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REPORT  
ON THE  
PLAGUE PREVAILING IN CANTON

DURING THE

*Spring and Summer of 1894.*

BY

ALEXANDER RENNIE, M.A., M.B., C.M.

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# REPORT ON THE PLAGUE PREVAILING IN CANTON DURING THE SPRING AND SUMMER OF 1894.

By ALEXANDER RENNIE, M.A., M.B., C.M.

IN China little or nothing had been heard of the plague since its prevalence at Pakhoi in 1882, so that its appearance at Canton in March 1894 was somewhat unexpected. Europeans, by the ravages of centuries, were rendered painfully familiar with the disease; but to them all interest ceased on its disappearance from Europe in 1841, and in 1844 from Egypt—its home for over 20 centuries. Several years passed, and epidemiologists were beginning to believe the virus was extinct and the plague a thing of the past when attention was directed to an outbreak in Assgr, Western Arabia, 1853; followed by outbreaks in Bengazi, North Africa, 1858; Persian Kurdistan, 1863; the banks of the Euphrates, south and west of Hillah, 1867 and 1873; extending as far north as Bagdad, 1876, and over the country lying between the Tigris and the Syrian Desert. It now appeared in South-eastern Persia and gradually extended northwards to the southern shore of the Caspian Sea; and in 1878 broke out in the province of Astrakhan, Lower Volga, thus reappearing on European soil after an absence of 37 years.\* It would thus appear that, though often seemingly quiescent, the plague has never really been extinct; and now, brought face to face with its presence in Southern China and Hongkong, menacing as it does commercial intercourse with the West, we must realise that the outbreak is fraught with danger.

The presence of the plague in the Chinese Empire does not seem to have been brought to notice until the outbreak in 1871, at P'u-êrh, in Yunnan, during the great Mahomedan Rebellion. With its subsequent progress in that province we have been made familiar by the notes of Mr. E. ROCHER and travellers such as BABER and BOURNE, and also by the French missionaries, who have on one or two occasions been attacked by the disease.† From the observations of these men we learn that the plague is endemic in Yunnan, prevailing annually from March to July, the summer heat being evidently adverse to its progress. Its severe epidemic violence in 1871-73 was doubtless accentuated by the misery and privation attendant on the horrors of civil war. According to Mr. ROCHER, opinion in Yunnan is divided as to the origin of the disease, some stating that it reached the province from Burma, while others maintain that it had existed previously in Tali-fu, in the extreme west of the province. In the absence of authentic history as to how long the plague has existed in Yunnan, we may be justified in inferring that the outbreak there is traceable to sources further west. The disease prevails in Northern India—under the name of *máhámari* or *pali*,—and, as we have seen, has prevailed in Persia and the neighbourhood of the Caspian Sea; thence it may have found its way to Yunnan through Thibet or Northern Burma. Of course there

\* Vide *Papers relating to the modern History and recent Progress of the Levantine Plague*, presented to Parliament in 1879.

† See also *Customs Decennial Reports*, pp. 670-672.

are writers who regard China as being the original home of the disease, whence it issued forth centuries ago to devastate the world. What their authority may be we cannot say, but probably it is no more reliable than that which has led certain speculators at all times to ascribe to China the honour of being the source alike of those diseases and inventions whose early history is involved in obscurity.

We can find no reliable evidence to show that the plague has been known in Canton previous to the present outbreak, although, of course, from vagueness of nomenclature, the history of any epidemic in China must always be surrounded with a certain amount of doubt. Making, however, all due allowance for this, we are, after diligent inquiry, obliged to accept the statement—received alike from official, medical and lay sources—that although from time to time various epidemics have prevailed in Canton, especially in the spring of the year, the particular disease in question has not hitherto been observed.

At the commencement of the outbreak the native doctors with whom we came in contact expressed themselves as quite ignorant of the nature of the disease. They held no particular theory as to its causation or treatment, but merely spoke of it in such indefinite terms as:—

時疫 (*shih-i*): "season epidemic"—an indefinite term applicable to any disease prevailing in an epidemic form; and

瘟疫 (*wén-i*): a term also indefinite, but one, nevertheless, most generally used by the people in connexion with the plague.

Later on many other names were applied to the disease, such as:—

鼠疫 (*shu-i*): rat plague.

