By the rivers of Babylon: the 1889-cholera outbreak in Iraq, production of medical knowledge, and construction of scientific periphery

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ABSTRACT: By examining the 1889 cholera outbreak in the Iraqi Ottoman provinces, this article explores the global dynamics of medical knowledge production at the turn of the nineteenth century. While the 1892-1893 outbreak is typically viewed as a pivotal moment in the history of cholera with the triumph of germ theory, this study investigates an earlier epidemic to analyze both the transformation of medical understanding and the complex knowledge exchanges between Western and Eastern scientific communities. The article critically examines the hierarchical structures that mediated scientific communication, revealing how established power dynamics shaped the circulation of medical knowledge. By examining these intellectual networks this article demonstrates how contemporary scientific discourse constructed and reinforced the concept of scientific periphery. By doing so, this study seeks to integrate Baghdad into broader narratives of global medical history and scientific knowledge production.

KEYWORDS: Cholera, Iraq, Ottoman Empire, Medical Knowledge, Epidemiology.

1. Introduction (*)

When flipping through nineteenth century newspapers, one is convinced that cholera was a topic of interest for readers around the world. Newspapers in London, Beirut, New York, Cairo, and Istanbul dedicated columns to the global spread of the disease and from time to time also published articles about the latest remedies or medical suggestion to prevent the readers from catching it. Together with other major epidemics such as typhus and yellow fever, cholera was at the center of a heated medical scientific debate that concerned the pathology of disease and the consolidation of the new science of bacteriology.

The cholera that broke-out in the Iraqi provinces of the Ottoman Empire in the summer of 1889, while relatively limited in its spread, was the subject of several articles published in contemporary international press including professional medical press. Considered a turning point in the history of cholera, the 1892-1893 epidemic that led to the demise of German hygienist Max Von Pettenkofer's environmental theory following the Hamburg catastrophe, was considered to be more significant from an international perspective. The shift, however, had earlier roots, especially the rediscovery of the cholera germ by Koch in 1884. The 1889-cholera outbreak in Ottoman Iraq therefore stands as an interesting moment in the history of medical knowledge allows for the scrutiny of both the change of a medical paradigm and the dynamics of knowledge circulation and accumulation in a global context. By tracing the work of local doctors during the outbreak, I will argue that fin de siècle Iraq was weaved into the global network of the scientific community not just in terms of sanitation regulation, but also in terms of scientific knowledge production.

This article joins the literature that views science as a construction and configuration of knowledge in a certain setting through practices and methods that are contingent to culture, politics, and economy. Specifically, it adopts the circulation approach that challenges the diffusion model of production

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of scientific knowledge. While diffusion implies a one-direction movement from West to East, and defines an active and a passive side, the circulation approach perceives the encounter itself as a site of knowledge production and emphasizes the multiple directions of the movement. It considers the power relations and limitations embedded in this encounter and the relationships between the different actors involved in the production of science[1].

Pasteur's and Koch's germ theory of disease and the coming of bacteriology, which had taken decades to be constructed and to which cholera had actually been one of the most important (though not the only) stimulus, altered the understanding of cholera epidemics of the 1880s-1890s. As this article demonstrates, the new understanding of the disease was not just a product of the perceived 'centers' of bacteriology, such as Paris and Berlin, but of a professional network working in a global context, which acted as the actual site of knowledge production. While the discovery of the bacillus introduced new bacteriologic practices it did replace investigations of field epidemiology, since the connection between the bacillus and the disease was not yet established and its identification was still difficult. Epidemiologists working in different environmental conditions helped researchers to eventually understand its pathology and epidemiology. By focusing on the 1889 cholera, this article will highlight the contribution of Ottoman individuals and institutions to the global history of knowledge on cholera[2].

The fight against cholera particularly seemed to have unified the globe. Fighting against its spread required stronger international cooperation based on the medical understanding of the disease as well as geopolitical interests of different governments, while putting more responsibility on British India, seen as the source of the disease[3]. In this regard, historians of science working on the eighteenth and nineteenth centuries have marked

1. Kapil Raj, "Beyond Postcolonialism . . . and Postpositivism: Circulation and the Global History of Science," *Isis* 104, no.2 (2013): 337-347, Stefanie Gänger, "Circulation: Reflections on Circularity, Entity, and Liquidity in the Language of Global History," *Journal of Global History* 12 no.3 (2017): 303-318, Kapil Raj, *Relocating Modern Science: Circulation and the Construction of Knowledge in South Asia and Europe, 1650-1900* (Basingstoke: Palgrave Macmillan, 2007).
2. Anne Hardy, "On the Cusp: Epidemiology and Bacteriology at the Local Government Board, 1890-1905," *Medical History* 42 no. 3 (1998): 328-346.
3. Emmanuel Le Roy Ladurie, *The Mind and Method of the Historian* (Chicago: Chicago Press,1981), 28-91, Valeska Huber, "The Unification of the Globe by Disease? The International Sanitary Conferences on Cholera, 1851-1894," *The Historical Journal* 49 no. 2 (2016): 453-476. Ladurie coined the term "the unification of the globe by disease" to describe political and economic processes between the fourteenth and seventeenth centuries that contributed to the microbal

the term of local informants to describe the part played by non-Western specialists in the production of science[4]. Elise Burton, working on post-World War II Iran and Israel/Palestine, describes Middle Eastern scientists as scientific collaborators rather than informants. She shows that they did not see themselves as intermediaries and did not act as such but rather as actors taking part in international scientific networks[5].

Keeping in mind the global nature of knowledge production, this article will also critically analyze the power relations that shaped this process. As historian Fa-ti Fan argues, the infrastructure that allows for the transmission of knowledge is not uniform or neutral but rather designed by power hierarchies, negotiations and struggles and therefore deserves historians' attention[6]. Historians of science in the Ottoman Empire tackled this issue by rebuking the view that since the eighteenth century, the Ottomans refused to accept scientific inventions and innovations. Deconstructing the view originating from the nineteenth century image of incapability of Islam and "modern science", scholars highlighted the Ottoman contribution to "European" science[7]. Others have shown how science was used to reinforce orientalist views and at times as pretext to intervene in Ottoman policies[8]. By engaging with the literature of the global history of knowledge production through the Iraqi outbreak this article will demonstrate that during the outbreak Iraq was a center for medical knowledge production and how the powers shaping

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unification of the world before the globalization of the nineteenth century. Huber uses this term to explain how the war against cholera unified the globe in the nineteenth century.

