

Engineering Metropolis:
Contagion, Capital, and the Making of British Colonial Cairo, 1882-1922
Shehab Ismail

Submitted in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy
in the Graduate School of Arts and Sciences

COLUMBIA UNIVERSITY

2017

© 2017

Shehab Ismail

All Rights Reserved

ABSTRACT

Engineering Metropolis:

Contagion, Capital, and the Making of British Colonial Cairo, 1882-1922

Shehab Ismail

This dissertation traces the transition of colonial Cairo from a marginal space to the British regime to an object of colonial governance and the site of technological and social intervention. It examines what caused this transition, how it shaped the spatial and social landscape of a booming metropolis, and how these developments produced and sustained opportunities, contradictions, and spaces for contestation and opposition. This dissertation challenges the current literature on British Cairo, which treats the colonial era (1882-1922) as a homogeneous expression of the regime's retreat and of capital-led growth, by providing an account of the regime's program of infrastructural reorganization and schemes of public housing and town planning. Because the literature largely ignores this history, it does not detect the colonial regime's increasing discomfort at capital-led urban development or the regime's late attempt to refashion its relation to capital and to take charge of Cairo's future growth.

The first part of this dissertation examines the pressures and crises that led to this transition. A protracted biological crisis that saw waves of cholera epidemics and high death rates underscored the need for constructing and improving infrastructures of sanitation and service provision. And capital's forceful entry into the city led to a speculative property bubble, a housing crisis, and uncoordinated urban expansion, which made the disjointed framework of urban administration and the absence of regulations all the more evident. These crises made the colonial regime liable to critiques from elites, proponents, and certainly from the nascent anticolonial

movement. The second part examines projects of sanitation and schemes of housing and town planning that the regime turned to since the beginning of the twentieth century and that embodied a changing approach to the city. During the latter two decades of the occupation, the colonial regime invested in upgrading Cairo's water supply and constructing the city's first sewage network. This dissertation traces not only how these infrastructural technologies worked but also how they became sites of contestation over power and knowledge. It examines the reception of infrastructures by urban dwellers across the social spectrum, the techno-social debates they occasioned among expert managers and designers, including above all engineers and public hygienists, and the social visions they embodied. Finally, the regime broached projects of public housing and town planning that constituted, in one sense, the culmination of a program of infrastructural reorganization, and in another, an attempt to give coherence to urban governance and assume leadership over the city's development. By offering material improvement, these schemes were also meant to neutralize political discontent, which nonetheless erupted with the 1919 revolution.

TABLE OF CONTENTS

<i>List of Figures and Maps</i>	ii
<i>Measures and Currency</i>	iv
<i>Acknowledgements</i>	v
Introduction	1
1. The Biological Crisis of Cairo	24
2. Housing the City: Health, Speculation, and Crisis	77
3. Conflict on the Nile: Taste, Technoscience, and the Water Controversy	140
4. Engineering Cairo: Sewers and the Social	211
5. Planning the City: Engaging Capital, Neutralizing Politics	290
Conclusion	350
<i>Bibliography</i>	357

LIST OF FIGURES AND MAPS

Orientation map, circa 1900	3
1.1. Cholera in Boulaq, 1883.	35
1.2. Cholera in Boulaq, 1883.	36
1.3. The Khalig Canal.	47
1.4. A Street in Sayyida Zainab after Rain, circa 1909.	50
1.5. Cholera Huts in Old Cairo.	67
1.6. The Khalig Canal in 1896.	68
1.7. Al-Azhar Cholera Riots in 1896.	70
2.1. Cairo's Slums, circa 1880s.	82
2.2. 'Eshash al-Kharboutli.	91
3.1. Map of water infrastructure, showing city limits, circa 1904.	149
3.2. A standpipe in Qobba, circa 1920s.	154
3.3. Advertisement for drinking water anti-bacterial drops.	161
3.4. Ataba Square, circa 1910.	162
4.1. Pneumatic cart belonging to the Cairo Sewage Transport Company.	223
4.2. Cairo Sewage Transport Company advertisement.	224
4.3. Longitudinal profile study for Baldwin Latham's proposed scheme.	228

4.4. Charles Carkeet James.	245
4.5. Map of the sewage system.	249
4.6. Advertisement for the Shone ejector.	251
4.7. Pipes at the background of a donkey market in Cairo.	256
4.8. Water allowance in 1907 and projected allowance in 1932.	269
4.9. Number of applications for connection to public sewers, 1914-1931.	283
5.1. Two copies of Grand Bey's map showing Faggala and Daher.	316
5.2. Plate from Barois' map and urban survey.	318
5.3. Index map for <i>Cairo, 1:1000</i> .	322
5.4. Plans showing method of numbering houses.	325
5.5. Density map of Cairo.	330
5.6. Major streets, circa 1920s.	332
5.7. Plan showing two areas for future development, 1921.	336
5.8. Housing scheme at Abbasiya, 1921.	337
5.9. Alexandria town planning scheme, 1919.	342
5.10. Housing scheme for the poor in Alexandria, 1919.	344
5.11. William McLean's development diagram.	345

MEASURES AND CURRENCY

LE = 100 piasters = 1000 milliemes

LE = £1. 0s. 6d.

French franc = approximately 3.80 piasters

1 imperial gallon = 4.546 cubic liters

1 feddan = 1.038 acres = 4200 square meters

ACKNOWLEDGEMENTS

I have incurred many debts in producing this dissertation. Marwa Elshakry has been a patient and supportive advisor. Her perspective on the history of science and technology and on Middle Eastern history guided me during the course of research and writing. This dissertation would not have been possible without her generous feedback on papers, rough drafts, and chapters. This project goes back to an eye-opening conversation with Khaled Fahmy in New York in 2008, when he first alerted me to the spatial consequences of mid-nineteenth century theories and practices of public health. And when I embarked on this project a few years later, one of the most challenging tasks was to remain attentive to the continuities and discontinuities between the mid-nineteenth century Cairo that he studied and the turn of the century city that I explored. Khaled also introduced me (and countless other historians) to the Egyptian National Archives. I am fortunate to have Timothy Mitchell on my committee. His theoretical insights and his comments on chapters made an impact on my scholarship. And I am grateful for the opportunity to work with two historians working on New York. Elizabeth Blackmar introduced me to new ways to study the urban landscape and to questions of housing and its commodification. Gergely Baics' empirical rigor and use of Geographic Information System (GIS) to analyze historical cities are inspirational. His close reading and exhaustive comments on chapters are much appreciated. I learned much from conversations with Pamela Smith, Deborah Coen, David Rosner, and Kavita Sivaramakrishnan. Kind thanks are due to Robert Vitalis, Eve Troutt Powell, and Anne Norton from the University of Pennsylvania. I owe Bob more than I can put in words and I am grateful that he brought Mike Davis' *City of Quarts* to my attention early in graduate school. Eve's generosity made this

dissertation possible. My earliest thoughts on this project go back to an independent study with her when we closely read parts of Ali Mubarak's *Khitat*.

The financial and practical support for the research and writing of this project came primarily from Columbia University's Department of History and the Graduate School of Arts and Sciences. A Mellon grant from the American Council of Learned Societies made possible the last phase of writing. I received support from more people than I could recall at numerous archives and libraries including the Egyptian National Archives, the National Archives of the United Kingdom, and the Archives of the Institution of Civil Engineers (London). I am thankful to Engineer Adel Hasan Zaki from the Greater Cairo Sanitary Drainage Company for providing permits to access the records of the company and to visit many of the historical sites of Cairo's colonial sewage network.

I am thankful to Ahmad Shokr, Omar Cheta, On Barak, Ceyda Karamursel, Murad Idris, Pascale Ghazaleh, Begum Adalet, Mohammed Ezzeldin, Jeremy Dell, Sarah El-Kazaz, Jon Argaman, Aimee Genell, and Dale Stahl for their support and feedback. I survived graduate school thanks to the camaraderie of Adrien Zakar, John Chen, Ulug Kuzuoglu, Rahul Sarwate, Angela Giordani, Owain Lawson, Natasha Pesaran, Allison Powers, Samuel Fury Daly, Ibrahim El-Houdaiby, and Nada Khalifa.

The research and writing of this dissertation coincided with momentous events in the life of Egyptians including myself. I entered the graduate program at Columbia months after the revolution of January 2011. And I began archival fieldwork in Egypt in mid-June 2013, two weeks before the military coup of June 30. During the months following the coup, I mostly stayed in my neighborhood as many revolutionary comrades did in order to avoid arrest, harassment by security forces or Muslim Brotherhood sympathizers, curfews, and carnage—the Rab'a al-'Adawiya

massacre being the biggest and most dreadful. During these rough months and years when our hopes and our very sense of historical being reached new heights and plummeted to uncharted depths, only companionship gave me perspective, solace, and inspiration. For this I am immensely grateful to Wael Ashry, Sara Fakhry Ismail, Malak Labib, Dalia Abd El-Hamid, Salma Said, Ahmed Ghoneimy, Muhammad al-Hajj, Salma Shamel, Abeer Farid, Nevin Adel, Maged Zaher, Mohammad Naeem, Ahmad El-Hady, Ahmad Fawzi Saleh, Hind Mahmoud, Mariam Kirolos, Mostafa El-Sayed, Mohamed Saleh Abd El-Hamid, Amr Wishahy, Salma Samy al-Balouty, Layla Samy al-Balouty, Yousef El-Chazly, Amir Allam, Ahmad Hammam, Rawya Sadiq, Ahmed Naji, Aya Nassar, Shady Lewis Botros, Wael Abd El-Fattah, Ali Hussein Ali Al-Adawi, Despina Lalaki, Said Abu Talib, and Leyla Sharafi.

