A History of Plague
In the
United States of America

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Chapter I

Introduction

Historically, bubonic plague has been responsible for a number of notable pandemics. The disease appears to have a strong, long-term, cyclic tendency. It flares up on a global scale and then slowly retreats to smolder in endemic centers. During the last 15 centuries, four important pandemics have been recorded: the pandemic of 542 to 600 A. D., which began during the reign of the Emperor Justinian and involved the whole Roman world; the "Black Death" of the 14th century, some of which was certainly plague, and which caused an estimated loss of 25 million lives, one-fourth of the entire population of Europe alone; the pandemic of the 15th, 16th, and 17th centuries, which culminated in the "Great Plague of London," 1664 to 1665; and the present pandemic, which began in 1894 and is now receding. Between pandemics, notable epidemics have been recorded in countries all over the world. There is also reason to believe that there are endemic centers in portions of Africa and Asia, which represent the points of origin of all pandemics (1).

The most recent pandemic of plague probably began in the Chinese province of Yunnan on the Tibetan border in the middle of the 19th century, reached Canton and Hong Kong in 1894, and Calcutta and Bombay in 1896. In a few years it had spread to Singapore, the Philippine Islands, Arabia, Persia, Turkey, Egypt, Africa, and Russia, and to parts of Europe, North and South America, Central America, the West Indies, and Mexico (1). Every continent in the world was soon involved. Numerous instances were reported of human beings on board ships who were sick with plague. It is not surprising, therefore, that the first recorded cases of plague within the borders of the United States were aboard ships arriving at San Francisco, Calif.; Port Townsend, Wash.; and New York, N. Y.

On June 27, 1899, the Japanese S. S. Nippon Maru arrived at San Francisco with a record of two cases of human plague on board between Hong Kong and Honolulu. Although no illnesses or suspicious symptoms were noted in either passengers or crew on arrival, because of the history of recent human plague on board, the vessel was placed in quarantine. When the crew and steerage passengers were inspected on the afternoon of June 27, 11 Japanese stowaways were found. When the crew was transferred to Angel Island the next day two of the stowaways were missing. Their bodies, bearing life preservers from the Nippon Maru, were recovered later from the bay. Post-mortem examinations made by the San Francisco Health Department showed plague bacilli in smears and cultures from enlarged glands (2).

On November 17, 1899, the British S. S. J. W. Taylor arrived at New York with plague on board. The ship had sailed from Santos, Brazil, on October 24, 5 days after plague had been officially declared to exist there. While in port at Santos, the steward had been treated at a local hospital for eczema of the face and lips, but had been discharged in time to sail with his ship. He became seriously ill on November 1 and died on November 7. On the day he died, the captain and the cook became ill. On arrival in New York, they were both convalescent, but each exhibited an ulceration on the foot and an inguinal bubo. Pus from the buboes contained plague bacilli. However, no further spread of the disease occurred (2, 3).

On January 30, 1900, the Japanese S. S. Nanyo Maru arrived at Port Townsend with a history of illness en route. One person, with all the symptoms of beriberi, died at the quarantine station. However, because of the patient's general glandular enlargement, the quarantine officer was unwilling to accept this
diagnosis and held the vessel and passengers to await bacteriological examination of tissues from the victim's body. The result of this examination confirmed the quarantine officer's suspicion of plague. Altogether, there were 17 cases of plague and 3 deaths among the crew and passengers of the Nanyo Maru (4).

These three instances all antedated the first case of plague in the San Francisco epidemic of 1900. It will never be known whether they had anything to do with the epidemics which later occurred in the ports of San Francisco and Seattle. However, they do suggest that the cases were probably associated with infected rats on ships and that there probably was ample opportunity in the last years of the 19th century and the early years of the 20th century for rats to leave ships in United States ports and start epizootics of plague.
Chapter II

