



Outbreaks occurred in Vietnam 1965-1969, especially in refugee centres.



Refugee centre in sand dunes of Tuy Hoa.

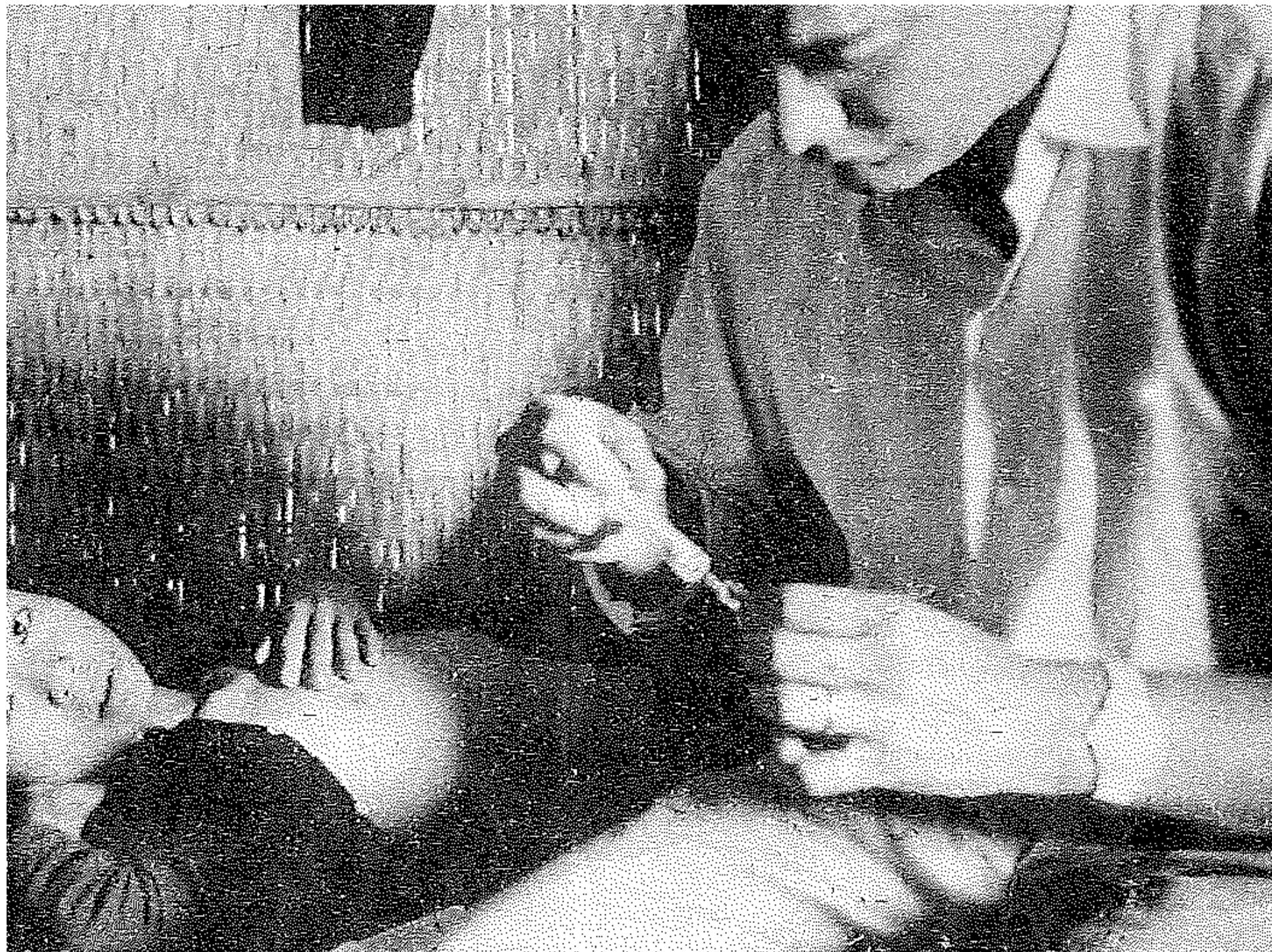


Outside clinic Tuy Hoa

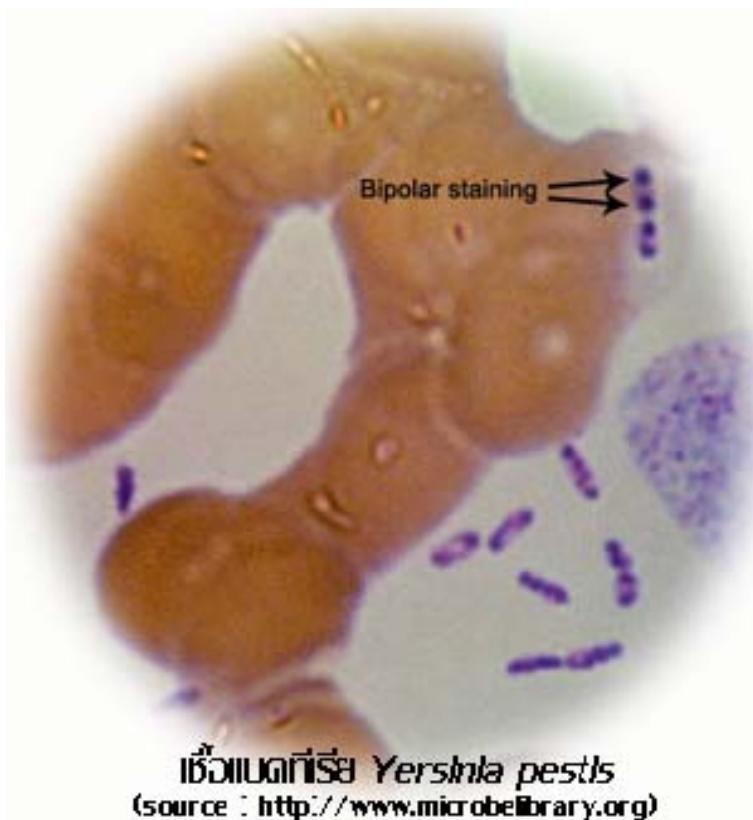


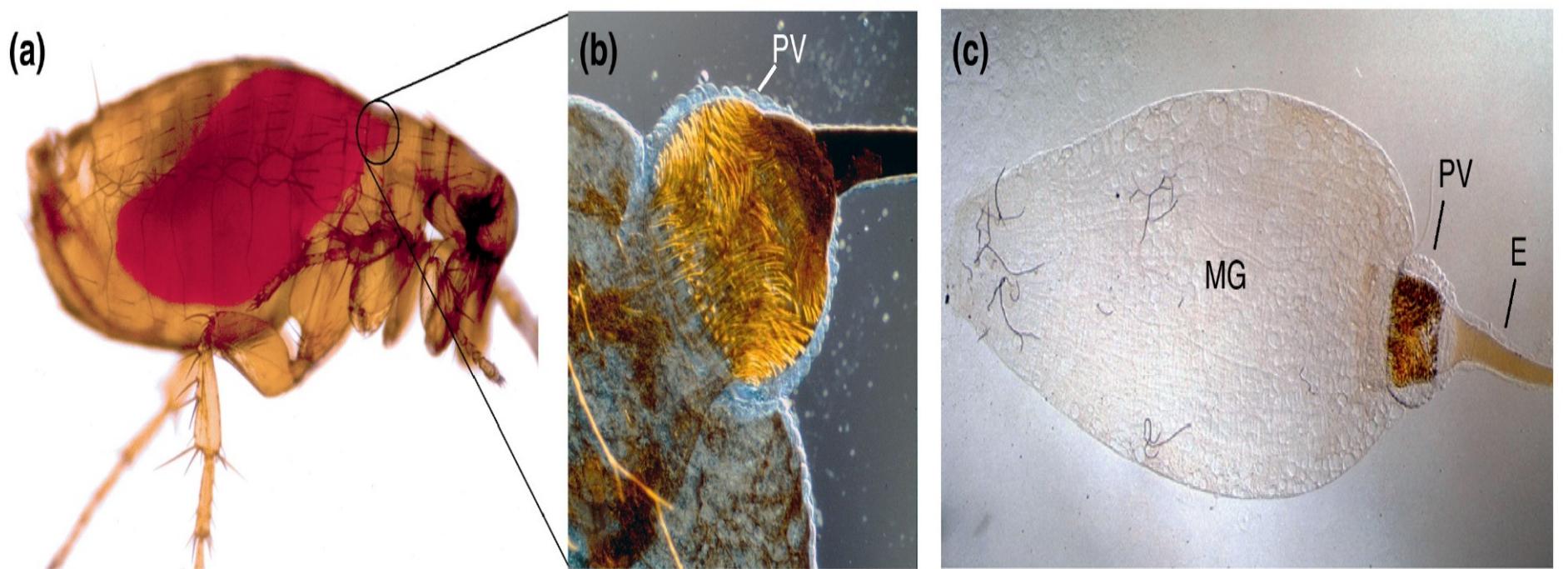
Boys with catch. Tuy Hoa 1967





1. Bipolar staining Gm neg coccobacillus.
2. Xenopsylla cheopis flea.
3. Black rat (*Rattus rattus*)





Plague in Vietnam

- 1898 Nha Trang
- 1906 Saigon, around 1000 / year...down to 25 under strict French rules.
- Increased in WW2.
- 1962 to 1973, perhaps 500 to 10,000 cases.
- Several hundred to 1997
- None since 2000

What type?

- Mostly bubonic.
- Few pneumonic.
- Also, asymptomatic pharyngeal carriers.
- Pharyngitis with cervical nodes.
- Meningitis.

Why did it take off?

1. Rural disruption as with earthquakes in India and Algeria? 7.5 million tonnes of bombs: 100 times impact of A bombs in Japan.
2. Rural exfoliation of six million acres.
Cases were most in defoliated areas.
3. Human disruption of 10% of population?
4. Was it thus in rural rats coming to town?

Not rural, urban rats from central supply, skinned on the spot.

- Not found in rural rats, only *R rattus*.
- And, the flea *Xenopsylla cheopis* was almost specific to urban rats.
- Only one species was shared.
- Central supplies of grain.
- Local refuse.
- Eating and thus skinning as in camel skinners and other practices.

