

2018

The Localization of the Indian Sanitary Department: Cholera's Role in Creating the Bureaucracy of the Raj and Sustaining an Empire

Ethan Friederich
Chapman University

Follow this and additional works at: <https://digitalcommons.chapman.edu/vocesnovae>

Recommended Citation

Friederich, Ethan (2018) "The Localization of the Indian Sanitary Department: Cholera's Role in Creating the Bureaucracy of the Raj and Sustaining an Empire," *Voces Novae*: Vol. 9 , Article 1.
Available at: <https://digitalcommons.chapman.edu/vocesnovae/vol9/iss1/1>

This Article is brought to you for free and open access by Chapman University Digital Commons. It has been accepted for inclusion in Voces Novae by an authorized editor of Chapman University Digital Commons. For more information, please contact laughtin@chapman.edu.

The Localization of the Indian Sanitary Department: Cholera's Role in Creating the Bureaucracy of the Raj and Sustaining an Empire

Ethan Friederich

In 1817, the first cholera pandemic emerged from the brackish waters of the Bangladeshi coast.¹ The bureaucracy of British India tasked regional Sanitary Commissioners with eliminating cholera, beginning a country-wide movement in public health, but both social pressures and imperial concerns impacted medical progress. Compared to the local officers, the national division of the Sanitary Department and the Indian Medical Service (IMS) crafted and employed a narrow scientific perspective, distinct from popular research and Western measures to counteract the disease. In the West, medical practice and study resulted in the successful implementation of public sanitation and new standards for clean water, unlike in India where effective prevention and treatment remained elusive until the end of the 19th century. During this time, the work of local Sanitary Commissioners offered a first-hand approach to the treatment and study of the disease, but if the broader implications of their research threatened the social, economic, and political outlook of the British Empire, their analysis was disavowed by the Raj. Between 1866 and 1884, the Indian government dominated and controlled medical discourse on cholera, which delayed the implementation of effective sanitary measures addressing the disease and localized the efforts of regional Sanitary Commissioners.

¹ McNeil Jr., Donald G. "Turning the Tide Against Cholera." *The New York Times*. February 06, 2017. Accessed February 19, 2017. https://www.nytimes.com/2017/02/06/health/cholera-vaccine-bangladesh.html?hp&action=click&pgtype=Homepage&clickSource=story-heading&module=second-column-region@ion=top-news&WT.nav=top-news&_r=1.

The grounds for these claims rest in the application of socio-scientific theory detailing the co-production of knowledge. In 1866, three competing scientific explanations regarding the spread of cholera dominated medical discourse and guided the implementation of sanitation through public health campaigns. Though sound science and empirical data supported the use of clinical trials to study the disease, the appeal, acceptance, and defense of each theory depended on political, economic, and ultimately social reasoning. Sheila Jasanoff writes in her book, *States of Knowledge*, “co-production is shorthand for the proposition that the ways in which we know and represent the world (both nature and society) are inseparable from the ways in which we choose to live in it.”² To understand the reasons why both society in general, and the Indian Sanitary Department gained their foundational structure, the link between the creation of knowledge and society must be connected.

Science, in the co-productionist framework, is understood as neither a simple reflection of the truth about nature nor an epiphenomenon of social and political interests. Rather, co-production is symmetrical in that it calls attention to the social dimensions of cognitive commitments and understandings, while at the same time underscoring the epistemic and material correlates of social formation.³

Utilizing Jasanoff’s breakdown of single disciplines and their interpretations of science and technology, the idiom of the co-production of knowledge provides the philosophical framework to interpret the work of medical researchers on cholera in British India. The co-production idiom rationalizes the distribution of power, making room for both descriptive and normative claims about the nature of empire. Utilizing the idiom translates scientific advancement into cultural developments exposing the social networks that drive humanity. Lastly, the framework provides

² Jasanoff, Sheila. *States of knowledge the co-production of science and social order*. London: Routledge, 2006., 2.

³ Ibid., 3.

a link between historic and contemporary scientific development.⁴ It is the focus on the co-production idiom that connects the creation of knowledge through scientific research to the emergence of the social narrative.

The discovery of the cholera bacillus in 1884 marked a new order of epidemiology, and provides an opportunity to explore how and why a government failed for so long to effectively treat and study such a massive public health concern. Finally understanding the micro biotic nature of cholera in 1884 legitimized the previously under-emphasized scientific insights produced by local sanitary departments that were formerly maligned in Indian medical discourse. This highlights the methods utilized by the government to manipulate scientific knowledge regarding cholera to command the Indian state.⁵

Cholera, an infectious microscopic bacterium, must be interpreted as a historical actor with agency. History is the recognition of agency, going beyond determining the how, why, or where something occurred to recognize the human and non-human connections, relations, and ties in society. This study relies on the actor-network theory, and seeks to explore both the atmosphere that defined the medical classification of cholera in India, and the world created by knowledge of the disease. Science, medicine, and technology are not devoid of social influence; reliance on the empirical is not contrary to the unending human pursuit of defining the social process. Research on cholera presented in this paper challenges any reliance on objectivity, threatening the wider use of the term within an epistemological context. Scientific conclusions seem to imply objectivity, however the connection between the scientific and the social indicates a lack of separation between the two spheres and presents the combination as a singular

⁴ Ibid., 4.

⁵ "Who first discovered cholera?" Who first discovered cholera? UCLA Accessed February 13, 2017. <http://www.ph.ucla.edu/epi/snow/firstdiscoveredcholera.html>.

phenomenon. Building on the concept of the social offered by Bruno Latour, this paper views “the social not as a special domain, a specific realm, or a particular sort of thing, but only as a very peculiar movement of re-association and reassembling.”⁶ “Organizations do not have to be placed into a ‘wider social frame’ since they themselves give a very practical meaning to what it means to be nested into a ‘wider’ set of affairs.”⁷ Therefore, the struggle to define cholera as well as the interplay between the disease and the inhabitants of British India explore the complex arena of Indian sanitation, and the nature of the empire itself.

Contemporary knowledge of cholera exists within an epidemiological context, a luxury afforded by two centuries of research contributing to a medical classification of the disease that is both empirical and universal. Persistent bouts of nausea and diarrhea- common symptoms caused by the presence of *Vibrio cholerae* in the small intestine- ravage the human body and diminish it of nutrients. If left untreated, the human host will likely suffer extreme dehydration and malnutrition. While the bacterium itself does not attack the infected individual directly, the symptoms, notably dehydration, have permanent, life-threatening implications. Severe dehydration will cause blood to become ‘ropey’ and solid; the liquidity decreases and the viscosity increases. As a result, the blood’s capability to transport oxygen and other nutrients throughout the body diminishes drastically. Without a functioning circulatory system, organs are pushed to the point of complete failure and death is almost unavoidable. Some bacteria leave the body on excrement, picked up in the intestinal tract. Outside of the host, the bacteria survive on night soil and thrive in bodies of water. Cholera is highly contagious, and most commonly transferred from person-to-person by ingesting water contaminated with fecal matter. The

⁶ Latour, Bruno. *Reassembling the Social: an Introduction to Actor-Network-Theory*. Oxford: OUP Oxford, 2005. 7.

⁷ *Ibid.*, 7.

severity of symptoms varies and not all victims perish, but the death toll of cholera epidemics is historically high. Between 1817 and 1865, cholera directly caused the death of at least 15 million individuals in India alone, prompting a sincere call for improvements in treatment and prevention across the globe.⁸

Given the complex, international medical discourse during the second half of the 19th century, the diversity of opinion and practice in treating the disease can be explained by exploring why certain theories on cholera appealed to different people. Hindsight offers a critical view of public health campaigns in India between 1866 and 1884. Utilizing contemporary knowledge, it is clear that sewage spreads cholera and any water-system containing infected fecal-matter was a hotbed for the disease. Therefore, any attempts by government officials to claim otherwise can be viewed as false. Nevertheless, such a narrative persisted, sustaining inappropriate practices and begging the question of why medical research and the sanitation enterprise entertained false classifications of cholera in India for so long. Without the epidemiological knowledge afforded by the discovery of the cholera bacillus, debate on the source of cholera and the mechanisms for its spread were vehemently argued. Researchers were operating within a realm of ambiguity that left much up to interpretation. In addition to prevailing research, social pressures distorted the perspectives of many researchers. The imperial concerns of the Indian government created tremendous incentive to maintain the country's profitability. Quarantine threatened both British commercial activity and authority, making quarantine undesirable. The uncertainty regarding the cholera debate allowed researchers to craft a disease framework that avoided such undesirable public health schemes even with a growing body of evidence attesting to cholera's true nature and contagiousness.

⁸ Arnold, David. *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-century India*. Berkeley: University of California Press, 1993. 164.

Historiography on the topic frequently comments on why certain scientists and Sanitary Commissioners remained loyal to a specific theory on cholera, but it dwells little on the interplay between regional and national Sanitary Commissioners within the Indian government and the role their exchanges played in the maintenance of the government's cholera narrative. The British Raj controlled medical discourse within the country by severely limiting the influence of local Sanitary Commissioners. If research offered an interpretation of cholera that contradicted the opinions of top officials, and by extension the economic needs of the state, then the data was dismissed and the researcher's credibility attacked. This bound Sanitary Commissioners to their respective regions, and silenced the voice of researchers whose work aligned with both contemporary knowledge of cholera, and the waterborne theory present in the second half of the nineteenth century.

