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Disease and Water Supply: The Case of Cholera in 19th Century Iran

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ABSTRACT

This paper explores why Iran was a particularly fertile ground for repeated visitation of cholera in the 19th century. Along with certain unique Iranian cultural and religious factors, the author demonstrates how Iranian urban ecology, particularly the *qanat* system, contributed to the fatal spread of the epidemic. These multi-faceted conditions, the author concludes, resulted in distinct modes of disease transmission and mortality in Iran.

“The cholera is the best of all sanitary reformers; it overlooks no mistake and pardons no oversight.”

The Times (London), 5 September 1848

INTRODUCTION

In recent years, the subject of national identity and the verity of topographical boundaries as reflections of a tangible identity has been an immense source of controversy among academics (Jackson and Penrose 1994; Anderson 1991; Hobsbawm 1993; Ranger 1992). The Middle East has been at the heart of this debate, principally due to the nature of its shifting national frontiers and the relative youth of a number of its nation-states (Khalidi 1997; Bozdogan and Kasaba 1997). It should come as no surprise, therefore, that aside from the obvious cultural, linguistic, and historic antecedents, the physical environment of the Middle East has also been utilized by scholars as an identity-building apparatus.¹ In this paper I hope to expand this debate by looking at a Middle Eastern national entity's unique experience with a pathogen during the great pandemics of the 19th century. By examining Iran's encounter with the *Cholera bacillus*, this paper will reveal environmental and cultural factors that made Iran's experience with Asiatic cholera distinct from that of other countries across the globe which were gripped by the same microbe.

I seek to demonstrate how the Islamic disposition toward “sacred-law” as the yardstick for purity, together with the lack of any sanitary base, made Iran a fertile ground for repeated visitations of cholera. Aside from Iran's own unique legacy, the attributes which predisposed it to repeated invasions of Asiatic cholera can also be used as an opportunity to assess the larger Middle Eastern legacy with epidemic diseases, which sets it apart from its European, Asian, and African counterparts. Furthermore, in evaluating these cultural and environmental factors, one can see the emergence of a degree of

¹ One does not need to look any farther than the colloquial use of the great river-systems from the “Oxus to the Nile” in delineating the geographical-cultural boundaries of the Middle East.

continuity in Iranian urban ecology as well as in its human dimensions, embodied by its religious ideologies, which stem from Avestan and Talmudic traditions. More than anything else, these continuities attest to the importance of considering historical trends in the ecology of illness in the Middle East, so as to better understand current environmental issues in that region.

ORIGINS OF THE ASIATIC CHOLERA PANDEMICS

The cradle of cholera's numerous visitations in the 19th century can be traced to the banks of the Ganges River where the *Cholera bacillus* had been thriving for centuries in its warm waters and the intestines of its neighborly human hosts. A "fecal-oral" disease, cholera is passed from the excrement of its victims into the food or water source of a community whereby it is ingested by a slew of new victims. The bacteria eventually find refuge in their hosts' digestive tracts, at which point the warm alkaline environment of the small intestine provides the ideal environment for the germs to multiply with great rapidity. Ironically, it is not the presence of the bacterium that causes the demise of its victims; rather it is the host's immune response that unleashes the lethal poison of the germ. Consequently, the most violent symptoms of cholera emerge as a result of the bacterial cells' destruction by the immune system, which releases the powerful toxin that they contain. It is this venom that causes the lethal manifestations of the disease (Snowden 1995). The pallet of these symptoms, which includes massive vomiting, diarrhea, and the blue-gray pallor of its victims, paints an abysmal picture. Indeed, one could say that the victims of the disease bear the very faces of death as a result of the loss of a quarter of their body fluid, which is the cause of the emaciated, blue-gray pallor and sunken eyes of the stricken. The Hippocratic signs of impending death are further brought to bear with the comatose and apathetic state of cholera's victims (Snowden 1995).

The penetration of the East-India Company into inner-Hindustan and the globalization of trade with the Indian sub-continent, provided the *Cholera bacillus* with a suitable vector through which it could spread on an international scale.² Maritime trade with India, which provided fast ships and frequent ports of call, allowed infected goods, such as recycled clothing or foodstuffs, to be spread from port to port. Furthermore, the relative rapidity of travel from India to a variety of ports of call, such as southern Iran, allowed infected human vectors also to serve as reservoirs for the spread of the disease. This vector was especially significant during the heyday of the anti-contagionist philosophy regarding cholera, in the mid-19th century, which had partly emerged as a result of the

