

THE GREAT PLAGUE OF HONG KONG

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Introduction

Throughout its relatively short history as a British colony, Hong Kong has had to withstand many crises of a diverse nature. Typhoons, droughts, floods, economic recessions, war, influxes of refugees and riots have, at one time or another, created emergency situations for both the administration and the people of Hong Kong. However, one crisis now long forgotten, but for the records kept in dusty annals in the Colonial Secretariat library, is the outbreak of bubonic plague which first appeared in the Tai Ping Shan district in the early months of 1894.

Bubonic plague swept through Europe during the sixth, fourteenth and seventeenth centuries and was responsible for the deaths of many millions of people. For good reason the disease caused conditions of near panic and hysteria for once contracted the outcome in the great majority of cases was a relatively quick but agonising death. A graphic description of the symptoms of bubonic plague is given by Wilm in his Report of Plague in Hong Kong compiled in 1896. Wilm observed that:

"At the outset of the disease the tongue usually became swollen, bright red at the tip and edges and was covered with a greyish white fur. Usually, on the second or third day of the disease, the fur became brownish or black, and dried in a crust. The tongue becomes cracked and fissured so that it soon resembles that seen in typhus or in enteric fever about a third week of the disease. The lips soon became dry and often fissured, the mucous membrane of the mouth and the pharynx was usually bright red. The appetite disappeared. There was frequently uncontrollable vomiting and great thirst, with a lower part of the abdomen. The vomit was sometimes watery, sometimes bilious, sometimes like coffee grounds. Diarrhoea was frequent at the outset and again in the later stages of the disease Blood,

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mucous and epithelium frequently appeared in the stools.”* Additionally, painful swellings or buboes commonly developed in the groin, neck or armpits usually by the second day.

Even though by the turn of the nineteenth century medical science had made significant progress little was still then known of the manner in which the disease was transmitted. It was not until 1905 that it was finally established in Bombay by the Plague Research Commission of India that the bacillus, *pasteurella pestis*, commonly gained entry into the blood stream by inoculation through the bite of fleas which, in turn, were carried by rats. Scientific research into the causes of the plague in Hong Kong came close to finding this answer but the plethora of other more plausible looking theories detracted attention away from the apparently harmless flea.

The Origin of the Plague in Hong Kong

Bubonic plague in China was thought to have first spread from Yunnan which, itself, is likely to have been infected by transmissions over the trade routes from India.

As a prelude to the outbreak of the disease in Hong Kong in 1894 it appears that it occurred in Canton in January of that year. By June it had reached epidemic proportions and had accounted for some 80,000 deaths. At the outbreak of the disease in Canton, many persons (particularly the well-to-do) moved into the countryside and thereby created new focii for its dissemination. Simpson thus records that it is “not surprising that whatever affects Canton is not long in making itself felt in Hong Kong. This year when cholera broke out in Canton there was only an interval of a few weeks before the disease appeared in 1894.”† Indeed, the spread of the disease to Hong Kong was accelerated by the unrestricted entry from Kwantung Province of many thousands of workers and also junks and river boats that formed an integral part of the colony’s role as an entrepot.

On the 10th May 1894 Hong Kong was declared an infected port and within the space of a few weeks the administration was

* Quoted in William Hunter, *A Research into Epidemic & Epizootic Plague Hong Kong, 1904*, p. 6.

† W. J. Simpson, *Report on the Causes and Continuance of Plague in Hong Kong and Suggestions as to Remedial Measures*, London, 1903, p. 22.

faced with our epidemic of great magnitude. By July, for example, there had been 2442 deaths. Hospitals were quickly established on board the "Hygeia", at Kennedy Town Police Station and at the Kennedy Town glass works. The first two hospitals were run by European staff whilst the third was manned by Chinese personnel of the Tung Wah hospital. Official despatches record that "it was deemed advisable to give the Chinese doctors a free hand at first. In any case, it is difficult to persuade the Chinese to report cases of sickness and their foolish and violent prejudice against Western medical men is quite sufficient to induce them, as they certainly did in the first fortnight or three weeks of the existence of the plague, not only to secrete their sick but often to desert their plague stricken friends and relations after death."*

A house to house inspection was carried out by personnel of the garrison and those houses in which plague had occurred were cleansed and disinfected. This action gave rise to numerous complaints from the Chinese community for it was rumoured that the foreigners had sinister and unspeakable desires on the women and children. Indeed, so inflamed did feelings become that a deputation of Chinese petitioned the Governor, Sir William Robinson, to order the cleansing operations to be stopped. However, Sir William made it clear in no uncertain terms that the government was determined to take strong measures. Subsequently, an anti-government poster campaign was launched and this spread to Canton where further rumours were started to the effect that English doctors were accused of cutting open pregnant women and scooping out the eyes of children to make medicines for the treatment of plague-stricken patients.