卵子症 (*luan-tzŭ-chéng*): egg disease, or, rather, bubonic disease.

標蛇 (*piao-shé*): "shooting snake"—a term said to refer to the rapidly fatal nature of the poison, and also to appearances on the body after pinching.

大頭天行症 (*ta-t'ou-t'ien-hsing-chéng*): } terms which are said to be applied on

紅絲疔 (*hung-ssŭ-t'ing*): }

account of certain appearances on the skin resulting from pinching by the fingers or scraping with copper cash, a method of treatment largely resorted to.

癩子瘡 (*yang-tzŭ-ch'uang*): this term was not in vogue at the beginning of the outbreak, and was no doubt borrowed from Yunnan, this being the common term in that province; it seems to refer to the boils appearing on the body.

In Pakhoi the disease has been known for quite 30 years, but little attention was drawn to it until the publication of Dr. LOWRY'S report on the severe epidemic prevailing in 1882.\*

Excluding as unscientific the theory that, under certain fostering conditions, the virus has originated *de novo*, the question arises, How did the disease reach the seaboard of China? The starting-point was doubtless Yunnan, and thence it most probably found its way to Pakhoi by one of the usual trade routes. The great highway of commerce between Yunnan and Kwangtung is the West River, on which are situated one or two entrepôts of trade with Pakhoi and Lien-chou, through which opium and other products of Yunnan are transmitted to those cities. Inquiry in official circles shows, however, that no outbreak of plague has been

\* Customs Medical Reports, xxiv et seq.

known at Nan-ning-fu, Wu-chou-fu or other cities on the West River, which we should expect to find if the disease had spread by this channel. We feel, therefore, justified in excluding this route and limiting ourselves to the more probable supposition that it reached Pakhoi overland through Kwangsi or the borders of Tonkin. Chinese authorities state that it reached Pakhoi from Tonkin, but as it is known sporadically in the borders of Kwangsi, this latter source is more probable.

From official sources we learn that in 1891 the disease broke out in Kao-chao, the prefecture adjoining Lien-chou, in which Pakhoi is situated; it had evidently, according to the Chinese, spread northwards from the latter city. During the present spring the disease prevailed in other places between Kao-chao and Canton; the outbreak at Yang-chiang was especially severe, and no doubt other towns and villages suffered equally from the ravages of the plague in its march northwards. An erratic course is characteristic of its progress, an observation which is fully borne out by a glance at Mr. ROCHER'S map of its spread in Yunnan, where that traveller remarks that, "instead of visiting every village in its course, it would pass some completely by, returning, however, to those neglected spots months afterwards, when the epidemic would appear to have passed far away."\* On the outbreak of the disease in Canton many persons, especially the well-to-do, removed into the country, thus forming fresh foci for its dissemination; and in the same way the outbreak in Hongkong no doubt arose from persons having migrated from Canton to Hongkong while actually suffering from the disease or during the short incubation period.

Apart from the risk of future outbreaks in South China, its presence there is fraught with danger to more northern ports. All attempts to keep out the plague by examination of steamers and quarantine regulations, such as have been adopted at some of the coast ports, must in the end prove futile, seeing that no control is exercised over the ingress of the disease by junks and other craft. Besides, there is nothing to hinder its spread overland, just as it reached Canton from Pakhoi. If it came to Canton by sea it is rather remarkable that Hongkong, which is nearer to, and in direct communication with, Pakhoi, should have been visited by an outbreak nearly two months later than Canton. In Hongkong improved house accommodation and hygienic arrangements may in the future prevent the plague attaining the same serious dimensions as in the severe outbreak of 1894; but what of the Chinese cities, where over-crowding, insanitary arrangements and filth provide the conditions so necessary for its propagation? History repeats itself: the disease may remain comparatively quiescent for a few years, but will surely be again called into activity under the same fostering conditions as preceded the present outbreak.

#### CAUSATION.

History shows that previous epidemics have been preceded or attended by certain conditions and circumstances pointing to a causal connexion.