² Of course this trend in global pandemics is nothing new. Ever since the first civilizations and emergence of global trade, disease has accompanied human quests to penetrate new markets. The genesis of Black Death in medieval Europe was a product of the newly globalized economic position of Europe, through Venetian trade in the Crimea, which incidentally (and fatefully) was also the port of call for caravans from China and central Asia. Patterns of epidemics and their impact on civilization have been beautifully exposed in recent works by William McNeill and Alfred Crosby. Unfortunately, the views on the nature and impact of disease on civilization seem to be fairly uniform, and the field is certainly in need of some dissenting views as to the nature and impact of these diseases on humanity; see W. H. McNeill, *Plagues and peoples* (New York: Doubleday, 1979) and Alfred W. Crosby, *Ecological imperialism: the biological expansion of Europe, 900–1900* (Cambridge: Cambridge University Press, 1986).

futility of quarantines and was to some extent due to the epidemic's selective impact.³

GROUNDWORK FOR AN EPIDEMIC

Iran was perfect territory for acquiring and subsequently “exporting” epidemics to other continents. Known as the “crossroad of civilizations” on account of its central position within the Eurasian plateau and its strategic position in the path of the historic trade and invasion routes, Iran had a long history of also being on the “crossroad” of global pandemics. In classical times it was *The Plague of Justinian* that crossed this land, followed by the medieval bubonic plagues, and, in the 1880s, an influenza pandemic. This singular position in the path of visitations was also due to Iran's territorial vastness. With a geographical area of about 1,648,000 km² and a frontier length of roughly 4,440 km, about half of which rested on the shores of the Caspian Sea and the Persian Gulf, the Iran of the 1890s presented many venues for the overland and maritime importation of disease into its lands. During this time, the Iranian dominions bordered the Russian Empire to the north, Mesopotamian and Anatolian districts of the Ottoman Empire to the west, and Afghanistan and British India to the east. Regrettably, this meant that Iran was in an ideal position to acquire epidemics from the east and subsequently export them to European territories through its extensive common border with the Russian Empire.

The cholera pandemics of the 19th century illustrate Iran's role as Europe's “hazardous underbelly.” Indeed, during the very first cholera pandemic (1830–1837), Europe acquired the disease through the common Russo-Iranian border. This event was replayed during the fifth European cholera epidemic (1869–74), when the disease entered Europe via Iran and Russia. In 1892, Iran again served as the transit point for cholera's westward journey.⁴ Naturally, it was a new-found position in the global maritime trade economy which had played an important role in sustaining Iran's key position in the export of cholera to Europe. Indeed, the British-Indian commerce, with its important relay ports in the Persian Gulf, served as a critical vector for the propagation of Asiatic cholera from its home in India to Iran. Consequently, visitations of cholera usually began their European-bound journeys in Persian Gulf ports that had important commercial links with British India. However, it should be acknowledged that British trade alone was not solely responsible for abetting the epidemic. Iran's central position in the Islamic pilgrimage route from the east also served as an important vector for the importation of cholera from India.

³ In contrast to the blind and indiscriminate ravages of the medieval Black Death, cholera's victims in Western Europe and North America belonged to the category of the poor and disenfranchised. Categorized as “the dangerous classes” by the Victorian elite, this group, more than any other, was feared as a source of radical predisposition and social unrest; see Evans 1988.

⁴ Contrary to the accusations of 19th-century sanitarians, the Ottoman Empire and Russia, rather than Iran, bore the brunt of the responsibility in cholera's westward transmission. Indeed, although Iran lacked effective sanitary defense mechanisms to protect it from the eastern flow of the epidemic, it very frequently acquired the disease from its northern and western neighbor.

The pilgrimage to Mecca, better known as the *hajj*, is one of the five pillars of the Islamic faith. After the opening of the Suez Canal in 1869 and the development of effective railway routes in the Caucasus and between Alexandria and Port Said, many wealthier pilgrims from Iran, Afghanistan, and central Asia took advantage of this circuitous, but more comfortable, northern route to Mecca (Farahani 1990). Characteristically, pilgrims travelling this route would leave Tehran by caravan or horse carriage to the Caspian port of Enzeli. From there, a Russian steamer would transport them to Baku, where they could acquire railroad passage through the Caucasus to the port of Batum in Turkey. From Batum a steamer would transport them to Istanbul and onward to Alexandria in Egypt. From Alexandria, they could continue by rail to the Suez, where maritime passage could be obtained to Yanbo and Jedda, and from those ports caravan transportation could be obtained to Mecca (Farahani 1990).