The prompt answer of the governor in Hong Kong was to station the gunboat "Tweed" off Tai Ping Shan and to offer a reward for information leading to the arrest of persons distributing malicious posters. Additionally, the Chinese Viceroy in Canton was requested to issue proclamations denying the atrocity stories. However, these were not made with any great degree of vigour and feelings in Canton continued to run high to the extent that two women missionary doctors were set upon by a mob.

* "Further Correspondence Relative to the Outbreak of Bubonic Plague at Hong Kong between Sir William Robinson to the Marquess of Ripon — 1894", p. 2 in *Blue Book Reports on Bubonic Plague 1894-1903*, Hong Kong.

The Chinese community in Hong Kong became panic stricken and there was a mass exodus of workers back to China. In the China Sugar Factory, for example, some 300 workers downed tools and walked their way back to Swatow about 180 miles away. The economic life of the colony suffered considerably as a consequence. So much so that Sir William Robinson recorded that "without exaggeration, I may assert that, so far as trade and commerce are concerned the plague has assumed the importance of an unexampled calamity."*

Conditions in the hospitals became exceedingly crowded. The Kennedy Town Glass Works Hospital was intended to accommodate 100 patients but at one point contained 200 afflicted persons. Admissions to hospital at the peak of the outbreak averaged 80 a day whilst dead bodies piled up in the streets at the rate of over 100 a day. A new pig depot had to be hastily converted into a hospital to take 140 patients and the running of all hospitals was assumed by European doctors as it was soon found that Chinese traditional medicine was of no avail.

During the frantic efforts to rid the colony of the plague about 7000 persons were dispossessed of their homes, 350 houses were condemned and sealed off and several boatloads of patients were sent to Canton.

With the advent of cooler weather the plague abated and there was hope that the visitation of 1894 would not be repeated. Indeed, there was no outbreak in the following year but in 1896 the oriental version of the black death stalked the streets of Hong Kong and carried off 1078 unfortunates, the majority being Chinese in the congested district of Tai Ping Shan. The plague thence became an almost annual occurrence usually making its appearance in February or March reaching a peak by July and then virtually disappearing during the autumn and winter. Over the period 1894-1901 some 8600 persons succumbed to the disease and this represented a mortality rate of about 95 per cent.

Relentless efforts were made to root out the assumed cause of the problem which was generally thought to be insanitary living conditions. Regulations were passed requiring notification to the nearest police station of any cases of plague and in default of this obligation there was a penalty of \$25, which at that time was a

* *Ibid.*, p. 5.

considerable sum of money. However, compliance with this regulation was seldom observed. House to house visits continued to detect afflicted premises but this also proved difficult. Usually, bodies were thrown out at night by the other occupants of infected houses so as to avoid detection and the subsequent disinfection of the premises. In 1900, for example, 412 dead bodies were dumped in the harbour.

When the disinfection of houses was undertaken it was the usual practice for the occupants to be issued with new clothes. Their own clothes, bedding, curtains and carpets were sent to a steam disinfecting station. The premises were then thoroughly cleaned by spraying the walls with a solution of perchloride of mercury; alternatively, rooms were fumigated with free chlorine obtained by the addition of diluted sulphuric acid to chlorinated lime. Finally, the floors and furniture were scrubbed with Jeyes fluid and the walls were lime-washed. During these operations the occupants were given temporary accommodation on Chinese marriage boats anchored off Stonecutters Island.

Other measures taken included the burial of the dead in a plague cemetery at Kennedy Town and the regular disinfecting of all public latrines with chlorinated lime.

In Search of an Answer

The suddenness of the attack of plague in 1894 and its continued virulence for the next two decades must have caused great dismay among the community in general, particularly as it also seemed impossible for modern science to eradicate the basic cause of the disease.