The First San Francisco Epidemic

On March 6, 1900, the body of a Chinese man was removed from the basement of the Globe Hotel in San Francisco and taken to a Chinese undertaker. The body was autopsied because, before granting of a burial permit, the board of health required a death certificate from a Caucasian physician and a necropsy on the body of every person who died unattended. The assistant city physician, Dr. Frank P. Wilson, reported the case as suspicious of plague to the city health officer, Dr. A. P. O'Brien. The bacteriologist for the San Francisco Board of Health, Dr. W. H. Kellogg, made smears from an enlarged lymph node from the body of the man and demonstrated organisms having the size, shape, and staining characteristics peculiar to the plague bacillus. The glands were then submitted to Surgeon J. J. Kinyoun, of the United States Marine-Hospital Service, Federal quarantine officer for San Francisco. Dr. Kinyoun inoculated rats, guinea pigs, and a monkey with the suspected material on March 8. Three days later, one rat and two guinea pigs died. The monkey became very ill and died on March 13. The pathological diagnosis on the dead animals was plague and was later confirmed by bacteriological studies done by Dr. Kinyoun at the United States Quarantine Station, Angel Island, Calif.

On March 7, the city authorities placed a cordon around 12 blocks of Chinatown. It was estimated that 25,000 persons lived in this 12-block area. The dead man's dwelling and the undertaker's shop were disinfected with formaldehyde. On March 8, Dr. Walter Wyman, Surgeon General of the United States Marine-Hospital Service, suggested by telegram that the following recommendations be made to the local board of health:

1. Antistrept serum to all persons known to have been exposed to plague.

2. Haffkine's vaccine to all other residents of Chinatown.

3. Disinfection of premises with sulfur rather than with formaldehyde.

On March 9, Chinatown was released from quarantine. However, guards were placed at each point of exit from the city by rail and by water to examine all Chinese attempting to leave the city and to detain every person with symptoms suspicious of plague. At the same time, 14 men began a house-to-house inspection. Within 5 days, 30 men were inspecting Chinatown and ordering inhabitants to clean up their premises. In another week, 30 medical inspectors and 120 lay inspectors were making house-to-house inspections and ordering a general cleanup. Sewers and dwellings were being disinfected with sulfur dioxide and bichloride of mercury.

On March 21, an Associated Press dispatch stated that there were four cases of bubonic plague in San Francisco, and that the news was being suppressed by the authorities, who wished to be positive of the diagnosis before
making any announcement. The next day, Dr. John M. Williamson, president of the San Francisco Board of Health, issued a statement to the effect that the Chinese quarter was infected with plague, that the Chinese were concealing cases of the disease, and that local newspapers were endeavoring to suppress news of plague in spite of the fact that Dr. D. W. Montgomery of the medical department of the University of California and Dr. William Ophuls of Cooper Medical College, San Francisco, had concurred in the diagnosis after examining material from the body of one of the victims (2).

On April 1, the State of Texas instituted quarantine measures which, while not naming California specifically, were directed against that State (5).

House-to-house inspection continued until April 10, principally in Chinatown, but also in the Latin quarter, which was inhabited chiefly by Italian fishermen. Because of the continued occurrence of cases of plague, on May 15 a joint meeting was proposed between the San Francisco Board of Health, the Editor's Association, and the Merchants' Association. Surgeon General Wyman telegraphed the following suggestions:

1. Transportation by common carrier was forbidden to Asians or members of other races particularly liable to the disease.
2. Common carriers were not to accept for transportation persons or things liable to convey the risk of plague contagion.
3. Bodies of persons dying of plague were to be cremated or transported in hermetically sealed coffins.

On May 24, the secretary of the Chinese Six Companies applied for a restraining order on the basis that the Federal Government had exceeded its authority. In the meantime, guards were on duty at all points of exit from the city and were inspecting railroad trains leaving the State. Asiaties attempting to enter the city without permits from the United States Marine-Hospital Service were turned back. To prevent an exodus from the city, launches were used at night to patrol the San Francisco waterfront, because threats were made to run down and destroy these launches, an appeal was made to the Navy for protection (9).

On May 28, San Francisco instituted quarantine against the State of California. The same day the California Board of Health demanded another quarantine of Chinatown, and Judge William W. Morrow, Judge of the United States Circuit Court, granted a restraining order based on the opinion that the regulations issued by the United States Marine-Hospital Service were class legislation and denied equal legal protection to Asians, that President McKinley's order was general and did not declare plague to exist in California, and that the proper local
authorities (board of supervisors of San Francisco) had not declared plague to exist. The following day, the board of supervisors declared that plague did exist in San Francisco and passed an ordinance requiring the board of health to quarantine, to take such measures as were necessary for the prevention of and against the spread of epidemic disease, and to establish immediately an absolute cordon around Chinatown. The board of health was afraid to act, in view of the injunction issued by the United States Circuit Court, but strengthened the cordon and kept up a desultory house-to-house inspection. An appeal was made by the State board of health to the Governor, who declined to aid or to cooperate with the city authorities.