With the ubiquity of the steamer and railroad in the Middle East, not only did pilgrimage to Mecca become faster, but cholera's spread also achieved a greater velocity and diffusion throughout the region. On that account, the 1871 and the 1892 cholera epidemics followed this new pilgrimage route into Iran, either disseminated by pilgrims coming back through the Red Sea or carried by Mecca bound travelers from northern India and Afghanistan (Lorimer 1915). Incidentally, Iran's unique Shi'ite sectarian identity also served to further compromise its people to the threat of cholera visitations. This was due to Shi'ite *ziyarat*s (devotional visits) to the holy shrines Najaf and Karbala in Mesopotamia, which provided a regular flow of traffic to cholera stricken areas. Located near the banks of the Euphrates and the Gulf, these areas were usually a focal point for pandemics originating in India, and, as could be observed in the 1899 epidemic, as one of the vectors for cholera's journey into Iran.

As such, for a variety of reasons Iran was ripe for the visitations of cholera; nonetheless, the question remains: why were these epidemics still occurring in the 1890s, at a time when the scourge of Asiatic cholera had largely been arrested throughout Western Europe and North America?⁵ Why was it that, unlike the Western European powers, Iranian authorities could not halt the flow of the outbreak? The answer to these questions can be found in Iran's weak central administration and in its sanitary neglect and lack of medical facilities, which together with religious and cultural factors predisposed and perpetuated Asiatic cholera among the Iranian populace.

⁵ Nevertheless, recent work by Snowden shows that epidemics of Asiatic cholera continued in Europe, well into the 20th century. Asiatic cholera in epidemic form also appeared in Hamburg in 1892; see Snowden 1995 and Evans 1987.

WEAK CENTRAL ADMINISTRATION

The Qajar dynasty (1796–1925) was marred by a feeble and hampered central government, which was essentially at the whim of the various “peripheral” power centers. Nasir al-Din Shah’s (1831–1896) reign was not an exception. In the north, Russian and Ottoman hegemony and meddling in administrative matters, together with Turkoman and Kurdish raids, weakened his government’s hold on the region. In central and southern provinces of Iran, the Bakhtiyari, Qashqa’i, and Khamsa tribal confederacies, together with British interests in the Gulf and Baluchistan regions, were wholly unsympathetic and even antagonistic toward any measure that would extend the central government’s administrative hold and threaten their position. This weakness *vis à vis* the provinces was also perpetuated by the custom of assigning princes as provincial-governors or simply auctioning ministerial appointments to inept administrators. Although in theory these governors were representatives of the Crown and accountable to the Shah, in practice they were fairly autonomous. This abuse was sustained in part by virtue of Nasir al-Din’s own dislike of bureaucracy and tendency toward a balance-of-power principle that rarely placed overwhelming authority in the hands of any one party. Consequently, any attempt by reform-minded premiers to increase the power of the central government met its demise at the hand of magnates and the European powers in the peripheries whose stronger influence in court circles overwrote ministerial authority (Bakhash 1978; Nashat 1982; Amanat 1997).

The deficiency of the Iranian administration was also reflected in the delay of organized response to the crisis of epidemics in the 19th century. Indeed, it was only in 1868 that the first National Sanitary Council (*Majlis-i hifz al-sihha*) assembled in Tehran. The Council, headed by Dr. Joseph Desiree Tholozan, the Shah’s chief physician, composed a report in which a summary of past epidemics was brought to light together with the need for sanitary and quarantine improvements as a means of preventing the future flow of cholera (Tholozan 1995). Although theoretically sound, the Council’s proposals could never be executed owing to the lack of authority on the part of the central government to enforce intrusive and restrictive measures in the provinces. Furthermore, the failure of defensive implementation was also due to the Council’s lack of mandate and to irregular meetings, which invariably only took place when a full-blown epidemic was already at hand. It was not until 1904, in accordance with the provisions of the 1903 International Sanitary Convention of Paris, that a regularly meeting Iranian Sanitary Council was inaugurated (Gilmour 1925). This paucity in regulation

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explains the inability to enforce quarantine measures in Iran during periods of crisis such as the 1889 cholera epidemic when “a quarantine station [that] had been established by the Persian Government was so contrived that it did not hinder at all the traffic carried on between Persia and Mesopotamia” (Dickson 1893–94).⁶ Moreover, in a culture that condoned “tax-farming” as a means of acquiring revenue, it was deemed acceptable to auction off the administration of quarantines to the highest bidder. Hence, those who were appointed to supervise *cordons sanitaires* during periods of crisis usually managed them for personal profit, and orders issued by the central government were not always obeyed (Camposampiero 1893–94).⁷ Ironically, the Government’s weak authority sometimes compelled “peripheral” powers, such as the various regional tribes, to assume the management of sanitary measures and quarantines to protect their own people.