Why did it not spread?

Hot: fleas are blocked over 30C

Dry: they and their eggs
desiccate in dry weather.

Antibiotics: reduced mortality to
1-5%

How did it get there?



Yunnan



Emile Rocher

Administrator with French China Customs, gun running for the authorities in the Moslem civil war with the Manchu dynasty.

First sign...sickness and mortality in rats, and other animals.

Rapid onset, high fever, thirst, prostration, buboes, mortality 4-6/100 but in other districts 'whole families disappeared one after another.

Recurring over 1871, 72, 73.

Originated in ? Burma, in ? Mecca, but reports of sickness in rats and humans in preceding 100 years.

Earlier version translated by Patrick Manson, medical advisor to Colonial Office...Medical Reports 1978.

War, famine and pestilence. Capture of Dali.



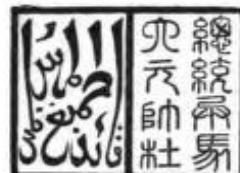
《云南大理府城回民战图》轴

清宫廷画家绘。绢本，设色。纵136.3厘米，横312.3厘米。此图原题《克复云南大理府城一律肃清回逆战图》，系《平定回匪战图》之三十三，所附上谕时间为“同治十二年正月二十九日”。故宫博物院藏。

LA
PROVINCE CHINOISE
DU
YÜ N - N A N
PAR

ÉMILE ROCHER
DE L'ADMINISTRATION DES DOUANES IMPÉRIALES DE CHINE

DEUXIÈME PARTIE



SCURO DU GÉNÉRALISSIME WU WEI-HSIAO

PARIS
ERNEST LEROUX, ÉDITEUR
LIBRAIRE DE LA SOCIÉTÉ ASIATIQUE
DE L'ÉCOLE DES LANGUES ORIENTALES VIVANTES, ETC.
28, RUE BONAPARTE, 28

1880

Tous droits réservés

NOTES SUR LA PESTE AU YÜN-NAN¹

La maladie connue au Yü-nan sous le nom de yang-tu (瘴 子), et qui paraît n'être autre que la peste bubonique, y fait chaque année de nombreuses victimes; elle sévit aussi quelquefois dans le Laos et sur la frontière du Kuci-chou.

D'après les renseignements que nous avons pu obtenir parmi les notables, cette maladie semble venir de la Birmanie, d'où elle est transmise par les caravanes qui traîquent entre les deux pays. On n'est pas d'accord sur l'époque de son apparition dans le Yü-nan: les uns disent (et la plus grande partie de la population est de cet avis) que le centre et l'est de la province n'ont connu le fléau qu'au début de la rébellion; d'autres prétendent qu'il s'est montré dans l'extrême ouest jusqu'à Ta-li-fu, quelques années auparavant. En supposant que cette dernière hypothèse soit vraie, l'épidémie a dû passer bien légèrement dans ces parages, puisqu'on n'en a pas eu connaissance dans les autres districts.

Depuis le commencement de la guerre civile, cette terrible maladie s'est déchaînée avec fureur sur la province et continue, encore aujourd'hui que la province est paisible, à y exercer ses ravages.

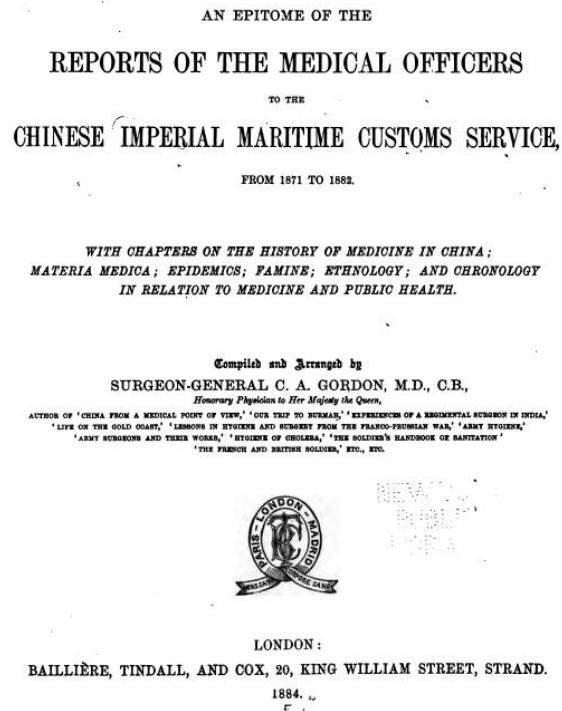
Ce qui ferait croire que cette épidémie n'est due qu'aux miasmes malfaisants qui s'exhalent de la terre, c'est que les petits animaux qui vivent dans les égouts ou sous la terre sont atteints les premiers, les rats par exemple. Dès qu'ils se sentent malades, ils sortent par bandes, font irruption dans l'intérieur des maisons, courrent affolés, et, après quelques tours sur eux-mêmes, tombent morts; le plus souvent ils crèvent sous les planchers, ce qui détermine dans les appartements des odeurs infectes, dont on ne découvre que trop tard la cause. Le même phénomène se produit chez tous les autres animaux, grands et petits: les buffles, les bœufs, les moutons et les chèvres sont frappés du même mal, et parfois aussi les oiseaux de basse-cour, mais, parmi ces derniers, la maladie fait moins de victimes.