In the early 1850s in England, roughly thirty years after the emergence of cholera, massive strides were made connecting cholera to effluent. Though epidemics originated in India in the early 19th century, cholera quickly made its way out of the sub-continent on a direct route to Europe, Africa, and the Americas.⁹ The sickness spread to many metropolitan cities, notably those well connected through trade and lacking hygienic sanitation infrastructure, establishing itself as a truly global pandemic. London, the center and crossroads of the British Empire, soon played host to the disease. Upon first contact, cholera proved puzzling as physicians in the United Kingdom struggled to appropriately address the violent symptoms. Without prior knowledge of the disease, the source of cholera and the mechanisms for its spread were completely unknown. In 1854, almost forty years after the first epidemic in India, Dr. John Snow first posited the theory on the epidemiological dangers of raw sewage: the waterborne theory of

⁹ Peters, John C., M.D. "The Origin and Spread of Asiatic or Bengal Cholera." *Public Health Papers of American Public Health Association*, 1874. 336.

cholera.

English physician John Snow's research on cholera progressed the medical interpretation of both the disease and sanitation in the United Kingdom, and impacted the work of researchers across the globe. Snow first encountered cholera as a young medical student, treating symptoms to no avail as an early epidemic swept through his hometown.¹⁰ In 1850, John Snow and other medical researchers founded the London Epidemiological Society, an organization dedicated to controlling, limiting, and studying the impact of disease.¹¹ The institutional approach of groups such as the London Epidemiological Society, in conjunction with the high death toll and the growing call for management through public sanitation meant that both the research and treatment of cholera was deeply political, as well as clinical. Epidemics struck without regard for class or racial distinctions, and there was mass motivation to effectively medicate those suffering and eradicate cholera. Nevertheless, researchers could not develop an effective approach before determining one fundamental detail: how and why the disease spread. By the early 1850s, several years after his first interactions with cholera, a spike in epidemics urged the doctor to focus his efforts once more on the disease. As an advanced professional, Snow's new approach understood cholera through a different lens. Conducting a series of experiments, observations, and case studies, Snow concluded that incidences of cholera would increase if a community consumed water contaminated with raw sewage. In the perfectly controlled Broad Street Pump experiment, Snow was able to dramatically reduce incidents of cholera within the Soho neighborhood of London by restricting residents' access to one particular water-pump.¹²

¹⁰ Frerichs, Ralph R. John Snow - a historical giant in epidemiology. Accessed April 17, 2017. <http://www.ph.ucla.edu/epi/snow.html>.

¹¹ Frerichs, Ralph R. Origin of London Epidemiological Society. Accessed April 17, 2017. <http://www.ph.ucla.edu/epi/snow/LESociety.html>.

¹² Frerichs, Ralph R. John Snow - a historical giant in epidemiology. Accessed April 17, 2017.

By pulling the pump off of the water reservoir believed to contain fecal matter and by extension cholera, the physician began a new dialogue on the disease. Snow's influence on the origin of modern epidemiology rests in his Broad Street Pump research. The impact this discovery had on the treatment of cholera in continental Europe was astonishing. Snow's work indicated that cholera could likely be controlled and treated properly outside of the hospital with public health initiatives on sanitation. Though the research produced by Snow implicated fecal matter in the water-supply as the mechanism for the spread of the disease, contagionism was still heavily disputed. Therefore, any campaign to treat cholera was subject to an intense scientific debate and political dialogue.

Not all researchers were convinced, but Snow's work proved a landmark discovery in the progression of cholera treatment. In an era where germ-theory was not widely accepted in the scientific and medical vernacular, Snow's research spoke out in favor of the view that the spread of cholera was not caused by divine intervention or randomness, but human interaction, and specifically the management of sewage. Though Snow's research made waves both in England and abroad, his work was only one side of the prevailing medical discourse during his time.

By the mid 19th century, sanitary measures both in India and elsewhere had proved effective in reducing cholera related deaths, and the need for civic hygiene sparked a new discussion on public health.¹³ As David Arnold notes in his book *Colonizing the Body*, the effectiveness of sanitary infrastructure turned the focus on cholera away from the health of the individual body, and towards public health measures.¹⁴ As a result, the definition of public health

<http://www.ph.ucla.edu/epi/snow.html>.

¹³ Macnamara, C. . "A Lecture on Asiatic Cholera Delivered at the Westminster Hospital, March 4th, 1884 by C. Macnamara, F.R.C.S., Surgeon to the Hospital ." *The British Medical Journal* 1, no. 1211 (March 15, 1884). JSTOR. 502.

¹⁴ Arnold, David. *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-*

was quickly associated with the wellbeing of the nation as a whole, piquing the Indian government's interest in medical research.¹⁵ Public health and the medical research on cholera were linked in a co-production of knowledge, prioritizing the colonial state and limiting the influence of local sanitary schemes, contrary to prevailing medical opinion. The scientific narrative surrounding cholera served as a source of legitimacy for the British Raj, and the Indian government's influence impacted the systematic treatment of the disease. The Indian government's characterization of the disease distorted popular interpretations of scientific research that relied on the waterborne theory of cholera, and impeded regional health campaigns for hygiene and cleanliness.

India remained thoroughly distinct from Europe and, surprisingly, Britain in its approach to cholera, with government administrators claiming that the country's status as the origin of the disease provided Indian researchers with firmer ground than the rest of the world to make, and resist, Western epidemiological claims.¹⁶ Arnold's work in *Colonizing the Body* highlights the seemingly contradictory stance of the lead Sanitary Commissioner Dr. James McNabb Cuningham as a fervent anti-contagionist, but a leader in the pursuit for improved sanitation across India. Arnold's writing furthers the claim that the Indian government resisted popular medical discourse, and even went to great lengths to craft its own.¹⁷ Cuningham pushed for greater hygiene, but denied the role of humans in spreading cholera. This stance is certainly provoking, a Sanitary Commissioner who denied humanity's part in communicating cholera and

century India. Berkeley: University of California Press, 1993. 183.

¹⁵ Acland, H. W. "An Address on Public Health Delivered at The Annual Meeting of the Social Science Association in Plymouth, September 1872. By H. W. Acland, M.D., F.R.S., President of the Health Department." *The British Medical Journal*, September 28, 1872. 345.

¹⁶ Arnold, David. *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-century India*. Berkeley: University of California Press, 1993. 192.

¹⁷ *Ibid.*, 195.

still supported greater calls for sanitation is seemingly contradictory. Even considering Snow's research, many scientists were divided on the true source of cholera, but Arnold aptly notes the effectiveness of sanitary schemes across India, and advantages the Indian government saw in continuing these programs.¹⁸ Nevertheless, the appeal of anticontagionism rested on a desire for the economic profitability of India, and any contradictory research was vehemently resisted through both scientific and political means. Cunningham's methods of controlling claims that challenged anticontagionism emphasized the influence political power and economic aspirations had over medical discourse in India, and his efforts shaped the impact of both clinical research and sanitary schemes.

Anticontagionism and improved sanitation, two contrary pursuits, existed side-by-side as a result of the government's control over medical discourse. In *Public Health in British India*, Mark Harrison claims that "in many respects the cholera debate was part of a wider debate about how best to govern India; about the role and responsibilities of the colonial state."¹⁹ Harrison pays close attention to the interchange between Sanitary Commissioners and the differing opinions held by officials. He argues that methods "of inquiry, though nominally empirical, tended towards unnecessary and somewhat inflexible theorizing about the 'laws' which seemed to govern cholera."²⁰ These 'laws' relied on popular theories about the spread of cholera, each noting a different mechanism for the travel of the disease, and some in direct opposition to John Snow's research.

Both Arnold and Harrison, among other foundational academics, discussed in their works early scientific research that contributed to the toxic environment in Indian medical

¹⁸ Ibid., 183.

¹⁹ Harrison, Mark. *Public Health in British India: Anglo-Indian Preventive Medicine, 1859-1914*. Cambridge: Cambridge University Press, 1994. 100.

²⁰ Ibid., 104.

administration during Cuningham's time as lead Sanitary Commissioner. Cuningham and other Indian officials supported calls for sanitation but denied the role of human intercourse as a contributing factor to the spread of cholera. On the surface it was a contradictory approach, but the impact the bureaucratic imperial power structure had on the creation of medical discourse on cholera cannot be overlooked. Commenting on the power structure is a valuable addition to a holistic understanding of the development and use of Sanitary Departments across the country. The efforts made to localize Sanitary Commissioners were attempts to silence any sanitary schemes that alluded to the validity of the waterborne theory. In turn, this fostered an imperial bureaucracy where public health maintained the needs of the state instead of the health of individuals in the general populous. Localizing regional Sanitary Commissioners who dissented from the national Sanitary Department and IMS was a mechanism the British used to control their subjects and create a medical narrative that was distinctly colonial, not based on pure scientific practices.