Dr. Camposampiero relates as an instance of the efficiency of *cordons sanitaires*, that when cholera prevailed at Mashad, the chiefs of the tribes of Bujnurd and Ghuskan, in the neighborhood of that city, interrupted all interaction between their camps and the infected places, and thus kept themselves free of the outbreak (Camposampiero 1893–94).

This administrative weakness *vis à vis* sanitation and response to epidemics was part of a larger “pathology,” the symptoms of which expressed themselves in the urban sanitary decay that characterized many cities in Iran.⁸

URBAN SANITATION AND NEGLECT

The occurrence and intensity of Asiatic cholera in the Iran of the Qajar period refutes the commonly assumed link with 19th century urbanization and its associate the Industrial Revolution. Although an accurate population census of Iran in the 19th century is lacking, an estimate in 1867 puts the total population at 4 million, with a mere 850,000 souls inhabiting the principal cities.⁹ Indeed, urbanization and the pattern of city growth observable in Western Europe did not occur in Iran until well into the 20th century. Even as late as 1925, only 2.5 million were urban dwellers, out of a population of about 11.8 million, indicating that the Iranians had kept the characteristic pattern of 21% in metropolitan settlements (Ehlers and Floor 1993). Furthermore, urban populations were not concentrated in any one Iranian city. Instead, masses were equally distributed among a number of regional centers. For example, in 1913, Tehran—Iran’s capital and most populated city—boasted 350,000 inhabitants (Issawi 1976; Curzon II). Now, taking the 21% “urban-dwellers factor” together with an appraisal of the total Iranian

⁶ The inefficient quarantine enforcements were certainly not limited to the Iranian case. During his travel through Egypt from Mecca in 1886 Mirza Mohammad Hosayn Farahani tells us that: “When officials are posted to the quarantine, it is as if they [had been appointed] officials in charge of fleecing and plundering the pilgrims. One of the circumstances that makes this clear is that the authorities of the quarantine, especially the chief doctor, take something from the captains of the steamers so they won’t cause any trouble: If someone dies during the two days stopped at the quarantine, they don’t renew the period and do not delay the steamer; see Farahani 1990: 291.

⁷ On the concept of tax farming and the purchase of offices, Curzon tells us that “so long as the gift of office is largely determined by the strength of the purse, corrupt administration must prevail, and honest men will go to the wall.” See Curzon 1892, I: 498.

⁸ The issue of urban decay was not unique to the Iranian context. Indeed, throughout the Middle East, sound urban planning was a prime concern that came to light following European models of urban and sanitary renewal; see Rosenthal 1980: 22.

⁹ The first national census of Iran was held in 1956; see Bharier 1968 and Issawi 1971: 28–29.

population in 1890 at nine million, we can safely estimate that the total population living in cities and large towns as late as the 1890s stood at about 1.9 million.

Obviously, with an overwhelming segment of Iranians leading a rural or sedentary life, the urban significance, with respect to the Iranian experience with Asiatic cholera, might be questioned. However, this issue is immediately resolved by the very nature of the “center-periphery” relationship in 19th-century Iran. Most importantly, villages, rural settlements, and even nomadic tribes, together with larger towns and cities were part of an organic system that depended on one another for survival. Owing to this mutual dependence, urban centers in Iran were the site for bazaars in which farmers and herders sold their harvest and cattle to feed the cities in exchange for the manufactured commodities of urban artisans, which they brought back to their tents and villages. As a result of its role, the bazaar became a regular icon of the Iranian urban landscape, ensuring frequent interaction between the “centers” and the “peripheries.” This meant that when a cholera epidemic broke out in a town or city, the bazaars became centers of infection, through which peasants and nomads carried the disease to the surrounding villages and campgrounds (Clemow 1893–94).

Trying to depict the urban sanitary condition during the Qajar era may seem like a gargantuan task in itself. Nevertheless, in a country of vastly contrasting climates and environments, which is mirrored by the variety of regionally determined designs of its urban landscape, the features of municipal sanitation (or lack thereof) remain remarkably similar throughout Iran. Tehran of the 1890s is a prime example of the unsanitary condition observable throughout urban centers in the Qajar era. As Curzon remarks: “That the city has yet much to do before it realizes the full aspiration of its royal Hausmann is evident as soon as we enter the gates” (Curzon 1892). By comparing Nasir al-Din Shah to Baron Hausmann, famed sanitarian and architect of Paris, Curzon’s taunt was unwittingly appropriate. Indeed, although the city had undergone some reconstruction in 1870s, which included the widening of some streets and the inauguration of several parks, on the whole, Tehran remained a city devoid of sanitary planning or municipal maintenance (Nashat 1982). Dirty streets, stagnant and contaminated pools of water, and a suffocating atmosphere characterized its scorched summer months. Tehran’s oppression reached such intolerable levels that it was commonplace for anyone who could afford it to escape the city for the cool shelter of the surrounding mountains, leaving behind the aromas of putrefying matter and the constant harassment of flies and mosquitoes (Polak 1865). Furthermore, with

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the exception of the cities of Isfahan and Rasht—which obtained their water exclusively from wells—highly unsanitary subterranean aqueducts, known as *qanats*, conducted the crucial municipal water supplies throughout most of Iran (Wulf 1968; Goblot 1979).