4. Bruno Latour, *Science in Action: How to Follow Scientists and Engineers Through Society* (Cambridge: Harvard university press, 1987), 215-218.
5. Elise Burton, "Essential Collaborators: Locating Middle Eastern Geneticists in the Global Scientific Infrastructure, 1950s-1970s," *Comparative Studies in Society and History* 60, no.1 (2018): 119-149.
6. Fa-ti Fan, "The Global Turn in the History of Science," *East Asian Science, Technology and Society: An International Journal* 6 no.2 (2012): 249-258.
7. Jane H. Murphy, and Sahar Bazzaz, "Re-examining Globalization and the History of Science: Ottoman and Middle Eastern Experiences," *The British Journal for the History of Science* 55 no.4 (2022): 411-422**,** LaVerne Kuhnke, *Lives at Risk: Public Health in Nineteenth-Century Egypt* (Cairo: American University in Cairo Press, 1990), Birsen Bulmuş, *Plague, Quarantines and Geopolitics in the Ottoman Empire* (Edinburgh: Edinburgh University Press; 2012).
8. Nükhet Varlik, "‹Oriental Plague› or Epidemiological Orientalism? Revisiting the Plague Episteme of the Early Modern Mediterranean" in *Plague and Contagion in the Islamic Mediterranean*, ed. Nükhet Varlik (Newark: Arc Humanities Press, 2017), 57-87, Liat Kozma, "Between Colonial, National, and International Medicine: The Case of Bejel," *Bulletin of the History of Medicine* 91, No. 4 (2017), 744-771, Michael Christopher Low, "Empire and the Hajj: Pilgrims, plagues, and pan-Islam under British surveillance, 1865-1908," *International Journal of Middle East Studies* 40, no.2 (2008): 269-290.

circulation of knowledge contributed to the construction of concepts such as scientific periphery. The comparison of local and Imperial sources with English and French medical journals will allow me to carefully trace the movement of knowledge about cholera.

After a short description of the centralization of Ottoman medicine in the nineteenth century, I will present the unfolding of the 1889 cholera outbreak in the Iraqi provinces. I will then analyze how local medical practitioners working in this outbreak perceived the disease and its transmission on the backdrop of the contemporary medical discourse on cholera. Finally, I will analyze the 1889 Iraqi outbreak as a case study for the production of knowledge in the international medical community.

2. Ottoman health institutions and the Ottoman physician in the 19th century: The figure of Suleiman Ghazala

Like other aspects of public life, Ottoman medicine underwent a series of transformations and regulations throughout the nineteenth century, as the Ottoman State began to be more directly involved in public health and especially the prevention of epidemics. Early on, Ottoman sultans and reformists understood the importance of medicine for their modernization projects, especially for military and commercial purposes. Thus, medical education and the installation of quarantine stations were among the first steps of this enterprise. The first modern medical school in the Ottoman Empire was established in 1827. It was run by European-educated teachers whose instruction language was French until it changed to Turkish in 1870[9]. In 1839, the *Meclis-i Umur-ı Sıhhiye* (Health Council), which included eight Ottoman and nine European delegates, was established, its task being the establishment of quarantine stations and local sanitary councils in different parts of the Empire, namely near the coastal and land borders[10].

9. Nuran Yıldırım, *A History of Healthcare in Istanbul: Health Organizations, Epidemics, Infections and Disease Control, Preventive Health institutions, Hospitals, Medical Education*, trans. İnanç Özekmekçi (Istanbul: İstanbul Üniversitesi, 2010), 21-22, Layla Aksakal, "The Sick Man and His Medicine: Public Health Reform in the Ottoman Empire and Egypt" (Third Year Paper, Harvard University: HSL Student Papers, 2003): 10.
10. Nermin Ersoy, Yuksel Gungor, and Aslihan Akpinar, "International Sanitary Conferences from the Ottoman Perspective (1851-1938)," *Hygiea Internationalis: An Interdisciplinary Journal for the History of Public Health* 10, no.1 (2011): 54-55.

Istanbul thus became the most important medical education hub in the Empire, followed by Beirut where the American Board of Commissioners for Foreign Missions established the Syrian Protestant College (later known as the American University of Beirut) in 1866. These schools produced hundreds of graduates who were integrated in the Imperial medical services. The process of standardizing medicine in the different provinces was gradual and was advanced by the Provincial Municipal Law, passed in 1877, which defined the responsibilities of the provincial government in different aspects of public health and sanitation of the public space[11].

Shortly after its creation, the Imperial Medical School launched the *Gazette Medicale d'Orient*, a medical journal that was published in French. Others that were published until the fall of the Empire, about 15 overall, were private initiatives. In addition, since the 1850s professional associations were established in Istanbul for different health professions such as doctors and pharmacists[12]. While European, chiefly French influence can be seen in all these Ottoman institutions, they nevertheless produced a local community of experts that worked throughout the Empire. The associations and the journals, the regulations that were gradually passed regarding the practice of medicine, all shaped the profession of the Ottoman doctor.

While the focus of this article is not the international relationships involving cholera, but rather the global aspects of knowledge production around the disease, it is worth noting that European countries put a lot of pressure on the Ottoman Empire regarding the eradication of epidemics, mostly cholera. This was since the empire controlled the holy cities of Mecca and Medina that thousands of Muslim pilgrims visited every year, a practice that was interpreted as a source for disease spreading. Ottoman territories were also considered the gate for cholera to enter Europe since they were situated between Europe and India, the so-called home of cholera. Whilst the formal task of the International Sanitary Conferences that were convened since 1851 was the standardization of sanitary regulations, they reflected this Euro-centric view, promoting health policies that fitted the interests of the Western powers. During the second half of the nineteenth century, the

11. Aksakal, "The Sick Man," 16.
12. Feza Günergun "La Revue Médico-Pharmaceutique *et al.* Transmission du Savoir Médical Européen en Turquie: Une étude sur l'année 1888," *Osmanlı Bilimi Araştırmaları* 12 no. 2 (2011): 146.

