plague from the locus directly related with cotton industry. The Figure 6 represents a map of the City of Yokkaichi, which was the starting point of the outbreak. The Zone A, directly connected with the port facility, had an warehouse of Toyo Spinning Co., which was the window through which plague was imported from India.

The diffusion of plague-infected rats or fleas from this focus of infection to other parts of the city was facilitated firstly by the flourishing industry and commerce of fertilizer, whose history reveals so far neglected aspect of the diffusion of plague in Japan. With the advent of the commercialization of agriculture in the seventeenth century, demand for commercial fertilizers in some parts of rural areas rose. The most sought-after fertilizer in the eighteenth and nineteenth century was dried sardine. When the price for fertilizers made from fish rose in the late 1880s, soy beans were imported from China and Manchuria. Numerous warehouses and factories of soy-made fertilizers stood side by side along the canal of Yokkaichi City. The vicinity of cotton factories and warehouses of soy-made fertilizers provided an environment in which plague among rats diffused beyond the point of introduction of plague from overseas. The spread of plague from the Zone A to the Zone B in the map was facilitated by the industry and commerce of fertilizers, which had the growth of commercial agriculture as its background. The similar structure of the co-existence of cotton spinning factory and fertilizer factory is found in other foci of plague in this area.

The further diffusion of plague to the Zones C and D had another industry as its cause, which was a recycling or scavenging activities. Those premises where plague-infected rats were discovered in Zone C were mostly poultry farming, which was a common side-business for agricultural farmers in the area. To feed chickens, farmers brought various wastes from the factory of cotton spinning and fertilizers to their premises. Such wastes were called “goods dust” (nikona), and its use or even merchandize was common in major port towns. Through such use of goods dust for suburban agriculture, plague spread to rural areas. A similar pattern can be found in the diffusion of plague to villages surrounding the City of Yokkaichi, as is shown in Figure 7.
The diffusion of plague in Mie and Aichi area depended thus on a structure much more complex than hitherto discussed. The window through which plague was brought into from India was cotton factories. But cotton industry alone did not account for the diffusion of the disease through the cities and surrounding villages. The commercialization of agriculture demanded vigorous traffic of fertilizer, whose factories and warehouses were more numerous and widely distributed within the cities. Moreover, scavenging or recycling activities by farmers in surrounding rural areas were the key of the wider diffusion of the disease. Plague diffused in Japan through such layers of industry and human activities, which put the most technologically advanced industry in Japan at that time (cotton spinning), the industry and commerce which catered for the vast number of farmers (fertilizer), and the economic activities of the lowest grade (scavenging and the use of industrial wastes) in one area.
Conclusion

Two historiographical insights can be drawn from what has been discussed above. The first is the paramount importance of port and water-borne traffic in the diffusion of plague in Japan. Port towns, whether big or small, was the site of the epidemic of plague in Japan. Major inland outbreak was virtually unknown. One of the reasons for the virtual absence of major inland outbreak was the geographical limitation of the route of infection. The traffic of goods dusts or industrial or commercial wastes in port towns was a small-scale industry which did not reach deep into the inland. For peasants living far away from ports, carrying goods dusts or wastes for a long distance over mountains did not pay. They were occasional resource for the poor living in the vicinity of the port. The range of plague diffusion in Japan was limited because of the limited route of infection, besides with prompt and thorough prevention measures taken at the starting points of the ports and warehouses of cotton and fertilizers.

The second is that the diffusion of plague in Japan depended almost entirely upon human activities. Whether it was the importation of cotton from India, the commerce of fertilizers, or bringing wastes for chickens, the route of the spread of plague in Japan was economic activities conducted consciously by humans. No incidence of plague becoming endemic among wild rodents was observed in Japan, in contrast to the experience of India, China, and other Asian and African countries. The spread of plague in Japan was due to the rats and fleas which were directly parasitic to the human economic activities. In other words, the plague in Japan spread exclusively through a man-made structure of infection, not touching the ecosystem of wild life. Perhaps this made its control relatively easy.