Since antiquity, *qanats* had been used as a method of securing water from distant places (See English, this volume). Their sheltering character allowed the water to traverse through warm climes with the least amount of loss due to evaporation. These channels were constructed by sinking vertical shafts every twenty or thirty yards and connecting them by tunneling (Gilmour 1925). Tehran's own water supply originated from streams and underground springs in the Shemiran slopes at the foot of the Elburz range to the north of the city. Departing from the aforementioned sources, the *qanats* conveyed water to the city, branching off among the important streets where they remained underground but very close to the surface. Once within the municipal boundaries, water from the *qanats* could be obtained by moving stone slabs that covered the channels traversing under the streets and alleys. Frequently nothing covered the *qanats* within city confines. In wealthier districts of Tehran, water was led to the houses through underground networks, whereas in the poorer neighborhoods, the water reached the surface and traveled in gutters on both sides of the street (Gilmour 1925). This water served the dual purpose of consumption and domestic usage; and hence, by its very nature and use the *qanat* system perpetuated infection among urban dwellers. Indeed, a chemical analysis of water, conducted in 1924, from six *qanats* as they entered Tehran revealed water of potable quality in only two cases. In three other cases the water purity was questionable and in one case the water was definitely unfit for drinking. These results were especially shocking due to the fact that these samples were taken from closed *qanats* before they were open to contamination (Gilmour 1925). This meant that even before entering the city, water purity had been pre-ordained, and protection from pathogens was not necessarily a correlate with income levels or neighborhood, since the same source which supplied the poor in the southern districts of Tehran also found its way into the city's wealthiest mansions. More than anything else, it was this system of water supply that was the main conveyor of the cholera epidemic, mainly due to the "fecal-oral" cycle of the infection, whereby the cholera bacterium had to be ingested by an unsuspecting host. As John Snow (1813–1858) had suggested in his investigations of outbreaks in England, more often than not it was the polluted drinking water of a community that was responsible for the outbreaks.¹⁰

¹⁰ During the 1848 cholera epidemic, which claimed 53,000 victims in England and Wales, Snow published several pamphlets and papers (*On mode of communication of cholera*), in which he claimed that the disease was a specific water-borne infection that was distinct from other fevers. During the 1854 epidemic he was able to support his argument through two famous epidemiological investigations. The most famous of the two was the mapping of the occurrence of cholera in his own neighborhood of Soho and tracing the guilty party to a single contaminated well in Broad (now Broadwick) Street. He accomplished this by finding visitors who had drunk from the well and succumbed to the disease, and by showing that the workers at the local brewery, who had unrestricted access to beer as a prerequisite for their job, were relatively immune. His careful and detailed analysis convinced local aldermen that the well was the source of cholera and they removed the handle to the well's water-pump (see Bynum 1994).

Throughout Iran, even if the *qanat* water was uninfected before entering the cities, it had ample opportunities to get contaminated while traversing the urban streets. With the lack of proper sewage and waste disposal throughout Iranian municipalities, the cholera bacterium easily made its way into the drinking water (Morton 1940). In the city of Bouroudjird, for example, the household sewage drained freely onto the streets towards the middle of the city, where an immense pit received all the waste, which was subsequently left there to be sterilized by sunlight (Fuevrier 1894). Moreover, if the bacterium was not already in the water system through the thin porous pavement, the tradition of watering the roads for cleaning purposes would then introduce the infection into the thinly covered *qanats* and drinking gutters lining the thoroughways. Indeed, the drinking gutters, which supplied the poorer districts in Iran, were open to all kinds of contamination. In the city of Muhammareh, for example, the only form of sewage was a channel cut down the middle of each street, which was generally choked up except after rain. In another city, Shushtar, the streets became receptacles for domestic sewage, which was left on-site until rainwater washed the foul matter away. Obviously, open waterways were exposed to dirt and rainwater and the waste that was left on the streets, but where nature did not carry infection it was the inhabitants themselves who contaminated their drinking water directly. In Tehran, for example, it was not unusual to see children playing in the gutters or people washing their animals or dirty linens in them; in some cases the linens would be the clothes of a victim who had succumbed to cholera and hence strewn with fecal matter. More blatant forms of pollution came in the form of direct introduction of feces into the waterways. Indeed, the Persian word for latrine was *Kinar-i ab*, “the water’s edge.” Hence, it was not unusual to see children defecating in the gutters, which a little farther up were being used for drinking purposes or pre-prayer ablution. Furthermore, cemeteries were often built next to the very waterways that supplied drinking water to the community. In the city of Hamadan, for example, the municipality’s largest cemetery was built next to the banks of the main waterway entering the city. This trait made municipal waterways highly compromised and open to infection especially via soil infection and “corpse washing” using the river’s water.¹¹ To the untrained contemporary European mind, the universal disregard for sanitation might have been passed off as a simple case of “oriental ignorance;” however, the lack of proper precautions found its source in cultural and religious beliefs of the Iranians which were at the very center of the popular conception of cleanliness (*nizafat*) and pollution (*nijasat*), doctrines, which, when put to the test,