When Sir William Robinson reported to the Marquess of Ripon in 1894 on the course of events he wrote:

"It is, I think, very probable that the want of sufficient water and the filthy habits of life amongst the 210,000 Chinese who reside here have rendered Hong Kong liable to the invasion and development of the germ of the bubonic plague, the Chinese are of the opinion that the plague emanates from the ground and is favoured by a long continuance of dry weather when the earth becomes porous and numerous fissures appear on the surface facilitating the escape of whatever causes the disease."*

* *Ibid*, p. 5.

Such wild speculation may well have created a fatalistic attitude to the inevitability of the plague as a natural phenomenon and consequently limited an awareness of the need to search in other directions. However, the desperate need to find a solution prompted a considerable amount of inquiry and reflection by a number of independent observers and some of these researchers deserve a fuller mention.

Dr. Gomes da Silva, the Principal Medical Officer of Macau gave an account of the disease which affected the Portuguese colony in 1895. He records that during a visit to Canton he had observed a strange disease that attacked "only Chinese and rats" and that the same disease spread from Hong Kong to Macau in 1895. In drawing attention to the association of the plague with rats Dr. da Silva also described the general sanitary condition of Canton which he concluded was a further causal factor. He records that house refuse was usually thrown into the streets where it accumulated until such time as the torrential summer rains and the overflow of the Pearl River cleared it away. However, between May and September 1894 it did not rain to any great extent with the consequence that large quantities of rubbish accumulated and reached an advanced state of putrefaction. These conditions were paralleled by outbreaks of plague. Conversely, Dr. da Silva, observed that when the summer rains were early and abundant the disease seldom occurred.

It is now not difficult to establish the chain of events that must have occurred, namely that during prolonged dry spells when refuse piled up in the streets colonies of rats thrived on the nourishment so carelessly provided. As the rats multiplied, so did the fleas and from but one source of infection carried by the fleas the disease spread like a forest fire first through the population of rats and then to homo-sapiens.

However, amidst the wild speculation of how the disease was communicated to man scientific researches undertaken by Alexandre Yersin in Hong Kong established in June 1894 that the bacillus, *pasteurella pestis*, was the direct cause of plague. This was subsequently confirmed by two Japanese doctors, Professors Kisato and Aoyama, who were also pursuing researches in the colony. Conclusive evidence was obtained by injecting animals with a virus preparation. Notwithstanding, the means of transmission of the

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disease to man remained a mystery and the two Japanese researchers could only but conclude that the bacillus was drawn from the air by breathing.

Further investigations soon established a positive relationship between the incidence of plague first among rats and subsequently among man. On this account, Simpson reported in 1902 that "no success is likely to accrue from the adoption of any measure limited to dealing with plague in human beings and which does not take cognizance of the fact that plague in rats and mice also disseminate the infection. It does not serve any very useful purpose to remove the sick and cleanse everything in the infected houses and above the ground if the infection is being carried by plague-stricken rats from house to house or district to district by the subterranean movements of rats, whether this be effected by rat burrows or by sewers and drains. Both rat and human plague possess infective powers and each can spread the disease not only to its own species but also to the other".*

Simpson could offer no explanation as to the medium of infection although he did make a number of observations as to the conditions which appeared to favour the spread of the disease. In particular he drew attention to the extremely crowded and insanitary conditions under which the majority of the Chinese population lived, the virtually unrestricted migration of thousands of people from infected areas in China to Hong Kong and the fact that the colony served as a great emporium with hongs and godowns filled with stores and infested with rats.

Simpson saw the solution to the problem by way of the strict enforcement of various preventive measures. Besides the already well established procedures for the disinfection of houses, public latrines and the like he recommended in 1902 the appointment of medical men in every health district to register cases and find out causes of the disease. He also urged the strict control over the disposal of dead bodies in the street and harbour and, to this end, suggested the enforcement of collective fines on all households in any street where a dead body was discovered. He further saw the necessity for the bacteriological examination of rats as part of an

* First Memorandum from W. J. Simpson, M.D., to James Stewart Lockhart, Sanitary Board Office, 20th January 1902, p. 1 in *Blue Book Reports on Bubonic Plague 1894-1907*.

intelligence service to pin-point danger spots and proposed the distribution of 100,000 hand bills publicising the causes and symptoms of plague, the destruction of rats and the addresses of places where sickness could be reported. Another recommendation was the establishment of a plague department with wide powers for the discovery, prevention and cure of plague including inoculation with a highly potent horse antiserum prepared at the Haffkine Institute in India.