Plans were then made to institute a detention camp where Asiatics could be housed; but on June 7, Judge Morrow enjoined the board of health from removing Chinese to such a camp. The board of health had hardly passed a resolution to raise the quarantine, 20 days after the last ascertained case of plague had been reported, when, on June 15, the Federal court ordered the quarantine raised. The next day, Dr. Kinyoun was served with an order to show why he should not be punished for contempt of court by restricting travel in spite of the court order. Two days later, all inspectors at the State border were withdrawn and all inspection ceased. On July 3, Dr. Kinyoun was held not to be in contempt of court (2).

Dr. Kinyoun's role in the early phases of this controversy was exemplary. He had the courage to face what amounted to the most severe personal criticism, almost approaching martyrdom. The campaign of vilification launched against him and others who contended that bubonic plague was present in San Francisco has never been equaled in its unexampled bitterness and unfairness.

That Dr. Kinyoun was included in this vituperation is most difficult to understand in view of his background and training. He was particularly fitted for his role as an expert on plague. He had received postgraduate training in Europe in the best laboratories of that continent, including study under Louis Pasteur in France and Robert Koch in Germany. In 1886, he began to apply the techniques he had learned by setting up a laboratory at the Marine Hos-

pital in Stapleton, N.Y. This laboratory became the Hygienic Laboratory which later developed into the National Institutes of Health. Dr. Kinyoun was the first of a long line of distinguished directors. Among his many accomplishments was the Kinyoun-Francis sterilizer, a shipboard disinfecting apparatus used in the quarantine service.

Dr. Kinyoun's ability was unquestionable. In spite of this, he became entangled in the political controversy over plague. Every attempt was made to discredit his findings, but history has supported his stand (6).

Few cases of plague occurred during the summer and fall of 1900, but by December of that year, the continued occurrence of cases of the disease and the unsatisfactory situation in general prompted the assignment to San Francisco of Surgeon J. H. White, chief of the Division of Domestic Quarantine, United States Marine-Hospital Service. On January 10, 1901, after studying the problem, Dr. White suggested that the testimony of the best bacteriologists in America was needed to confirm or deny the diagnosis of plague, since that was the major point of difference between Federal and local authorities.

On January 19, Secretary L. J. Gage of the Treasury Department appointed a commission
of experts consisting of Professors Simon Flexner of the University of Pennsylvania, F. G. Novy of the University of Michigan, and L. F. Barker of the University of Chicago. The commission proceeded to San Francisco.

The Governor of California, Henry T. Gage, was notified about the commission on January 25. He immediately sent a telegram to the President, in which he expressed the hope that no discourtesy was intended by the Secretary of the Treasury in appointing a commission without consulting State authorities, and suggested that local scientists and possibly scientists from other countries be appointed to the commission.

In reply to Governor Gage's telegram to the President, Secretary Gage stated that members of the commission had been selected wholly because of their knowledge of, and experience with, plague and that they had been directed to pay their respects to the Governor and acquaint him with their work. The commission, the Secretary explained, was to work independently without creating undue publicity and was to be unhampered by detailed instructions from any source. No discourtesy was intended. On January 31, a bill was introduced in the California Legislature to stop the work of the commission, but the bill never passed.

The commission met in San Francisco on January 27 and decided to examine rats until human cases of plague should occur, to request of university authorities the privilege of using bacteriological laboratory space, and to open temporary offices which would permit interviews with local citizens. A private room was made available in the University of California Medical Department by Professor A. E. Taylor. This action was later countermanded by the president of the university. The city authorities then made suitable space available to the commission.

On January 29, the commission requested an appointment with Governor Gage in order to pay its respects. The Governor's secretary replied that the Governor would be pleased to receive the members at any time they deemed proper. An appointment was requested on February 12. The Governor arranged to be in San Francisco on February 16. In the meantime, the commission had had an opportunity to examine six cases of plague between February 5 and 13 and was ready to make its report after seeing the Governor.