¹¹ These characteristics also explain the reasons for the British Legation’s private purchase of a *qanat*, which was completely subterranean (sometimes running up to two hundred feet beneath the surface) from its source in the mountains to the legation grounds in Tehran. Indeed, it can be said that it was this safe water source and proper quarantining that saved the British and American legations from outbreaks of cholera within their compounds. The British legation supplied the American legation with safe drinking water free of charge (see Pearson 1903).

proved to be more than effective in guarding the health of an urban population; however, it was Asiatic Cholera which proved to be the singular Achilles' Heel in Islamic conceptions of purity.¹²

RELIGIOUS AND CULTURAL PREDISPOSING FACTORS

When Dr. James E. Baker disdainfully observed that “Persians ‘religiously’ hold to the idea that running water cannot be defiled,” he could not have known the irony of his statement (Baker 1886). Indeed, at the very root of the Islamic Iranian sanitary culture lay the belief that running water could be considered immaculate for rituals and consumption unless its color, taste, or smell indicated the presence of impurities. Furthermore, water from stagnant sources such as ponds, reservoirs, and wells was also considered pure, like running water, so long as its volume occupied at least one *korr* (350 liters), the religiously prescribed volumetric quantity that assured purity. Accordingly, to be considered clean, the water that was stored from *qanats*, in home reservoirs, also had to agree with the quantitative delineation of purity (Poonawala 1991). Consequently, basins were always guarded from dropping below 1 *korr*, which assured that the water was potable, no matter how long it had stood stagnant. This faith, rooted in the *hadith* (prophetic traditions) explains why Iranians did not conceptualize the idea of *jubs* or *qanats* as sources of infection and propagation of disease, for such a notion would have challenged their very system of beliefs. Indeed, the 19th century witnessed an almost obsessive concern with “ritual” purity or *taharat*. Indeed, the innumerable *fatwas* (edicts) and religious prescripts are an indication of the preoccupation of the *‘ulama* with the subject of cleanliness and the influence of these opinions on the general public at this time.¹³ Nevertheless, a minority of Iranians—such as Nasir al-Din Shah—did espouse the European conception of water-borne infections and as a result they employed a *saqqa* (water-carrier), whose task was to ensure the drinking water’s purity by bringing it from the source where the *qanat* first came to the surface.¹⁴

The same Islamic tradition that delineated the guidelines for water purity also required that Iranians copiously wash the bodies of the deceased before burial. This system, coupled with the staunch belief in the purity of running water, led many to wash the bodies of their loved ones who had died of cholera in *jubs* and streams which supplied the urban *qanats*. In addition, faith in the purity of running water also allowed graves to be dug right above the city *qanats* and close to other sources of drinking water, without any concern for pollution (Bell 1894). Unfortunately, faith in the purity of running or voluminous water, along with the religious obligation to wash the

¹² It should be recognized that even water polluted by the *cholera bacillus* in itself cannot give rise to illness since under normal conditions stomach acids should destroy the germs. However, prolonged periods of malnutrition and famine lower stomach acidity and breach the body’s normally effective defense mechanisms. Famine and malnutrition were chronic problems in nineteenth century Iran and it should come as no surprise that cholera outbreaks paralleled periods of drought and dearth.