By the second half of the 19th century, prevailing studies on cholera offered differing interpretations of the disease, but the acceptance of each theory was largely based around its political, social, economic, and cultural appeal, particularly in India. Between 1866 and 1884, three theories outlining differing approaches to cholera defined both research and public health campaigns from Sanitary Commissioners. Research on cholera lacked bacteriology, but scientific inquiry and medical experiments offered valuable insights. The Pettenkofer theory, named after its German-hygienist creator, argued a connection between soil and climate as the determining factors influencing the spread of cholera.²¹ The theory claimed specific environmental factors were crucial to understanding cholera's communicability, and appealed to those who desired to

²¹ Isaacs, J. D. *D D Cuningham and the aetiology of cholera in British India, 1869-1897*. 3rd ed. Vol. 42. Medical History, 1998. 281.

avoid quarantine and other socially restrictive measures.²² Popular for similar reasons in the 1800s, the airborne theory proposed a link between atmospheric contaminants and cholera. Under this doctrine, particles in the air determined the spread of the disease across long distances. The airborne theory provided an explanation for the global pandemic, and like the Pettenkofer theory, placated imperial trade and rendered quarantine unnecessary. Still popular globally but far less favorable among Indian officials, the waterborne theory implicated fecal matter in the water-supply as the basis for epidemics.²³ With the waterborne theory guiding sanitation and medical research, it would be irresponsible and indeed deadly to overlook the role of humans and their bodily waste. To address cholera using the waterborne theory, the Indian government needed to halt trade to stop the spread of the disease, and enact wide-reaching public health campaigns to revolutionize the sewage system. These were costly measures from both an economic and public relations standpoint.

The British maintained a strong hold over their colonies, but their power was far from absolute. The 1857-58 Indian rebellion frightened British colonizers and proved the question of Indian identity and unity was more complex than previously believed. Though ultimately unsuccessful, the rebellion resulted in the removal of the British East India Company as the governing body and the complete installation of the British Raj. India's status as a colony and the government maintenance of the territory changed as a result. Rule over India was intertwined with both Eastern and Western conceptions of knowledge and authority, and indigenous groups did not always recognize the legitimacy of British rule without fighting back. Initiatives in public health and calls for societal change to address medical concerns from the British threatened

²² Isaacs, J. D. *D D Cunningham and the aetiology of cholera in British India, 1869-1897*. 3rd ed. Vol. 42. Medical History, 1998. 281.

²³ "Lessons From India." *The British Medical Journal* 2, no. 568 (November 18, 1871): 589. <http://www.jstor.org/stable/25230822>.

Indian equilibrium, making the Raj pause before interfering with local customs and practices.²⁴

Incentive to keep a doctrine of anticontagionism and noninterference ran deep, and was exemplified in the vocabulary used to frame government schemes. Upon being asked if the Raj should provide sanitary guidelines for an indigenous religious pilgrimage in India, a government official responded: "better in my opinion would it be that India should be devastated by cholera than subjected to religious persecution."²⁵ Public bureaucrats framed knowledge of cholera and the Western medical approach as potentially threatening to the Indian status quo, especially with the recent rebellion on their minds. Scientific advancement that offered new interpretations of the disease were viewed by many officials as delegitimizing the British Raj, and politically costly. Scientific conclusions aim to avoid intentional distortion to present an empirical representation of reality, but the validity of theories on cholera faced a troubling hurdle if the broader implications threatened Imperial rule. The social network Indian medical researchers operated within placed theoretical constraints on scientific inquiry.

Both the Pettenkofer and the airborne theory addressed the pandemic nature of cholera, but understated the impact of human intercourse in cholera's spread and appealed to the way of thinking and epistemic pursuits of the Indian government. The defining characteristics of each theory maintained that the disease was not strictly communicable from one individual to another, rather only indirectly transferable. Soil, wind, and other natural forces were to blame for the spread of cholera, not human intercourse. Questions regarding contagiousness were central to the issue of public health and pinpointing the source of cholera was fundamental to gauging the communicability of the disease. Without a solid epidemiological base upon which to measure the

²⁴ Arnold, David. *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-century India*. Berkeley: University of California Press, 1993. 170.

²⁵ Ibid., 190.

differing deductions, a single conclusive theory remained elusive, but researchers and Sanitary Commissioners were still willing to address sanitary concerns.

Though each theory differed, all three required an organized sanitation effort, supposing cleanliness would yield a reduction in cholera related deaths. By the middle of the 19th century, public hygiene had yielded promising results.²⁶ Statistical deductions lacked clinical support, but research in microbiology and primitive knowledge of infection guided the application of the prevailing cholera theories. Outside the work of John Snow, research relied on the concept of miasma, the belief that deadly contaminants floated around in the air.²⁷ Epidemiology was still in its infancy in this era, and though miasma did not include the similar clinical approach required by bacteriology, fear that particulate matter causing disease sparked a revolution in hygiene and sanitation among Western scholars. The actions of Sanitary Commissioners were not at odds with the theories of miasma; indeed, many chose to embrace the idea and used it to support both the Pettenkofer and airborne theory. Sanitary Commissioners were split on their interpretation of cholera, but the work of many was dominated by the popular conception of miasma. The damaging effect of miasma and the Pettenkofer theory meant researchers were susceptible to a worldview that precluded certain methods of contagion. The questions asked by commissioners were vulnerable to false presupposition and even when the result was unexpected, miasma remained unquestioned while interpretations of cholera changed.

With widespread hesitancy and inexperience prohibiting many scientists from accepting germ-theory and bacteriology, theories on miasma enjoyed attention and appeal to a point at which the medical theory was effectively blackboxed. In his contemporary socio-scientific work,

²⁶ Arnold, David. *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-century India*. Berkeley: University of California Press, 1993. 183

²⁷ Hoffbuhr, Jack W. "Waterscape An Executive Perspective: Miasma." *American Water Works Association* 96, no. 11 (November 2004): 6.

Bruno Latour argues “scientific and technical work is made invisible by its own success. When a machine runs efficiently, when a matter of fact is settled, one need focus only on its inputs and outputs and not on its internal complexity. Thus, paradoxically, the more science and technology succeed, the more opaque and obscure they become.”²⁸ The popularity of miasma encouraged scientists to conduct experiments testing the effects of cholera prevention by limiting contact to the dangerous air particles. Without alternative theories challenging the fundamental concept of miasma, the evidence supporting the hazards of bad air and its connection to disease was rarely challenged. Instead, only the results of sanitary schemes involving miasma were examined. The figurative black box containing the concept of miasma sat on a pedestal. Alternative explanations were ignored until the cholera bacillus proved researchers needed to rethink their fundamental assumptions of contagionism.

In the context of Sanitary Commissioners, each of these theories defined the practical approach to cholera prevention, hygiene, and the collection and interpretation of data.

“Pettenkofer’s preoccupation with locality would place Indian sanitary practice on firmer foundations. The government’s use of scientific expertise, then, was highly selective: etiological theories did not so much determine, as provide, a justification for existing sanitary policies.”²⁹ The use and appeal of Snow and Pettenkofer’s work, and miasma, was a social question, and was the fundamental interpretation of cholera guided scientific inquiry through both statistical observation and clinical research.

The anticontagionist perspective during the late 19th century was an extension of

²⁸ Latour, Bruno. *Pandora's Hope Essays on the Reality of Science Studies*. Cambridge: Harvard University Press, 1999. 304.

²⁹ Harrison, Mark. *Public Health in British India: Anglo-Indian Preventive Medicine, 1859-1914*. Cambridge: Cambridge University Press, 1994. 109.

foundational research on cholera from Max Joseph von Pettenkofer.³⁰ Pettenkofer's conclusions from studies on cholera during the 1854 outbreak and subsequent epidemics failed to align with John Snow's research.³¹ While Snow's work emboldened Sanitary Officials controlling cholera to monitor the water-supply, Pettenkofer's research offered a novel explanation for the spread of the disease that was more satisfying to Indian officials. The Pettenkofer theory tied cholera directly to the local environment, an approach highly attractive to British medical officials in India who were determined to research a distinctly Indian strain of cholera. Even though Pettenkofer's theory supported anticontagionism, his writings were co-opted by Indian officials to exhibit a slightly different message than Pettenkofer himself was arguing, thus displaying both the control the Indian government had in crafting a cholera narrative, and the exceptionalism maintained by the country in regards to epidemiology. A brief written in the British Medical Journal (BMJ) proclaims,

though there are several things in Professor Pettenkofer's paper with which we cannot entirely agree, we may congratulate ourselves on having at least one, standing deservedly high in the opinion of Continental epidemiologists, who, without taking up the position of an advocate or partisan, expresses so hearty and approval of the policy of our government in the present crisis.³²

The British, and by extension the Indian government, felt secure in continuing imperial trade, and believed that quarantines were proven medically unnecessary. Though Pettenkofer did not dismiss the role of human intercourse in spreading cholera, he fervently believed that quarantines would not help treat the disease.

Pettenkofer, however, is far from denying the influence of human intercourse and

³⁰ Ibid., 109.

³¹ Evans, Alfred S. "Two Errors in Enteric Epidemiology: The Stories of Austin Flint and Max von Pettenkofer." *Reviews of Infectious Diseases* 7, no. 2 (May 1985). 434.

³² "Pettenkofer On Cholera And Quarantine." *The British Medical Journal* 10, no. 1193 (November 10, 1883). 928.

commercial relations in determining the march of the pestilence, and in this respect his differs entirely from the school of Fayers, Chevers, and Cunningham³³; and he connects the appearance of cholera in Europe fifty years ago, with the increased facilities then offered by steam and the 'overland passage' for communication with India and the East. But he is no believer in the efficacy of any practicable quarantine. [...] Though persons are the vehicles of transportation and introduction of the disease, infected places are, he maintains, the means of its propagation; and, if we understand him aright, we agree with him to a great extent. The germs, we believe, must be brought by man himself.³⁴

Indian officials delighted in the support from the medical community, but the question of how Pettenkofer's work was connected with sanitary practices if it decried quarantine was still present. Notably, Pettenkofer's interpretation of cholera placed the disease within the context of its local environment.