Ottomans also used anti-epidemic measures, such as quarantine networks, to fulfil their political aspirations for example in the Persian Gulf[13].

While much ink has been spilled about Ottoman health institutions and reforms, not much is known about the experience of Ottomans who chose to study and practice medicine. The autobiography of Dr. Suleiman Ghazala (d. 1929) presents a unique opportunity to learn about his experience as a doctor at the service of the Ottoman health system, but his personal story can also teach us about the complex circulation of knowledge at that time[14]. Since Iraq did not have a medical school until the establishment of the Iraqi Royal Medical College in 1927, during the Ottoman period Iraqi students who wished to study medicine had to choose between Beirut, Istanbul, or foreign schools[15]. The Baghdad born Ghazala was trained in the Faculté de Médecine de Paris, specializing in ophthalmology, obstetrics, and bacteriology. One of his teachers was the renowned hygienist Adrien Proust, an internationally esteemed epidemiologist, and the French delegate to several International Sanitary Conferences[16].

Little is known about Ghazala's family background, but we do know that his maternal uncle, Eliya Abu al-Yunan (d. 1894), was appointed Patriarch of the Chaldean Catholic church in Iraq in 1878. Ghazala does not elaborate on his choice to study medicine in Paris, but he does mention consulting his uncle before deciding to go. In doing so, he took the first steps towards entering the new Ottoman elite whose power was based on expertise and knowledge[17].

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13. Huber, "The Unification," Low, "Empire and the Hajj," Isacar A. Bolaños, "The Ottomans during the Global Crises of Cholera and Plague: the view from Iraq and the Gulf," *International Journal of Middle East Studies* 51.4 (2019): 609.
14. While Ghazala is an incredibly interesting figure who was even elected at the end of his life as a deputy of Basra in the Iraqi Council of Representatives, he remains a rather neglected figure in the history of Iraq.
15. Sarah Farhan, "The Making of Iraqi Doctors: Reproduction in Medical Education in Modern Iraq, 1869-1959" (PhD diss.,York University, 2019).
16. Suleiman Ghazala, *Hayati al-Shahsiya wa al-Wazaifiya* (My personal and proffesional life) (Baghdad: Dar a-Tibaa al-Haditha, 1929): 19, Bernard Straus, "Achille-Adrien Proust, MD: doctor to river basins," *Bulletin of the New York Academy of Medicine* 50.7 (1974): 833.
17. Ussama Makdisi, "Corrupting the Sublime Sultanate: The Revolt of Tanyus Shahin in Nineteenth-Century Ottoman Lebanon," *Comparative Studies in Society and History* 42, no 1 (2000): 181-183. Ghazala mentions his uncle in the dedication he wrote on his thesis: *Essai sur la cause de la mort naturelle ou physiologique*, which he completed in 1886.

It seems that Ghazala was representative of doctors of his generation whose knowledge and intellectual curiosity extended beyond the medical field. In addition to his work as a doctor, he published several poem collections and his love of and high proficiency in Arabic was manifested at the beginning of his professional career as a language teacher in Christian and Jewish schools in Iraq. During his stay in Paris, he was not busy only with his medical studies but also attended lectures in politics and economics. He translated some parts of the Quran to French and worked as an assistant editor to the journal *Kawkab al-Mashriq* (The Star of the Middle East) that was published in Paris since 1883 by the Syrian journalist 'Abdallah Marrash[18].

When in Paris, Ghazala also attended a meeting of young women's club where women learnt how to manage their household and educate their children according to scientific and medical principles. He was impressed with this idea and wanted to bring this knowledge to his country, and in fact when he served as a medical officer in Tripoli, he wrote a guide on the modern organization of the family in Arabic. As other doctors in the second half of the nineteenth century in the Ottoman Empire as well as in other parts of the world, Ghazala saw himself as an agent of modernity who possessed the proper knowledge to rearrange society according to the lines of science and civilization[19].

But despite the Western education that he valued and even aspired to share with his countrymen, Ghazala was aware and critical towards the orientalist view that existed among Western medical practitioners. He did not dismiss local medical knowledge outright, as the following example suggests. When plague appeared in south Iraq in the winter of 1890, an Armenian doctor from Baghdad refused to believe the disease he saw among some Bedouin tribes was indeed plague. He was certain that the lymph that appeared on patients' bodies was caused by gonorrhea which according to his conviction was typical to the Bedouins. The diagnosis of the disease as sexually transmitted reinforced the image of the Arabs and the Bedouins as unhygienic and placed them as responsible for the disease and marked their otherness[20]. As the local government was keen to conceal the outbreak of contagious disease, and preferred to accept the diagnosis of venereal disease,

18. Ghazala, *Hayati*, 18, Ami Ayalon, *Language and Change in the Arab Middle East: The Evolution of Modern Arabic Political Discourse* (Oxford: Oxford University Press, 1987), 177.
19. Ghazala, *Hayati*, 19
20. Liat Kozma, "Between Colonial," 746.

such diagnosis had grave implications. While discussing the disease with the governor, Ghazala used the claim that the local Bedouins recognized the disease as plague and called it "Abu Rubiya" as an evident in his argument with the Armenian doctor[21].

3. 1889 cholera outbreak in the Iraqi provinces

As mentioned earlier, the 1889 outbreak was relatively limited in space and time. The course of the disease began in south Iraq and followed the rivers and towns up north until it reached Baghdad, and later continued north to Mosul, and to Diyarbakir and Mardin where Ottoman health authorities put a lot of efforts to prevent the disease from entering Anatolia. Rumors of cholera in India had reached Baghdad as early as June 1889. But this unofficial information attracted little attention since cholera was endemic in India and had not struck Iraq for nearly two decades. Eventually, cholera broke out in the city of Shatra in mid-July, the first alert of the disease being sent by the governor of Nasiriyyah on August 1st reporting a fatal malady in the southern area of the Muntafiq tribe and requesting a physician to be sent there. The following day a telegram reported cholera in Shatra[22]. The Shatra epidemic reached its zenith on August 15th, with 494 recorded deaths until that date. The total number of deaths caused by the outbreak in Shatra was 700[23].