I would like to thank my parents—Mona Ahmad Sadiq Saad and Mohammad Fakhry Abd al-Ghafour—for their steadfast support and for the many things I learned by virtue of growing up in an extended household of communist comrades. Mai Taha had privileged access to my struggles to bring this work to fruition during the last nearly three years. I am grateful for her support. This work is dedicated to my son Zayd Ismail, may he cherish the city that I grew up in, studied, and loved.

INTRODUCTION

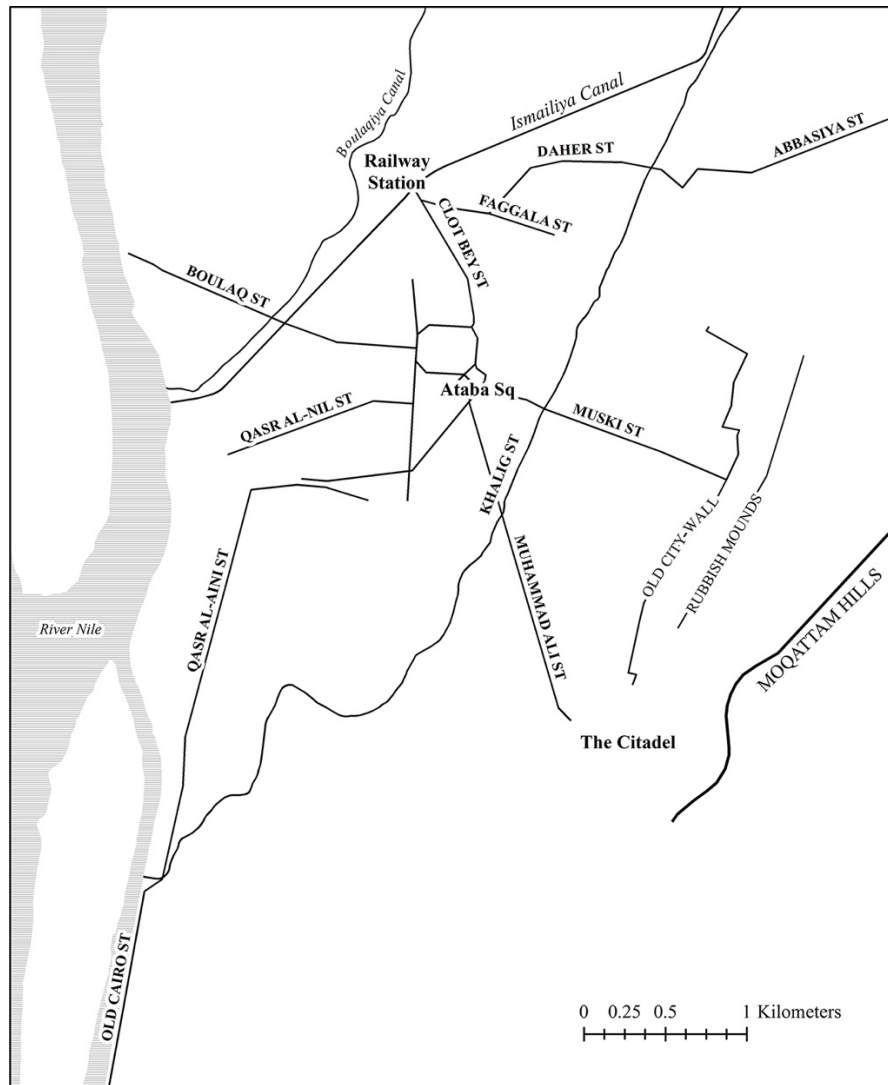
The history of British colonial Cairo (1882-1922) is often told as one of discontinuity with the Khedival period particularly under the reign of Ismail (r. 1863-1879). The story goes that while Cairo substantially expanded due to government's efforts under the Viceroy, its development stagnated under the British occupation before capital took the lead, shaping elite spaces of residence and commerce. Contrasted with Ismail's energetic urban development efforts, which were financed by the cotton boom and foreign borrowing, the British regime was faced with a "race against bankruptcy" and was more invested in laying out the infrastructures of cotton agriculture and transportation. Egyptian cities, and particularly Cairo, had no space in the British regime's predominantly agrarian policies. But the British regime also encouraged an influx of foreign capital with investments in both the countryside and in Egypt's leading cities. Capital-led urban growth in Cairo created wealthy suburbs, zones of exclusivity, and elite spaces of commerce and leisure.

This dissertation reconstructs the history of British colonial Cairo by revising this story and by probing the motivations of its protagonists. Its point of departure is that the four decades of British colonial rule were marked by a significant transition whereby the regime forged a new approach to the city and attempted to adapt its relationship with capital. While it is true that the colonial regime was initially disinterested in Cairo, the latter two decades of the occupation witnessed the rise of the city as an object of colonial governance and a field for ambitious schemes that sought to modernize the urban landscape and to reorder it spatially and socially. Examining the underlying causes and consequences of this transition leads to three themes that further distinguish this account from available ones. First, this dissertation argues that the transition was

caused by public health and housing crises that galvanized the colonial regime into action and forced it to reconsider its approach to the city. Second, in response to these crises, the regime fashioned a program of infrastructural reorganization, investing in urban infrastructures of water supply and sanitation. Finally, by the last decade of the occupation, the colonial administration came to the conclusion that capital-led urban growth led to a housing crisis and chaotic urban development. In response, the regime broached schemes of public housing and town planning that attempted to take charge of Cairo's growth while engaging private capital on its own terms. In other words, while the current literature treats the colonial period as a homogeneous expression of official retrenchment and capital-led urbanization, this account argues that the period was marked by a shift whereby Cairo became a site of technological and social intervention and an arena for refashioning the regime's relationship to private capital. This account is equally concerned with contradictions, making explicit how the colonial era spawned a fraught urban geography of unequal wealth, health, and authority to shape collective life.

Before laying out the broader implications of this reading of Cairo's colonial history, let's consider the interplay of contagion, capital, and infrastructures by following two British colonial officials to the hills of Moqattam, which surrounded the city from the southeast. Ascending to the top in order to capture the then rare bird's-eye view of Cairo was a gesture of authority that disclosed the desire to contemplate the urban landscape in its totality and to understand it in new ways.

H. R. Greene was the director of the Department of Public Health and Sanitary Services from 1885 to 1892. When he wrote "Mokattam: A Sanatorium for Cairo" in 1895, the former director's professional interests had moved on to include health tourism and the development of healthy suburbs for moneyed residents. The British doctor invited an imaginary spectator to take



Orientation map, circa 1900

a seat near the edge of the cliff and contemplate the city below, “happily embellished by the enhancement of distance.”¹ At the foot of Moqattam and to the right extended the “labyrinthine mass” of the “native town,” a term that Greene and many other officials and observers used as a shorthand for Cairo’s oldest neighborhoods, which predated Khedive Ismail’s western expansions of the late 1860s and early 1870s. These quarters were marked by their dense fabric, layered

¹ Greene Pasha, “Mokkatam: A Sanatorium for Cairo,” *The Lancet*, June 29, 1895, 1663.

historical architecture, and centers of commercial and artisanal activities. The spectator would also see Muhammad Ali street, which the Pasha “with a characteristic mixture of despotism and enlightenment, drove through the heart of labyrinth” and that marked the beginning of the newer part of the town. Constructing the straight avenue on top of Cairo’s old fabric required destroying proprieties and monuments, which were no obstacles to “the destructive creator.” Greene had no doubt regarding the value of the artery, which replaced “squalor and unmitigated crookedness,” thus rendering service to the city “from a hygienic point of view, whatever may be said of it aesthetically.” According to the medical theories of the mid-century, which were slowly dying out due to the rise of the new science of bacteriology, generating air circulation and relieving congestion were unconditionally good for any city. To the west, or between the old eastern neighborhoods and the Nile, stretched the “modern division of the town,” with its modern houses and spacious gardens. These quarters that housed the city’s Egyptian and foreign elites were distinct from old, eastern neighborhoods, and it was common for contemporaries to refer to them as the “European quarters” due to their urban fabric, the texture of social life, and European-inspired architecture. Greene pointed to the extreme right, where the spectator would have seen the distant Abbasiya, then a military neighborhood that housed army barracks but was already beginning to witness residential development. The city’s expansion towards Abbasiya would only accelerate during the following decades as a result of the property bubble of 1897-1907. For the interest of tourists, Greene also pointed to the Nile and the Pyramids, which could be seen in the distance further west.

Greene, however, sought to interest his imaginary spectator, or readers of the London *Lancet*, in another more practical project, “a healthy and easily reached suburb” in Moqattam. Composed of three vast plateaus, the hills had not received the proper attention of the tourism

industry, urban developers, or the government. The latter could facilitate the entry of private enterprise by constructing a funicular elevator to connect Moqattam to the city. Greene was surprised that officials of the Public Works Ministry never broached the topic given that many of them gained their experience in India, where whenever there was raised ground, officials utilized the natural advantage for the improvement of health. He was equally surprised that the idea never occurred to the European community in Cairo. The former director of the Public Health Department had in mind two concrete proposals that were both lucrative and beneficial to the health of Cairo's elites. First, a sanatorium could be established to receive health tourists and moneyed Cairenes. European residents and tourists already travelled very far to reach the few locations known for their salubrity, such as Marariya, Helwan, and Mena House at the Pyramids, when they felt they needed a "respite...from the foul smells and coprophagous microbes of the undrained city."² An accessible sanatorium at Moqattam could rapidly establish a reputation among these healthy spots. Second, the pure air could be utilized for the purpose of developing a suburb to attract European residents. With "a little energy, a little money," the new suburb could become a "refuge" for European residents from the diseased city. The healthy quarter "would unquestionably be a great boon to the European inhabitants of Cairo in general" as it could save their lives and relieve them from the need to send their children to Europe during the summer to avoid heat and disease. And the new suburb could be served by a water supply convened from the south by means of gravity or pumping.