¹ Nous résumons ici nos observations sur la peste, dont nous avons déjà parlé, notamment pp. 35, 36, de la première partie. Ainsi condensées, ces notes faciliteront les recherches de ceux qui concernent cette question spéciale.

First report in Southern China. Dr Lowry, Pakhoi

An Epitome of the Reports of the Medical Officers to the Chinese Imperial Maritime Customs ...

<https://archive.org/details/anepitomereport01gordgoog>



Called the Yunnan sickness.

Epidemic in 1882 but recurred since 1867 when the Yunnan war involved troops from Pakhoi.

Rats dying...slightly congested lungs, congested abdominal organs, but no bacteria on microscopy!

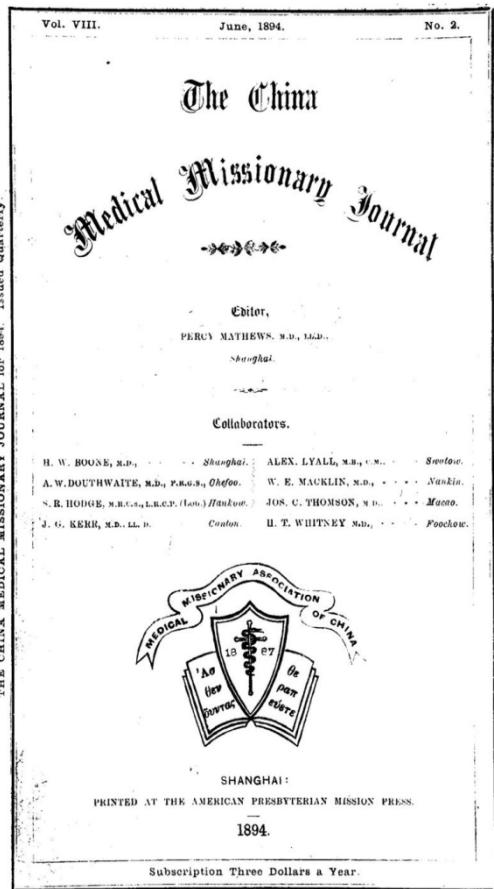
Unable to get blood from victims or do postmortem examinations.

First report in Canton. Dr Mary West Niles

(1884-1933)

Presbyterian obstetrician at Canton Hospital
Founder of school for blind children.

<http://findit.library.yale.edu/bookreader/BookReaderDemo/index.html?oid=11178999#page/1/m>



January 16, 1894....General Wong's daughter in law...Fever, petechiae, inguinal 'boil', was dressed in shroud, but recovered.

Many cases in following months, with people leaving Canton for home villages.
Outbreaks in villages.

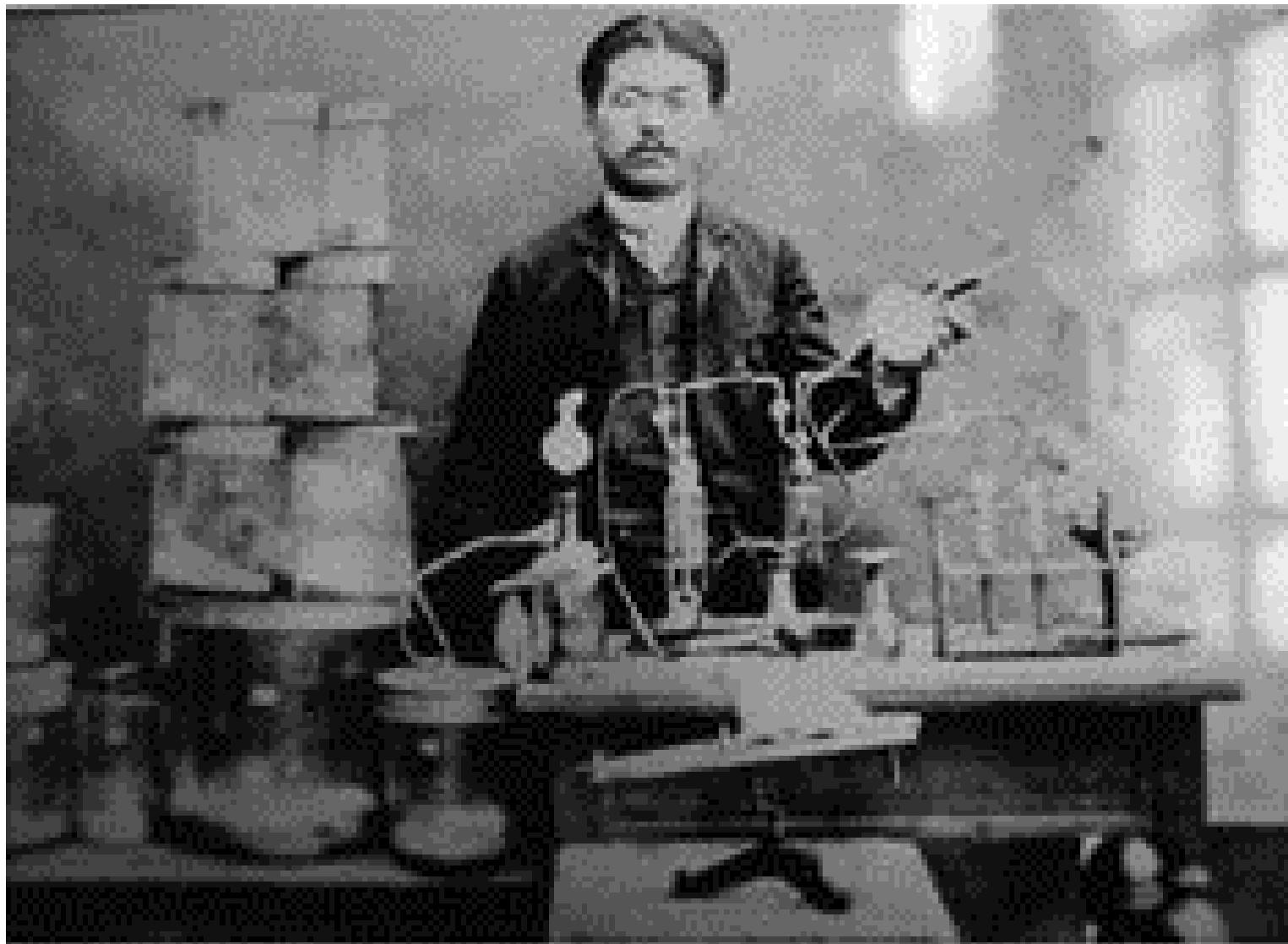
1000 coffins a month.
Over 80-100,000 deaths