On February 17, Governor Gage again protested to the President that the State had been denied any opportunity to participate in the plague investigation, that Dr. Kinyoun, who was considered to be prejudiced, had been actively assisting the commission, and that a report by the commission that plague existed in San Francisco would be regarded as the result of an unfair and unjust investigation. The Governor suggested that a reinvestigation be made by a commission of three members appointed by the Federal Government, three by the State, and a seventh to be chosen by the other six in case their opinions were equally divided. If such a new commission could not be appointed, the Governor requested that California have an opportunity to discuss the commission's report before it was made public and before any action was taken. Secretary Gage accepted the latter suggestion.

On February 25, the Governor requested the Federal Government to assume responsibility for all plague-control work in San Francisco, and on February 27, he appointed a commission to go to Washington to confer with the Secretary of the Treasury on arrangements. The conference was held in Washington on March 9. John P. Young, Fremont Older, W. F. Herrin, H. T. Scott, and T. T. Williams represented the Governor, and it was agreed that plague-control measures would be adopted in San Francisco, the work to be done with the advice and cooperation of Surgeon J. H. White of the Marine-Hospital Service.

The report of the commission of expert diagnosticians was made available immediately to the Governor of California, the mayor of San Francisco, and several State health officers. A synopsis of the report was published in the March 29, 1901, issue of Public Health Reports (p. 636), and the entire report (7) was printed in the April 19 issue (pp. 801–816).

An interesting sequel to the commission's work occurred when Dr. Novy took cultures of plague bacilli back to Ann Arbor with him. A medical student (C. B. H.) employed to prepare Haffkine's vaccine and Lustig's serum under Dr. Novy's direction contracted pneu-
monic plague on April 3, 1901, and plague bacilli were recovered from his sputum. The student recovered and later practiced medicine for many years in California. His was the first laboratory infection, the first and only case of plague ever reported in Michigan, the first case in the United States outside of California, the first reported recovery from plague, and the first reported pneumonic plague recovery in the country (8).

On March 31, agreement was reached by the Governor of California, the mayor of San Francisco, the committee sent to Washington by the Governor, and Dr. White of the Marine-Hospital Service to raise funds for disinfecting all plague-infected houses, and for providing hospitals for suspects, detention houses for contacts, and a morgue. It was agreed that:

1. The Chinese were to make every concession toward a daily inspection of all sick and dead.

2. The sick whose illnesses were deemed to be at all suspicious of plague by the inspectors were to be removed to a hospital designated for the purpose, where they could be under constant observation.

3. The dead were to be removed to a morgue in Chinatown for necropsy. After necropsy, bodies were to be placed in lime in hermetically sealed coffins, buried immediately in a separate area, and not disinterred for a year.

4. All contacts of plague patients were to be detained under observation for 2 weeks.

5. Houses were to be fumigated for 48 hours with 5-percent sulfur dioxide (5 lb. per 1,000 cu. ft.).

6. Textiles were to be subjected to steam at 215° F. for 20 minutes.

7. Other goods were to be soaked in 1/1,000 bichloride of mercury solution or 5-percent carbolic acid solution.

8. Other articles were to be burned.

9. Walls were to be scraped, floors were to be soaked and scrubbed with saturated lye solution and then with plain water. Then walls and floors were to be washed with a 1/1,000 solution of bichloride of mercury and, after drying, were to be whitewashed.

On April 8, 1901, inspecting, cleaning, and disinfecting of houses were begun. Two days later, the city auditor declared that the appropriation made by the board of supervisors for cleaning Chinatown and erecting a hospital was illegal. However, the work in Chinatown continued until it was completed on June 21, 1901.

The district bounded on the north by Broadway, on the east by Kearny Street, on the south by Bush Street, and on the west by Powell Street, and commonly known as Chinatown, had been cleaned in a more effective manner than ever before. Every house in this district except those inhabited by the wealthy, and usually clean, Chinese was washed from garret to cellar with a solution of caustic potash, followed by spraying with a bichloride of mercury solution. Household goods were removed and aired from 1 to 3 days, and the rooms were then either reoccupied as they were or, if dark, were whitewashed thoroughly. This latter treatment was applied to all cellars and basements. Houses where plague had occurred at any time within the year not only were given this treatment but were also exposed to a 5-percent volume of sulfur dioxide for 24 hours. When plague had occurred in cellars contiguous to silk warehouses, formaldehyde fumes were generated by autoclaves and a 6-percent volume, 24-hour exposure was given. These methods were applied to 1,180 houses and 14,117 rooms (7).