[Pettenkofer] shares with many of our Indian surgeons, the belief in a special liability of certain places to, and an immunity of others from, attacks of cholera, for reasons as yet imperfectly understood, and not easily referable to their sanitary condition; his own town, for example, having been visited on three occasions only, and then but lightly, although it could boast of no sanitary superiority over others which suffered heavily; while the remarkable immunity enjoyed by Lyons presents a problem of the greatest difficulty.³⁵

The Pettenkofer theory argued that though the symptoms of cholera were universal, the disease was fostered through very specific environmental factors that varied from location to location.

This doctrine provided Sanitary officers with reason to seek a more hygienic infrastructure, while maintaining the limitations of the disease's contagiousness.

Again, that cholera has always made its appearance in Munich after a rise in the ground-water, is directly dependent on the conditions of the soil saturated with the filth and excreta of centuries, the emanations from which are forced out by the rising water, while in a pure soil the ground-water may rise and fall without any such risk. Cholera, in fact, will fail to get a firm footing in any town with well-constructed sewers, pure water-

³³ The Cunningham mentioned in this BMJ article is likely David Douglas Cunningham, a microbiotic researcher in India's Sanitary Department whose work on anticontagionism, career, and impact are discussed later in this paper.

³⁴ "Pettenkofer On Cholera And Quarantine." *The British Medical Journal* 10, no. 1193 (November 10, 1883). 928.

³⁵ "Pettenkofer On Cholera And Quarantine." *The British Medical Journal* 10, no. 1193 (November 10, 1883). 928.

supply, and good domestic sanitary arrangements.³⁶

Sanitary Officials kept working to seek empirical progress in the fight against cholera, and the Indian government operated without much interference.

That epidemiologists and santiarians owe much to the indefatigable research and scientific ingenuity of Pettenkofer, even those who are least disposed to agree with all his conclusions will not deny. It was he who first called attention to the part played by variations of level in the ground-water, and the consequent movements of the ground-air in determining the incidence and intensity of several diseases, and few men in Europe have given more study to the causes of the spread of cholera.³⁷

Additionally, any gains from sanitation were staged within the scope of the government, legitimizing the Pettenkofer theory even though some sanitary schemes were based on a completely different approach to cholera. The appeal of Pettenkofer's work to Indian officials sustains the co-production idiom. Though scientific insights and inquiry sought to present an honest depiction of reality, the shape of the scientific narrative and the social pressures from the Raj placed epidemiology in the hands of the central government, and not local Sanitary Commissioners.

Despite India's role as the original host of cholera and the staggering death tolls among both native and European inhabitants, researchers on the subcontinent operated in a scientific backwater. Discoveries from local Sanitary Commissioners published in international medical journals were disavowed by the central Sanitary Department. The theories endorsed by the national government diverted from the popular medical discourse of Europe. By the early 1860s, John Snow's work attracted international attention and converted many doubters to the waterborne theory.³⁸ Even India's implementation of the Pettenkofer theory differed slightly

³⁶ Ibid., 928.

³⁷ Ibid., 928.

³⁸ Hoffbuhr, Jack W. "Waterscape An Executive Perspective: Miasma." *American Water Works Association* 96, no. 11 (November 2004): 6.

from what the German hygienist originally outlined in his writings.³⁹ National Sanitary Commissioners and other government officials in India afforded themselves a status of exceptionalism based in Orientalism.⁴⁰ The medical knowledge imported to India by the British was not an exact copy of the practices on the archipelago; information was reinterpreted through an Orientalist lens that appropriated indigenous practice and emphasized a supposedly unique disease environment. "Without being wrenched free of its metropolitan roots, [Western medicine] nonetheless had grafted onto it ideas and concerns that had their origins in India or in Europe's Orientalizing of India. Western medicine in India was Western medicine for India in a way that Europe-based experts and observers often found distressing or bizarre."⁴¹ British-Indian medical practices served the state by encouraging the imperial network. "The search for authority and control was not simply the stark European/Indian dichotomy it is sometimes taken to be. The idea of Orientalism is one which it is useful to invoke and echo in these pages, but its historical limitations do much to test the theoretical boldness."⁴²

The combination of Western and Indigenous medicine helped foster a scientific opinion that disease and sickness were closely related to the local environment. After all, as Arnold argued, "medicine was too powerful, too authoritative, a species of discourse and praxis to be left to colonizers alone."⁴³ Incorporating Ayurvedic treatment into the British-Indian doctor's mindset, treatment focused on local factors that seemingly contradict Western medicine's claims of universality.

³⁹ "Pettenkofer On Cholera And Quarantine." *The British Medical Journal* 10, no. 1193 (November 10, 1883). 928.

⁴⁰ Arnold, David. *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-century India*. Berkeley: University of California Press, 1993. 192.

⁴¹ Arnold, David. *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-century India*. Berkeley: University of California Press, 1993. 9-10

⁴² Ibid., 10.

⁴³ Ibid., 10.

The great significance attached to environmental factors- climate, topography, vegetation –in the causation and transmission of disease, together with the supposed effects of heat and humidity on European constitutions, meant that the practitioners of Western medicine saw an imperative need to adapt and modify their practice to physical circumstances that were very different from those found in Europe. Once established, this environmentalist paradigm remained the dominant one in epidemiological thought in India almost throughout the nineteenth century, even after it had been effectively deposed in Europe by the germ theory of disease. Moreover, environmentalism evolved and expanded during the first half of the century to include a variety of social and cultural characteristics, which were also thought to contribute to the idiosyncratic nature of disease in India. Thus, the environmentalist paradigm was also an Orientalist one (in the sense in which the term Orientalism has been employed by Said and others), embodying and projecting Western ideas of how India was intrinsically different from the West, even in the nature of its diseases and the therapeutics appropriate for their treatment and cure.⁴⁴

Despite the incorporation of the indigenous medical practices, Western medicine remained relatively unpopular among the Indian masses. This relegated public health to the state, and gave the government undue control of medical discourse.⁴⁵

The Sanitary Department's approach to cholera championed imperial trade, but it came at a cost as scientific conclusions suffered as a result. Cholera's potential communicability, still widely debated before 1884, complicated the task of governing the British Empire.⁴⁶ Beginning in India, epidemics quickly ravaged the rest of the world.⁴⁷ Addressing the pandemic was an important venture for participants in the increasingly globalized economy. In 1866, a coalition of scientists from Great Britain and other European countries gathered in Constantinople "to investigate the cause [of cholera], and to devise means for preventing this disease from so

⁴⁴ Ibid., 58-59.

⁴⁵ Arnold, David. *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-century India*. Berkeley: University of California Press, 1993. 60.

⁴⁶ Cameron, Charles. "An Address Delivered At The Opening Of The Section Of Public Medicine, At The Annual Meeting Of The British Medical Association, Held In Belfast, July And August, 1884." *The British Medical Journal* 2, no. 1231 (August 2, 1884). JSTOR. 283.

⁴⁷ Peters, John C., M.D. "The Origin and Spread of Asiatic or Bengal Cholera." *Public Health Papers of American Public Health Association*, 1874. 336.
<http://resource.nlm.nih.gov/101665867>.

frequently spreading.” The conference established the International Sanitary Board (ISB), a group with regulatory powers.⁴⁸ To halt the flow of the disease, the ISB was tasked with restricting contact with impacted regions. Indian officials were perturbed by the potential for medical quarantines, considering them unwanted trade restraints and unnecessary for medical progress. Even Dr. John Murray, Inspector-General of Hospitals in India and a quarantine advocate, noted that “the inconveniences of quarantine regulations are palpable, and naturally render them distasteful to the unthinking public, who have much influence in directing the measures of their government.”⁴⁹ The creation of the ISB played a significant role in the cholera debate. In a speech in 1884, former Sanitary Commissioner of Bengal Dr. C. Macnamara argued that Indian officials who feared disadvantageous mercantile restrictions refused to speak definitively on the source of cholera, and rejected the idea that the disease could be transmitted from one human to another.⁵⁰

While the nature of cholera remained capricious, the connection between outbreaks and environmental factors were institutionally accepted in India after the Constantinople Conference of 1868.⁵¹ At the behest of the ISB, the Indian government created the Cholera Committee, composed of the Principal Inspector General of the Indian Medical Department, the Sanitary Commissioner for Madras, and a military colonel. The multi-disciplinary research called for

⁴⁸ Macnamara, C. . "A Lecture on Asiatic Cholera Delivered at the Westminster Hospital, March 4th, 1884 by C. Macnamara, F.R.C.S., Surgeon to the Hospital ." *The British Medical Journal* 1, no. 1211 (March 15, 1884). JSTOR. 502.

⁴⁹ Murray, John . "Review of Dr. Cuningham's Report of the Epidemic Cholera of 1872." *The British Medical Journal* 1, no. 861 (January 17, 1874). U.S. National Library of Medicine. 73.

⁵⁰ Macnamara, C. . "A Lecture on Asiatic Cholera Delivered at the Westminster Hospital, March 4th, 1884 by C. Macnamara, F.R.C.S., Surgeon to the Hospital ." *The British Medical Journal* 1, no. 1211 (March 15, 1884). JSTOR. 503.

