The Bubonic Plague in Hong Kong
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1894
Translated by Joko for Forbidden Knowledge (August 2nd, 2025)
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1 Introduction

At the beginning of last May, there erupted, in Hong Kong, an epidemic of bubonic plague that was very deadly for the Chinese population of this city. The disease had long since been rampant, in the endemic state, on the high plateaus of Yunnan and had made, from time to time, some appearances not all that far from the border of our Indo-Chinese possessions, at Mengzi, at Lanzhou, and at Beihai. In March of this year, it made its appearance at Guangzhou and, in some weeks, caused more than 60,000 deaths in that city. The great commercial movement existing between Guangzhou and Hong Kong on the one hand, between Hong Kong and Tonkin on the other hand, and the difficulty of establishing, on the coast of these countries, a really effective quarantine made the French government fear that Indo-China would be invaded by the epidemic.

I received the order from the ministry of the Colonies for me to go to Hong Kong to study the nature of the sourge, the conditions in which it is spread, and to research more effective measures to prevent it from reaching our possessions.

As soon as I arrived in this city, June 15, more than 300 Chinese had already succumbed. With all haste they built some temporary shacks, the hospitals of the colony not being able to suffice to shelter the sick.

I settled down with my laboratory materials in a cabin, in a straw hut that I built, with the authorization of the English government, within the outer wall of the main hospital.

2 Symptomology

The disease, which was rampant almost exclusively in the Chinese neighborhoods of the city, presents all the symptoms and the clinical characteristics of the ancient *plague of buboes* which has decimated many times, in the centuries passed, the peoples of western Europe like those of the Levant. The famous epidemic of Marseille, in 1720, was the most recent to date that France has had to suffer. Since this epoch, the scourge remained more or less confined in some homes limited to Persia, to Arabia, and to the Chinese province of Yunnan.

Here are the symptoms of the disease:

- Sudden onset after an incubation of 4.5 days to 6 days; overwhelming, prostration [i.e. weakness and fatigue].
- One is suddenly struck by a high fever often accompanied by delirium. From the first day, a generally unique buboe appears. 75 times out of a hundred, this buboe is seated on the groin; 10 times out of a hundred in the armpit; rarely on the back of the neck or in some other regions.

- The lymph node very quickly attains the size of a chicken egg. Death arrives after 48 hours and frequently earlier. When life is prolonged beyond 5 to 6 days, the prognosis is better, the buboe has then softened; one can operate on it to give the pus a way out.
- In some cases the buboe doesn't have time to form: One observes then some hemorrhaging of the mucous membranes or of the petechial spots on the skin [i.e. purple spots from broken capillaries].
- The mortality is very high: 95% in the vicinity of the hospitals!

3 Epidemiology

In the infected neighborhoods, many dead rats lie on the ground. It is interesting to note that, in the part of the city where the epidemic first exploded and caused the most devastation, a new sewer canal came to be installed. The conduits, with dimensions much too cramped, are separated by distance upon distance from the sedimentation basins whose cleaning is pretty much impossible and which constitute, as a result, multiple permanent sources of infection. It's not understood why there exist in Hong Kong two distinct sewers: the one large and well conditioned, for draining rain water; the other, constantly obstructed, for the cleaning waters and the waste from the houses.

The bathrooms of the wealthy are made up of mobile chamber pots that are changed every day and whose contents, after having undergone certain preparation, serve to fertilize the innumerable Chinese gardens which border the Pearl River, across from the island of Hong Kong.

The apartments, occupied by the Chinese of the lower classes, are everywhere disgusting slums where one hardly dares to enter and where there's gathered an incredible number of people. Many of those slums don't even have windows and are below ground level. One grasps the ravages that an epidemic can cause when it takes residence in such terrain, and the difficulty that one must have in trying to stop it! The sole remedy has been setting fire to the Chinese city: it has been proposed, but some budgetary reasons have delayed it from being followed.

Few of the Europeans, so far, have been struck by the disease, thanks to the conditions of much better hygiene in the houses and neighborhoods which they inhabit. These European houses are not, however, the refuge of all danger, because many times some dead rats are encountered, some clues as to the very close vicinity of the infectious germs.

The physicians of traditional Chinese medicine who had had the occasion to observe the epidemics of Beihai and of Lianzhou, in the province of Guangdong, and M. Rocher, consul of France to Mengzi, had already remarked that the disease, before striking humans, began by taking action with a great intensity on the mice, the rats, the buffaloes, and the pigs. (Netten Redcliffe, *Ninth annual report of the local gov. board*, 1881, and D^{r} Pichon, *Voyage au Yunam.*)

4 Methodology and Results

The particular aptitude of certain animals to contract the plague permitted me therefore to undertake in some good conditions an experimental study of the disease.