A final recommendation made by Simpson was a general improvement of sanitary conditions and stricter control over the design of tenement blocks which he described as follows:

"The rooms, as a rule, are far too deep, the object of this depth being to subdivide each room into a number of cubicles for the accommodation of families or lodgers. Though there may be windows at each end of the room, the great depth materially obstructs the light to take an example from the better class of buildings, many of the houses that are being erected are eighty feet deep without lateral windows and contain long, narrow rooms of fifty-five feet in depth, by twelve or thirteen feet in width, lighted in front by a window and also in the rear by another window which looks into a backyard of twelve feet. . . ."

From the recommendations made by Simpson arose the Public Health and Buildings Ordinance of 1903 which set new standards for the design and occupancy of buildings and which remained in force until 1935.

By 1904 a considerable amount deductive evidence had accumulated to link the occurrence of plague which the fleas carried by rats. Dr. J. M. Howie of Changpoo, for example, was of the opinion that the main cause of plague was inoculation through the bite of fleas, lice and mosquitos. Dr. H. Dobson of Yung Kong also noted that the cases he had observed appeared to have been caused by "the bites of insects (fleas), contamination of open wounds on legs or elsewhere (or) through food containing the germ."† William Hunter, the Government Bacteriologist of Hong Kong also noted

* Second Memorandum from W. J. Simpson to James Stewart Lockhart Sanitary Board Office, 20th March 1902, p. 15 in *Blue Book Reports on Bubonic Plague 1894-1907*.

† W. J. Simpson, *Report on the Causes and Continuance of Plague in Hong Kong and Suggestions as to Remedial Measures*, London, 1903, p. 31.

that "Simond. . . . has given a great deal of attention to this subject (and) came to the conclusion that Indian rat fleas bite man and that rat fleas spread plague from one rat to another and also to the human species."* However, Hunter himself was not convinced of this theory and subscribed to the view that cockroaches picked up the bacillus and transferred the disease to food stuffs. Others shared his scepticism.

Finally, studies undertaken in 1905-06 by the Indian Plague Commission in Bombay conclusively established that fleas were the principal agents of transmission. Of the 1500 species of fleas about 100 can transmit plague; the most widely disseminated is *Xenopsylla cheopis* which is equally at home on rats or homo sapiens. At one feeding on a rat, the blood of which contains 100 million organisms per millilitre, a flea will ingest about 5000 organisms which then multiply in the flea's digestive tract. Later, its proventriculus becomes plugged by gelatinous masses of bacilli and, as a result, the valvular action becomes impaired. Because of this obstruction, blood cannot be sucked into the stomach. The esophagus becomes distended and the elastic recoil of the walls of both pharynx and gullet when the flea stops sucking may drive back into the bite wound highly infective blood. An infected flea may regurgitate as many as 10,000 to 24,000 organisms at one biting. Many species of fleas, however, may become infected without incurring blockages and these may never become pestiferous unless they have fed on severely infected rodents.

Once a rat has become infected and subsequently dies the fleas carried thereon migrate to another host when the corpse loses its body heat. When the rat population has become decimated the fleas transfer their attention to human beings. This sequence of events thus explains the commonly observed phenomenon that plague in rats precedes plague among the inhabitants of infected premises.

Even though the discovery of how plague was transferred from rats to man enabled more effective preventive measures to be taken to eradicate the disease in Hong Kong, it continued to afflict the colony until as late as 1929 when two cases were recorded. Virulent

* W. Hunter, *A Research into Epidemic and Epizootic Plague*, Hong Kong, 1904, p. 32.

outbreaks occurred in 1912, 1914 and 1922, predominantly among the Chinese community. Over the period 1894-1929 the total number of cases numbered over 24000 and some 90% of these had a fatal outcome. The disease, however, did not confine itself to Hong Kong and it is somewhat alarming to note that as recently as 1950 it occurred in Pakhoi where from January to September 627 cases were recorded.

One final comment that needs to be made is that throughout the centuries plague has occurred in cycles commencing abruptly and finishing within a relatively short space of time. No satisfactory explanation has yet been found for this phenomenon and this gives emphasis to a continuing need for vigilance.

REFERENCES

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