⁵¹ Mushtaq, Muhammad Umair. "Public Health in British India: A Brief Account of the History of Medical Services and Disease Prevention in Colonial India." *Indian Journal of Community Medicine* 34 (January 2009). doi:10.4103/0970-0218.45369.

increased sanitary measures to stop the spread of cholera in India.⁵² Sanitary Departments were nothing new, but the mandate for a more hygienic infrastructure placed the Sanitary Commissioners in a complicated relationship with the Raj. The government delegated research, but Commissioners acted as aids to government officials and their function was strictly auxiliary. Regional Sanitary Commissioners were unable to wield explicit administrative power and remained purely advisory.⁵³ The relative impotency of the job was an impediment to the demands of the profession. Though many of the schemes of the local officials were implemented, the research of the commissioners was susceptible to criticism not grounded in the academic and scientific practices, but applicability. The conclusions drawn by sanitary commissioners relied on data collected in specific districts, but the acceptance of these conclusions depended heavily on the opinions of government officials. The dismissal of genuine scientific research on the basis that it could not translate to the main goal of the state was common, and fit into prevailing attitudes that triumphed the productive management of India as a colonial state.

Positions within the Indian government incentivized professional physicians and researchers to join the Sanitary Department, instead of the Indian Medical Service, skewing the personalities involved in each branch. Opportunities for promotion, career development, and higher pay meant that more talented, decorated individuals chose to work in the Sanitary Department, rather than the IMS. For most of the Raj's regime, the Sanitary Department employed more officials with medical degrees than the IMS. Many physicians in the Sanitary Department came from university backgrounds with experience in scientific research, which

⁵² Mushtaq, Muhammad Umair. "Public Health in British India: A Brief Account of the History of Medical Services and Disease Prevention in Colonial India." *Indian Journal of Community Medicine* 34 (January 2009). doi:10.4103/0970-0218.45369.

⁵³ Mushtaq, Muhammad Umair. "Public Health in British India: A Brief Account of the History of Medical Services and Disease Prevention in Colonial India." *Indian Journal of Community Medicine* 34 (January 2009). doi:10.4103/0970-0218.45369.

marked a genuine interest in impacting professional medical discourse.⁵⁴ A sharp rivalry developed between the IMS and Sanitary Department, and even though interpretations on cholera were by no means unanimous in either department, political ties fed straight into research and conclusions. With many Sanitary Commissioners holding advanced degrees, research and conclusions often followed general guidelines on scientific methodology, and the first-hand exposure to cholera provided regional Sanitary Commissioners with an intimate knowledge of the disease.

The rhetoric of both high level, and many rank-and-file government officials in India encouraged a sharp division between domestic research and the ongoing international medical discourse. Individuals like Cuningham were able to control the cholera debate by limiting the scientific implications of sanitation programs, thus forbidding trials of public hygiene from impacting medical interpretations about cholera. The success of each scheme was based on empirical measures- fewer deaths were clear statistics- but the programs' impact on medical discourse was controlled by government officials guiding the cholera discussion. The Indian Raj had plenty of motivation to ensure that neither public health programs nor scientific research interrupted the day-to-day operations of the imperial system. In this process, the information afforded by many sanitary programs was ignored by the national government and prevented from affecting medical discourse.

The imperial bureaucracy was the final interpreter of scientific conclusions, and the legitimacy of a Commissioner's work depended on state officials who interacted with and evaluated sanitary research. The reach of a local Sanitary Commissioner was limited; they were only able to enact hygienic measures in a local region. Prioritizing trade over the health of

⁵⁴ Harrison, Mark. *Public Health in British India: Anglo-Indian Preventive Medicine, 1859-1914*. Cambridge: Cambridge University Press, 1994. 23.

India's inhabitants deeply impacted medical discourse. Dr. James McNabb Cunningham, lead Sanitary Commissioner with the Government of India from 1866 to 1884, shaped the national government's interpretation of scientific and sanitary knowledge by controlling the impact and implications of regional Sanitary Commissioners' work.⁵⁵

Sanitary Commissioners led local initiatives in improving general hygiene and the national government employed researchers dedicated to a clinical approach to cholera. In 1869, Dr. David Douglas Cunningham was appointed scientific assistant to J. M. Cunningham. D. D. Cunningham was one of the first scientific professionals in India at the time with experience in microscopic research.⁵⁶ J. M. Cunningham was in full support of his new assistant's clinical research, and proclaimed "the microscopic investigation of the disease in India affords a field which is of almost boundless extent, and which as yet has hardly been entered upon. The careful enquiries of such painstaking and able observers cannot fail to add much to our knowledge."⁵⁷ D. D. Cunningham had his own lab, and his research was greatly anticipated and respected by Sanitary Commissioners across the country.⁵⁸

Under the supervision of J. M. Cunningham and other high level officials from the Indian government, D. D. Cunningham used his clinical research to defend the airborne and Pettenkofer theory of cholera until he left the country in 1897, despite the widespread knowledge of the cholera bacillus.⁵⁹ D. D. Cunningham had a personal relationship with Pettenkofer, having

⁵⁵ Isaacs, J. D. *D D Cunningham and the aetiology of cholera in British India, 1869-1897*. 3rd ed. Vol. 42. Medical History, 1998. 281.

⁵⁶ Isaacs, J. D. *D D Cunningham and the aetiology of cholera in British India, 1869-1897*. 3rd ed. Vol. 42. Medical History, 1998. 280.

⁵⁷ *Ibid.*, 285.

⁵⁸ Murray, John . "Review of Dr. Cunningham's Report of the Epidemic Cholera of 1872." *The British Medical Journal* 1, no. 861 (January 17, 1874). U.S. National Library of Medicine. 73.

⁵⁹ Isaacs, J. D. *D D Cunningham and the aetiology of cholera in British India, 1869-1897*. 3rd

worked alongside the researcher in 1868 before arriving in India.⁶⁰ Pettenkofer's work was far from typical in Europe, but his anticontagionist stance appealed to Anglo-Indian scientists for political reasons.⁶¹ By controlling the statistical analysis of regional Sanitary Commissioners and government lab researchers, J. M. Cunningham's hold over the cholera debate remained strong, and administrators continued their denial of humanity's role in the disease's communicability to ensure that the Raj remained profitable.

The work of D. D. Cunningham represented a departure from the popular research methodology dominating work on cholera in India.⁶² Most of the research, both from the IMS and Sanitary Commissioners utilized statistical analysis.⁶³ While medical scrutiny acknowledged the likelihood of a microorganism causing cholera, the majority of research at the time relied on statistics, not laboratory science.⁶⁴ Faith in microorganisms pushed Indian research into the field of bacteriology, a relatively new division of scientific research. Nevertheless, a reliance on the Pettenkofer Theory dominated Cunningham's laboratory work and micro-biotic focus. The newfound confidence in lab-based analysis primed the pump for a major breakthrough in the epidemiology of cholera, and paved the way for Koch's monumental discovery. Nevertheless, for nearly two decades clinical studies in India still perpetuated Pettenkofer's theory. Even without Koch's findings, statistical insight was still able to provide promising results in cholera management through sanitation. The key to promising research and results that were in line with

ed. Vol. 42. Medical History, 1998. 305.

⁶⁰ Isaacs, J. D. *D D Cunningham and the aetiology of cholera in British India, 1869-1897*. 3rd ed. Vol. 42. Medical History, 1998. 285.

⁶¹ Isaacs, J. D. *D D Cunningham and the aetiology of cholera in British India, 1869-1897*. 3rd ed. Vol. 42. Medical History, 1998. 282.

⁶² Harrison, Mark. *Public Health in British India: Anglo-Indian Preventive Medicine, 1859-1914*. Cambridge: Cambridge University Press, 1994. 113.

⁶³ *Ibid.*, 109.

⁶⁴ *Ibid.*, 110.

the contemporary knowledge of cholera was through basing an approach to the disease on the foundational work of John Snow.

Medical discourse on cholera in India between 1866 and 1884 was founded on three presuppositions, one based on the work of John Snow, the second on Max Joseph von Pettenkofer, and the third on miasma. Both theories provided ‘laws’ in which Sanitary Commissioners, along with researchers, tested the boundaries of cholera, but the appeal of each theory rested in political reasoning, not empirical rationality. Snow’s work and the research of others implicating the water-supply as the basis of cholera understood the disease as highly contagious and communicable along lines of human intercourse. Sanitary Commissioner of Punjab Dr. Annessely Charles DeRenzy stated “under the difficulties attending the study of the causation of disease in India, Dr. Snow’s great and pregnant discovery was little appreciated by Indian physicians.”⁶⁵ This carried tremendous implications for an empire based on global trade. Alternatively, Pettenkofer’s theory aligned with the desires of anticontagionists, and appealed directly to scientists and government officials hoping to stop public health campaigns from infringing on communication and trade. Surprisingly, neither of these theories disrupted calls for improved sanitation and indeed both researchers claimed public hygiene would be a boon to society and disease management. Clean water and a generally sanitized environment were pursued by the Indian government with the full support of popular scientists, but the focus on contagionism and the structure of the bureaucratic government emphasized the interaction between knowledge and social control.

Reliance on John Snow’s experiments and the call for clean water supplies were far from radical as his epidemiological work was accepted by many researchers across the globe. The

⁶⁵ DeRenzy, A. C. C. "Sanitary Improvement In India." *The British Medical Journal* 2, no. 616 (October 19, 1872). 436. <http://www.jstor.org/stable/25233155>.

