

Uneasy Bedfellows: Science and Politics in the Refutation of Koch's Bacterial Theory of Cholera

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Six cholera epidemics occurred in Europe between 1830 and the First World War. The first has been subject to much research; mainly the efforts associated with it that went into improving water and sewage systems during the time.

The Fifth epidemic occurred in the 1880s, was first confined to Italy but soon spread to Italy, Southern France, and Spain. Understanding this epidemic, and British reaction to it is important for three reasons:

- 1) The MAJOR difference between this epidemic and its predecessors was the presence of the Suez Canal. The outbreak in Egypt in 1883 was the first after the completion of the canal, and some European Powers claimed that English Ships returning from India were to blame.
- 2) During earlier outbreaks Britain, France and Germany had all suffered. This time each could afford to dispatch research commissions to study the disease. "the three big powers almost simultaneously sent teams of investigators to Egypt, each of which was laboring under different national expectations."
- 3) These were critical years for the identification of the cholera germ. German microbiologist Robert Koch was still in the process of formulating postulates for determining a germ source for a disease.

Koch's commissions to Egypt and India in 1883-84 observe that the British were doing very little in response to the new epidemic. William Hunter was dispatched to study the cholera in Egypt and his final report was published in the *British Command Papers* in 1883. In February 1886, "The Official Refutation of Dr. Robert Koch's Theory of Cholera and Commas" was published.

This was intended to be a point by point refutation of Koch's research on cholera and his identification of a germ for its source. "To cast light on the reasons that British or Indian governments refuted Koch's germ theory of cholera it is necessary to extend our research from biological and medical arenas to include the political and economic ones."

"The germ theory which made cholera universally communicable was deeply bound up in the issue of quarantine." Britain had acquired a major interest in the Suez Canal in 1875 wanted to abolish quarantine and make do with medical inspections since at least 1873. Via the Suez canal the shipping distance between London and Bombay could be cut by 41% and between London and Calcutta, 32%. Time is money. The canal reinforced British dominance of world shipping. British Tonnage through the Suez Canal in 1880 comprised nearly 80% of the total, clearly

very important for British Trade. Koch's apparent discovery of a cholera germ implied that cholera might be brought to Egypt or even to Europe from India via the Suez Canal.

Estimates are 50,000 Egyptians died from June to September 1883., and the chief concern was the the epidemic might spread to Europe. By 1883 due to unrest in Egypt, particularly Alexandria, Egypt was virtually a protectorate of the British Empire.

What to do? The president of the Medical Board of the India Office in London, Sir Joseph Fayrer, recommended that Surgeon General William Hunter be dispatched to Egypt as a commissioner to study the Cholera. The letter was sent to Hunter on 14 July 1883.

On 17 July the French political newspaper *le Moniteur Universel*, reported on Austria Hungary's anger at Britain's apparent carelessness regarding the impending cholera danger: which Ogawa quotes IN FRENCH.

Hunter arrived in Cairo on 26 July 1883 and began investigating in cooperation with Ten English physicians dispatched to assist him. He emphasized the futility of quarantine, and sent two reports regarding the epidemic to British Consul General in August. Hunter left Egypt on 13 September 1883 and arrived in London the by the end of the month and submitted his final report in December of the same year.

Hunter's reports were mainly from the viewpoint of sanitation. He wrote "This polluted water was drunk by the people unfiltered, and to this circumstance and also the fact that the poorer classes having freely indulged in the practice of eating the flesh of the cattle which died of typhus, must be ascribed to the prevalence of bowel disorder in the country.

British citizens living in Egypt at this time seem to have been aware of the danger of untreated or unboiled water. The consul general even noted his household only drank boiled water and the British Military regularly boiled their drinking water, whatever other filtration methods were available.

In a January 1884 lecture Hunter based his findings on meteorological data of the previous fourteen years and that the most recent outbreaks was the result of unusual weather conditions. He therefore denied that the disease had been imported from India and insisted instead that it was endemic to Egypt. Ogawa says this seemed to have satisfied the British Government, for Hunter was subsequently made a Knight Commander of the Order of St. Michael and St. George.

There were other qualified people that could have went to Egypt. In fact one, Surgeon-Major Nottidge Macnamara, -an authority on Asiatic cholera of the time and whose book *A History of Asiatic Cholera* is considered a classic, had written the Earl of Kimberley secretary of State for India, on 19 February 1883 requesting a chance to work on the bacteriology of cholera in Egypt. Fayrer refused. Although he recognized Macnamara's qualifications and zeal, he did not share Macnamara's views on the origin of cholera. Macnamara's previous research convinced him that cholera was caused by an intestinal bacillus; a view confirmed by his study of bacteriology under Robert Koch in Berlin in the late 1870s. Macnamara's theory was not likely to be welcomed by the British government, which intended to deny that cholera had been imported from India.

France and Germany both dispatched commissions to Egypt within three or four weeks of the British delegation. The research objective of each group was to address the allegation that cholera had been brought to Egypt from India by ship.

The French commission had been organized under the auspices of Louis Pasteur, although he did not go to Egypt. The French had difficulty collecting corpses of cholera victims suitable for study since the epidemic had already peaked. Also one of their researchers contracted the disease and died shortly after the commission's arrival. In the end they gave up their research, and after their member's funeral left Egypt on 9 October 1883 without obtaining conclusive results.