Greene's article is noteworthy for both what it shows and what it elides about Cairo's landscape more than a decade into the British occupation. First, it indicates how concerns for health

² Ibid.

shaped the physical landscape of nineteenth century cities, further confirming what Khaled Fahmy argued about Cairo more than a decade ago.³ Second, the article provides a glimpse into how the same concerns for health underwrote capital's entry into the city. Demand for health created opportunities for capital investment and accumulation in urban development, particularly in the housing industry and in urban infrastructures of transportation, sanitation, and service provision. Finally, the article serves to highlight key actors who shaped the urban landscape and their motivations. Cairo's elites were anxious about their health in a city where the death rate was high and remained so during much of the British colonial period. The pressure they exercised on the regime and the opportunities they created for capital were both significant. Yet, the former director of the Public Health Department omitted crucial details, failing to draw the attention of his imaginary spectator to other defining features of the urban environment. First, Greene never pointed to the enormous chain of rubbish mounds that lay parallel to Moqattam, separating it from eastern neighborhoods, which would have been visible from where the doctor was. Authorities were most familiar with the unsanitary rubbish mounds that had been accumulating for decades if not centuries and that sometimes reached more than forty meters in height. Whether the omission was due to genuine oversight or a willful act of avoiding inconvenient details is secondary. Removing the rubbish mounds would have been costly and administratively taxing. Leaving them would have cast doubt on the reputation of a proposed healthy suburb in close proximity. Second, what about the health of the "swarming multitude" of congested old quarters, who constituted the majority of the city's residents? As a former director of the Public Health Department, Greene

³ Khaled Fahmy, "An Olfactory Tale of Two Cities," In *Historians in Cairo: Essays in Honor of George Scanlon*, ed. Jill Edwards (Cairo: The American University in Cairo Press, 2002) and idem, "Modernizing Cairo: A Revisionist Narrative," In *Making Cairo Medieval*, eds. Nezar Alsayyad, Irene Bierman and Nasser Rabbat (Lexington Press, 2005).

realized that the health of elites was not entirely separable from the health of the less fortunate classes who were more susceptible to diseases. He elided the fact that healthy suburbs for elites could not fully guarantee health in the diseased city. And he certainly knew that a viable solution to unhealthy conditions in Cairo required authorities to consider Cairo as a whole.

In his capacity as the Under-Secretary of State for the Public Works Ministry, British engineer Murdoch Macdonald wrote the following account of Cairo in 1916. The ministry housed the Tanzim ('organization') Council or Department, which exercised a significant role in the management of the city, including street construction and maintenance as well as issuing construction permits. Macdonald's note demarcated Cairo's main spatial divisions as if looking at it from the Citadel, which stood on a rocky promontory of Moqattam. First was the area containing the older, densely inhabited quarters that lay at the foot of the Citadel. "Here narrow crooked streets, blind alleys, and covered pathways abound, ways of communication detestable to the engineer of European training."⁴ According to Macdonald, the challenge that faced the engineer in these neighborhoods was to introduce "modern ideas" while preserving the picturesque charm of the old town, including its mosques and artisanal markets. Absence of regulations and prohibitive expenses of expropriation posed formidable challenges to schemes of improving these neighborhoods. These schemes invariably recommended carving wide streets, widening existing ones, and adjusting alignments. And the civil engineer had much to say about streets. He pointed out that good streets needed not be straight and regular and that optimal width was a function of the average height of houses that could supply much needed shade in hot climates. The use of macadam and asphalt in new quarters already enhanced "the value to health" of Cairo's streets as

⁴ Ministry of Public Works, Egypt, *Annual Report: 1915-1916* (Cairo: Government Press, 1917), 12.

it allowed street washing, and the government planned to extend these surfaces to old neighborhoods gradually with the laying of public sewers. The sewage system, which began operating in 1915, led to evident improvements as “the small garden plots no longer have the sodden appearance caused by cess-pit infiltration.”⁵ Second, the Under-Secretary pointed to “modern Cairo,” which occupied the space between old quarters and the river bank. There, regular street layout bore testimony to the “presence of the reforming European.” However, important thoroughfares were still too narrow in light of the extension of tramways.⁶

Macdonald also looked beyond the usual dual city division to examine new spaces and search for possibilities of future expansion. The Tanzim Department considered a number of projects, including public housing projects, that “though not monetarily productive,” were of great value to “the progress of Egypt.”⁷ Macdonald pointed to a large area northeast of the city, bounded by Abbasiya, the old city wall, and Moqattam. While area had been cut off by the infamous rubbish mounds, the Tanzim was freeing this space gradually by removing these unsanitary features. Urban authorities had plans for the area, namely to lay out a quarter of “middle-class property.” And Macdonald believed that “with its clean soil, relative eminence and northern exposure it should form an attractive and very healthy suburb.”⁸ Another possible area of development was Old Cairo, the infamously unhealthy quarter and “abandoned scene of earlier Arab settlements.” The Tanzin studied the area for the purpose of “the reconstruction or extension on modern lines of a poor quarter.” Macdonald believed that the area should be generously planned with “houses of stable

⁵ Ibid., 13.

⁶ Ibid., 14.

⁷ Ibid., 11.

⁸ Ibid.

design” and “claims of health and education” in order to attract poorer residents and replace or at least relieve pressure on the city’s slums.

Macdonald’s reflections were symptomatic of the colonial regime’s changing approach to the city. Capital-led urban development since the turn of the century created a speculative housing market and led to uncoordinated growth and shortage of affordable housing. These schemes demonstrate that the regime sought to remedy the effects of Cairo’s speculative growth. The engineer’s comments also serve to highlight two broader themes of this dissertation. First, engineers and other experts explicitly conceived of Cairo socially, or as a social space containing distinct social classes, however undertheorized ‘class’ was. Their designs and schemes were anchored in social analysis, or different visions of what constituted the city as a social space. And by extension, the infrastructures and urban projects that experts designed and monitored embodied and enacted these social visions and gave rise to debates around them. Second, Macdonald’s comments serve to underscore the fact that what took place above ground was always in relation to what took place underneath it. This relation was mutual and contingent—different actors and forces took the lead at different time while others caught up. Contagion and the construction boom unleashed pressures that underscored the need for infrastructural reorganization. In turn, urban infrastructures created opportunities for the housing market and invited ambitious schemes of urban planning.

The agrarian vision of the British regime was one of the pillars of colonial policy in Egypt. The British occupation of 1882 took place in the wake of state bankruptcy and a failed revolution.⁹

⁹ Juan I. Cole, *Colonialism and Revolution in the Middle East: Social and Cultural Origins of Egypt’s ‘Urabi Movement* (Princeton: Princeton University Press, 1993) and Alexander Schölch, *Egypt for the Egyptians! The Socio-political Crisis in Egypt, 1878 - 1882* (London: Ithaca Press, 1981).

For colonial administrators such as Lord Cromer, the British Consul-General and de facto ruler of Egypt from 1883 to 1907, the two trump cards of colonial rule were financial expertise and hydraulic technology. The first was meant to keep Egypt solvent in order to be able to service the debt. The second aimed to provide the necessary infrastructure of agriculture, which was the basis of economic prosperity. Indeed, the colonial regime devoted much attention to the material, legal, and financial infrastructures of cotton agriculture. Irrigation, railways, agricultural surveys, and credit institutions were meant to create a well-oiled machine for cultivating, transporting, and exporting cotton, Egypt's most important cash crop.¹⁰ For Cromer and other administrators, agrarian prosperity was in turn the anchor of the political stability of the colonial regime. Cromer laid out the philosophy behind the regime's agrarian vision on many occasions. For him, Egypt was primarily composed of a homogeneous mass of nearly nine million peasants, who deserved attention on account of their number and the political role they could, if passively, exercise. For Cromer, the stability of the regime hinged on the ability "to create a large class of small holders who would constitute a conservative dead weight, averse to any radical change."¹¹ Thus, the regime's program of agrarian improvement, which led to an overhaul of the irrigation system and

¹⁰ Roger Own, *Cotton and the Egyptian Economy* (Oxford: Clarendon Press, 1969), idem, *The Middle East in the World Economy 1800-1914* (London: I.B. Tauris, 2002), Gabriel Baer, *A History of Land Ownership in Modern Egypt* (London: Oxford University Press, 1962), Jacques Berque, *Egypt: Imperialism and Revolution* (London: Faber & Faber, 1972), 'Ali Barakat, *Tatawur al-Milkiya al-Zira'iya fi Misr wa Atharahu 'Ala al-'Haraka al-Siyasiya, 1813-1914* [The Development of Landed Property in Egypt and its Effect on Politics, 1813-1914] (al-Qahira: Dar al-Thaqafa al-Jadida, 1977), Alan Richards, *Egypt's Agricultural Development, 1800-1980: Technical and Social Change* (Boulder, CO: Westview Press, 1982), Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley: University of California Press, 2002), Terje Tvedt, *The River Nile in the Age of the British: Political Ecology and the Quest for Economic Power* (London: I. B. Tauris, 2004), and On Barak, *On Time: Technology and Temporality in Modern Egypt* (Berkeley: University of California Press, 2013).

