PUBLIC HEALTH

Japan's New Enemy

Disease-Bearing Rats, Entrenched in Their Strongholds In Manchuria, May Succeed Where China's Armies Failed

By JANE STAFFORD

WILL PLAGUE stop the Japanese from further encroachment into China? Will the Black Death force them to give up all or part of their holdings in their neighbors' territory.

The Chinese could not stop Japan's invasion of their country, but the Black Death may prove a more implacable, devastating foe than regiments of Chinese soldiers.

Epidemics of both bubonic and the even more dreaded pneumonic forms of plague have already attacked districts in the north and west of Manchuria, China's Lost Province.

If plague should succeed in thwarting the Japanese, there will be a sort of poetic justice in the situation, for the disease has reentered China from its haunts in Transbaikalia, a province of Japan's old enemy, the Russians.

Furthermore, the Japanese will have themselves to thank if the Black Death puts a disastrous end to their plans for extension of the empire into China. The present outbreaks of plague in Manchuria are seen by quarantine officers in China and elsewhere as the direct result of Japanese military occupation. This disrupted the highly important work of the Manchurian Plague Prevention Service, practically strangling its activities at Harbin.

The Plague Prevention Hospital at that city had been the main line of defense against plague for both China and the rest of the world. But when the Japanese entered the country, its experienced and eminent director, Dr. Wu Lien-Teh, was obliged to leave. His name was stricken from the list of officers of the hospital, and the institution was put in charge of a junior officer.

The hospital and the Plague Prevention Service had been established after the disastrous epidemic of pneumonic plague in Manchuria and Northern China in 1910 and 1911. At that time 60,000 lives were taken and the monetary loss resulting from the epidemic was estimated at one hundred million dollars. Harbin played an ominous role in the epidemic of that winter, but when plague struck Manchuria again ten years later, it was the Plague Prevention Hospital and Service that played the leading role in stopping the epidemic and preventing it from spreading beyond that point.

The devastation of an invading army pales beside the havoc that follows an extensive outbreak of plague. In England during the Middle Ages the Black Death took from half to two-thirds of the population. In other words, 600 out of every 1,000 persons fell a victim to plague. It is estimated that 20,000 of London's entire population of 40,000 died of plague during the years of the Black Death. Business was dislocated; cattle and sheep were left to wander, for there was no one to care for them; and disease broke out among the beasts also. As half the laborers in the country were dead, wages rose to an unprecedented height.

Devastated Common People

"The distribution of the mortality was various," one historian wrote of the plague in England in the fourteenth century. "Those of high rank were not greatly affected, but of the common people an incalculable number died, and very many of the clergy, nuns and friars. The religious houses seem especially to have been severely visited by the Black Death, and many of them were closed and left deserted. The records of mortality in those days were indifferently kept and it is most difficult to arrive at an estimate of the number who died of the plague. Contemporary writers vary in their estimates from one-fifth to nine-tenths of the total population as the extent of the mortality, but it is probable that between one-half and two-thirds would be a more accurate estimation."

Another authority relates that in India the appalling number of 10,000,000 persons died of plague between the years 1896 and 1917.

If you recall the disastrous influenza epidemic during the World War and the terror that outbreak aroused, you will have a faint picture of what a plague epidemic can mean to a country and its people. The plague that swept the world in the middle of the fourteenth century, described as the worst disaster ever experienced by man, is said to have been three times as severe in actual number of people killed as that frightful influenza epidemic.

Plague is caused by a microbe called *Pasteurella pestis,* seen under the microscope to be a short, thick, rod-shaped bacillus. Here again the international situation injects itself interestingly: The germ that causes the disease now raging around Manchuria, apparently as a result of the Japanese occupation, was discovered by the Japanese scientist, Kitasato, during an outbreak in Hongkong in 1893. Kitasato shares honors as discoverer of the plague bacillus with the French scientist, Yersin. While Kitasato was working in Hongkong, Dr. Yersin, sent from Pasteur's laboratory to investigate a simultaneous outbreak in Cochin-China, also succeeded in finding the causative organism.

But the real villain of plague epidemics is the Big Bad Rat. This animal and his zoological cousins, mice, squirrels, marmots and other rodents, keep the disease alive in between epidemics and help to spread it from one place to another. Fleas living on plague-infected rats give the disease to man when they get a chance to bite him.

A connection between rodents and the Black Death was suspected even in very early times, centuries before man had learned that animals might be reservoirs of human disease or that minute living organisms were the causative agents of the plagues that scourged the world.

Conquered by Great Fire

According to the Bible, the Philistines made offerings of golden images of mice to stay the pestilence that marred the land—a pestilence that was very probably the plague. If they had only known it, burnt offerings of real mice and rats would have been much more effective in ridding the country of plague. The coincidental burning of all rodents in London during the Great Fire of 1666 was what finally rid England of the plague that had harassed it for 300 years.