Hong Kong. May 94

- Governor William Robinson requested help.
- Japanese government responded with equipped team lead by famed microbiologist Shibasaburo Kitasato, trained in Berlin, found tetanus bacillus and developed antitoxin.
Arriving June 12
- Found organisms in blood on June 14.
- Success telegraphed to Lancet by James Lowson, Superintendent of the Government Civil Hospital , on June 15. Report appeared in Lancet on June 23.
- Pasteur Institute sends Alexandre Yersin. Arriving June 15. Little help. Bribes guards for access to corpses. On June 20, finds bacilli in buboes, unlike Kitasato's, reproducing disease in rats. On June 23, finds same bacilli in dead rats. Considers rats as vectors. Lancet reports sceptically on August 4.Ultimately vindicated.

Shibasaburo Kitasato

<https://au.pinterest.com/pin/51298883232301901>



Alexandre Yersin

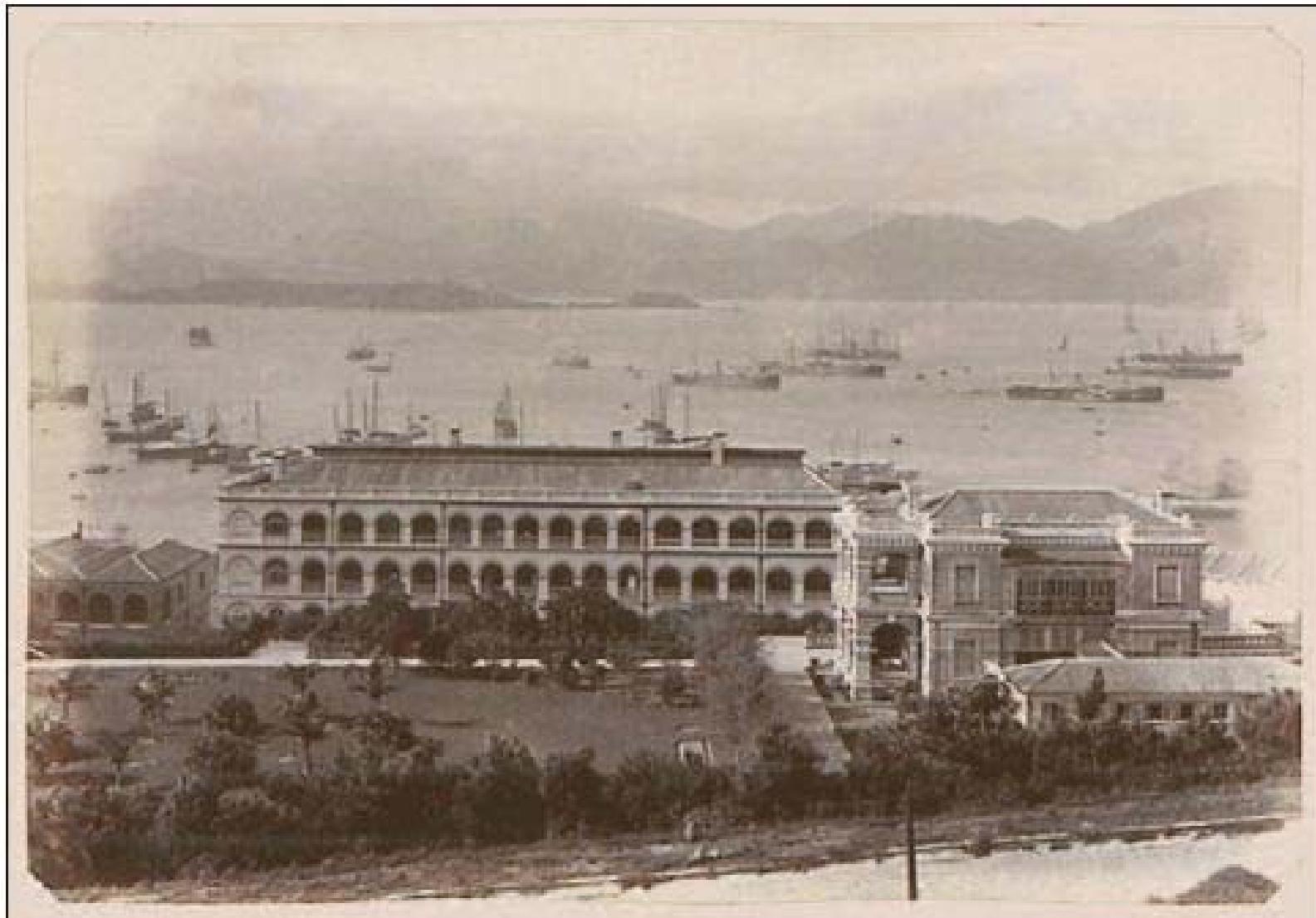
Yersin Photograph Collection © Institut Pasteur – Musée Pasteur.