The Germans, Koch included, worked out of the Greek Hospital in Alexandria. They brought with them a number of animals (rabbits guinea pigs, dogs, cats, monkeys, pigs, rats, etc) as subjects for their experiments, but were unable to infect any of them with cholera.

So they went into India and arrived in Calcutta on 11 December 1883. The British surgeon general in India welcomed them the next day and offered them the second floor of a building adjacent to the Medical college hospital for their laboratory work. Koch again failed to infect any of the animal subjects with cholera. He justified his identification of a cholera germ partly on the inability to infect animals with typhoid and leprosy, and both of these diseases have been accepted as being caused by a specific bacterium.

He sent his seventh and last report to the secretary of state on 4 March 1884. This report described how some villagers who had used water from communal tanks contaminated with comma bacilli had become infected with cholera, and that he considered this a crucial natural trial involving human subjects that compensated for the failure at infection in the animal experiments. The German commission returned to Berlin in May 1884. Its members were celebrated throughout the German Empire, awarded medals by the Kaiser, and given a grand by the Reichstag of 100,000 marks in gold.

Koch's conclusions were not welcomed by the British or Indian governments. If the cause of cholera were a microbiological entity, it could certainly be carried by ship, and therefore the quarantine restrictions agreed on at the Constantinople and Vienna Sanitary Conferences would have to be strengthened. Damn. What would the British do? Fayrer says: "Happily we have pathologist and microscopists who are as competent as any one in Germany or elsewhere to carry out such an investigation, and, in view of the important issues concerned I would most strongly urge the Secretary of State in Council to assent to such an inquiry. They would send their own team.

Since Koch's research in India appeared to support his theory that the comma bacillus was the source of Cholera Hunter's miasmatic, or meteorological explanation was no longer sufficient to counter the criticisms of France and Germany.

The British government would now benefit from the expertise of a noted professional microbiologist rather than that of Surgeon-General Hunter. Edward Klein was a physician, a microbiologist, and the only scholar of microbiology in England who enjoyed similar status to Koch's.

Ogawa points out that there were two other highly qualified bacteriologists who might have been chosen instead of, or at least in addition to, Klein. One in particular was N.C. Macnamara, who, if you remember, actually had expressed his desire to go to Egypt specifically to study cholera at the behest of Hunter's commission. The other was 32-year-old William Cheyne. However, both of these scholars were inclined to a germ theory of cholera, and BOTH had studied under Koch.

Events in France and Germany during summer of 1884 further galvanized Britain's need to address Koch's theory. A cholera epidemic had begun in France, and Bismarck was exploiting British embarrassment in the whole debate. With cholera in Toulouse and Marseilles, Koch hit the road with his team from India, and identified it with the cholera in Egypt and India.

Bismarck regarded Koch and Virchow as having scientifically endorsed British responsibility for the spread of cholera to Europe.

Klein and Gibbes arrived in India in September of 1884 and left in December that same year. They investigated cholera cases mainly in Calcutta and Bombay. An honorarium was given to Klein in the sum of 800 British pounds, a considerable amount that equates to not less than 51,200 pounds today. Klein leaves Gibbes along for two weeks while he settled certain matters with the Indian government. No one really knows what they complain about the facilities even though Koch found them quite satisfactory the year before.

In May and June 1885 the Sixth International Sanitary Conference was held in Rome. At previous conventions Britain in common with other powers have fielded two or three representatives, while India had never been represented in its own right, in Rome however, British successfully negotiated separate representation and voting powers for Britain and India.

Klein and Gibbes' final corrected text of the memorandum for the third day of the committee meetings was drawn up and published by Secretary Lewis and published without notes in the *Quarterly Journal of Microscopical Science* under the explicit title, "The official Refutation of Dr. Robert Koch's Theory of Cholera and Comas" was originally to have been "An Inquiry into the Etiology of Asiatic Cholera. And they were told by the secretary of state that their work was "to ascertain the nature, origin, and propagation of cholera, the microscopic organisms connected with it and their relations—causal or otherwise—to the disease.

Why published in such an obscure journal? Its editor, Edwin Lankester, was a leading critic of Koch's cholera germ claim, and Klein himself was on the editorial board of *Quarterly Journal*. Others, such as *Lancet* and the *British Medical Journal* accepted Klein and Gibbes' report as valuable though inconclusive.

Ogawa concludes that Klein did not misrepresent the evidence against Koch's theory, that he actually logically pointed out genuine insufficiencies in Koch's position. The French researchers in southern France in the summer of 1884 continued to doubt the adequacies of Koch's demonstrations. The water tank example could be

interpreted in two ways: while Koch emphasized the number of villages who had been infected with Cholera, Kelin's report emphasized the number who had not.

This case is a particularly striking example of the degree to which the pursuit of "science" can be influenced by social and political forces, for the real disagreement seems to have been between the scientific and the political ends of the debate. A political decision was made to challenge a scientific theory; but this was undoubtedly a mistake, for two reasons he says.

First, the principals of the germ theory upon which Koch's discovery were accepted by some among British medical authorities, and secondly the acceptance of Koch's discovery, or of a germ theory in general, did not necessarily lead to quarantine.

In conclusion "**Medicine has always been a significant tool of empire**"

I do not think it is fair to blame the scientist for the politics involved some of these scholars really truly believed that Cholera was not caused by a germ.

I also think that he could have translated a foreign newspaper source he quoted at length.

His sources are all the medical reports, as well as committee reports, etc. mostly primary sources from the physicians and scientist involved.

I think the title should have been different as well.