¹³ Some examples of this genre are: Al-Bihbanani, *Risala fi kayfiyyat wujub al-tahara* (Manuscript: Sepahsalar 2487); Al-Ansari, *al-Tahara* (Ed. Tabriz, 1303); Al-Rashti, *al-Tahara* (Manuscript: Masjid-I Aizam 367). Even the late Imam Khomeini had a fascination (a common theme with the *‘ulama* as we have seen) with the subject of ritual cleanliness and purity in daily life, see Khomeini, *K. al-Tahara* (Qom-Najaf, 1382–90).

¹⁴ The father of Amin ul-Soltan, had started his career as the *Sakka Bashi* (chief water-carrier) of Nasir al-Din shah (see Feuvrier, *Trois Ans*: 187).

dead, would prove disastrous during cholera epidemics. The high casualty rates during Iran's encounter with these visitations are a testament to the role of the unsanitary condition of the urban water supply in perpetuating and abetting Asiatic cholera.

Although cholera's etiology made it principally rely on the intermediary of drinking water to be disseminated, the Shi'ite tradition of seeking entombment in the holy cities of Karbala and Mashhad gave Asiatic cholera in Iran the unique opportunity to continue to use a person as a vector for transmission, long after he or she had been "dead and buried."

Even when they are buried, the bodies are not allowed to rest in peace. The richer families hold it a point of honor to lay the bones of their relations in some holy place—Kerbela [sic.], where Hussein was slain, or the sacred shrine of Meshed [sic.]. They therefore commit them only temporarily to the earth, laying them in shallow graves, and covering them with an arched roof of brickwork, which practice accounts for the horrible smell around graveyards after an outbreak of cholera. A few months later and long before time has killed the germs of disease, the bodies are taken up, wrapped in sackcloth, and carried, slung across the backs of mules, to their distant resting place, sowing not improbably the seeds of a fresh outbreak as they go.

(Bell 1894)

Essentially, these mule-driven caravans traveled from city to city in Iran, collecting the deceased and a small sum of money in exchange for a promise to the family of the departed that their loved ones would be buried in one of the Holy Cities (Mashhad or Karbala) for which they were bound. Often, the bodies were enclosed in an imperfectly nailed box, so as to facilitate transport, an operation that was accomplished by tying a pair of the coffins to the sides of a mule (Sheil 1856). The obvious result of this engagement was that caravans of stench and disease were continuously streaming across Iran, carrying and spreading infection at every halt. Sometimes the owners of the transports would decide to dispose of the corpse short of the promised destination so as to cut the costs of labor and conveyance. On these occasions, it is quite conceivable that the bodies were disposed of in rivers and streams, which might have also supplied drinking water of a town or village.¹⁵

Cholera in Iran did not always go hand in hand with what contemporary European observers labeled as a culture of unsanitary praxis. Sometimes, the pursuit of cleanliness, and the virtues of

¹⁵ During the 1870 cholera epidemic, Dr. Dickson—chief physician to the British legation—credits the exhumation of bodies (victims of cholera) to be buried at a holy site, with the renewed outbreak of cholera in Iran. (Great Britain, The Public Record Office, Foreign Office, General Correspondence; Dickson to Granville, FO 60/326, no. 282).

bathing proved just as lethal as burial practices and the pollution of water. Indeed, the *hammam* (public bathhouse) in Iran became an important center for the propagation of cholera during times of epidemic. This condition came about for a variety of reasons, which included the customary location of the *hammams*, below the street level, so as to facilitate pumping and carrying water; a characteristic that also allowed sewage and garbage to have easy access to these locales (Gilmour 1925). Furthermore, the tubs in the *hammam* were usually filled with tepid water that was recycled from previous bathers, and it was not uncommon to see the sick or diseased bathing side by side with the healthy, especially since many traditional remedies for cholera recommended bathing (Baker 1886). Hence, not only did Iran's physical construct help spread cholera, but also a variety of cultural factors made people more predisposed to the disease. The only questions that remain, in this regard, are the factors for the limited frequency of outbreaks and the reasons for Iran is never becoming an endemic region for cholera.

CONCLUSION

For students of medical history, the Victorian era, roughly spanning from the 1830s to the closing years of the 19th century, is a period of prodigious innovation and advances in the medical sciences. This period marks the beginnings of the Christian and Muslim worlds' divorce from the Galenic ethos, which had dominated their medical practice for over two millennia. Essentially, the foundations of various disciplines of contemporary medical sciences were built in the 19th century, and no discipline characterizes this debut more than the field of epidemiology and public health.¹⁶ Obviously, we should not confound our "modern" image of the epidemiologists with the Victorian "sanitary physicians," nor should we lead ourselves into believing that this "sanitary" outlook emerged overnight. Nevertheless, most historians of medicine would agree that the cholera pandemics of the 19th century were instrumental in the emergence of this new intellectual-scientific trend. Indeed, the sanitary-physician of the 19th century emerged in part as a result of active campaigns on the part of European governments to prevent the flow of epidemics into their lands. Moreover, these sanitary physicians, together with the active participation of their ruling administrations, took dynamic measures to change their environment and augment the sanitary standards of their citizens.