https://en.wikipedia.org/wiki/Alexandre_Yersin



Superintendents House and Government Civil Hospital in Hong Kong ca 1893.

Colonial Office Photographic Collection.

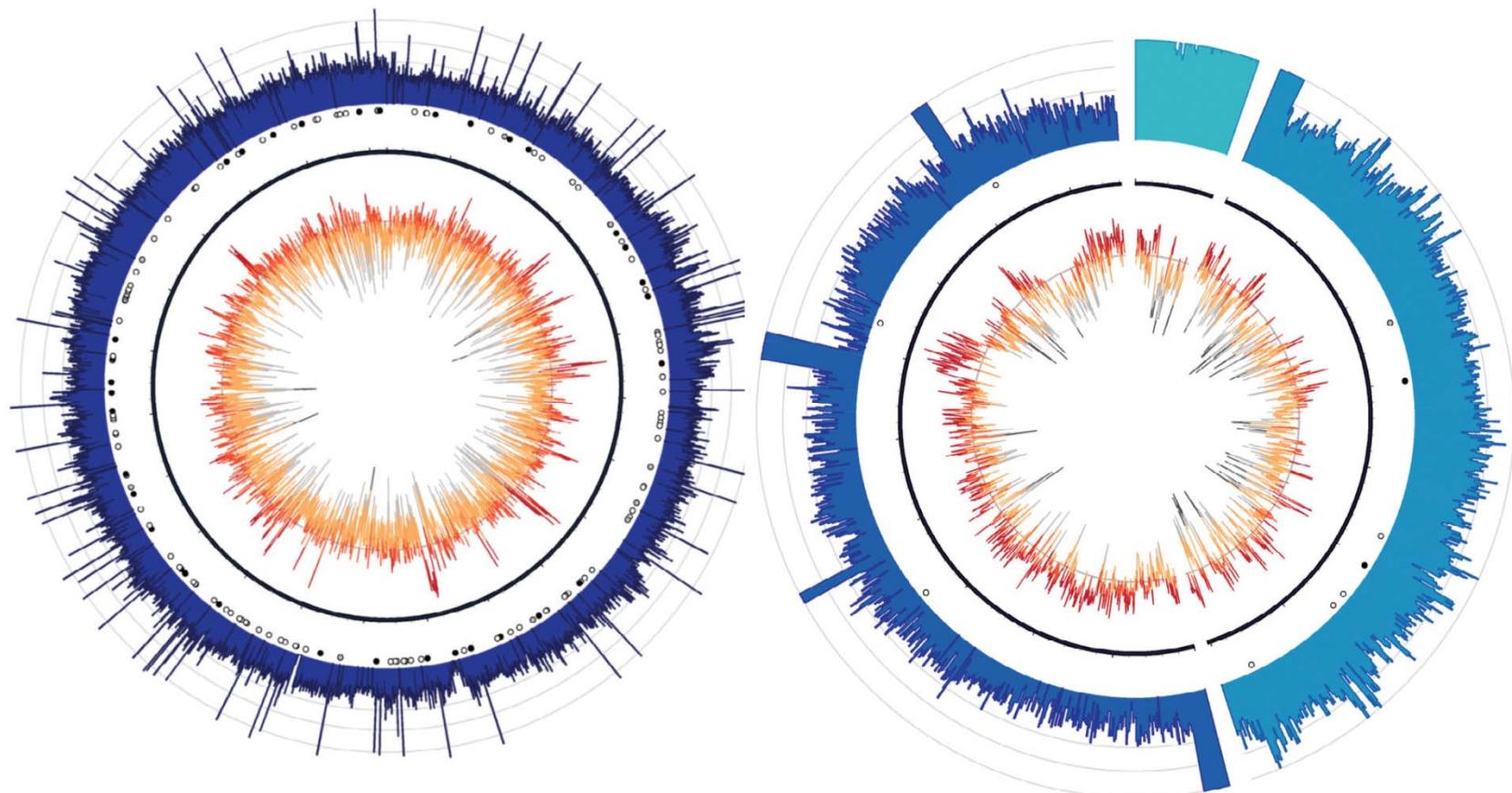


(A) Aerial photograph showing the location of the grave of individual A120 in the Aschheim-Bajuwarenring cemetery, Bavaria, Germany. (B) Shared grave of A120 and two other individuals. (C) Skeleton of A120. (D) Sampled tooth from A120. (E) Goods23 obtained from the grave of A120 that were used to estimate the age of this burial to 525–550 AD. Parts (A) and (B) reproduced with permission of Hans Peter Volpert. Part (E) reproduced with permission of Doris Gutsmiedl-Schümann.