Indian government's reliance on the Pettenkofer and Airborne theories bucked the trend of popular knowledge even though it relied on concerted efforts of pure science. However, the popularity of miasma and the Pettenkofer and airborne theories of cholera in India was by no means an indication of the complete dismissal of the waterborne theory. By 1866, Indian Sanitary Commissioners and medical professionals were well aware of Snow's insight.⁶⁶

All, however, are alike agreed that, whether an atmospheric-theory such as that of Dr. Bryden, or the water-theory of Dr. Snow, disclose the vera cause of choler epidemics, 'the degree in which inhabitants of a given area are likely to escape will depend greatly on their sanitary condition, on the purity of the water-supply, the excellence of the drainage, and the completeness of all other such arrangements.'⁶⁷

In the three decades between Snow and Koch's work, the dialogue surrounding the disease became a conversation about social and political infrastructure, with an emphasis on sanitation. Medical discourse in this time still did not entirely explain the nature of the cholera bacillus, but John Snow's breakthrough proved the value of prevention through sanitation. The takeaway from Snow's work highlighted the role of the state in the treatment and control of diseases. The commitment to sanitation reform in Europe began with Snow, but was nowhere near universally applied. Even in England, reforms which emphasized the necessity of the proper management of effluent were met with relative disdain in certain circles. John Snow emphasized the human element in cholera, and centered on the social implications, insisting on changes in tradition, culture, practice, and law. Even for medical reasons, the implications from these social changes were high, especially in an age before the acceptance of germ theory.

As the leader of the Indian Sanitary Commission, James McNabb Cunningham translated research on cholera and sanitary initiatives into a national pursuit of public health. Opinions

⁶⁶ Isaacs, J. D. *D D Cunningham and the aetiology of cholera in British India, 1869-1897*. 3rd ed. Vol. 42. Medical History, 1998. 283.

⁶⁷ "Lessons From India." *The British Medical Journal* 2, no. 568 (November 18, 1871): 589. <http://www.jstor.org/stable/25230822>.

differed, but Cuningham formed a united front against data from sanitation measures that utilized and progressed the waterborne theory. To maintain the Indian government's authority over cholera research, Cuningham adamantly defended a non-contagious interpretation of the disease. Emphasizing cholera's presumed non-communicability allowed the government to treat outbreaks as local endemics to be handled by low-level Sanitary Commissioners. Sanitation was, in many ways, tied to the local environment, and using the Pettenkofer and Airborne theories varied depending on climate and ecology. Quarantines had no impact on non-contagious diseases, minimizing the risk of nation-wide trade restrictions. Government controlled medical discourse was advantageous to the economic future of the state, but regional Sanitary Commissioners faced controversial evidence suggesting cholera's contagious nature.

Cuningham stood as one of many government officials denying the human role in the spread of cholera. Dr. James L. Bryden, a prominent member of the IMS and statistical officer to the government of India's Sanitary Commissioner, outwardly decried John Snow's Broad Street Pump conclusions, and criticized theories based on a waterborne approach to cholera.⁶⁸ Bryden argued that winds were behind the cholera pandemic, clearly an indication of his support for the airborne theory.⁶⁹ As statistical officer to the government of India's Sanitary Commissioner, Bryden wielded tremendous influence. His actions reveal the power scientific institutions could hold over the development of medical theories. Bryden's popularity during the 1870s was based on his support of Cuningham. The lead director of the Indian Sanitary Department believed that Bryden's opinions "gave fresh statistical precision and scientific authority to the old idea that it was the elusive but omnipotent forces of the Indian environment which accounted for the bulk of

⁶⁸ Arnold, David. *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-century India*. Berkeley: University of California Press, 1993. 193.

⁶⁹ *Ibid.*, 193.

the subcontinent's diseases and their distinctive nature and occurrence.”⁷⁰ This local environment centered approach fit within the ideal of the Indian government, and did not violate accepted knowledge on cholera.

Though the regional, ecological approach to cholera was created with Pettenkofer's research and known information on miasma, the epistemological struggle allowed the Indian government to create a unique Indian perspective on cholera. This India-specific view of the disease served to legitimize the work of scientific officials and bolstered popular support of the government, even though the cholera debate was shaped and largely controlled with the widespread power of the Raj. The government fostered the cholera debate, and benefited from the knowledge research produced. This, however, could not have been achieved without the careful management of dissent among Sanitary Commissioners. John Snow's research and the waterborne theory did have several champions within the Asian sub-continent.

Regional Sanitary Commissioners had the upper hand in terms of primary medical research, but the attitude of lead government officials emphasized the view of the country as a colony and therefore subject to different natural laws than Europe. Though the reach of their experiments was often limited to prisons, military encampments, British communities, and few middle-class neighborhoods of indigenous Indians, the first-hand experience with cholera provided local Sanitary Commissioners a detailed view of the disease within society.⁷¹ Despite this, the national government believed that those who had prolonged experience with the social, environmental, political, and economic history of India, namely leaders in the national government, were more adept at interpreting the causes and effects of disease. This was

⁷⁰ Ibid., 194.

⁷¹ Arnold, David. *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-century India*. Berkeley: University of California Press, 1993. 23.

inherently a colonial perspective⁷² The government pursued a doctrine which argued that diseases were not subject to universality; instead, illness operated differently based on location. Employing this line of thought, government officials believed it was up to the colonial leaders to determine what was best for the country. Their knowledge allowed them to exercise unique control over the territory, while at the same time the might of the government as a colonial authority allowed officials to determine what knowledge was valuable, and what was to be discarded.

Sparked by Bryden's controversial stance and the division between airborne, Pettenkofer, and waterborne devotees, the professional dispute between J. M. Cunningham and the Sanitary Commissioner of the Punjab, Dr. Annesely Charles DeRenzy, emphasized Cunningham's efforts to limit the influence of local sanitary schemes in medical discourse and the control of the Indian government. In an article published in 1869, DeRenzy criticized Dr. James L. Bryden's research for promoting the airborne theory of cholera.⁷³ Bryden supported "J. M. Cunningham in his battle against quarantine and contagionism," and Cunningham was devoted to defending the airborne theory of cholera.⁷⁴ As an outspoken advocate of the waterborne theory, DeRenzy was eager to dismiss Bryden's research.⁷⁵ In response to DeRenzy's attack on Bryden, and at the behest of Cunningham, the Official Secretary to the Government of India stated that DeRenzy's attack was "likely seriously to retard sanitary progress." To the Raj, the influence of a government official

⁷² Ibid., 19.

⁷³ Officiating Secretary to the Government of India. "Sanitary Reports - Mode of Preparation – Review of Local Sanitary Commissioners' Report for 1869 Proceedings No. 405 of 1871." In *Abstract of Proceedings of the Sanitary Commissioner with the Government of India During the Year 1872*. 24-25. Calcutta: Office of the Superintendent of Government Printing, 1873. 24.

⁷⁴ Isaacs, J. D. *D D Cunningham and the aetiology of cholera in British India, 1869-1897*. 3rd ed. Vol. 42. Medical History, 1998. 282.

⁷⁵ DeRenzy, A. C. C. "Water-Theory of Cholera by A.C.C. DeRenzy November 1871." *The British Medical Journal*, November 25, 1871. 627.

was not to extend beyond what was “essential to the successful discharge of sanitary duties.”⁷⁶

This assertion provided Sanitary Commissioners with little room to advocate for the broader application of their research within India, despite numerous publications in popular medical journals. To the state, sanitary work was restricted to local application, and any attempt by Commissioners to address scientific theories on cholera was not tolerated if it threatened the government's control over the disease's categorization.

In open defiance of the state's wishes, DeRenzy continued promoting the waterborne theory. In 1871 he wrote that “if the water supply is a matter of importance in a country like England, what must it be in the case of drinking-water in the endemic area of cholera?”⁷⁷ DeRenzy's argument was based in the work of John Snow, and movements in the British government to improve metropolitan sanitation on the British Isles. That same year, DeRenzy criticized Cuningham's interpretation of cholera and argued that “differences in opinion in the interpretation of facts are inevitable; but the facts themselves should be beyond dispute.” He added, “I have not found a single instance in which the water-supply was not palpably subject to gross contamination; and, on the other hand, I have found that, in several stations which suffered severely, a bad water-supply was the only sanitary defect of importance discoverable.”⁷⁸ In 1872, DeRenzy reasserted his position on cholera, citing evidence that the only common denominator among epidemics was water contaminated with effluent. DeRenzy emphasized, “the absence of a

⁷⁶ Officiating Secretary to the Government of India. "Sanitary Reports - Mode of Preparation – Review of Local Sanitary Commissioners' Report for 1869 Proceedings No. 405 of 1871." In *Abstract of Proceedings of the Sanitary Commissioner with the Government of India During the Year 1872*. 24-25. Calcutta: Office of the Superintendent of Government Printing, 1873. 24.