There was every indication to look first of all for whether there exists a microbe in the blood of the sick and in the flesh of the buboes.

The flesh of the buboes is, in all cases, filled by a veritable purée of a short, stocky bacillus with rounded tips, easy enough to color with the colors of aniline, and is not stained by the method of Gram. The extremities of the bacillus are colored more strongly than the center, so

that there presents often a space in its middle. Sometimes, the bacilli appear as if surrounded by a capsule. It is found in very great quantity in all the buboes and the cysts of the sick. The blood sometimes contains it, but in very much less great abundance: it's only found there in the very serious and rapidly fatal cases.

The flesh of a buboe, seeded onto agar, gives a development of white, transparent colonies presenting some rainbow colored edges when one examines them with a reflecting light.

The culture is made still better on glycerinated agar. The bacillus also grows on the coagulated serum.

In the stock, the bacillus offers a very characteristic appearance, entirely remniscient of cultures of erysipelas: clear liquid, deposited lumps along walls and at the base of the tube.

The alkaline solution of peptone at 2%, additionally some 1 to 2% of gelatin, is the most favorable environment.

Those cultures examined under the microscope show some veritable chains of short bacilli, presenting as places of large, ball-shaped bulges. On agar, if one examines it with a lot of care and with strong magnification, one notes some bacilli in the milieu with normal forms, sometimes skinny, sometimes large chains constituted by some little rods joined end to end.

Those expanded and abnormal forms become more and more numerous in the old cultures, they take coloring agents badly.

If one inoculates the flesh of the buboe into some mice, into some rats, or into some guinea pigs, these animals are surely killed, and at autopsy they present some characteristic lesions, with numerous bacilli in the cysts, in the spleen, and in the blood. The guinea pigs die in an average period of 2 to 5 days; the mice in 1 to 3 days. One finds, particularly in the first passages, some microbes encompassed in the mononuclear leucocytes.

Among the guinea pigs, after a few hours, one feels already an edema at the point of inoculation; the nearby cysts become perceptible to touch. After 24 hours, its fur becomes dishevelled, it doesn't eat anymore, then suddenly it falls on its side and becomes the prey of convulsive seizures until its death.

If one opens the bodies immediately, one finds some hemorrhages of the abdominal wall, and, in the place inoculated, an extensive pink edema, around the nearby cyst which is very fat and full of bacilli. The intestine is often hyperemic, the adrenal glands congested, the kidneys turned purple, the liver fatty and red; the spleen, very fat, frequently presents a sort of eruption of small tubercules resembling millet seeds. In the case when disease is prolonged by a little bit, there exists, occasionally, some abcesses of the abdominal wall.

In the pleura and the peritoneum, there exists a little bit of thin watery fluid containing the bacillus. It also exists in the blood or it takes a form more stretched out than in the lymph nodes. The liver and the spleen are equally very rich in microbes.

One can easily do some passages from guinea pig to guinea pig with the help of spleen flesh or the blood. Death arrives more quickly after a few passages.

The pigeons don't die when one inoculates them with a moderate dose, either with the flesh of the buboe, or with a culture of the bacillus of the plague.

A first culture having for its origin a buboe is difficult on the agar-peptone. It is developed nevertheless and also kills as quickly as the buboe flesh.

One notices after some days, on those cultures, that a certain number of colonies are developed much more than the others. Examined under the microscope, all contain the pure bacillus. If one seeds them so as to separate the germs, the new colonies are developed with a greater speed. When one inoculates these ones onto the animals, one observes that their virulence is strangely diminished: they no longer kill guinea pigs in a long enough time or they don't kill them at all, but they still make white mice perish.

I have noticed that, on agar, the less virulent colonies are developed faster and tend to stifle the others, so that the successive cultures very quickly lose their virulence.

In their eating either the cultures, or some fragments of spleen, or some liver of an animal that died of the plague, mice are often killed, rats almost always. At autopsy, the bacillus is found in the blood, the liver, the spleen, and the lymph nodes.

The mice that resisted several contaminated meals die when one inoculates them under the skin.

The dead rats which one finds in the houses and in the streets almost always contain the microbe in great abundance in their organs. Many of them present with veritable buboes,

I have placed in the same place some healthy mice and some inoculated mice: the inoculated mice died first; but, in the following days, the healthy mice all succumbed one after the other, with the bacillus of the plague in their organs.