¹¹ The National Archives of the United Kingdom (hereafter TNA), Public Record Office (hereafter PRO) 30/57/42: From Lord Cromer to Lord Kitchener, dated July 25, 1912. See also Baer, *A History of Land Ownership in Modern Egypt*, 87.

the extension of rural railway networks, was linked to both economic prosperity and political stability.

Cities, however, were another matter, for according to colonial administrators, they did not form a whole with the rest of the country. Rather, they were socially discrete, anomalous entities, and largely irrelevant to the project of governing the countryside. For Cromer, the space of Cairo, that “maze of old ruin and modern café, that dying Mecca and still-born Rue de Rivoli,” somewhat mirrored the city’s social hodgepodge.¹² In his *Modern Egypt*, Cromer defended his position that an Egyptian nation was nonexistent—there were only “dwellers of Egypt”—which foreclosed the questions of national autonomy, by giving a “fair ethnological description of the first ten people [one] meets in one of the streets of Cairo.”¹³ The colonial administrator-ethnographer listed social types to be encountered on the city’s streets: the peasant, the Bedouin, the Coptic clerk, the Turco-Egyptian pasha, the Syrian money-lender, a *sheikh* or religious figure from al-Azhar Theological University, a Jew, a winter tourist, “some Levantine nondescript, whose ethnological status defies diagnosis,” a Greek trader, not to mention the Armenians, Sudanese, Maltese, the “half-breeds of every description,” and finally the Europeans who stood at the apex of this world. Cairo was a space for finance, commerce, and tourism, a center of colonial administration, and home of substantial foreign communities and native elites, but for Cromer it did not reveal anything true

¹² Cromer quoting Sir William Butler’s *The Campaign of the Cataracts*. The Earl of Cromer, *Modern Egypt* (New York: The Macmillan Company, 1908), Vol. 2, 127.

¹³ *Ibid.*

about Egyptians. Cairo was the proof of their national nonexistence. As he opined elsewhere Alexandria was a different case, for it was in reality a European city.¹⁴

There was another significant urban class against which the imperial administrator often railed, namely modern educated Egyptians. For him, they were incongruent products of the introduction of European civilization into Egypt.¹⁵ As a social class, they were referred to as *effendis*, or *effendiyya* (sing. *effendi*). During the colonial period, *effendis* constituted an embryonic and upwardly mobile middle class. As a sociocultural category, *effendis* straddled the middle class, the new Egyptian bureaucratic class, and would-be elites. They wore clothes that distinguished them socially, most importantly, a western suit and a *tarboosh* (a fez, or a red hat). *Effendis* were most commonly lawyers, clerks, doctors, engineers, and journalists among other professions.¹⁶ The four decades of the colonial era saw the rise of modern educated *effendis* from a nascent group to an upwardly mobile middle class that sought employment in the Egyptian bureaucracy and demanded equality with foreign employees of the government who occupied the upper echelons of the administration. Blocked mobility constituted one of the most outstanding grievances of middle class *effendis* who demanded to partake of the benefits of prosperity. As we will see, middle class Egyptians wanted a share of the benefits of the regime's sanitary infrastructures, which provided the material conditions of bourgeois privacy and modern subjectivity. The grievances of

¹⁴ TNA, Foreign Office (hereafter FO) 407/170: The Earl of Cromer to Sir Edward Grey, dated March 3, 1907. For a recent study that complicates national identification in Alexandria see Will Hanley, *Identifying with Nationality: Europeans, Ottomans, and Egyptians in Alexandria* (New York: Columbia University Press, 2017).

¹⁵ The Earl of Cromer, *Modern Egypt*, Vol. 2, Ch. 37.

¹⁶ Lucie Ryzova, *The Age of the Efendiyya: Passages to Modernity in National-Colonial Egypt* (Oxford: Oxford University Press, 2014), Arthur Goldschmidt, Amy Johnson, and Barak Salmoni, eds., *Re-envisioning Egypt, 1919-1952* (Cairo: American University in Cairo Press, 2005), and Wilson Chacko Jacob, *Working Out Egypt: Effendi Masculinity and Subject Formation in Colonial Modernity, 1870-1940* (Durham: Duke University Press, 2010).

effendis fed into anticolonial mobilization, particularly the nationalist movement, which was formed during the period. The challenge to the colonial regime by nationalists and other anticolonial groups became particularly acute and violent in the 1910s.¹⁷ For colonial administrators, modern educated *effendis* constituted a largely hostile urban class that demanded employment and social mobility, published subversive newspapers, formed secret societies, and openly attempted to undermine the authority of the regime. When Lord Kitchener, who was known for his ruthlessness in Sudan and the South African Boer War, became the Consul-General of Egypt in 1911, an English observer felt the need to dispel the suspicion that the military general was in Egypt “merely to terrorise a few thousand Nationalists in Cairo.”¹⁸

One of the symptoms of the colonial regime’s neglect of Cairo was the disjointed framework of administration that managed urban affairs. The regime handled the city as if it was a province, or a governorate, which was a broad administrative subdivision. Governing Cairo was the responsibility of primarily three branches of the central government. The first of these was the Tanzim Department that was part of the Public Works Ministry, the second was the Public Health Department which was organized under the Ministry of Interior, and the third was the Governorate. The Tanzim was in charge of the construction and maintenance of roads, building regulations, and street lighting. The Public Health Department managed the medical and sanitary affairs of the entire country. The department’s most important responsibilities in Cairo were sanitary inspections on services and establishments, preventive measures during times of epidemics, and other routine

¹⁷ Ilham Khuri-Makdisi, *The Eastern Mediterranean and the Making of Global Radicalism, 1860-1914* (Berkeley: University of California Press, 2010) and Malak Badrawi, *Political Violence in Egypt, 1910-1924: Secret Societies, Plots and Assassinations* (Richmond, Surrey: Curzon Press, 2000).

¹⁸ Alfred Cunningham, *To-Day in Egypt: Its Administration, People and Politics* (London: Hurst and Blackett, Ltd., 1912), 308.

tasks including street watering and scavenging. The Governorate issued licenses for temporary occupation of public roads. In addition, there were other official and private institutions that were critical to the management of urban life. The concessionary Cairo Water Company wielded enormous influence on water provisioning, constituting an additional layer of sovereignty over the city. And the Ministry of Charitable Endowments (*Awqaf*) administered many of the city's collective institutions of sanitation and water consumption including mosques, public baths, and water fountains. The ministry also managed other lands and buildings donated by their owners as inalienable charity. These spaces peppered the urban landscape of the turn of the century. Only during the last decade of British rule that city officials broached proposals to reform and centralize urban administration in order to facilitate the regime's new plans for Cairo. These proposals, which ran in parallel to debates outside government circles, ranged from establishing a municipality to enlarging the capacities of the Tanzim. Colonial officials were aware that introducing a municipality, as a representative intuition of local self-government, could open the door for forces hostile to the regime including nationalists to challenge its management of the capital, which was the seat of the central government and the colonial administration.

This disjointed administrative structure was compounded by inadequate budgets and lack of fiscal autonomy. Particularly, the meager budgets of the Public Health and the Tanzim departments led to constant critique of the priorities of the regime and doubts regarding the interest of decision makers in pressing urban reforms. In fact, directors of the Public Health Department occasionally voiced their frustration at being the subject of critique, when their hands were tied by limited budgets that were allocated by Cromer and his powerful advisors in the Finance Ministry. Similarly, Tanzim officials often complained about lack of funds needed to improve old neighborhoods, which required adjusting street alignments and opening new ones—both were

expensive operations that required compensating proprietors. At the other end, Cromer voiced his frustration that “each zealous official, anxious to improve the administration of his own department, hurled in demands for money on a poverty-stricken Treasury.”¹⁹ For instance, “the medical authorities clamoured for hospitals, and pointed out that, without improved sanitation, which was a bottomless financial abyss, there could be no guarantee against epidemic disease.”²⁰ And these large demands were usually followed by “every species of minor proposal.” For instance, “what report would the winter visitor to Egypt make when they returned to Europe, if, in driving to the Pyramids, they were bumped over a road which had not been repaired since the Empress Eugénie drove over it some twenty years previously?”²¹ For Cromer, the problem with these “zealous” officials and their proposals was that they were unaware of the financial situation as a whole. For only he and a few administrators and advisors really understood the logic behind the disproportional spending on irrigation rather than cities, which owed to the agrarian priorities of the regime, or on policing rather than public health, which owed to necessary interest in the security of the regime. The complaints of officials, however, paled next to those of the city’s elites who were anxious for their health and who continued to mount pressure on the administration until they began to see improvements.

The system of capitulations and the international control of the reserve funds through the *Caisse de la dette publique* (Public Debt Commission) added yet another layer of complexity to the administration of Cairo. The system of capitulations was essentially one of tax exemptions for the subjects of fourteen European powers who resided in the Ottoman Empire and its provinces

¹⁹ The Earl of Cromer, *Modern Egypt*, Vol. 2, 445.

²⁰ *Ibid.*, 446.