Surgeon J. H. White was ordered to Washington on June 7 and Passed Assistant Surgeon Rupert Blue was left in charge of the plague eradication work.

After June 21, the Service maintained a laboratory at 641 Merchant Street to continue inspection of premises and to do such autopsies as were required. Plague continued to be reported, and toward the end of 1902 nearly 100 cases had been seen.

Opposition to all control efforts was steadily manifested by the Governor and the State board of health, who consistently refused to allow inspection of other California cities where plague was rumored to exist. San Francisco was embarrassed by lack of funds and by a new mayor who tried to remove members of the city board of health. He was prevented from doing so by an injunction. In October 1902, Surgeon A. H. Glennan was ordered from Cuba to assume charge of the Federal group. Dr. Glennan called on Governor Gage, in
On November 8, the city board of health, employing 3 men and 50 traps, began to trap rats in Chinatown (10a).

On November 20, Governor Gage appointed Dr. Matthew Gardner, chief surgeon of the Southern Pacific Railroad, to accompany Dr. Glennan on the inspection of other cities in California. Oakland, Berkeley, Alameda, San Jose, Sacramento, Davisville, Stockton, Fresno, and Bakersfield were inspected, but no present nor past plague was discovered.

Early in 1903, a new Governor of California, George C. Pardee, M.D., was inaugurated. Dr. Pardee was a practicing physician and a former member of the Oakland Board of Health. One of his first acts was to appoint Dr. Gardner as the official California representative to a conference in Washington on January 19. This conference had been requested by seven States for the purpose of discussing the plague situation in California. Representatives were present from 20 States or Territories and the District of Columbia. The resolution passed by this conference (11) is summarized below:

SINCE the presence of plague in California is established beyond debate,
AND the presence of plague in any community where proper precautions are not taken to prevent its spread is an injury to the best interests of that community,
AND the present danger to California and to the United States lies primarily in the persistence of a definite nidus of plague infection in that part of San Francisco known as Chinatown,
IT IS RESOLVED, That the Surgeon General of the Public Health and Marine-Hospital Service be requested to inform the various State boards of health at least 2 weeks before the annual meeting of the Public Health and Marine-Hospital Service and the State health officers to what extent the sanitary recommendations this day made to control and prevent the existence of plague in California have been carried out, to the end that they may then be prepared to take further action that may be necessary.

On January 18, Governor Pardee issued the following statement to the press:

Whatever the Marine-Hospital Service desires me to do in the way of public health preservation shall be done. If Surgeon General Wyman and his conferences decide that the safety of the country or any part of it would be enhanced by a more stringent adherence to the laws of sanitation in California, their decision will be respected by me and carried out in accordance therewith to the best of my ability and the State's available resources.

A History of Plague in the United States
Again, on January 22, the Governor stated:

I want to say that I propose to act in complete harmony with the Federal authorities. They must be satisfied so as to restore public confidence and my plans therefore will be made to fit with theirs. The medical authorities have emphatically declared that plague has existed and does exist in San Francisco, and that settles it as far as I am concerned. It matters not what one’s belief may be as to the existence or nonexistence of this disease. Medical men say it exists and there is no going behind the returns. Consequently, I stand ready to do what the Federal authorities desire. What we want to do is to put an end to the suspicion with which California is regarded outside the State’s limits.

On February 2, 1903, Governor Pardee; Dr. Matthew Gardner, representing the State board of health; and Dr. A. P. O’Brien, health officer of San Francisco; E. E. Schmitz, Mayor of San Francisco; Surgeon A. H. Glennan, of the Public Health and Marine-Hospital Service; A. R. Briggs, vice-president of the Californian State Board of Trade; A. A. Watkins, president of the San Francisco Board of Trade; G. A. Newhall, president of the San Francisco Chamber of Commerce; F. J. Symmes, president, Merchants’ Association of San Francisco; G. W. McNear, president, Merchants’ Exchange of San Francisco; A. Sbarbora, of the Manufacturers and Producers Association of California; and P. P. Jennings of the California Promotion Committee, signed the following official statement:

Whereas competent medical authority has declared that bubonic pest has existed to a limited extent in the restricted area known as Chinatown in San Francisco, the last case having been reported December 11, 1902, and although the health authorities have exercised sanitary supervision over the section in the past, nevertheless this undersigned joint official statement is promulgated in accordance with the resolutions adopted at the conference of State health officers, held at Washington, D. C., January 19, 1903, as an assurance that there is no present or future danger from that disease, inasmuch as complete and harmonious action by all the health authorities concerned is hereby assured and will be maintained.