The plague is therefore a contagious and inoculable disease. It is probable that rats constitute the principal vector, but I have equally observed that flies catch the disease, die from it, and can thereby become agents of transmission.

I had remarked that, in the laboratory when I did my autopsies on animals, there were a lot of dead flies. I took one of those flies, and opened it up having already pulled off the legs, the wings, and the head, I ground it into some of the stock and I inoculated it into a guinea pig. The inoculation liquid contained a great quantity of bacilli absolutely similar to those of the plague, and the guinea pig died in 48 hours with lesions specific to the disease.

I was able to isolate the bacillus of the plague from the earth collected at a depth of 4 to 5 centimeters in the soil of an infected house, and where attempts at disinfection had been made; it was absolutely similar to the one taken from buboes, but it was not virulent.

I said above that, in the cultures coming from the blood or from a buboe of one affected by plague, one can isolate several varieties of the bacillus differing among themselves in their virulence with regard to the animals, and that certain colonies had the same loss of all virulence for the guinea pig. In seeding the flesh of a lymph node which had been taken from a patient who had been recovering for three weeks, I was able to obtain some colonies absolutely deprived of all virulence, same for the mouse.

Among the other patients who recovered after fifteen days and who presented with enormous petechia spots on the thigh, I had retrieved a bacillus virulent to the guinea pig and the mouse.

5 Future Work

These facts, very suggestive, permit me to suppose that the inoculation of certain breeds or varieties of specific bacilli with little to no virulence would probably be capable of giving animals immunity against the plague. On this path, I've begun some experiments whose results I will publish later on.

A Note About This Translation: I don't know French, but I'm a native English speaker, and I'm very familiar with both Latin and Italian, all three of which are pretty close to French. I've also studied a little bit of Spanish and Romanian, which are also pretty close to French, as well as studying a little bit of French itself too. Because of a familiarity with these languages, some more than others, I felt that I probably have an idea of what's going on grammatically, so the translation mostly involved looking up definitions of French words that I wasn't familiar with (which was a lot of them). I did this mostly with the help of a French-English dictionary at the website wordreference.com.

Moreover, the Chinese place names have been updated to reflect the increasingly common pinyin way of spelling Chinese words and names with the Latin alphabet. The pinyin standardization didn't even exist at the time that Yersin was writing, and Yersin would have had no way of knowing how the names would be spelled more than a century in the future, so this update only makes the text more readable for today's readers. For example, in this translation, the name "Lanzhou" was used, even though Alexandre Yersin spelled the name of this place as "Lang-Tchéou." Two exceptions have been made to this rule: First of all, the *rivière deCanton* is translated as the Pearl River, which is what that river is called in English today. Second of all, where Yersin was citing a document, namely Pichon's *Voyage au Yunam*, the spelling "Yunam" has been preserved in case the reader is interested in finding that text, even though today the same region of China is called "Yunnan." The following is a table of place names:

Yersin	**Pinyin**
Yunnam	Yunnan
Mong-tzé	Mengzi
Lang-Tchéou	Lanzhou
Pakhoï	Beihai
Canton (city)	Guangzhou
Canton (province)	Guangdong
Lien-Chu	Lianzhou

Also I made minor stylistic changes. Yersin's original paper wasn't broken up into sections, but was one continuous stream of text; I've broken up the text into "Introduction," "Symptomology," "Epidemiology," "Methodology and Results," and "Future Work" sections so as to provide some organization to the paper. To be clear: None of the text was moved around; I broke the paper up into sections *without* altering at all the order that Yersin presented the information in. Bullet points were added where Yersin provided a list of symptoms. Yersin didn't use bullet points, but he listed the symptoms in such a way that, if he were writing the same thing today, he'd probably have used bullet points. I also used today's percent symbol (i.e. %) where Yersin used the more archaic way of writing the same thing (i.e. 0/0). Yersin didn't use Oxford commas, but I've included them because, in my opinion, they make the text more readable; otherwise the commas haven't been intentionally altered from the way Yersin used them. This includes leaving a mistake that Yersin made: He ended one sentence with a comma instead of a period, namely the sentence, "Many of them present with veritable buboes,"

Perhaps it should be noted for English speakers that, where Yersin referred to a person named "M. Rocher," the "M." is not a first initial but stands for the French title "Monsieur." The man's first name was Émile, and "M." is similar to "Mr." used in English.

If anyone spots a problem with the translation, let me know, and I can update it.

—Joko

Typos fixed as of August 20th, 2025:

- "permantent" corrected to "permanent"
- added an Oxford comma after "the buffaloes"