²¹ *Ibid.*

including Egypt. In 1885, that is after the British occupation of Egypt, European powers agreed, yet only in principle, to equal taxation with Egyptians. However, European governments were still free to contest new taxes and the modifications of existing ones. The issue was critical for the administration of Egypt's largest cities due to the significant presence of European communities. Raising taxes on European owned urban properties required laborious negotiations with all the other European powers.²² However, it was not impossible. The British administration incessantly invoked the capitulations to justify inaction with respect to a number of projects, such as urban drainage schemes and the proposed Cairo municipality, both of which required levying taxes on Europeans. The government argued that complicated negotiations with the powers hindered these project, often before or without entering any negotiations. Government critics, and sometimes its proponents, argued that this was only a ready excuse not to entertain projects towards which the colonial regime was disinclined for other reasons, financial or political. And the Alexandria Municipality, whose formation in 1890 required negotiations with the European powers, was a ready counterexample to the regime's argument concerning the difficulty of establishing a municipality in Cairo. However, the international control of the reserve funds posed a sterner challenge to the British regime. The most important function of the *Caisse*, which originated in the years of state bankruptcy before the British occupation, was to service the foreign debt using the reserve funds. Since 1885, six European powers, including France, administered the *Caisse*, and their authorization was required for the use of any portion of the funds. The reserve, which accumulated due to surplus state revenues, became substantial by the 1890s as the financial

²² James Harry Scott, *The Law Affecting Foreigners in Egypt. As the Result of the Capitulations, with an Account of their Origin and Development* (Edinburgh: William Green and Sons, 1907) and Nathan J. Brown, "The Precarious Life and Slow Death of the Mixed Courts of Egypt," *International Journal of Middle East Studies* 25, 1 (1993).

situation of the country improved. With respect to large-scale urban projects, the British regime complained of French interference when it sought using the reserve. As we will see in Chapter Four, there is some evidence that the French government did interfere, not simply to block British projects, but to impose conditions that were meant to ensure the competitiveness of French capital in Egypt. This situation was resolved in 1904 when the Anglo-French *entente cordiale* released six million Egyptian pounds from the reserve funds, or nearly half of a year's total receipts, for government's use without international checks.²³

This dissertation draws upon and pushes against various bodies of scholarly literature. It revises the current literature on colonial Cairo by approaching the city as a social space that is both interconnected and differentiated. The available literature provides excellent accounts of new elite spaces and upper class residential districts, while more compelling variants dig deeper into the capital that made these spaces possible and the elites who inhabited them.²⁴ However, these accounts tend to be disproportionately spatial, with a near exclusive focus on new architecture and urban developments. What is missing from these accounts to varying degrees, is analysis of the rest of the city, with its old neighborhoods and slums, its *effendis* and lower classes.²⁵ To a certain

²³ Ali Tunçer, *Sovereign Debt and International Financial Control: The Middle East and the Balkans, 1870–1914* (London: Palgrave Macmillan, 2015), 44-49.

²⁴ Janet Abu-Lughod, *Cairo: 1001 Years of the City Victorious* (Princeton: Princeton University Press, 1971), Robert Ilbert, *Héliopolis, le Caire, 1905-1922: genèse d'une ville* (Paris: Centre Nationale de la Recherche Scientifique, 1981), Mercedes Volait, *Architectes et architectures de l'Égypte moderne (1830-1950): genèse et essor d'une expertise locale* (Paris: Maisonneuve & Larose, 2005), idem, "Making Cairo Modern (1870-1950): Multiple Models for a 'European-style' Urbanism," In *Urbanism: Imported or Exported? Native Aspirations and Foreign Plans*, eds. Joseph Nasr and Mercedes Volait (London: Wiley-Academy, 2003), and Jean-Luc Arnaud, *Le Caire, mise en place d'une ville moderne, 1867-1907: Des intérêts du prince aux sociétés privées* (Aix-en-Provence: Actes Sud, 1998).

²⁵ There are excellent studies that examine dimensions of Cairo's social and cultural history, either primarily or peripherally, yet without offering spatial analysis. See John Chalcraft, *The Striking Cabbies of Cairo and Other Stories: Crafts and Guilds in Egypt, 1863-1914* (Albany: State University of New York Press, 2005), Ziad Fahmy, *Ordinary Egyptians* (Stanford: Stanford University Press, 2011), and Barak, *On Time*.

extent, everyday experience of cities points to the shortcomings of the literature. Substantial development of new urban spaces rarely leaves intact the rest of the city. Rather, it creates new pressures on the urban fabric and its infrastructures. It tests the priorities of urban authorities. It attracts a demographic and excludes others. It modifies everyday commute and work patterns. It reflects new desires for privacy and exclusivity. It gives rise to new standards of housing. And it influences rents and value of lands near and far.

This work seeks to reorient the study of colonial Cairo by probing the social nature of urban space. First, it investigates the city through the lens of housing, underscoring how rents and land values redistributed the urban population onto a new socio-spatial configuration. Elites searched for healthy neighborhoods and distant suburbs offering modern housing, comfortable Egyptians left the neglected old neighborhoods for new ones that catered to a rising middle class, and the poor were squeezed in congested old quarters and slums. Second, this dissertation analyzes the contradictions of capital-led urban process. It shows how dispossession was part and parcel of opening urban space for capital accumulation. And it aims to be receptive to the traces that Cairo's poor left on urban space as well as in administrative documents and engineering reports. Third, this dissertation underscores the interconnectedness of urban space by dwelling on its infrastructures. Examining the city's infrastructures in parallel to its spatial expansion makes explicit interdependent dynamics and forces that engulfed the entire urban landscape. Finally, this account distinguishes itself from uncritical modernization narratives by underscoring the pressures and exigencies that generated British regime's self-proclaimed projects of improvement and modernization, and the ways in which these projects channeled colonial power.

This dissertation places science and technology studies in conversation with urban history and colonial history, probing the mutual constitution of science, technology, and society through

the study of Cairo and its infrastructures.²⁶ Infrastructural technologies are key sites of contestation over knowledge, power, and visions of the social order.²⁷ This study interrogates the logics and epistemologies of expert designers and managers of urban infrastructures—engineers, hygienists, chemists, bacteriologists, and geologists among others. It underscores how experts reflected on their knowledge and its limits and on the relationship between technology and the social world it aimed to pattern. Two arguments are relevant in this context. First, the unevenness of colonial power undergirded the advance of modern scientific rationality and technoscientific controls into everyday domains where local knowledge and epistemologies, however tangled and informal, exerted influence.²⁸ The third chapter traces a controversy over Cairo’s water supply that pitted laypeople against experts involved in monitoring and controlling drinking water. However, unlike stories of mediation and brokerage between knowledge traditions, lack of recognition constituted

²⁶ Bruno Latour, *Science in Action: How to Follow Scientists and Engineers Through Society* (Cambridge: Harvard University Press, 1987), idem, *We Have Never Been Modern* (Cambridge: Harvard University Press, 1993), Wiebe Bijker, Thomas Hughes, and Trevor Pinch, eds., *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology* (Cambridge, Mass.: MIT Press, 1987), Wiebe Bijker and John Law, eds., *Shaping Technology / Building Society: Studies in Sociotechnical Change* (Cambridge: The MIT Press, 1994), Steven Shapin and Simon Schaffer, *Leviathan and the Air-pump: Hobbes, Boyle, and the Experimental Life* (Princeton: Princeton University Press, 1989), and Steven Shapin, “Following Scientists Around,” *Social Studies of Science* 18, 3 (1988).

²⁷ David E. Nye, *Electrifying America: Social Meanings of a New Technology, 1880-1940* (Cambridge, Mass.; London: The MIT Press, 1992), Thomas P. Hughes, *Networks of Power: Electrification in Western Society, 1880-1930* (Baltimore: Johns Hopkins University Press, 1993), Maria Kaika and Erik Swyngedouw, “Fetishizing the Modern City: The Phantasmagoria of Urban Technological Networks,” *International Journal of Urban and Regional Research* 24, 1 (2000), Mitchell, *Rule of Experts*, Ch.1 and 3, David Gilmartin, “Imperial Rivers: Irrigation and Visions of British Empire,” in *Decentering Empire: Britain, India and the Transcolonial World*, ed. Dane Kennedy and Durba Ghosh (Delhi: Orient Longman, 2006), and Andrew Barry, *Material Politics: Disputes Along the Pipeline* (West Sussex: Wiley-Blackwell, 2013).

²⁸ For syntheses of the literature on science and technology in the colonies see Roy MacLeod, “Introduction to Nature and Empire: Science and the Colonial Enterprise,” *Osiris* 15, 1 (2000), Londa Schiebinger, “Introduction to Focus: Colonial Science,” *Isis* 96, 1 (2005), David Arnold, “Europe, Technology, and Colonialism in the 20th century,” *History and Technology* 21, 1 (2005), and Suzanne Moon, “Place, voice, interdisciplinarity: Understanding technology in the colony and postcolony,” *History and Technology* 26, 3 (2010). For studies on medicine and science in colonial Africa see Luise White, *Speaking with Vampire: Rumors and History in Colonial Africa* (Berkeley: University of California Press, 2000) and Helen Tilley, *Africa as a Living Laboratory: Empire, Development, and the Problem of Scientific Knowledge, 1870-1950* (Chicago: University of Chicago Press, 2011).

a tension that was evocative of imperialism and everyday opposition to it.²⁹ Second, while infrastructural technologies invoke notions of connectivity and circulation, they could also be dividers that cement and give material expression to hierarchies. The fourth chapter examines the contending epistemologies and social visions of engineers who were involved in designing drainage schemes for Cairo. To borrow from Michel Callon, engineers are also sociologists who interrogate the relationship between engineering, as a practice that mediates knowledge, action, and materiality, and the social world it seeks to organize.³⁰ The chapter shows that while some experts proposed universalist visions of engineering, the vision that ultimately triumphed in Cairo considered sharp colonial and class hierarchies as limits to be preserved rather than softened or challenged. Yet, the decolonization of the urban landscape after the 1919 revolution revealed the brittleness of colonial social visions. Finally, this dissertation draws on science and technology studies in a broad sense by investigating contagion as a social and political force that intersects with capital and colonialism.