In the early stage of the epidemic's progression, most of the sick did not survive, and patients sometimes died as quickly as four hours after exhibiting the first symptoms[24]. The patients all presented the same clinical features of massive vomiting and diarrhea, low body temperature, muscle cramps and dry white tongue, many of them passing away within six to forty-eight hours. Until August 6th the spread of the disease was restricted to the south of Iraq, mainly the towns of Shatra and Nasiriyyah. The following day a cholera case was seen in the southern port city of Basra, where the number of sick increased daily. Between August 8th and 13th, the disease progressed to al-Kut, Suq al-Shuyukh and Qurnah, located at the junctions of the Tigris

21. Ghazala, *Hayati*, 34-36.
22. E. D. Dickson, "The Outbreak of Cholera in Mesopotamia and Syria in 1889, 1890 and 1891," *Transactions of the Epidemiological Society of London* 13 (1894): 128.
23. *Ibid.* 130.
24. Pierre Ponafidine, *Life in the Moslem East* (New York: Dodd, Mead and Company, 1911), 63

and Euphrates. In two weeks, the disease followed upstream the Euphrates and the Shat al-Arab rivers[25].

The disease created panic everywhere it arrived and drove the inhabitants to escape their homes and towns —some even managed to enter Baghdad despite the cordon sanitaire. On August 14th cholera appeared in Baghdad, where the first recorded patient was a soldier who showed symptoms and died within six hours. Between August 17th and 26th 537 deaths were reported in the city, though all reports estimated that the actual numbers were much higher. At the beginning cholera cases in Baghdad were limited to the Bab al-Sheikh neighborhood, where refugees from Basra were found, but it quickly spread to other parts of the city[26].

After August 26th and until the end of September, between 2-3 deaths occurred daily in Baghdad. The disease spread north and reached Suleimaniyah, Khanaqin and Mosul in the months of October and November. From Khanaqin, a town bordering with Persia, it entered Iran where it remained until the end of February. The total number of deceased in Baghdad since the beginning of the outbreak until the end of September topped up 1000, and overall, in the Iraqi provinces, 6,173. Some sources raised the death toll to 7,261 people in Iraq in the year of 1889[27].

In the following summer cholera returned to Iraq. On July 12th, 1890, the Sanitary Department of Baghdad reported cholera in Irbid and Karbala, but no cases were diagnosed in Baghdad. New cases appeared in the summers of 1891, 1893 and 1894, but these outbreaks were substantially smaller and much less deadly than that of 1889.

4. 1889 Iraqi cholera outbreak and the scientific discourse about cholera

Since cholera was unknown in Europe before the 19th century and due to its quick spread and high mortality, the question of its mode of transmission became of great importance for contemporary medicine. In his important

25. Author Unknown, "Cholera in Mesopotamia: Translation from the Revue Médico-Pharmaceutique, Constantinople, August 31," *Weekly Abstract of Sanitary Reports* 4 no. 45 (1889): 372-374.
26. Dickson, "The Outbreak," 139.
27. *Ibid.* 145.

work historian Erwin Ackerknecht classified scientists into two distinct camps: the first, influenced by the miasma theory, understood cholera as an aerial or climatical infection that was not transmissible from human to human. These were generally referred to in research as anticontagionists or environmentalists. Others understood cholera to be contagious and were therefore looking for an object or a pathogen that triggered the disease. A rich body of literature has since analyzed the evolution of both medical paradigms and the defeat of anticontagionism, and challenged Ackerknecht's dichotomic distinction by elaborating a more complex picture of those medical practitioners who did not accept human to human contagion[28].

While the depth of this debate is outside the scope of this article, it is important to understand the main controversy surrounding cholera during the time of the 1889 outbreak and the questions that remained unanswered. An important cornerstone in the understanding of cholera were John Snow's publications of 1849-1855 where he identified a correlation between the spread of the disease in London and the drinking water system in the city. The next major step occurred in 1884 when the German bacteriologist Robert Koch managed to isolate and describe the vibrio cholerae in his expedition to Egypt and India[29]. While this was an immense feat, the claim that the bacterium was the sole agent of the disease would not be accepted for another decade or so[30]. Koch's main opponent, German hygienist Max von Pettenkofer did not reject the existence of an organism that cause the disease, but rather asserted that the disease would break out only in cases where the germ penetrated and polluted the soil, thus causing poisonous cholera miasma that polluted the air. To him, the contagionist view failed to explain cholera's seasonality and spread pattern. These were, in his opinion, dependent on environmental parameters such as the quality of the soil and the level of groundwater[31].

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28. Erwin Ackerknecht, "Anticontagionism between 1821 and 1867," *International journal of epidemiology*, 38 no. 1 (2009): 7-21, Elspeth Heaman, "The Rise and Fall of Anticontagionism in France," *Canadian Bulletin of Medical History* 12 no. 1 (1995): 3-25, Huber, *"The Unification,"* 457.
29. While the Italian physician Filippo Pacini isolated the bacterium in 1854, the medical community rather ignored his discovery until it was rediscovered later by Koch. Rao M. Subba, and N. Howard-Jones, "Original observations of Filippo Pacini on Vibrio cholera," *Bulletin of the Indian Institute of History of Medicine* 8 (1978): 32-38.
30. Bruno Latour, *The Pasteurization of France* (Cambridge: Harvard University Press 1988), 64, Christopher Hamlin, *Cholera the Biography* (New York: Oxford University Press, 2009), 210-212.
31. Alfredo Morabia, "Epidemiologic Interactions, Complexity, and the Lonesome Death of Max von Pettenkofer," *American journal of epidemiology* 166, no. 11 (2007): 1234-1235, Max von

The different understandings of the disease and its transmission translated into different sanitary measures and policy recommendations. Contagionists aimed at preventing the movement of people and objects that carried the bacteria through cordons sanitaires, quarantine and the usage of disinfectants. The localist view, on the other hand, regarded these steps to be counterproductive since they did not prevent the infection of the soil. They advocated for sanitary reform, the cleansing of cities, removal of health hazards, the cleaning of water resources and the establishment of sewage. While improving sanitation in the cities helped to prevent cholera outbreaks, when cholera had already broken out, isolation and disinfection were crucial. During the 1892 Hamburg outbreak, the refusal of the local government to install sand-filtration system for drinking water in accordance with Pettenkofer views, resulted in the death of thousands, leading to the acceptance of the germ theory. While cholera was at the center of attention of the global medical community for many decades, the period between Koch's discovery in 1884 and the 1893 pandemic witnessed a fierce debate with higher stakes than ever[32].