⁷⁷ *The Dublin Quarterly Journal of Medical Science*. Vol. 2. Dublin: Fannin and Company, Grafton - Street, 1871. 485-486

⁷⁸ DeRenzy, A. C. C. "Water-Theory of Cholera by A.C.C. DeRenzy November 1871." *The British Medical Journal*, November 25, 1871. 627.

proper system of sewerage has everywhere resulted in great impurity of the water-supply, which is obtained from very numerous surface-wells.”⁷⁹ He claimed that “facts [...] are rapidly accumulating, which show that water is perhaps the most important factor in the propagation of Indian epidemics.”⁸⁰

Despite outspoken criticism from DeRenzy and other scientists, Cuninghame’s influence reigned supreme and the support for the Pettenkofer theory resulted in a sub-soil registration system to establish a statistical connection between sub-soil conditions and cholera.⁸¹ This registration system ended in utter failure, and received plenty of criticism from DeRenzy.⁸² The foundational platforms for sanitary schemes were dividing scientists on ideological lines, but the institutional hierarchy of the government bureaucracies stopped dissenting opinions from impacting the government’s control of medical discourse.

DeRenzy’s attacks, the success of many of his sanitation schemes, and the failure of the national government’s pursuit of sanitation based on the Pettenkofer and airborne theory challenged popular knowledge on cholera within India, and placed the Indian government in a precarious position. If the government was to continue advocating for the Pettenkofer or airborne theories, they needed to silence the waterborne theory or be forced to change course. While a new hygienic infrastructure based on the waterborne theory of cholera had the potential to reduce the death toll, if properly implemented, the change in dialogue threatened the Raj’s control over medical discourse, and the trade of the nation. In essence, the new knowledge challenged the authority of the government. As a result of both the environmental classification of cholera

⁷⁹ DeRenzy, A. C. C. "Sanitary Improvement In India." *The British Medical Journal* 2, no. 616 (October 19, 1872). 433. <http://www.jstor.org/stable/25233155>.

⁸⁰ *Ibid.*, 436.

⁸¹ Arnold, David. *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-century India*. Berkeley: University of California Press, 1993. 109.

⁸² *Ibid.*, 109.

within Indian medical discourse and the statewide emphasis on unfettered trade, the Indian government localized regional Sanitary Commissioners and disavowed their research. The imperial bureaucracy in India was thus cemented in a manner that prevented dissent and reinforced the overarching power of the leaders of the Raj.

Cunningham was not a malicious character determined to restrict scientific dialogue at any cost, but his actions exposed the imperial government's underhanded approach to opposition. DeRenzy did credit Cunningham with progressing sanitary research by increasing the collection of statistics on cholera, but DeRenzy's stance contrary to the lead Sanitary Commissioner in India and the public dispute between the two emphasized the power of the national government and the mechanisms they utilized to control the cholera debate.⁸³ Cunningham's opinions as well as those of other government officials overshadowed the work of the local sanitary commissioners, thereby controlling the impact of conclusions and ignoring the scientific methodologies. The conclusions of Sanitary Officials differed, but Cunningham lumped together all members, and controlled their output. This was a process of deliberately pressing scientific research in a specific direction, manipulating research and empirical data to argue a particular point even amidst dissent. Borrowing from Latour's own words, Cunningham turned "a gathering of forces into a whole that then [was] used to control the behavior of the enrolled groups."⁸⁴ Scientific conclusions were susceptible to government distortion primarily because their role in medical discourse depended on an appeal to imperial bureaucrats. The state legitimized scientific research with campaigns for public health, and knowledge of cholera contributed to the power of the government by defining the success of each scheme.

⁸³ DeRenzy, A. C. C. "Sanitary Improvement In India." *The British Medical Journal* 2, no. 616 (October 19, 1872). 434.

⁸⁴ Latour, Bruno. *Science in Action: How to Follow Scientists and Engineers Through Society*. Cambridge: Harvard University Press, 1987. 131.

Cunningham openly supported the airborne theory of cholera in addition to the Pettenkofer, demonstrating his reliance on a belief that natural forces rather than human interaction transmitted the disease. The Pettenkofer theory and the airborne theory of miasma were not necessarily opposites and could rationally be combined. In an 1872 report, Cunningham proclaimed that cholera was “only contagious under certain aerial influences.”⁸⁵ Neither Cunningham nor Bryden were alone in their support of the airborne theory as the majority of medical officers they surveyed were in agreement.⁸⁶ This consensus was likely the product of the same forces that produced Cunningham and Bryden’s opinions: the imperial approach, scientific blackboxing, and professional pressure that pushed perception.

Even as lead Sanitary Commissioner in India, Cunningham’s conclusions and actions were not free from criticism; the ambiguity Indian officials enjoyed while implementing their plans for public health often hit its limits within the wider scientific community. DeRenzy stands as one example of Cunningham’s control over the cholera debate, but popular dissent both in India and around the globe plagued the government official’s research and claims. Dr. John Murray claimed that “cholera was communicable by human intercourse, on the ordinary lines of commerce.”⁸⁷ Murray asserted that “above an infinitesimal number of medical officers in India, or any other part of the world,” water’s role in the spread of cholera and the communicability of the disease was rarely contested. Only officials employed directly under Cunningham or Bryden claimed otherwise.⁸⁸ Critiquing Cunningham’s findings, Murray opined that the head Sanitary Commissioner’s work was “of great importance in determining the question of the

⁸⁵ Murray, John . "Review of Dr. Cunningham's Report of the Epidemic Cholera of 1872." *The British Medical Journal* 1, no. 861 (January 17, 1874). U.S. National Library of Medicine. 72.

⁸⁶ *Ibid.*, 72.

⁸⁷ *Ibid.*, 72.

⁸⁸ *Ibid.*, 72.

communicability of the disease by human intercourse, and it indicated the little value of negative evidence to find Dr. Cuningham asserting that there is no proof of communication through human intercourse in this epidemic.”⁸⁹ Cuningham was determined to deny the human role in spreading cholera, but evidence quickly mounted in opposition of this opinion.

In America, the Indian debate over the cholera pandemic also sparked the interest of medical professionals. Dr. John C. Peters argued that scientists and officials should be more careful in discussing the disease in its international context. By mapping wind patterns, Peters asserted that for cholera to be spread via air, wind currents should have determined the course of the pandemic. He argued that “Drs. Cunningham and Bryden have most carelessly assumed that the disease of 1867 was blown only over the borders of India in 1869, and by a monsoon, which does not blow in that direction at this season.”⁹⁰ In light of the dangers of the disease and its spread through commercial ventures, outsiders were not buying the arguments of India’s top Sanitary Commissioner. The discussion of public health was beginning to change; professionals were paying closer attention to the usefulness of the water-borne theory and the work of sanitary officers. In a speech given in 1872 by the president of the English Health Department, Dr. H. W. Acland acknowledged the monumental sanitary work of DeRenzy, and similarly argued that the water-supply in India was the main contributing factor to the spread of cholera.⁹¹ Nevertheless, Cuningham was still able to control the cholera debate through India’s exceptionalism, engendered by their Orientalist perspective.

⁸⁹ Ibid., 72.

⁹⁰ Peters, John C., M.D. "The Origin and Spread of Asiatic or Bengal Cholera." *Public Health Papers of American Public Health Association*, 1874. 340.
<http://resource.nlm.nih.gov/101665867>.

⁹¹ Acland, H. W. "An Address on Public Health Delivered at The Annual Meeting of the Social Science Association in Plymouth, September 1872. By H. W. Acland, M.D., F.R.S., President of the Health Department." *The British Medical Journal*, September 28, 1872. 346.

The British Raj maintained its unique depiction of cholera and asserted its legitimacy by carefully managing the imperial bureaucracy. Dealing a critical blow against Sanitary Commissioners who supported the waterborne theory of cholera in India, DeRenzy was officially censured by the Indian government, no doubt at the behest of Cuningham, and in 1875 was transferred to military duty in Assam.⁹² Cuningham was able to dictate the professional futures of insubordinate Sanitary Commissioners, and Indian government officials outside of the Sanitary Department were in full support. The threat of transfer or dismissal directly impacted the types of research and public health initiatives Sanitary Commissioners were willing to initiate. Deputy Surgeon-General H. W. Bellew, Sanitary Commissioner of the Punjab and DeRenzy's replacement, wrote in his *History of Cholera in India from 1862 to 1881*, "of the precise conditions producing these varying degrees of intensity of prevalence of cholera, the statistics available do not afford sufficient data for the expression of any definite explanation."⁹³ His comment stood against popular scientific opinion of the time and was an appeal to the medical discourse endorsed by the colonial state. The message to Bellew from the Indian government and Cuningham, though not blatantly coercive, was clear after DeRenzy's dismissal.⁹⁴ Bellew kept his research, studies, and sanitary measures local to steer clear of the mistakes of his predecessor, and avoided as much as possible issues involving clean water and

⁹² Hume, John Chandler, Jr. "Colonialism and Sanitary Medicine: The Development of Preventive Health Policy in the Punjab, 1860 to 1900." *Modern Asian Studies* 20, no. 4 (1986). 717. <http://www.jstor.org/stable/312630>.

⁹³ Bellew, H. W., C.S.I. *The History of Cholera in India from 1862 to 1881 Being a Descriptive and Statistical Account of the Disease*. London: Trübner and CE., Ludgate Hill, 1885. 777.