This dissertation is attentive to attempts to consolidate power through the government of cities, or inversely, to the centrality of cities for the development of new technologies of

²⁹ For studies of mediation and brokerage across epistemic traditions see Kapil Raj, *Relocating Modern Science: Circulation and the Construction of Knowledge in South Asia and Europe, 1650–1900* (New York: Palgrave Macmillan, 2007), and Simon Schaffer, Lissa Roberts, Kapil Raj, and James Delbourgo, eds., *The Brokered World: Go-Betweens and Global Intelligence, 1770–1820* (Sagamore Beach, Mass.: Science History Publications, 2009). On controversies involving experts and laypeople see Linda Nash, *Inescapable Ecologies: A History of Environment, Disease, and Knowledge* (Berkeley: University of California Press, 2006) Ch. 4-5, Maril Hazlett, “‘Woman Vs. Man Vs. Bugs’: Gender and Popular Ecology in Early Reactions to Silent Spring,” *Environmental History* 9, 4 (2004), and Daniel Lee Kleinman, ed. *Science, Technology, and Democracy* (Albany: SUNY Press, 2000). For an account of the roots of the recent crisis of water supply in Flint, Michigan, see Andrew Highsmith, *Demolition Means Progress: Flint, Michigan, and the Fate of the American Metropolis* (Chicago: University of Chicago Press, 2015).

³⁰ Michel Callon, “Society in the Making: The Study of Technology as a Tool for Sociological Analysis,” in *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, eds. Wiebe Bijker, Thomas Hughes, and Trevor Pinch (Cambridge, Mass.: The MIT Press, 1987). See also Bruno Latour, *Aramis, or, The Love of Technology* (Harvard University Press, 1996) Ken Alder, *Engineering the Revolution: Arms and Enlightenment in France, 1763–1815* (University of Chicago Press, 1997), and Chandra Mukerji, *Impossible Engineering: Technology and Territoriality on the Canal Du Midi* (Princeton: Princeton University Press, 2009).

government.³¹ It offers a study of how Cairo became an object of colonial governance and of social and technological engineering. And it probes the pressures that led the British regime to develop its administrative capacities and resources in order to intervene in the urban environment in new ways. While the colonial regime sought to reorganize the city through its infrastructures, the turn to the city as a space in which power could be consolidated was significant. Especially so in colonial Cairo, where other overlapping sovereignties challenged the regime. As opposed to other colonial cities including Indian cities under the British Raj and Arab cities under French rule, colonial power was more limited in Cairo by the complex financial and legal framework of the capitulations, the Public Debt Commission, and the Mixed Courts.³² In addition, powerful companies such as the Cairo Water Company wielded authority over urban life. This dissertation shows that Cairo's infrastructures were often expressions of fragmented and overlapping sovereignties as well as sites where the colonial regime attempted to resolve this tension and consolidate its power. And the final chapter takes up schemes of urban planning that revealed the colonial regime's desire to take charge of the city's future and to reformulate its relation to private capital.

³¹ Notice the centrality of cities in Foucault's analysis of the formation of new technologies of governance. Michel Foucault, "The Politics of Health in the Eighteenth Century," in *Power: Essential Works of Foucault, 1954-1984*, ed. James D. Faubion (New York: The New Press, 2001) and idem, "Space, Knowledge, and Power," in *Power: Essential Works of Foucault, 1954-1984*, ed. James D. Faubion (New York: The New Press, 2001). See also Patrick Joyce, *The Rule of Freedom: Liberalism and the Modern City* (London: Verso, 2003) and Chris Otter, *The Victorian Eye: A Political History of Light and Vision in Britain, 1800-1910* (Chicago: University of Chicago Press, 2008).

³² For works on cities under Ottoman, British, and French rule see Gwendolyn Wright, *The Politics of Design in French Colonial Urbanism* (Chicago: University of Chicago Press, 1991), Robert Home, *Of Planting and Planning: The Making of British Colonial Cities* (Oxford: Taylor & Francis, 1997), Jens Hanssen, *Fin de Siècle Beirut: The Making of an Ottoman Provincial Capital* (Oxford: Clarendon Press, 2005), Stephen Legg, *Spaces of Colonialism: Delhi's Urban Governmentalities* (Oxford: Blackwell Publishing, 2007), Zeynep Çelik, *Empire, Architecture, and the City: French-Ottoman Encounters, 1830-1914* (Seattle: University of Washington Press, 2008), Partha Chatterjee, *The Black Hole of Empire: History of a Global Practice of Power* (Princeton: Princeton University Press, 2012), Ch. 1, and Gyan Prakash, *Mumbai Fables* (Princeton: Princeton University Press, 2011), Ch. 2.

While the dual city model has dominated the study of Middle Eastern, and to some extent colonial, cities, this dissertation seeks to direct attention to the heterogeneity of Cairo's colonial landscape and to the new ways in which it became connected and divided.³³ It is evident that for the inhabitants of colonial Cairo the difference between old and new neighborhoods was visually striking, the kind of difference that could be perceived immediately. This difference served for the purpose of making coarse arguments—colonial observers mapped an “unchanging orient” onto old quarters, and nationalists charged that European quarters thrived at the expense of the disadvantaged old quarters. Be that as it may, this dissertation shows that the colonial period witnessed the formation of new urban spaces and the differentiation of old ones in tandem with laying out the infrastructures of transportation, sanitation, and service provision. And schemes of town planning and housing further underscore the declining significance of the dual city.

Finally, this dissertation sheds light on a moment before public monopoly on vital infrastructures became the norm, that is before the consolidation of the urban “infrastructural ideal” to quote Steve Graham and Simon Marvin's *Splintering Urbanism*. The fragmented infrastructures of the late nineteenth century are reminiscent of privatized contemporary infrastructures under neoliberal economic policies.³⁴ This dissertation absorbs the lessons of

³³ For an influential formulation of the dual city model see Janet Abu-Lughod, “Tale of Two Cities: The Origins of Modern Cairo,” *Comparative Studies in Society and History* 7, 4 (1965). And see Khaled Fahmy's critique in Fahmy, “An Olfactory Tale of Two Cities.”

³⁴ Stephen Graham and Simon Marvin, *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition* (London: Routledge, 2002), Karen Bakker, *Privatizing Water: Governance Failure and the World's Urban Water Crisis* (Ithaca: Cornell University Press, 2010), Matthew Gandy, *The Fabric of Space: Water, Modernity, and the Urban Imagination* (Cambridge: MIT Press, 2014), Ch.4, Lisa Björkman, *Pipe Politics, Contested Waters: Embedded Infrastructures of Millennial Mumbai* (Durham: Duke University Press, 2015), and Nikhil Anand, “Pressure: The PoliTechnics of Water Supply in Mumbai,” *Cultural Anthropology* 26, 4 (2011).

contemporary debates on the privatization of infrastructures and offers a study of fragmented infrastructures of the past and the pressures that led to their consolidation.

This dissertation is organized into two parts. The first scrutinizes the events that shook the colonial regime out of its initial disinterest in Cairo. Chapter One examines waves of cholera epidemics that hit Cairo in 1883, 1895-1896, and 1902, stretching the capacities of urban authorities to their limit and exposing their unpreparedness for such biological disasters. Chapter Two probes the city's capital-led growth, which saw rampant speculation and a cycle of boom and bust, piecing together how these dynamics redistributed the urban population and led to a housing crisis. The biological and housing crises placed a premium on large-scale government intervention and challenged the colonial administration in ways that pushed it to rethink its urban policies. The second part of this dissertation examines urban projects and schemes that embodied the regime's changing approach to urban governance. Chapter Three analyzes official attempts at exercising scientific control over Cairo's water provisioning, highlighting epistemological friction and contestations over the authority to control this everyday necessity. Chapter Four investigates the design and construction of the city's first sewage system, tracing various debates on the social nature of engineering and how infrastructures give material expression to engineering epistemologies. Finally, Chapter Five charts how the regime's program of infrastructural reorganization culminated in schemes of housing and town planning that highlighted the need to rethink models of urban governance.

CHAPTER ONE

THE BIOLOGICAL CRISIS OF CAIRO

Introduction

John Rogers Pasha, the director of the Public Health Department from 1892 to 1899, compared the impact of the 1883 and 1895-96 cholera epidemics on Egypt and Cairo, the most stricken city in both cases. He reflected that back in 1883, during one of the worst cholera outbreaks to hit the country, “people had jealously reserved the right to die where they liked, to communicate disease as they liked.”¹ And he recounted seeing the corpses of cholera victims being washed on the banks of the Nile at Cairo, where the epidemic hit with such virulence that not all dead were registered or properly buried. He even witnessed some corpses in Ismailiya Canal floating within close proximity to the intake of the Cairo Water Company, which supplied filtered water to the city’s elites. And he remembered how then people, including European doctors, believed and circulated the “old fiction” of yellow cholera fogs and burned barrels of tar at night in the streets in order to purify the air.² Rogers was satisfied that his department performed much better in 1896 as it focused on key measures to protect the city’s water supply, which effectively contained the outbreak.