The following plan was then agreed upon by Dr. Gardner, Dr. O’Brien, and Passed Assistant Surgeon Blue (10b):

1. Dr. Matthew Gardner, representing the State, will pay three medical inspectors, two sanitary inspectors, and two Chinese interpreters.
2. The city board of health will begin immediately the extermination of rats by means of traps and poison, employing three sewer men for the purpose. Fifty additional traps will be supplied for this work. The city agrees also to disinfect immediately all infected places, and will cause the renovation of such habitations in a manner satisfactory to the health authorities.
3. The city further agrees to have the streets of the Chinese district thoroughly swept at least three times a week and the same flushed with water once a week. A per capita price will be paid for rats found in Chinatown. An extra effort will be made for the removal of garbage and the sanitation of back areas.
4. The United States Public Health and Marine-Hospital Service will exercise immediate supervision over this work in conjunction with State and city authorities, and will furnish for the prosecution of the work, a bacteriologist and laboratory, three medical officers (more if needed), and two Chinese interpreters.

Finally, it is agreed that all cases shall be reported to the proper authorities; that all inspectors shall report daily at 641 Merchant Street, United States Plague Laboratory, for instructions; that inspectors shall be required to make daily reports of their observation and the number of sick and dead seen by them; that the Chinese make every concession toward a thorough inspection of all the sick and dead in Chinatown; that the above work will be continued for at least 1 year from date of adoption of the plan; that the city board of health agrees to recommend to the board of public works and to the board of supervisors that Dupont Street be paved from California Street to Broadway Street; that the city board of health will immediately request the board of supervisors to provide sufficient funds for the purpose of carrying out the obligations assured by it herein.

The city board of health approved the plan, as outlined, on February 9, but because the action was not fully understood in other States, Colorado reimposed its original quarantine order of May 28, 1900. On February 21, Frank J. Symmes, chairman of the Mercantile Joint Committee of San Francisco, telegraphed Surgeon General Wyman to see if he could help lift the quarantine against San Francisco which Ecuador and Mexico had imposed, and this was accomplished. A similar request was made on March 10 in regard to the restrictions placed on San Francisco by Sydney, Australia. In March 1903, although 3 months had elapsed without a human case of plague, Mexico again instituted quarantine against San Francisco at her Pacific ports.

On April 2, representatives from the State board of health visited the United States Public Health and Marine-Hospital Service laboratory, inspected the work in progress, and heartily endorsed the program. On May 11, at the meet-

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ing of the State board of health in Sacramento, 
a resolution was passed recommending that 
Chinatown be moved en masse to a new location 
and that temporary housing be given to Chinese 
in the meantime. This was never done. 

On May 12, Ecuador again instituted quarantiné against California. This quarantine was 
finally lifted on June 16. On May 30, Surgeon 
A. H. Glennen was transferred to Washington 
and the direction of activities again was turned 
over to Passed Assistant Surgeon Rupert 
Blue (11). 

The plan of action agreed upon by Dr. 
Gardner, Dr. O'Brien, and Dr. Blue and 
approved by the city board of health on 
February 9, 1903, was to have continued for at 
least a year. A year later, on February 6, 1904, 
following the appointment of a new city board 
of health, a meeting was called of Federal, 
State, and city health authorities, the finance 
committee of the board of supervisors, and 
representatives of mercantile organizations. 
The following resolutions were passed: 

RESOLVED, That it is the sense of this meeting that 
the sanitary measures adopted by the city, State, and 
Federal health authorities in February 1903, for the 
eradication of contagious diseases in Chinatown be 
continued for so long a time as may be considered 
necessary; that the city board of health be requested 
to recommend to the board of supervisors additional 
measures for the wholesale destruction of rats. 

RESOLVED, That all cellars, basements, and 
underground places in the district between California and 
Pacific, Stockton, and Kearny, be condemned as places 
of abode and the same be destroyed; that in case of 
reconstruction, the owners be required to remove sur-
face soil and to concrete the area thus exposed solidly 
from wall to wall. 