The observers and medical practitioners who were present in the 1889 outbreak in Iraq reflected in their writings on how the global medical discourse was localized to this province of the Ottoman Empire and how they understood the transmission of the disease and the ways to stop its spread. The medical staff working in the Iraqi provinces during the outbreak comprised both local and foreign doctors employed in the military and civic Ottoman medical services. Among the locals was Dr. Ghazala, while foreign doctors working in Ottoman health institutions were Dr. Lubicz, the sanitary inspector of Baghdad and the most senior health officer in the area, and the Austrian Dr. Adler, his deputy. Other foreign practitioners outside the Ottoman administration were those of the Church Mission Society and those attached to the foreign consulates in several cities throughout the Empire.

Ghazala was sent to the infected area where he moved from town to town following the spread of the disease and recorded the data of the patients, their symptoms, and the evolution of the disease. He diagnosed the disease as

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Pettenofer, "On Cholera, with Reference to the Recent Epidemic at Hamburg," *The Lancet* 140, no. 3612 (1892): 1182.

32. Morabia, "Epidemiologic Interactions," 1235, Mariko Ogawa, "Uneasy Bedfellows: Science and Politics in the Refutation of Koch's Bacterial Theory of Cholera," *Bulletin of the History of Medicine* 74, no. 4 (2000), 671-707.

Asiatic cholera, based on his field investigation even before using laboratory tests[33]. He later also performed a bacteriological test which identified the presence of the vibrio cholerae, thus confirming his diagnosis[34].

Ghazala asserted that the disease was contagious and that those who isolated themselves during outbreaks were not affected. He also argued that those who had previously survived cholera attacks developed natural immunity to the disease (*taṭaaʿmu kuluhum ṭabiiʿyan*)[35]. The official correspondence between the Ottoman Interior Ministry (*Dahiliye Nazareti*) and the Iraqi provinces show the different ways in which Ottoman health officials understood the spread of the disease. Many of the documents express the contagionist view as they attempted to stop the contagion (*sirayet*) and therefore ordered to establish a network of quarantines and cordons to prevent contact between people from infected areas and those in other localities.

This is also demonstrated by their use of chemical disinfectants such as copper sulphate (*kibrit-i nuhas*) and carbolic acid *(hamed-i fenik)*[36]. They cleaned the neighborhoods and even inside the homes of the sick, disinfecting them by vaporizing with coal tar (*qatran*) and applying lime whitewash (*kireç badana*)[37]. The disinfection methods and chemical substances described in the Ottoman documents reflect medical knowledge and practices that were generally accepted to fight cholera around the world[38].

Further instructions regarding the treatment of linen and other objects touched by the sick and the deceased, as well as exact and detailed instructions of burial for disease victims also demonstrate the understanding that the disease could be transmitted via humans. Many of the documents dealt with the regulation of burial, an issue that concerned epidemiologists and hygienists around the world are conveyed in the Ottoman medical documents[39]. These also expressed the concept of polluted drinking water as a danger for cholera: they order not to wash contaminated objects in the river

33. Dickson, "The Outbreak", 130-131.
34. Ghazala, *Hayati,* 23-24.
35. *Ibid.,* 26.
36. Başbakanlık Osmanlı Arşivleri (The Prime Minister's Ottoman Archives, henceforth BOA) DH_MKT 1649 24.3 August 18th, 1889.
37. BOA DH_MKT 1648.13, August 18th, 1889.
38. Dr. Adrien Proust lists these substances as disinfects. Adrien Proust, *La defence De l'Europe Contre le Choléra* (Paris: G. Masson, 1892), 432-433.
39. Hamlin, *Cholera,* 211.

because its water is used afterwards to drink and prepare food[40] and warned not to drink water from the margin of the river, but from the mid-stream[41].

Despite highlighting the contagious nature of the disease, Ghazala and other doctors also associated it with environmental conditions. His reports indicate that the rainfall during recent years, the temperature, and the appearance of other seasonal maladies were considered to be relevant medical facts for the analysis of cholera and were documented along with the number of cholera cases. This view is consistent with the localist view of cholera, represented by Pettenkofer who tried to explain the appearance of cholera by correlation with such environmental factors[42].

Doctors and observers also continued to associate cholera with filth and bad odors and therefore commented on the hygiene of Iraqi towns in their reports[43]. But despite the traditional association with filth and poverty, they could not explain the spread of this specific epidemic because in the words of the American consul in Baghdad:

> Unlike the plague which visited this city in 1876, the cholera has so far been confined to the cleanest quarter of the city, while among the first victims were members of the best families, whose sanitary and physical conditions were regarded as perfect. Sanitation and good living insure no one, rich or poor, against the disease[44].

The Ottoman authorities nevertheless worked to clean the city, the streets, and the shops and ordered to restrict the work of butchers inside the city as they produced bad odors and filth[45]. They also acknowledged the environmental conditions which were favorable to the disease. Based on medical opinions the Ottoman officials conceived the marshes of lower Iraq which were half dry due to sparsity of sediments in the previous winter as a potential cause for the spread of cholera and ordered to dry them all together or fill them with water. The flagging of marshes as the source of

40. BOA DH_MKT 1649 24.3 August 18th, 1889.
41. British National Archives Foreign Office (henceforth FO) 195 1647 p. 250.
42. Dickson, "The Outbreak," 130.
43. *Ibid.,* 139.
44. National Archives of the United States, Records of the U.S. Department of State, 1888-1944: Dispatches from U.S. Consuls, No. 9, Consulate of The United States, Baghdad, "Cholera in Mesopotamia," August 22nd, 1889.
45. FO 195 1647, p. 250.

disease was common in this period in other parts of the world[46]. Despite the different methods that were used simultaneously against cholera, the physician to the British Embassy in Istanbul. Dr. Dickson stated that the Sanitary Commission in Baghdad focused mainly on the establishment of cordons and quarantines while neglecting the improvement of sanitary conditions in Baghdad[47].