However, Rogers concluded his report with a complaint to his colonial superiors. He called upon them to implement much needed, yet expensive, enduring sanitary reforms to redress Cairo’s unhygienic conditions instead of acting mostly during times of epidemics. Health experts in Egypt

¹ Ministry of Interior, Sanitary Department, *Report on the Epidemic of Cholera in Egypt During the Years 1895 & 1896* (Cairo: National Printing Office, 1897), 61.

² *Ibid.*, 131,

agreed that authorities were better able to fight cholera during the epidemics of 1895-96 and 1902 due to the discoveries of the German bacteriologist Robert Koch, who was able to isolate the cholera bacteria in 1883-84 in Egypt and India. However, the same experts lamented that two decades into the British occupation, knowledge did not translate into durable measures to improve the health of Cairo and lower its excessive death rate. And complaints of the city's elite residents, foreign communities, public hygienists, investors in tourism and urban development, as well as the nascent Egyptian middle class formed a crescendo that was directed at the colonial regime's decision makers. By the turn of the twentieth century, it was evident that Cairo's protracted biological crisis required much more than temporary, uncoordinated measures. It required an overhaul of the urban landscape.

Focusing on the three cholera epidemics of 1883, 1895-96, and 1902, this chapter shows how contagion delivered a shock to the colonial regime's policies, establishing the need to bring Cairo to the center of projects of governance. Cholera epidemics spurred two interconnected developments in how the regime accounted for and governed urban space. First, they gave rise to official efforts to study and map out the sanitary geography of Cairo in a systematic fashion. Concerns for public health were the occasion of numerous commissions and investigations by doctors, engineers, and other experts to study the urban landscape including its sanitary infrastructures, urban services, streets, houses, mosques, baths, water fountains, markets, slaughterhouses, trash mounds, and vacant lands. Out of these efforts emerged an image of a bifurcated geography whereby a minority of elites were able to afford sanitation and water privately, while the majority of Cairenes depended on collective spaces such as mosques, public baths, and water fountains. Second, contagion underscored the urgency of official intervention into the urban landscape in order to improve the city's health by ensuring adequate services,

constructing boulevards, and most importantly carrying out ambitious schemes to modernize sanitary infrastructures. Cairo's unsanitary conditions became a point of contention for urban elites, businessmen, and the government's own officials who argued that such neglect of the capital was unacceptable, for it was home to sizable foreign communities, a tourist destination, and an increasingly important financial center. Finally, this chapter traces the epistemological displacements that accompanied these events, most importantly, the normalization of modern scientific rationality and the formation of new conceptions of health, disease, and cleanliness that captured the imagination of modern educated Egyptians. Middle class *effendis* refashioned their relationship with inherited medical traditions, increasingly distancing themselves from popular practices and epistemologies of healing.

The 1883 Cholera Epidemic

One year into the British occupation of Egypt, British officials faced many challenges, from the reorganization of Egyptian finances to establishing order in the countryside and the south. However, another stern challenge to British rule came from an unlikely source, a biological agent, namely cholera. The disease swept through the country during the summer of 1883 claiming thousands of lives and spurring medical debates on the etiology and mode of transmission of cholera as well as political debates on the responsibility of stemming its spread. Because cholera waves were global events, the disease gave rise to disputes, competition, and friction among European imperial powers, the Ottoman center, and local authorities in Egypt and Ottoman Arab provinces over causes and preventive measures. In Cairo, the epidemic woke the British administration to the realities of urban governance, led to a more systematic investigation of the

sanitary infrastructure and geography of the city, and initiated debates on cleanliness and hygiene that voiced the formation of new corporeal sensibilities and subjectivities.

Cholera was at the center of global medical and political debates well before the 1883 epidemic.³ During the nineteenth century, global waves of cholera spread covering vast stretches of land from South and East Asia to Europe, the Middle East, Africa, and the Americas. With significant local variations, these pandemics led to social conflicts, the rise of public health movements, and the extension of sanitary infrastructures in cities during the second half of the century, particularly in Europe. They have also led to new forms of international cooperation and competition. Since 1851, international sanitary conferences were held where national representatives debated the best measures to stem the disease and limit its effect, particularly before it reached Europe, and the debates at these events were simultaneously scientific and political.⁴ Epidemic diseases also led to new dynamics of scientific competition among European empires over disease etiology and medical theories more broadly. Colonies increasingly became sites of such competition, particularly towards the end of the century when infectious diseases

³ For a sample of the extensive literature on the history of cholera see Roderick McGrew, “The First Cholera Epidemic and Social History,” *Bulletin of the History of Medicine* 34 (1960), Asa Briggs, “Cholera and Society in the Nineteenth Century,” *Past and Present* 19 (1961), Charles Rosenberg, *The Cholera Years: The United States in 1832, 1849 and 1866* (Chicago: The University of Chicago Press, 1962), Margaret Pelling, *Cholera, Fever, and English Medicine, 1825–1865* (Oxford: Oxford University Press, 1978), Richard Evans, *Death in Hamburg: Society and Politics in the Cholera Years* (Oxford University Press, 1987), LaVerne Kuhnke, *Lives at Risk: Public Health in Nineteenth-Century Egypt* (Berkeley: University of California Press, 1990), Peter Baldwin, *Contagion and the State in Europe, 1830-1930* (Cambridge: Cambridge University Press, 1999).

⁴ Norman Howard-Jones, *The Scientific Background of the International Sanitary Conferences, 1851-1938* (Geneva: World Health Organization, 1975), Valeska Huber, “The Unification of the Globe by Disease? The International Sanitary Conferences on Cholera, 1851-1894,” *The Historical Journal* 49, 2 (2006), idem *Channelling Mobilities: Migration and Globalisation in the Suez Canal Region and Beyond, 1869-1914* (Cambridge University Press, 2013), and Christopher Hamlin, *Public Health and Social Justice in the Age of Chadwick: Britain, 1800-1854* (Cambridge: Cambridge University Press, 1998).

broke out in Europe less frequently due to improved sanitation and more effective international hygienic control.⁵

The second half of the nineteenth century witnessed a crucial shift in the scientific understanding of infectious diseases that bore direct consequences to how urban public health was conceived and how cities were spatially organized. Before the rise of microbiology at the hands of Louis Pasteur and Robert Koch, scientists were largely divided into two camps with respect to the mode of transmission of particular diseases: contagionists and anticontagionists. As the labels suggest, the contagionists believed that diseases such as cholera could be transmitted from one human being to another, no matter what the ultimate cause for cholera was. They argued that the only way to explain the geographical spread of cholera pandemics was by pointing to human transmission and mobility. The contagionists overwhelmingly believed that the disease was endemic to India, Britain's most prized eastern colony, and that it reached Europe via infected patients through various routes. Main land routes included those of trade and the Muslim pilgrimage, or the Hajj, while the most crucial maritime route was that of the Suez Canal, which made transportation of people, commodities, and diseases between Europe and India considerably faster since its opening in 1869. In general, many continental European medical authorities were firm contagionists, and they advocated sanitary cordons and maritime monitoring and quarantines as effective measures against the spread of disease. On the other hand, anti-contagionists argued that infectious diseases such as cholera were not endemic to specific places but were potentially everywhere. For them, outbreaks took place due to conflation of environmental and meteorological

⁵ Richard Drayton, "Science, Medicine and the British Empire," in *The Oxford History of the British Empire* Vol. 5, ed. Robin W. Winks (Oxford: Oxford University Press, 1999), 274, Mariko Ogawa, "Uneasy Bedfellows: Science and Politics in the Refutation of Koch's Bacterial Theory of Cholera," *Bulletin of the History of Medicine* 74, 4 (2000).

conditions, including lack of sanitation, high levels of subsoil water, and high temperatures. According to this view, the existence of these conditions anywhere could lead to outbreaks. Many British medical authorities as well as some renowned German epidemiologists such as Max von Pettenkoffer were staunch anti-contagionists. Thus, they believed that better infrastructures of sanitation including sewers, healthier housing, and groundwater drainage were the surest measures against cholera. For them, cordons and quarantines were ineffective and barbaric practices of a bygone era. British officials and medical authorities viewed the idea that India was the seat of cholera as unscientific and politically motivated, as it rendered the British empire and its maritime commercial fleet the world's purveyors of disease. Because British shipping comprised about seventy percent of navigation in the Suez Canal, lengthy quarantines would have entailed considerable commercial disadvantage. Contagionists pointed to these facts as evidence that their scientific rivals were economically and politically motivated. By the last decades of the nineteenth century, debates among scientists whether at international conferences or at local sites of confrontation, such as Cairo, were situated in a context that blurred the boundaries between science and political loyalties.⁶

In 1883, the colonial regime was only beginning to establish its influence in ministries and departments. A program of bureaucratic reorganization restructured entire branches of the administration and placed trusted British "advisors" in ministries, where in reality they had more authority than ministers. The administration of sanitation and public hygiene in Egypt fell under

⁶ Erwin Ackerknecht, "Anticontagionism between 1821 and 1867," *Bulletin of the History of Medicine* 22 (1948), Sheldon Watts, "From Rapid Change to Stasis: Official Responses to Cholera in British-Ruled India and Egypt: 1860 to c. 1921," *Journal of World History* 12, 2 (2001), and Michael Christopher Low, "Ottoman Infrastructures of the Saudi Hydro-State: The Technopolitics of Pilgrimage and Potable Water in the Hajj," *Comparative Studies in Society and History* 57, 4 (2015).