(A) Mapped to the chromosome of the reference strain CO92. (B) Mapped to the three plasmids (pPCP1, pCD1, and pMT1) of the reference strain CO92.
The chromosome and plasmid plots are not
shown to same scale. Single-nucleotide polymorphism colours: black=non-synonymous, grey=synonymous, white=non-coding region. Coverage axes (outer
ring) for both chromosome and plasmids
at 1 (ten-times), 1·47 (30-times), and 2 (100-times) GC content: axis at 0·5. Colour gradation from greater than 0·55 (red) to less than 0·3 (black). Coverage
and GC content calculated in: 1000 bp
windows from chromosome, 100 bp windows for plasmids. Figures produced using Circos.²⁷

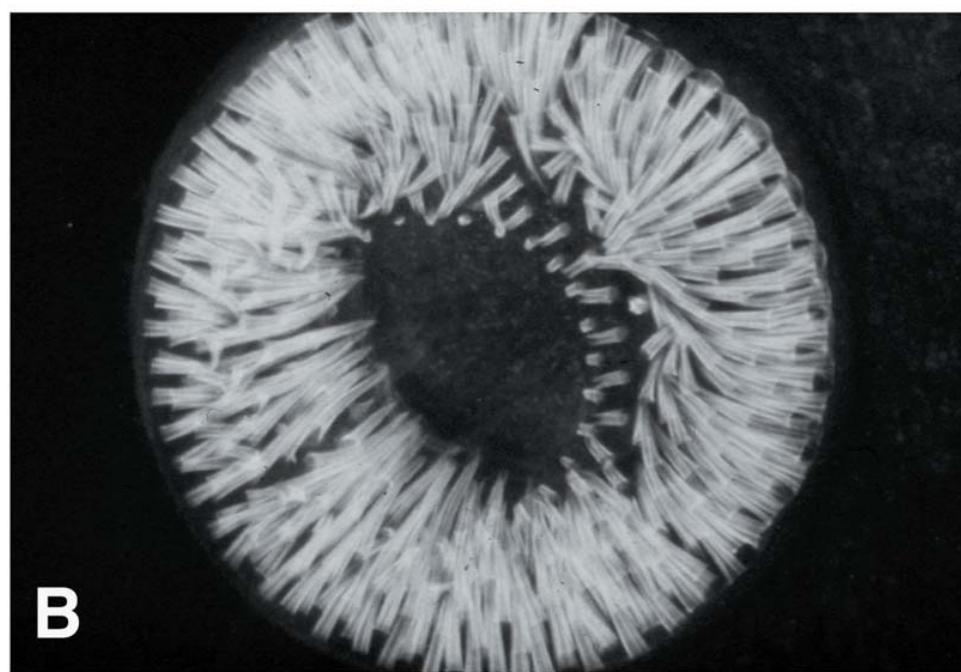
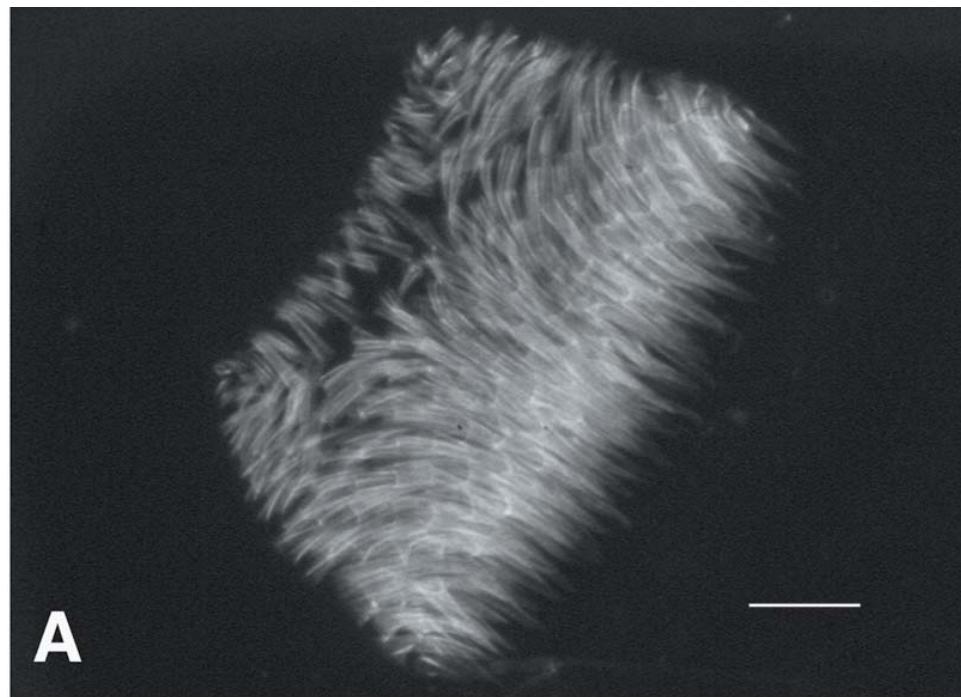