In the great epidemics of the Middle Ages, various observers noted that rats came from their holes, lost all their fear of man, became uncertain in their

PREHISTORIC MIRROR

A University of Pennsylvania Museum expedition recently returned from Piedras Negras, Quatamala, with fragments of what is said to be the largest hematite mirror ever found by archaeologists. The assembled mirror is displayed in the picture by Miss H. Newell Wardle of the Museum staff. Hematite is a form of iron ore that was put to many uses by primitive people in America.

movements and died in great numbers. Even the most ignorant people came to regard deaths among rats as foretelling the coming of the plague. When they found dead rats in their homes or about the premises they fled, abandoning their homes and seeking refuge in the country, which was generally considered to be healthier.

Poverty, hunger and filth were long known to favor the spread of the disease. Naturally the better constructed and better kept homes of the well-to-do were more apt to be free from rodents and vermin even in early times, although the rich and powerful did not escape the disease during the epidemics of the Middle Ages and earlier periods.

Ignorance and poverty are important factors in keeping the disease alive in China. During hard times and famines the people are obliged to rely for part of their food on hunted wild rodents, particularly the tarabagan or Siberian marmot, a kind of woodchuck. These animals are apt to be infected with plague; and when the famine-stricken population of Manchuria and neighboring Transbaikalia turn to the tarabagan for food, they get the disease.

These animals are valued for their fur as well as for food during hard times. It has long been known that men became infected with a highly fatal disease in skinning the animals. The risk is increased by the fact that the ones that are ill with plague are of course easily captured.

In this region the people live crowded together in small huts during the winter, which favors the spread of the infection. Whole communities are wiped out. Fear drives some of the population to adjacent territory, but unfortunately they carry the disease with them.

Goes From Man to Man

The disease once established in man may be transferred directly from one person to another. This is particularly the case with pneumonic plague, which is the most deadly variety.

Plague occurs in several forms. Bubonic plague is the common variety. Swollen glands or buboes are a characteristic feature which gave this variety its name. Another characteristic is the development of spots on the skin known as "plague spots" or "tokens of the disease." From these spots the disease got its name of Black Death during the Middle Ages. Headache and backache, stiffness of arms and legs, restlessness, great anxiety and depression of the spirits mark the beginning stages of bubonic plague.

This form may also attack the lungs, but true pneumonic plague has a much more sudden onset and the lungs are first involved. Patients rarely recover from this form, generally dying from two to four days after being stricken.

Fighting the plague means fighting rats or whatever rodent is responsible for the disease in the locality where it appears. During an epidemic the campaign is carried on by trapping and poisoning all the rats. All patients, of course, must be isolated. In between epidemics, anti-plague measures consist chiefly in rat-proofing buildings. Dwellings and particularly warehouses and food storage houses must be so built that rats cannot enter them. Plague was formerly carried from one country to another by the rats that lived in the holds of ships and came ashore at ports.

Stopped by Rat-Proofing

When the rat's villainous role was learned, wharves were rat-proofed and smooth metal guards, too wide for a rat to crawl over were fitted onto ships' hawsers. Ships known to have come from plague-infested ports are fumigated by quarantine officers.

Both a vaccine for protection against the plague and a serum for its treatment have been developed, but neither has been very successful. The vaccine gives relative immunity to the disease for about six months.

All these measures for checking plague and preventing its spread are well-known to the Japanese. Plague has broken out in that country and has been eradicated very promptly. Quarantine officials here believe that they will lose no time in taking action against it if it reaches the occupied area. But the fight against plague is very costly and tedious, particularly in such a disorganized and backward region as Manchuria. The Japanese may decide to retreat before this new and implacable foe. The plague-ridden region may not seem worth the struggle and the cost, in men and money, of a mighty battle with the Black Death.

In contrast to the Manchurian picture, plague seems to be on the decline in other parts of the world. The Health Section of the League of Nations reports that during the last two years plague has disappeared from Algeria, Tunis, Tripolitania and Nigeria. There has been a marked decline in Egypt and East Africa, and in Senegal it is limited to Dakar. On the other hand the disease has invaded fresh territory in Southwest Africa and Angola and has increased in Madagascar.

In South America the disease is on the decline in Ecuador and Peru, but fresh small foci have appeared in Bolivia and Argentina.

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SEISMOLOGY

Benares Near Center Of Monday Earthquake

BENARES, sacred city of India, was the nearest large focus of population to the epicenter of the severe earthquake that struck India at 3:43.1 a. m. (Eastern Standard Time) on Monday, Jan. 15, seismologists calculated after examining data wired to Science Service by a dozen earthquake observatories in the United States, Canada and England.

The approximate location of the center of disturbance was 25 degrees north latitude, 84 degrees west longitude.

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