I.—*Filthy and insanitary Surroundings.*—The sanitary arrangements of Canton are similar to those existing in other large cities of China. Public water-closets are established all over the city, from which both fæces and urine are daily removed and utilised as manure for

\* *La Province chinoise du Yunnan.*



the surrounding country. A drainage system can scarcely be said to exist, unless we regard as such the ditches that run under the large paving stones of the streets, and receive rain water and refuse matter washed into them from the houses and shops. The city being flat, there is no fall to empty those drains, and as no municipal control is exercised over the cleansing of them, this duty devolves on individual householders, who, of course, attend only to the sections which more immediately concern them. Consequently the drains are more often than not choked up, and are practically cesspools containing fermenting animal and vegetable refuse. In the smaller streets waste material finds its way into open side ditches, which are usually in the same neglected condition. Several canals enter the city, and as the tide has a rise and fall of about 5 feet twice in the 24 hours, a certain amount of rubbish is carried off in this way. When, however, the river is abnormally low, as during the early part of the year, these canals are like stagnant pools, thick with decomposing matter.

The water supply is equally defective. People living near the river use the river water, which, containing as it does the refuse of the immense boating population, is of course very impure. The majority depend on surface wells, which exist all over the city. These merely contain surface and tidal water which has percolated through a porous soil sodden with the filth of centuries. Bad at the best of times, one can readily imagine the chemically impure state of the water in these wells, almost empty after such a prolonged period of drought.

To persons imbued with Western ideas of sanitation this state of affairs must sound very unwholesome, and no doubt would prove most deadly but for the attention which Chinese in general bestow on the proper cooking of their food and drink. As cities in China go, Canton is comparatively clean and healthy, and, so far as concerns immunity from epidemic diseases in general, may even compare favourably with Eastern cities boasting of more elaborate sanitary arrangements.

2. *Prolonged Drought.*—The rainfall in Canton during the winter months is very small, but during the past winter and spring was exceptionally so. Thus:—

	<i>Inches</i>
1893. November . . . . .	...
December . . . . .	0.01
1894. January . . . . .	0.80
February. . . . .	0.31
March . . . . .	1.87
	<hr/>
	2.99
	<hr/>

Intelligent Chinese regarded this absence of rain as the most important factor in the propagation and dissemination of the disease, rendering as it did both wells and drains more filthy than usual.

3. *Epizootics among the Lower Animals.*—In addition to the mortality among rats, we learn from Mr. ROCHER that in Yunnan cattle, pigs and dogs die in great numbers previous to the outbreak of the plague. Rats, however, suffer more than other animals, and are thus said "to give warning (*p'ao hsin*), for they tumble about and die in the streets." \*

\* BOURNE, *Report of a Journey in South-west China.*

The same circumstance was noted in Canton both previous to and during the epidemic. From districts of the city where the disease had lasted for some time rats entirely disappeared, but kept on dying in other parts to which it subsequently extended. They would come out of their holes in broad daylight, run and tumble about in a dazed condition and die. Certain officials took steps to have all dead rats collected, offering about 10 cash per head. Up to 8th May it was stated that the officer in charge of the west gate had in this way collected 22,000, which were duly interred outside the city. So far as we can learn, no other animals were affected. With a view to ascertain the cause of death, we from time to time examined the bodies of these rodents and noted the following postmortem appearances:—

1. Stomach distended and filled with particles of food, sand and indigestible substances; mucous membrane red and inflamed towards the pyloric end.
2. Liver much enlarged and congested, and containing (*a.*) encysted tapeworms (probably *tænia saginata*)—these were present in every case, in some as many as nine cysts being noted; (*b.*) ova of distomata, usually found in patches near the anterior border—in some the whole liver substance was infiltrated with ova.
3. Congestion at base of lungs present in some—about 40 per cent.
4. Glandular enlargement was present in 30 per cent. of those examined, but in a much less marked degree than in the human subject.

Is the disease in man and animals identical? Should bacteriological examination give an answer in the affirmative, then we must recognise that these rodents are active agents in transmitting the disease from place to place for long distances overland.

We regret that, owing to the strong antipathy of the Cantonese to any foreign interference either in the treatment or postmortem examination of these cases, we have been unable to obtain any evidence bearing on the pathological conditions present in the human subject. Much light will most probably be thrown on the pathology of the disease by the band of scientists who are engaged in investigating the question in Hongkong.