**Original photograph of the triple-inhumation regarding the three male soldiers (Brandenburg, Germany),
dated to the Thirty Years' War (1618–1648).**

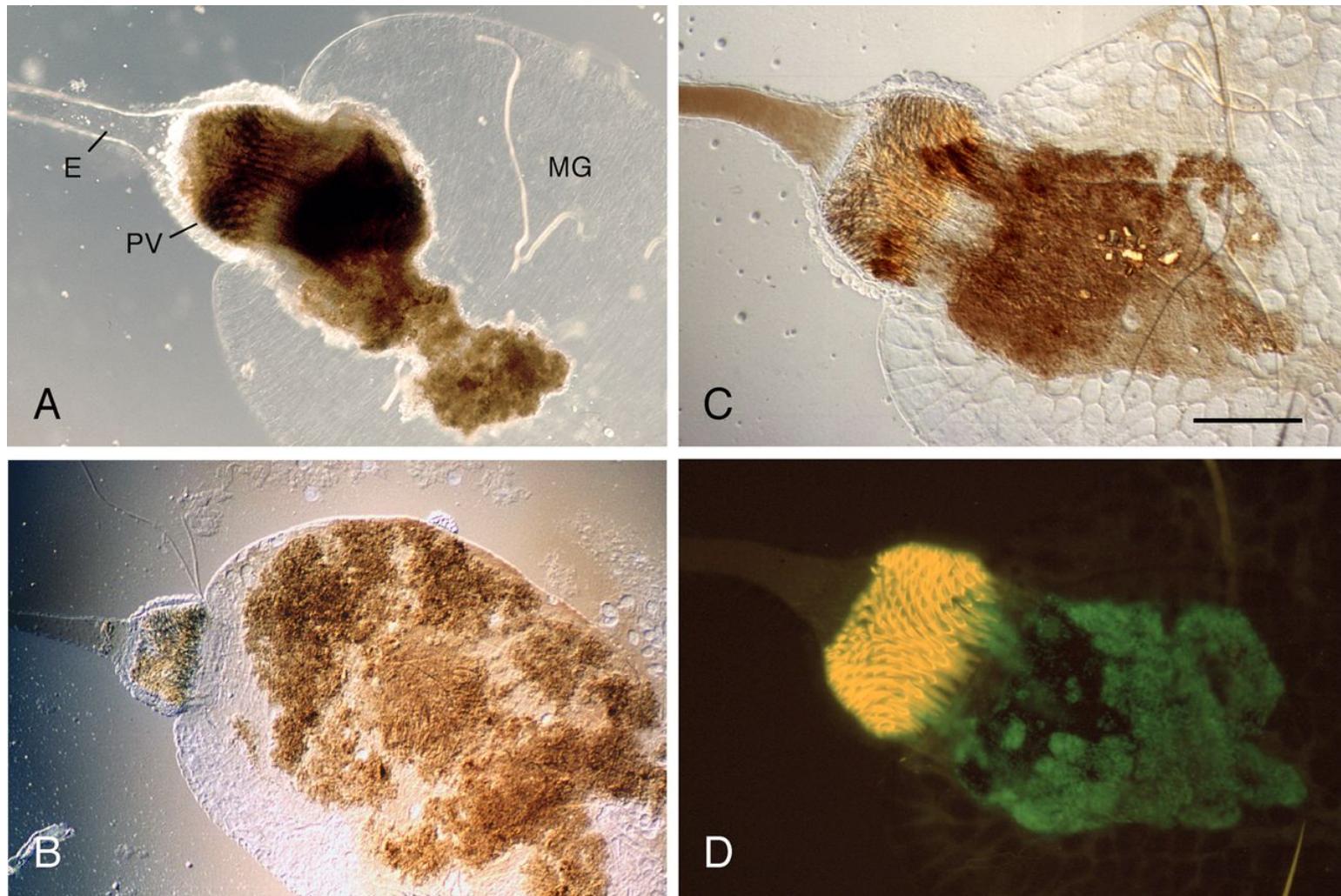
PLoS One. 2016; 11(1): e0145194.

Published online 2016 Jan 13. doi: [10.1371/journal.pone.0145194](https://doi.org/10.1371/journal.pone.0145194)





Fragile biofilm produced by PhoP– Y. pestis in the flea gut.



Roberto Rebeil et al. J. Bacteriol. 2013;195:1920-1930

Journal of Bacteriology