We cannot always understand the logic behind certain steps taken against the epidemic, for example burial regulations can be seen as a way to prevent the pollution of the soil, or to prevent the contamination of ground water which will become dangerous to consume. The cleaning of the city can also be seen in different lights: the usage of chemical disinfectants is associated with the contagionist view of disease but the desire to generally clean the city probably draws from the association of the disease with pollution and filth. Terms such as filth that were associated with cholera at the beginning of the century, were still present in cholera reports, but much greater emphasis was given to new scientific methods of disinfection. As in other cholera outbreaks around the world at that time, also in Ottoman Iraq the germ theory was not exclusively used and did not replace altogether the logic of the environmental theory of the spread of disease, rather, a hybridization of the two logics was enacted. Anti-cholera policy demonstrated pragmatism of the authorities facing limited budget[48]. The Ottoman government, governing vast areas of different climate and geographical conditions understood that the measures to prevent cholera had to be adapted to Iraq's natural environmental conditions, its climate, and the nature of the soil[49].

46. BOA DH/MKT 1657 14 September 15th, 1889.
47. Dickson, "The Outbreak," 137.
48. Jon Arrizabalaga and Juan Carlos García-Reyes, "Contagion Controversies on Cholera and Yellow Fever in mid nineteenth-century Spain: The Case of Nicasio Landa," *Mediterranean Quarantines, 1750-1914: Space, Identity and Power*, edited by John Chircop and Francisco Javier Martínez, Manchester: Manchester University Press, 2018, pp. 170-196.
49. BOA DH/MKT 1657 14 September 15th, 1889. While burial was considered a sanitation hazard in other locations, it seems that in Iraq it presented a major challenge due to its soil and groundwater. Different primary sources suggest that burial ground in and around Baghdad was scarce due to the flooding of the river, the shallowness of groundwater and the hardness of the soil at certain location in and around the city.

5. Who knows what? Structure of the circulation of medical knowledge on cholera

After discussing the nature of the discourse about cholera and how it manifested itself in 1889 in the far end of the Ottoman Empire, this section now turns to tracing and analyzing, again through this particular outbreak, the power relations that shaped the circulation of medical knowledge inside and outside the Empire. Istanbul had been carefully watching the latest developments of the scientific debate around cholera. Sultan Abdul Hamid II was committed to science and medicine and had personally ordered the translation of the most recent treaties and research as well as the regulations against cholera used in Germany and France during the 1890s. He also invited to Istanbul researchers from the Pasteur Institute in Paris as well as German and Austrian doctors. This invitation during the 1892-1893 epidemic that severely attacked Istanbul expressed the importance the Sultan saw in eradicating the disease from the capital, while it also further advanced Istanbul's place as the center for medical knowledge in the Empire. The European experts even participated in the establishment of the Constantinople Imperial Bacteriology Institute in 1893[50].

Whereas the Sultan endeavored to transfer Istanbul into a scientific hub, during the outbreak the Iraqi provinces became the center of attention. Since cholera had not attacked the Iraqi provinces for two decades, some medical practitioners struggled to properly diagnose the disease even though it represented a major threat to public health. Some might have heard about it in their medical training but have never encountered and treated it before or were aware of the required epidemiological steps. Since most of the doctors working in south Iraq were unfamiliar with the disease and considering the rising number of cases, the sanitary inspector of Baghdad Dr. Lubicz sent doctors from throughout the provinces to the infected areas. Some of the physicians who were sent from the Baghdad province were reluctant to admit that the disease was cholera. Since Shatra was not a seaport, they conceived

50. Nuran Yilderim and Hakan Ertin. "European Physicians/Specialists during the Cholera Epidemic in Istanbul 1893-1895 and their Contribution to the Modernization of Healthcare in the Ottoman State" in *Health, Culture and the Human Body: Epidemiology, Ethics and History of Medicine; Perspectives from Turkey and Central Europe,* eds. Ilhan Ilkinç *et al.* (Istanbul: Betim, 2014), 199, Maurice Huet, "The Constantinople Imperial Bacteriology Institute," *Histoire des Sciences Médicales* 34 no, 3 (2000): 289-294.

that it was not possible that Asiatic cholera visited there from India, but rather assumed it was a kind of a mild cholera endemic to the Muntafiq marshes[51].

The correspondence shows that the health officers in Istanbul were critical towards the diagnosis of some of the doctors working in Iraq and questioned the evidence they used as basis. They were also aware of the fact that the doctors who are unfamiliar with the disease might be afraid and therefore negligent. They therefore appointed Qaymaqam 'Abdi Bey to oversee the doctors working in the Ottoman health services in Baghdad. They also sent ten graduates of the Imperial School of Medicine, and some pharmacists and surgeons to the infected areas in Iraq[52].

Apart from treating patients and fighting the spread of the disease, Ottoman medical officers provided data and statistics from the site of the outbreak. Ghazala carefully documented the symptoms of his patients, the size of their pupils, their responsiveness, their body secretions, their facial expressions, their complaints of pain, body temperature, and pulse. He classified the cases to different types: the rapidly fatal, the severe and the mild form. He saw it as his responsibility as a doctor to engage in the international conversation about cholera and to contribute to the better understanding of its transmission. These findings became the basis for epidemiological reports about Iraqi cholera in internationally read medical journals. For example, Dr. Dickson, the physician of the British Embassy in Istanbul, published a detailed article in 1894 in the *Transactions of the Epidemiological Society of London*, whose content is based on the above-mentioned doctors' observations[53].