#### COURSE AND SYMPTOMS.

A few stray cases occurred in the beginning of March, but it was not until the end of the month that attention was awakened, on account of its fatal prevalence in a poor neighbourhood near the south gate of the city, and also in Nan-shêng-li, a quarter occupied by Mahommedans, among whom the mortality was very high. At this time the type of the disease was exceedingly severe—of those attacked, quite 80 per cent. dying. Towards the middle of April the cases we saw were of a milder type; but the disease subsequently became more severe and extended its boundaries to other parts of the city and also to Honam, the maximum mortality being reached about the middle of May. At the "Fang Pien So," an institution inside the north gate, we had opportunity from time to time of examining patients, and were thus enabled to form a more accurate estimate of the progress of the disease than by the slender and unreliable information obtainable from outside sources. Rain fell copiously during the month of May and beginning of June, so that many streets were under water; the temperature remained comparatively low.

But both these factors seemed to favour the propagation of the disease, as by the beginning of June it was rife in the western suburbs as well as in the surrounding towns and villages.

It is impossible to give any correct estimate of the mortality, as no official records of burials are kept. Comparing the estimates obtained from various sources, we believe the mortality from the beginning of the epidemic to the middle of June (the date of writing) to have been about 40,000—a large number, but, in a city with a population of about 1,500,000, by no means excessive when compared with the ravages of this fell disease in other cities. In the great plague of London (1665) it was estimated that 60,000 deaths occurred in a population of 500,000.

Although a goodly number of well-to-do people fell victims to the pestilence, the chief sufferers were the poor—over-crowded and badly housed. The people who escaped the scourge in the most marked degree were those living in upper stories and the boating population. With the exception of those put in boats after falling sick, scarcely a case was noted on the river. Many well-to-do people, observing this immunity, removed from their houses and made their homes on the water. Judging from this circumstance, therefore, and also from the fact that rats living in the ground and drains were the first animals to fall victims, we infer that the specific poison emanated from the soil. What the specific poison may be is not determined, but no doubt the insanitary conditions referred to, exaggerated by a prolonged period of drought, provided a specially suitable nidus for its growth and dissemination.

The immunity enjoyed by residents on the foreign Settlement of Shamien is remarkable, seeing that it is separated only by a creek some 20 yards wide from houses where cases of the plague occurred. Not only did foreigners living on the Settlement enjoy excellent health, but no case of plague occurred among their servants living on the premises; the rats also, up to the date of writing, remain healthy and lively.

The disease is not markedly contagious; it affects chiefly those occupying the same rooms and coming in close contact with the affected. Casual visitors, especially if there is free ventilation, are not liable to contract the disease. In its mode of spread, and in the limited area to which the poison extends beyond the body of the victim, the affection bears a remarkable likeness to typhus, although the course and symptoms show little or no affinity to that disease.

The malady runs no regular course, and has no characteristic eruption or day of crisis. With or without premonitory symptoms, such as malaise or rigor, fever sets in suddenly, rising to 105° or even 107° F., accompanied by headache, thirst, great restlessness, giddiness and subsequently stupor. In from 8 to 24 hours a glandular enlargement occurs in the neck, axilla or groin; in a few hours the swelling may reach the size of an egg, is hard and acutely tender. Coma supervenes, and death occurs in 48 hours from the onset or sooner. Cases lingering on for several days are regarded as hopeful, although relapses are liable to occur. The date of appearance of the bubo is most uncertain, and may occur at any stage of the fever; we have seen it as late as the 5th day, and as early as the onset of the fever. In a few cases vomiting of blood has been observed; in others petechiæ appear, but no characteristic eruption. In milder cases glandular enlargements are absent, the prominent symptoms being fever and diarrhœa with great restlessness and giddiness. Boils may appear during convalescence. Post-mortem lividity is very pronounced, giving rise to the term "black plague."

The chief sufferers are women and children, most probably because, leading a more in-door life, they are more freely exposed to the source of contagion. We have frequently remarked the number of female children suffering from the disease. A medical friend has suggested that as in wet weather Chinese stay in-doors, and so absorb a larger dose of the specific virus, the increase after rainfall may be due to this circumstance.

