

"Plague" -

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PLAGUE ON THE PACIFIC COAST OF
THE UNITED STATES.

Historical.

Plague is a very old disease, forty-one epidemics being recorded before the time of Christ. Extensive epidemics in Egypt and Syria are recorded in the writings of Rufus of Ephesus who lived one hundred years B. C. The first pandemic of Plague began during the reign of Marcus of Aurelius, one hundred sixty-four to one hundred eighty A. D. The present pandemic, which is the fourth began in China in 1894. Spreading rapidly through China, Formosa and Japan, it reached India in 1896 and the entire country became infested in a short time. Plague first entered the United States in 1900, an epidemic occurring in San Francisco. It was shown by investigation that the disease came from Honolulu where an epidemic was raging at that time. The disease was confined at first to the Chinese quarters of San Francisco, but interference on the part of State Officials in the matter of Public Health Measures, soon allowed the disease to get a foothold among the white population. In 1904 it was discovered that the ground squirrels in California were infected. During that same year, 113 deaths from Plague were recorded. In 1907, 77 deaths were recorded in California, while in 1908 only 15 deaths occurred, showing the effect of Public Health Measures on the disease. This gives us an idea of the importance of Plague to us on the Pacific Coast. More will be said later.

Geographical Distribution.

During the year 1919 - 20 human indemic cases of Plague were reported from California, Louisiana and nearly all of the South American Republics, the larger seaports of England, France Spain, Africa, Japan, China, Turkey, India, Hawaii, Phillipine Islands, The Azores, Straits Settlements, Java and Malta. These countries listed are some we come in almost daily contact with through the medium of our shipping. It is easy to see how great is our exposure to Plague. The abundance of food for rats along the grain docks make life very easy for the chief spreader of Plague, and should the disease once start here in Portland, it would prove to be a hard thing to eliminate. It is a disease far easier to prevent from entering a country than it is to get rid of once it has started.

Etiology

The cause of Plague is the B. Pestis, a small coccoid, gram negative organism discovered by Kitasato in Japan and by Yersin in Hongkong. The organism occurs in great numbers in the Lymph Glands, Blood, Spleen and Liver. It occurs singly or in chains of two or three bacilli. The growth on Loefflers Media in twenty-four hours is abundant, the appearance being a moist dirty yellow.

Infection and Transmission

Infection may be produced by inoculation, inhalation, ingestion or by rubbing the organisms through an abrasion in the skin. Rodents are the natural reservoir of Plague. It has been found

that in one c. c. of rats blood, there may be 100,000,000 Plague Bacilli. The three types of rats (1) Brown or Norway Rat, (2) Alexandrinus and (3) Rattus are the chief carriers of the disease, but the ground squirrel Citellus Beechyi is also a carrier. In California the ground squirrel has been especially concerned with the spread of the disease. Infection is carried from animal to animal by (1) the flea which is found in such abundant numbers on the rodents or (2) by the ingestion of the dead bodies of rats who have died from the disease or (3) by ingestion of infected excreta. The flea infects animals or humans by biting the individual and then regurgitating some of its Plague infested stomach contents into the wound during the process of sucking. It has been found that Plague breaks out first among rodents and not until a great many rats have been killed does the disease spread to man. When at last, because of the vast diminution in the number of rats, the fleas are forced to turn to man for food, the disease breaks out among humans. It has been estimated that Plague will not occur among humans until the number of Plague infected rats is 0.2 %. Mice are susceptible to Plague, but they are not apt to spread the disease to man since their fleas do not attack humans. Pneumonic Plague may occur because of the inhalation of infected material.

Types of Plague.

There are two types of Plague (a) Bubonic and (b) Pneumonic. Bubonic Plague attacks the lymph glands while the Pneumonic type primarily attacks the smaller bronchials. The incubation period

of Plague is from two to ten days, the average being three days.

Diagnosis.

A sudden septicemia with marked tenderness and glandular enlargement accompanied by leucocytosis is suggestive of Plague. Aspiration of one of the affected glands with subsequent examination of smears for *B. Pestis* (2) inoculation of guinea pigs with aspirated material for reproduction of the disease and (3) growth on Loeffler's blood serum furnish laboratory methods of diagnosis. Diagnosis of Pneumonic Plague is made by finding gram negative *B. Pestis* in the sputum.