A series of three articles that were published in the 45th volume (8 November 1889) of the *Weekly Abstract of Sanitary Reports*, an American public health journal issued by the US Marine Hospital Service, further confirms the role of Ottoman medical community in the production of knowledge about the disease. Two of them were translations of articles previously published in the Istanbul-based French language journal *Revue Médico-Pharmaceutique*. This journal, that was founded by the Istanbul-born pharmacist Pierre Apéry who had studied pharmacy in the Imperial School of Medicine and become the secretary of the *Société de Pharmacie*

51. Dickson, "The Outbreak," 133.
52. BOA DH_MKT 1650.1.1 August 20th, 1889. DH_MKT 1649.71.1 August 17th, 1889. DH_MKT 1650.8.1 August 21st 1889.
53. Dickson, "The Outbreak".

de Constantinople, was created so that European medical professionals were brought into contact with the work of their Ottoman counterparts[54].

Additionally, during the epidemic Dr. Ghazala served as a direct contact and informant for his old teacher from Paris, Dr. Proust, providing him with reliable data without having to wait for the official information from Istanbul, and in this way making it possible that Proust published several articles about the Iraqi outbreak[55]. In one of his publications, he presented Ghazala as an Arab native to Baghdad who graduated from the Paris school of Medicine, which seems to have been a way to establish his credibility as a doctor with a first-hand, native understanding of the province and its inhabitants[56].

The information gathered on the Iraqi 1889 outbreak establishes the rendering of the Iraqi provinces as a medical center for knowledge production. Ottoman physicians, institutions and journals were important links in the chain of transfer of knowledge between Iraq and the West because they had the proper infrastructure, that is, doctors who could speak the international language of science. Modern medical education provided the infrastructure for this production of knowledge so that doctors who graduated from Beirut, Istanbul and Paris could speak the same scientific language. Epidemiology due to its immense progress during the nineteenth century and to its international importance, shaped an awareness among students that they were part of an international community of experts and that they needed to be aware of the latest developments in medical knowledge and to use their findings to contribute to this community[57]. Like in Iraq, every cholera outbreak that occurred within this scientific network and was afterwards studied and analyzed became a site for knowledge production by itself[58].

But the knowledge produced in Iraq was not merely transferred to other parts of the world but rather it was shaped by power relation that contributed to constructions such as scientific periphery. An important point is that none

54. Author Unknown, "Cholera in Mesopotamia", Michèle Nicolas, "Pierre Apéry et ses publications scientifiques" Revue d'histoire de la pharmacie, 94 no. 350 (2006): 237-247.
55. Ghazala, *Hayati,* 23.
56. Adrian Proust, "Le Choléra de Mésopotamie, de Perse et de Syrie, en 1889 et 1890," *Bulletin de l'Academie de Médecine* 26 (1891) 137.
57. Nükhet Varlik, "'Oriental Plague'", Ilana Löwy, "From Guinea Pigs to Man: The Development of Haffkine's Anticholera Vaccine," *Journal of the History of Medicine and Allied Sciences* 47, no. 3 (1992): 270-309.
58. Anne Hardy, "Methods of Outbreak Investigation in the 'Era of Bacteriology', 1880-1920," *Sozial-und Präventivmedizin* 46 (2001): 355-360.

of the articles I traced in the English and French press was written by any of the Ottoman doctors who were present during the outbreak, while Proust's name already became associated with this outbreak while it was still ongoing[59], thus revealing the division between those who conducted research and those who published it. It is worth noting that Proust and Ghazala had teacher-student relations, and that Proust enjoyed such a solid experience and authority, and his seniority compared with Ghazala partially explains why he published. It is also significant to mention that Proust sometimes credited Ghazala for his fieldwork and research. His relationship with Ghazala, together with professional relations he probably withheld with physicians in different countries, rewarded Proust with the position to narrate the story of cholera to the West.

While Proust sometimes credited Ghazala for his work, other published reports on the 1889 outbreak often named their sources as "Constantinople". For example, in a series of articles published in *The Sanitarian* journal published by the Medico-legal Society of New York describing the Iraqi outbreak in detail, all the sources mentioned are working in the Ottoman Capital[60]. This is misleading since, while their direct sources came from Istanbul, they were actually based on Ghazala's and Lubicz's data and insights. Ignoring the role of local medical actors lead to their historic erasure and helped to construct Iraq as a scientific periphery.

One of the most important questions that interested the medical press was the origin of the epidemic. Some of the Western observers argued that cholera was endemic to the marshes of southern Iraq. The article in *The Sanitarian* expressed a similar opinion, which the author reached after dismissing the only path he could think of for the importation of the disease: "pilgrimage to Mecca was made under the best sanitarian conditions and it was impossible to trace the disease to India"[61]. The resident surgeon of the British regiment in Iraq, Dr. Bowman, who was there during the outbreak and closely knew the environment, shared this opinion and dismissed the idea that the disease was imported from India. He was convinced that it originated from the towns in southern Iraq where natural conditions were favorable for its generation[62].

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59. The British Medical Journal, November 2nd, 1889, July 26th 1890. Abstract of Sanitary reports, June 30th, 1893.
60. Unknown Author, "Cholera Outbreak in Mesopotamia," *The Sanitarian* 23, 302-305.
61. "The Cholera in Mesopotamia," *The Sanitarian* 23 (1889): 302
62. FO 195/1682 January 7th, 1890.

The conviction that cholera was endemic to Iraq could be viewed as an acceptance of contingent contagionism understanding of the disease that identified certain conditions to be more prone to the development of cholera[63]. This is also evident in the Ottoman correspondents that tagged the marshes in south Iraq as a potential source for cholera contagion[64]. However, this assertion was often made casually and decisively without attempting to bring evidence. Proust for example accepted this hypothesis even before the 1889 outbreak and while Ghazala was still studying in Paris. But since Proust did not have the data to support it, he wanted Ghazala to return to his homeland after graduating and use his knowledge in bacteriology to conduct research in this subject, and he promised to present Ghazala's finding to the French Academy under Ghazala's name. In fact, he even wrote Ghazala a recommendation letter that helped him to be appointed in the Ottoman health services as the Sanitary inspector of south Iraq[65].