#### TREATMENT.

If not edifying, it is at least interesting, to glance at the line of treatment adopted by the native faculty. At first, and in the absence of previous experience of the disease, the usual remedies against fever were employed, but subsequently others, regarded more or less as specifics, were had recourse to. Recipes for nostrums claiming infallibility were freely distributed both by physicians and laymen. Of these the following translation is a fair sample:—

1. *Pterocarpus flava*, 1½ mace.
2. Betel-nut, 3 candareens.
3. Wild chrysanthemum, 3 mace.
4. *Scutellaria viscidula*, 1½ mace.
5. *Taraxacum officinale* (dandelion), 1½ mace.
6. Szechwan rhubarb, 1½ mace.
7. Kan-ts'ao (a kind of grass), 2 mace.

Mix these ingredients, boil, and drink the resulting liquid.

In addition, directions are given to rub the body with the leaves of the wild chrysanthemum chopped into paste.

The following formula was circulated by a gentleman possessed of a smattering of knowledge regarding Western drugs:—

To a teacupful of sea water add 2 candareens of lime made from stone (lime from other sources unsuitable). Shake and filter. To this add ½ tael of calomel. Rub this over the swelling.

In addition, when the patient is dangerously ill, dissolve a dose of iodide of potassium in warm sea water and drink at once.

Many nostrums were vaunted for purposes of gain, while others were distributed by benevolent persons free of charge. Prominent among these are so-called preventive remedies, although from the harmless composition of some we cannot but infer that the element of faith plays an important part. In the streets almost everyone kept smelling some substance which he regarded as endowed with virtues capable of neutralising the poison of the pestilence.

Later on more drastic measures were resorted to, such as burning and incising the swellings, even when no signs of suppuration were present. This line of treatment was certainly severe, but not marked by any success. In fact, taking the treatment all through, and leaving out of the question the pretensions of quacks, native doctors of good repute readily admit that drugs generally are powerless in arresting the progress of the disease.

Passing on from those remedies of a tangible nature, we turn to the devices suggested by superstitious belief, which is particularly rampant in the native character in proportion as ordinary remedies are powerless. With a view to dispel the evil influences, processions paraded the streets by day and night, accompanied by much noise and firing of crackers. Prohibitions

against the slaughter of pigs were equally unsuccessful; so at length the happy idea suggested itself to inaugurate a new year. Proclamations were accordingly issued ordering the 1st day of the 4th moon to be observed as such, and this day was therefore ushered in by the usual noisy demonstrations. The idea underlying this device was that so much suffering having filled the early months of the year, by this resort the misery would be left behind and the remaining months be happy. Dragon boats, which are supposed to possess power to drive away the evil influences, were called into requisition. These boats, after the proper Dragon Festival, are submerged in the beds of the streams until the time of the next annual celebration approaches; but on this occasion they were raised from their resting-places much earlier than usual and paddled along the creeks adjoining the city.

Although we had abundant opportunity of examining the disease in the city, foreign treatment was at a decided discount, and but few cases came under our care.

A. B., foreigner, resident in the city; was first seen on 1st March. Temperature  $104^{\circ}.5$ ; pulse 96. Complained of pain in right groin. On examination found a small bubo, hard and very tender. On inquiry found that a servant resident on the premises had died the previous day, and although the exact nature of the disease could not be ascertained, still, from the fact that the total duration of illness was under 40 hours, accompanied by fever and giddiness, it was suspicious of plague.

Temperature ranged from  $103^{\circ}$  to  $105^{\circ}$  for four days, at the end of which period we removed patient to more healthy quarters. The temperature gradually declined, and under painting by iodine liniment and poulticing, the bubo was sufficiently soft to admit of incision on the 9th day, after which convalescence was rapid, although a fistulous opening persisted for some time afterwards.

In the few cases under our care the line of treatment was, briefly, free purgation by calomel at the outset, antipyrin to reduce high fever, quinine and stimulants when necessary. Having regard to the fact that the affection is more or less a form of blood-poisoning, some benefit might possibly be derived from the administration of germicidal remedies, such as carbolic acid, bin-iodide of mercury, etc. Our experience, however, in the matter of treatment has been too limited to warrant us in expressing an opinion on this subject; the rapidly fatal nature of many cases we saw led us to infer that remedies in most instances would prove of little avail, and that success must be chiefly looked for in the domain of preventive medicine.