Treatment.

Briefly the treatment of Plague may be said to consist of intravenous injections of Yersin Roux anti-plague serum until improvement takes place. The mortality has been reduced to twenty-five per cent by the use of this serum. Prophylactic inoculation has been tried very extensively in India, Java and Japan, but has been abandoned by some. There is a wide variation in opinions of those who have used the serum. Those who believe in its efficacy claim that an immunity lasting from five to six months is obtained by its use.

Preventive Measures.

Now as to preventive measures. There are four main methods in use at the present time for the prevention of Plague.

(1) rat proofing houses, (2) wholesale destruction of rats and ground squirrels, (3) rat guards on the lines of ships and (4) fumigation. In the rat proofing houses especial care is taken to make the basements rat proof by building concrete basements, eliminating all unnecessary rubbish, etc. Single walls are better than double for houses in Plague districts, since rat runways between walls are thus eliminated. The second measure or wholesale trapping of rats is a great problem. When we consider that one pair of rats are capable of producing from four to six hundred offspring in fifteen to eighteen months time, we can see what a large destruction of rats mean. An index of the rat population is to be had by the mouse population. As the rats decrease the mice increase. Trapping rats is effective in the case of the brown rat only, since *Alexandrinus* and *Rattus* are trap shy and must be dealt with by fumigation. Other means of rat destruction have been tried such as the use of cats, rat terriers and rat viruses. As to the first, two cats and rat terriers, they are entirely ineffective. The number of rodents killed by this means is extremely small. Rat viruses kill the rats who obtain it but the virus is not spread to other rats even if dead carcasses are eaten. This necessarily makes viruses of limited value. The third measure or placing rat guards on the lines of ships is one that is strictly enforced. The guards consist of large metal discs placed on the ships lines about midway between the vessel and the wharf

These discs are so constructed that the rats cannot crawl over them and so passage of rats from vessel to wharf or vice versa is prevented. The fourth measure or fumigation is also one of great importance. At the principal ports of entry, Quarantine Stations are established with facilities for fumigation of vessels. These Quarantine Stations must be equipped for the boarding and inspection of vessels, apparatus for disinfection by steam, sulfur and Formaldehyde. Before a ship can clear for any foreign port, the ship's master must obtain what is known as an Original Bill of Health, signed by an Officer of the United States, usually a consular agent. This Bill of Health gives information as to the health of every member of the crew of the vessel, the length of time the vessel remained in port and the sanitary conditions of the port. All vessels from foreign ports on arrival in the United States Ports must be inspected. The quarantine period for Plague, according to The United States Regulations is seven days. The work done at these quarantine stations in the prevention of Plague is a very great one.

Now, as to the meaning of Plague to us on the Pacific Coast of the United States. We have already stated that Plague entered San Francisco in 1900, and has been prevalent there since. One investigator stated that the endemic prevalence of Plague among squirrels of California is a menace to the entire United States. Because of climatic conditions Pneumonic Plague is not a serious problem to the Pacific Coast, but is to other sec-

tions of the country. California spends sixty thousand dollars every year in an attempt to eradicate Plague. When we remember that it is only a little less than one and one half years since the last human case of Plague occurred in California, we can see that Plague is by no means a past issue here in the United States. Measures taken to eradicate or prevent the disease cannot be too strenuous for when we read the accounts of the great Plague in London with its toll of over seventy thousand lives, we can realize the frightfulness of the disease. Once it breaks out, trade is practically paralyzed. Exports from infected districts are prohibited if the epidemic is a severe one and in any case, much delay is caused by inspection of merchandise, inspection of vessels and their crews etc. What Plague would mean to a city like Portland, the chief industry of which is trade, can readily be imagined.

In conclusion we would just bring back as a reminder that the world's toll to Plague during the past twenty-five years has been ten million lives, the loss of millions of dollars and the destruction of countless numbers of homes. Then when we remember that only next door to us in the neighboring state of California is a source of infection, a smouldering hot bed of Plague as it were, we can see that the disease does concern us on the Pacific Coast and is one that everyone of us should do our utmost to prevent.