Some of those who accused Iraq of hosting cholera reminded their readers that this was true to other Oriental places as well. For example, in another article published in *The Sanitarian* regarding the 1889 Iraqi cholera, the author implied that in 1883 the Egyptian authorities had tried to conceal the endemicity of the disease[66]. Working on the 1848 cholera outbreak in the Egyptian city of Tanta, historian Stephanie Anne Boyle has shown how doctors writing on cholera as early as its first appearances outside of India in the 1830s, tried to argue that cholera had an affinity to Egypt's natural conditions. She showed that in successive outbreaks the medical press often implied that the disease was endemic there[67].

The effort to present cholera as an endemic disease to different Ottoman and eastern territories seems to portray an attempt to construct the disease as an oriental phenomenon. We should analyze the discourse about cholera in a similar way to Nükhet Varlik's analysis of the plague discourse. She carefully examines and deconstructs the nineteenth century medical discourse and demonstrates how plague was constructed as an oriental disease that marked the border between the East and the West, between the civilized and

63. Ackerknecht, "Anticontagionism," 7-21.
64. BOA DH/MKT 1657 14 September 15th, 1889.
65. Ghazala, *Hayati*, 20.
66. "Cholera in Mesopotamia and Persia," *The Sanitarian* 24 (1890): 61.
67. Stephanie Anne Boyle, "Cholera, Colonialism, and Pilgrimage: Exploring Global/Local Exchange in the Central Egyptian Delta, 1848-1907," *Journal of World History* 26, no. 3 (2015): 581-604.

uncivilized. While cholera was associated with the Ganges valley in India and referred to, including by Ottoman doctors as "Asiatic Cholera", the assertion of some doctors that it was endemic to Iraq or Egypt, could be understood as an attempt to link this disease that was associated with filth and poverty with the general concept of the Orient, thus marking the border even within this global threat. Medical commentators even went as far as to argue that in the same locality Europeans were less prone to become sick with cholera then others, without explaining why[68].

Unlike the plague whose presence in European cities was less significant in the nineteenth century and appeared in the Western discourse as an Eastern disease, cholera was a tangible fear for Europeans and tying it with the East in general put the responsibility for the spread of dangerous diseases on the oriental. The classification of countries vis a vis cholera was significant during the International Sanitary Conferences and served as a pretext for Western powers to intervene in internal policy of different countries[69].

While professional opinions asserting that cholera was endemic to Iraq prevailed before this outbreak, the Ottoman Board of Health understood the importance of investigating the source of the disease. They assembled a commission for that purpose that interestingly did not include any foreign doctor, but only Ottoman doctors: Drs. Ghazala and Lubicz, and two other military and civil doctors. They visited the infected towns and villages in south Iraq and after a careful examination and investigation determined that cholera had entered the Iraqi provinces from Basra and from there spread to Shatra and Nasiriyah. More generally, they argued that cholera was imported to the Ottoman territories from British India in contrast with Proust and others' initial assumption. The committee arrived at south Iraq at the end of April 1890, more than six months after the outbreak, and the only method to discover the origin of the epidemic and the timeline of its spread was to inquire the inhabitants about their recollection of the events. For example, they interviewed the father of a deceased woman originating from Iran, who had previously experienced two outbreaks of cholera and described the symptoms in detail, convincing the doctors that this indeed

68. Proust, *La Défense*, 63.
69. *Ibid.* 61-63. For example, in the ninth international conference in Paris, 1894, Proust argued for the need to enforce sanitary surveillance in the Red Sea and Persian Gulf. Norman Howard-Jones, "The Scientific Background of the International Sanitary Conferences, 1851-1938" *History of International Public Health*, World Health Organization, 1975, 71.

was cholera. Thus, the government mediated the information provided by the inhabitants themselves and used it to establish scientific conclusions[70].

The findings of the commission were published in the *Bulletin de l'Academie de Medecine* by Dr. Proust in 1891. In his article, Proust accepted the Ottoman conclusion that cholera was brought from outside of Iraq and wrote that it was indeed not likely that the disease was endemic to the marshes since it did not break out there for two decades[71]. In his 1892 treatise, the French hygienist classified countries around the world and determined that while the disease was endemic in certain parts of India, other countries present favorable conditions for its existence, mostly South-East Asia: China, Cambodia, Vietnam and Japan. In the following page he explained that the native population was more likely to be infected then European visitors[72]. This assertion, unexplained, reveal Proust's assumptions about the hierarchy of the different populations. Thus, while the question of origin of the disease was still important, the actions of the Ottoman Board of Health had prevented the inclusion of the Ottoman Empire among the countries where cholera prevailed. Proust's observations from this outbreak and its echoes in the following months were the basis for international policy recommendations, which demonstrated the importance of learning from case studies around the world for the research of the disease.

6. Conclusion

By focusing on one particular outbreak this article examined the process of creation and circulation of medical knowledge about cholera in global networks of experts. The 1889 epidemic in Iraq demonstrates how doctors working in the Ottoman Empire localized the latest findings about cholera from different schools of thought and used them to fight against the spread of the disease. The measures ordered by Ottoman doctors were similar to anti-cholera practices elsewhere. By tracing the actors, skills, practices and medical institutions involved in this outbreak, this paper demonstrated that this site served as a medical center for knowledge production and contributed to the understanding of the disease. This could not have been accomplished

70. Ghazala, *Hayati*, 32-33, Dickson, "The Outbreak," 147-148.
71. Proust, "Le cholera de Mesopotamie," 140.
72. Proust, *La defense* 61-63.

without a somewhat unified infrastructure of medical education, medical institutions and journals.

While adopting the circulation model of knowledge production, this article highlighted the importance of critically analyzing the transmission of knowledge. This allows for the deconstruction of certain concepts regarding not only disease but of the position of the Orient in the global network of medical knowledge production. The fact that none of the doctors operating in Iraq published articles about it, doesn't signify only personal missed opportunities but rather the dominance of the Western voice in telling the story. This contributed to the construction of Iraq and other places as scientific periphery, a location where disease spread but not where the medical community learns about it. In fact, not only did Ottoman Iraqi doctors participated in knowledge production, but they were also engaged in discourse with international figures in order to influence the narrative and avoid framing Iraq as inclined to have endemic cholera. ▮

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