⁹⁴ Hume, John Chandler, Jr. "Colonialism and Sanitary Medicine: The Development of Preventive Health Policy in the Punjab, 1860 to 1900." *Modern Asian Studies* 20, no. 4 (1986). 717. <http://www.jstor.org/stable/312630>.

cholera for fear of provoking the state.⁹⁵

The social pressures within the colonial bureaucracy created an environment where challenges to authority had powerful implications. Peer review, differences in opinion, and criticism were all part of the scientific process, but the nature of the imperial government and the social forces guiding research impaired proper scientific inquiry. Data may be empirical but its collection was easily susceptible to bias. Personal ideology, loyalty, and even fear could heavily impact the interpretation of information and resulting conclusions. The Indian government carefully managed medical discourse on cholera through its bureaucratic system to create knowledge that served the needs of the state. Imperial administration played a significant role in both epidemiology, and the larger epistemic role of a colonial government. Rule over India could not be achieved through a simple balance between incentive and force. Neither economic prospects, nor crime and punishment would be enough to control a country completely. The relationship between knowledge and power fit into the ethos of the British Raj and helped sustain a society directed by those at the top.

The bureaucracy of the Raj was a firm hierarchical structure that shaped the nature of scientific inquiry and administrative operations. The Orientalism that marked Indian medical research and opinion on cholera as different from the West was as much a product of this top-down configuration as it was a social force that shaped it. The commitment to one of the three theories on cholera, the interpretation of empirical data, and the public health campaigns set in place represented a distinctly colonial approach to medicine. The British Raj attempted to take control of cholera just as it tried to colonize the Indian people. With the 1857 revolt still fresh in the minds of many government officials, colonizing and fostering a unified state and nation

⁹⁵ Ibid., 717.

amidst a diverse political landscape needed to occur through an epistemological battle. The challenge of controlling knowledge on cholera coexisted symbiotically with the management of the economic plans of the empire. The high death toll associated with cholera, the many international studies on the disease, and the planet-wide call for public health and sanitation in one form or another, created a world in which the Indian government could only isolate itself so much. Power over classifying the disease was not absolute, but the implementation of sanitary measures to address the disease opened up a world for historians to explore. The diametric pursuits between sanitation and anticontagionism invite pause when considering the actions of the state and the epidemiological stance it endorsed. The deployment of local Sanitary Commissioners allowed the bureaucratic hierarchy to dominate the discourse of lower level administrators and physicians, even if professional research diverged from the opinions of the lead Sanitary Commissioner.

J. M. Cuningham worked to silence a distinct portion of the cholera debate and used his authority to do so. His war against the waterborne theory was waged on two fronts. Cuningham forced the campaigns of regional Sanitary Commissioners to remain local, keeping the scientific debate on cholera within the government's control by censoring output. The lead Sanitary Commissioner also mandated wide-ranging but guided clinical research campaigns to take part in the growing trend of micro biotic research in epidemiology. Both of these research campaigns missed the mark on cholera by relying on foundational research that was massively appealing to Imperial governments instead of information from local Sanitary Commissioners and the broader trend in Europe supporting the waterborne theory. In the early 1880s, the Indian government prohibited quarantine regulations, a clear statement from officials on the government's preferred

interpretation of cholera.⁹⁶ The attitudes of the British Raj forged a sanitary bureaucracy that was intensely limited, making minor improvements in regional districts, while avoiding changes on a national scale.

The clinical struggle against cholera in India was distinct from Europe, but the main difference between the treatments of the disease in both areas lies in the approach of the state. A series of cholera epidemics struck the Indian subcontinent earlier than Europe, and the British regime in India found itself thoroughly unprepared for such a problem. While the medical community struggled to adapt to the nature of the illness, the British government found itself in a precarious position. In Europe, before the discovery of the cholera bacillus in 1884, the prevention of cholera was easily managed with the improvement of, or in some cases introduction of, sanitary infrastructure. Snow's work did not completely eliminate cholera in Europe, but by the 1860s, after the physician's death, many scientists openly endorsed the foundational epidemiological research Snow introduced. Twenty years later, German researcher Dr. Robert Koch's epidemiological breakthrough provided a new foundation for the waterborne theory. His research was based in Snow's work, but employed laboratory and micro biotic research to introduce the active agent in the struggle to understand the spread of the disease: the cholera bacillus.

Koch's discovery of *Vibrio cholera* in 1884 sparked a change in the administrative outlook toward both the disease itself and the question of sanitation in India.⁹⁷ Additionally, 1884 marked the year J. M. Cuningham stepped down from his position as Sanitary Commissioner for the Government of India. Medical professionals and government officials

⁹⁶ Ibid., 282.

⁹⁷ Macnamara, C. . "A Lecture on Asiatic Cholera Delivered at the Westminster Hospital, March 4th, 1884 by C. Macnamara, F.R.C.S., Surgeon to the Hospital ." *The British Medical Journal* 1, no. 1211 (March 15, 1884). JSTOR. 504.

across India used Koch's discovery to advocate for a new and more coherent approach to sanitation. In his 1884 inaugural address as president of the South Indian Branch of the British Medical Association, newly elected Surgeon-General W. R. Cornish ushered in a wave of novel sanitary measures based on a water-borne theory of cholera. "The results of the sanitary work already accomplished are cheering; and here, as in all other countries which acknowledge sanitary laws and regulations, the efforts to save life and prevent suffering have not been in vain." Changes in local government structure and the civil medical administration would, according to Cornish, forge a new approach to cholera.⁹⁸ That same year in a speech in England, Macnamara credited former commissioners, including DeRenzy and Murray, as pioneers of sanitary measures in India improving the conditions of the water-supply. In 1884, researchers finally viewed the work of local Sanitary Commissioners as foundational to the fight against the deadly disease.⁹⁹ Notably, at the British Medical Association's opening of the Section of Public Medicine in 1884, a speech given by member Charles Cameron outlined the implications of Koch's research, mentioning DeRenzy by name as a sanitary commissioner who struggled for years to appropriately address cholera.¹⁰⁰ Cameron did so in an effort to display how the future of cholera prevention, in light of epidemiological evidence, should be based on the work of commissioners like DeRenzy. The emphasis on Koch's discovery was a clear display of the faith in bacteriology, and the newly established link between clinical research and sanitation.

⁹⁸ Cornish, W. R. "Inaugural Address on Cholera: And on the Scientific, Medical, and Sanitary Work of England in India." *The British Medical Journal* 1, no. 1218 (May 3, 1884). U.S. National Library of Medicine. 848.

⁹⁹ Macnamara, C. . "A Lecture on Asiatic Cholera Delivered at the Westminster Hospital, March 4th, 1884 by C. Macnamara, F.R.C.S., Surgeon to the Hospital ." *The British Medical Journal* 1, no. 1211 (March 15, 1884). JSTOR. 503.

¹⁰⁰ Cameron, Charles. "An Address Delivered At The Opening Of The Section Of Public Medicine, At The Annual Meeting Of The British Medical Association, Held In Belfast, July And August, 1884." *The British Medical Journal* 2, no. 1231 (August 2, 1884). JSTOR. 238.

In 1884 local approaches to sanitation entered the cholera debate. J. M. Cunningham's retirement was not connected with Koch's monumental work, but the combination ushered in a new era of public health in India. Between 1866 and 1884, the Indian government was able to dominate the cholera debate and control scientific conclusions to fit the government's imperial needs while neglecting the implications of local research. With the newfound relationship between sanitation and lab research, the cholera debate in 1884 benefitted from the work of previous Sanitary Commissioners. The control the state retained over the question of public health did not change, but local sanitation could no longer be ignored in medical discourse on cholera in India.

Epistemology and its role in society is not devoid of science and technology. Just as observing a subject impacts its activity, the actions of a subject distinguish what is to be observed. The scientific methodology and its reliance on purity of thought and research might imply that results are sacrosanct, above scrutiny, and ultimately objective. While science can certainly produce insights about the empirical world to a high degree of certainty, research, conclusions, and the corresponding application of scientific research are completely susceptible to the social forces dominating the time. Above all else, science is an appeal to consensus. Popular wisdom might make one averse to accepting facts, but the process of scientific inquiry, peer review, reproducibility of experiments, and criticism affords science a distinct advantage in describing reality. Nevertheless, scientific claims, especially in the realm of public health and social application, were completely susceptible to bias and influence.

The co-production idiom brings to attention the connection between the epistemology and authority, represented in this paper by the struggle between epidemiology and colonial governance. Those in power create knowledge just as the existing body of knowledge legitimizes

authority. Together, the relationship produces a society devoid of any distinction between natural and manufactured reality. The agency of human and non-human actors are connected in a network that acknowledges the ties that explain humanity and progress the social narrative.

With varying theories on cholera between 1866 and 1884, individuals loyal to both the positive economic outlook of India and Indian exceptionalism fostered by an Orientalist framework were able to rationalize a scientific process despite widespread criticism. The first hand experiences of many regional Sanitary Commissioners enabled local researchers to confront empirical realities about cholera that could easily be ignored by the national government. With the discovery of the cholera bacillus however came a new relationship between regional and national Sanitary Commissioners.

The new classification of cholera, sparked by the discovery of the bacillus, impacted the actor-network of the British Raj by pinpointing a new social agent; cholera. Human and non-human actors allow for diverse groupings given the multifaceted relations at play. The cholera bacillus was a new agent in history, and the network that dealt with it from an epidemiological standpoint, and epistemological standpoint, was forced to reassemble. Adapting to the new medical discourse, the defense of colonial ideals took a new form, but the work of regional Sanitary Commissioners was finally recognized as an important resource to combat this new social agent. Nevertheless, between 1866 and 1884 localizing Sanitary Commissioners allowed the Indian government to control medical discourse, and directly limit the progress of sanitation in India.