RESOLVED, That the work be done under the direc-
tion and supervision of the Public Health and Marine-
Hospital Service and that a meeting of the representa-
tives of the Public Health and Marine-Hospital Service, 
the city board of health, and the State board of health 
be held once every 2 weeks for consultation. 

MARTIN ROGENBURGER, 
President State Board of Health. 
RUFERT BLUE, 
Passed Assistant Surgeon U. S. P. H. and M. H. S. 
JAMES W. WARD, M. D., 
President San Francisco Board of Health. 
N. K. FORSTER, 
Secretary State Board of Health. 
A. A. D'ARCONA, 
Member Hospital and Finance Committee, 
Board of Supervisors. 
WM. C. HASSLER, M. D. 
Chief Inspecting Physician. 

SAN FRANCISCO, February 6, 1904. 

This is apparently the first record of a resolu-
tion recommending ratproofing as an antiplague 
activity. Under the authority granted, many 
insanitary structures were demolished and 
removed, and in 22 city blocks, all wooden 
floors in basements were destroyed. By the 
end of June 1904, the following recapitulation 
was made of this ratproofing activity: 

<table>
<thead>
<tr>
<th>Activity</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basements and cellars torn out</td>
<td>155</td>
</tr>
<tr>
<td>Basements and cellars cemented</td>
<td>139</td>
</tr>
<tr>
<td>Rear areas torn out</td>
<td>173</td>
</tr>
<tr>
<td>Rear areas rebuilt</td>
<td>113</td>
</tr>
<tr>
<td>Buildings totally destroyed</td>
<td>7</td>
</tr>
<tr>
<td>Buildings refitted with new plumbing</td>
<td>71</td>
</tr>
<tr>
<td>New toilets erected</td>
<td>72</td>
</tr>
</tbody>
</table>

Thus, the art of ratproofing was born even 
before the role of the rat in the transmission 
of plague was accepted generally (12). 

Altogether, there were 121 cases of plague 
with 118 deaths during the first San Francisco 
epidemic. Fourteen of the cases were diagnosed 
iclinically; 107 diagnoses were confirmed by 
laboratory methods. Two cases were not 
classified as to type, but 4 were septicemic, 
5 were pneumatic, and 110 were bubonic. 
The last case of human plague in this outbreak 
was reported on February 29, 1904, but certain 
phases of plague control continued until the 
laboratory was discontinued on April 13, 1905. 

The first epidemic was over. It had existed 
for nearly 4 years and, during the first 3 years, 
there was constant warfare between those who 
knew the disease was plague and those who 
suggested it was something else. Even after the 
Plague Commission made its report early in 
1901, which proved the existence of plague 
beyond the slightest doubt, there were those 
who would not accept the truth. The Governor 
of California was adamant in his stand, and 
it was not until a new governor was inaugurated 
in 1903 and other States in the Union began 
to exert steady pressure that any real progress 
was made in controlling the disease. 

Noteworthy also in the first San Francisco 
epidemic was the general belief that Asiatics 
were more susceptible to plague infection than 
other races. It is true that there was a predomi-
nance of Chinese and a few Japanese in 
the list of cases; however, this was not because
of their greater susceptibility to plague, but rather because of their environmental situation.

It is interesting to note that, although the Plague Commission in February 1901 stated that they wanted to obtain and examine rats, it apparently was not until November 8, 1902, that rats were actually trapped and examined for plague. Surgeon General Walter Wyman had recommended measures for the destruction of rats on May 15, 1900, but there is nothing to indicate that antirat activities actually were initiated until 1902. During the calendar years 1902, 1903, and 1904, there were found 16, 12, and 10 plague-infected rats, respectively.

Emphasis during the first epidemic was placed on fumigation and disinfection of infected premises or premises suspected of being infected rather than on antirat activities. This is not surprising, because the role of the rat and its ectoparasites in the transmission of plague had not yet been proved. Ogata (18), in 1897, crushed fleas from rats which had died of plague and injected them into two mice, one of which died of plague after 3 days. Ogata suggested, from epidemiological considerations, that plague was usually conveyed by suctorial insects. However, the rat-flea theory was not universally accepted until after the work of the Commission for the Investigation of Plague in India in 1905–16 (14).