During the 19th century Iran was not isolated from these emerging intellectual trends in medicine. The *Dar al-Fonun*, or the Polytechnic College of Tehran, with its Europeanized medical school and Austrian instructors, is indicative of the change insofar as the

¹⁶ For an in-depth exposition of medicine and public health in Victorian England, see W. F. Bynum's *Science and the practice of medicine in the nineteenth century*, Cambridge, Cambridge University Press, 1994. A more focused account of the foundations of epidemiological science in Victorian England is presented in David E. Lilienfeld, *The greening of epidemiology: sanitary physicians and the London Epidemiological Society, (1830–1870)*, *Bulletin of the History of Medicine*, 1975, 52: 503–528 and A. Dodin and J. Brossollet, *L'épidémie de cholera de 1832, ou la naissance de l'épidémiologie moderne*, in *Hommage à Marcel Baltazard*, Paris, Institut Pasteur, 1972.

medical curriculum was concerned. The issue that remains perplexing is the seeming lack of Iranian impetus in putting new ideas dealing with sanitation and public health into practice.¹⁷ This is a discrepancy, which, I propose, can be solved by comparing the Iranian experience with cholera with its European counterparts. Indeed, a corresponding look into the subject reveals that part of the European motivation in creating a “sanitary police” emerged out of the cholera’s selectivity in that it impacted the lower ranks of European society more than its notable classes. The obvious repercussions of such discriminate casualties were that they bred an inherent suspicion and hatred of the “upper classes,” which were not affected by the epidemics. European governments felt that in due course such resentments would lead to insubordination and rebellions, and in some cases such uprisings, due to cholera, were actually experienced. Hence, there was a very tangible self-preserving interest on the part of the European governments to institute change. Cholera in Iran, on the other hand, selected its victims on a much more democratic basis. Epidemics affected prince and peasant regardless of class or status; hence, the motivation to improve the foundations of public health was much less pressing. Obviously, this is but one symptom of a more general pathology within the Qajar government, which prevented it from instituting adequate sanitary measures.¹⁸ Nevertheless, it gives us yet another perspective on the uniquely Iranian response, which emerged from its experience with the visitations of Asiatic cholera.

It should be reemphasized that Iran’s experience with repeated visitations of Asiatic cholera, which included a distinct mode of transmission and mortality, indicates that pathogens and patterns of illness do somewhat legitimize boundaries and cartographic delineations. In essence this signifies that in as much as the cultures and national identities in the Middle East mirror the ecology and environment of that region, these distinguishing cultural and environmental features in turn give rise to unique physical and social responses to contagious diseases that further distinguish individual countries. The transmission of Asiatic cholera in 19th-century Iran, therefore, becomes a measure of that country’s unique environmental and cultural identity. Consequently, Iran’s central position on the Eurasian plateau, its unique practice of water husbandry, its predominantly Shi’i faith, together with a weak central administration during the 19th century, have direct bearing on Asiatic cholera’s pathogenesis and transmission in that country.

¹⁷ An active countrywide attempt at arresting the progress of epidemic diseases only occurs in the 1970s under the leadership of Dr. Joseph Desiree Tholozan, the Shah’s French physician, and E’tezzad al-Saltana, the Shah’s staunchly conservative Minister of Science. For more on the roots of Iran’s sanitary regime, see my upcoming article: *Defending the Guarded Domain: Epidemics and The Emergence of an International Sanitary Police in Iran*.

¹⁸ Obviously, the lack of adequate state revenues and the decentralized “tribal” nature of Qajar polity were also great obstacles to the implementation of adequate sanitary measures. Homa Nateq gives a more conspiratorial reason for the administrative inaction to the threat of cholera by showing the epidemics as a “tool” used by the ruling class to distract the populace from administrative corruption and abuse. See Homa Nateq, *Mosibat-e Vaba va Balay-e Hokoomat* (Tehran: Nashr-e Gostareh, 1977).

¹⁹ This distinct experience with illness can be seen in Iran’s encounter with the 1918–1919 influenza pandemic. During Influenza’s visitation, Iran had distinct patterns of comorbidity and significantly higher mortality as compared to other countries that were gripped by the pandemic; see my upcoming article in the *Bulletin of the History of Medicine*, *Compromised constitutions: the Iranian experience with the 1918–1919 Influenza Pandemic*.

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