the jurisdiction of primarily two government bodies that predated the British occupation. The International Board of Maritime Quarantine was based in Alexandria and presided by the Egyptian doctor Hassan Pasha Mahmoud. Fourteen capitulatory European powers appointed delegates who met regularly to discuss quarantine measures and regulations on ships passing through Egyptian waters including the Suez Canal with the explicit intent of stemming infectious diseases in Egypt before they reached Europe. Based on negotiations at international sanitary conferences, European powers established the international board after the cholera pandemic of 1865. And because continental Europeans held a majority, the board enforced quarantines in Egypt despite the objections of British authorities and the complaints of British shipping business. The second body was the Board of Health, which dated back to the middle of the nineteenth century and dealt exclusively with all matters of internal sanitary and public health administration. Egyptian doctor Salem Pasha presided over the Cairo based agency. British officials, including Evelyn Baring, the British Consul General from 1883 to 1907, viewed the Cairo Board of Health as inefficient, partly due to its handling of the 1883 cholera outbreak. In early 1884, the colonial regime replaced the board with the Department of Public Health and Sanitary Services, which fell under the Interior Ministry until 1936 when it became a separate ministry.⁷

The 1883 cholera epidemic stirred terror among Egyptians and took the British colonial regime by surprise. As the disease first appeared in Damietta in June of 1883, the International Board of Maritime Quarantine dispatched a medical committee composed of Ahmed Bey Hamdi, Sanitary Inspector of Cairo, Grant Bey, Chief Medical Officer of the Railways Department, Ahmed Bey Chaffey, the board's Egyptian delegate at Jeddah, and Salvatore Ferrari, director of

⁷ The National Archives of the United Kingdom (hereafter TNA), Foreign Office (hereafter FO) 407/32: From Evelyn Baring to Earl Granville, November 5, 1883.

the board at Damietta. The committee's report summarized Damietta's insanitary conditions and attempted to reconstruct the outbreak according to the general principles of the miasmatic theory of disease. The town witnessed the arrival of 15,000 visitors to celebrate a popular feast (*moulid*), which coincided with a heat wave. There were rumors that the meat of animals dying from recent bovine typhus was clandestinely sold to the public, while carcasses littered the Damietta branch of the Nile. Doctors cited *fesikh*, a popular salt-prepared fish known for its pungent smell as a specimen of bad local diet. Cholera attacked with virulence sometimes causing death in a matter of hours.⁸ In their final report, Chaffey and Ferrari addressed the politically sensitive question of origin. They generally believed that cholera was not endemic to Egypt, and they admitted support for theories of importation from India. However, they could not dismiss the idea that meteorological and sanitary conditions at Damietta approximated those of the Ganges valley in India, where cholera was believed to be endemic, and that these conditions in effect produced cholera.⁹ The debate on origin continued unresolved while French, British, and German scientific commissions arrived in Egypt to investigate the outbreak.

The Board of Health attempted to act rapidly in order to stem the advance of cholera to Cairo and Alexandria. Salem Pasha ordered strict supervision of markets, slaughterhouses, and public spaces, as well as inspection and disinfection of urban canals, mosque latrines, barracks, schools, and prisons. Authorities disinfected houses of cholera patients and burned their clothes. However, despite these measures, cholera made its first appearance in Cairo in mid-July,

⁸ Government of Great Britain, *Commercial. No. 34 (1883). Correspondences respecting the cholera epidemic in Egypt: 1883* (London: Harrison and Sons, 1883), 3-9: "Rapport des Commissions Médicales chargées de déterminer la Nature et les Caractères de la Maladie qui a éclaté à Damiette le 22 Juin, 1883."

⁹ *Ibid.*, 87-95: "Report to the Maritime Sanitary and Quarantine Board of Egypt, by Ahmed Chaffey Bey and Salvatore Ferrari."

presumably introduced by infected refugees from Damietta and other towns in Lower Egypt who either escaped the government's sanitary cordon or left before it was enforced. The disease simultaneously hit Giza, then a village on the western bank of the Nile, and Boulaq, the semi-isolated neighborhood where hygienic conditions were "extremely favorable to the development of the germ of the disease," according to British vice-consul Borg.¹⁰ From Boulaq, the outbreak reached the districts of Abdin and Old Cairo, another neighborhood that was infamous for its unsanitary conditions and slums. And for more than a month the disease swept throughout the entire city claiming thousands of lives before it subsided. The official death toll in Cairo was 5,630. But sanitary authorities pointed to the state of disarray that the outbreak created in Cairo's poorest and most affected neighborhoods such as Boulaq and Old Cairo, where hundreds died daily and many were buried without registration by the short-staffed local medical authorities. Thus, the adjusted figure was approximately 8,000 out of a total population of 368,000, and between 80,000 and 100,000 countrywide. As medical observers knew, Cairo had seen worse cholera epidemics in 1831 and 1865, the first of which wiped out six percent the city's population.¹¹ However, the outbreak was severe enough to put the city's sanitary conditions at the forefront of official debates on public health.

The epidemic gave rise to a hygienic urban geography where danger was unequally distributed among Cairo's neighborhoods. In *Waba' al-Haida (The Cholera Epidemic)*, Hassan Pasha Mahmoud argued that it came as no surprise that Boulaq and Old Cairo took the brunt of the outbreak. Both riverside neighborhoods were characterized by marshy lands, stagnant ponds,

¹⁰ Ibid., 62-64: "From Vice-Consul Borg to Sir Edward Mallet."

¹¹ For comparative figures see Ministry of Interior, *Report on the Epidemic of Cholera in Egypt During the Years 1895 & 1896*, 61 and H. Bitter, "Le choléra et la peste en Égypte," in *Comptes Rendus de Premier Congrès Égyptien de Médecine tenu au Caire du 19 au 23 Décembre 1902* (Le Caire: Imprimerie Nationale: 1904), 215.

and narrow waterways. Other officials pointed to the overcrowding of these neighborhoods, their exceptionally unsanitary conditions, and their slums. In Boulaq, the city's most populous neighborhood of 50,000, the official death toll reached 2,189. According to the miasmatic medical theory, dryness of the soil was one of the guarantees of health. Thus, Mahmoud argued that the epidemic had a relatively lighter impact on Darb al-Ahmar and Khalifa because these eastern neighborhoods were located on high, rocky lands that were less prone to underground water infiltration.¹² The fact that the disease claimed hundreds of lives in the elite neighborhoods of Abdin and Azbakiya raised alarm for the city's moneyed residents and confirmed the idea that cholera recognized no class boundaries. As we will see in the next chapter, Cairo's elites subsequently sought distance from what came to be seen as Cairo's diseased neighborhoods. As cholera ravaged the city, elite foreign residents who feared for their lives exercised pressure on the British administration through their consuls to form neighborhood committees in order to discuss the best measures to protect their areas. The Interior Ministry also formed a special sanitary committee that included Egyptian elites and members of consular bodies.

The nights of cholera-besieged Cairo smelled of tar and sulphur since medical authorities lighted barrels of these substances in all neighborhoods as they were thought to purify the air of cholera-causing miasmas. Authorities cleaned and sprinkled all major streets. They collected and disinfected rubbish before removing it to designated sites outside of the town. And they conducted sanitary inspections on mosques, latrines, and baths, disinfecting some while permanently closing others deemed too dangerous to public health. Finally, they conducted sanitary inspections on the

¹² Hassan Pasha Mahmoud, *Waba' al-Haida fi Sanat 1883* [The Cholera Epidemic in the Year 1883] (Al-Matba'a al-'Amera al-Sharafiya, 1884), 14.

slums of Boulaq and Old Cairo, ultimately proclaiming them unfit for future habitation and destroying large areas of slums by fire.¹³

Medical officials incessantly complained that the most common response of Egyptians to falling ill was to escape authority. People fled in fear of their livelihood being interrupted by cordons and quarantines, of being incarcerated, or of being made objects of medical practices they did not fully comprehend. Escaping was an expression of powerlessness and vulnerability in the face of both disease and the power of the state. Inside the cordon that the government enforced around Damietta, there were fears of short supplies of food, medicine, and disinfectants, and the prices of basic foodstuffs soared. And despite official directives to shoot transgressors with live ammunition, many attempted, and managed to, escape.¹⁴ Cholera was known locally as *al-hawa' al-'asfar*, or yellow air, in association with the prevalent belief that the disease spread through airs and miasmas and coincided with changes in weather patterns. During the epidemic, crowds of Boulaq residents attempted to escape both cholera and the government by taking refuge in boats. Georges Montbard, a French illustrator who witnessed the outbreak, captured the scene of terrified Boulaq residents carrying their children and belongings and huddling together on boats. Another illustrator whose work appeared in *Life* magazine vividly portrayed the city's poor escaping Boulaq under the intimidating supervision of mounted police, while ominous smoke rose in the background, possibly a reference to tar and sulphur fires or the razing of slums. Cholera caused such panic that it was common for elite residents to flee the city. And the stationed troops of the

¹³ Government of Great Britain, *Commercial. No. 39 (1883) Correspondences respecting the cholera epidemic in Egypt: 1883* (London: Harrison and Sons, 1883), 48-51: "From Messrs. Gibson and Ornstein to Sir E, Mallet."

¹⁴ Government of Great Britain, *Commercial. No. 34 (1883)*, 26-33: "Sir E. Mallet to Earl Granville" and 37-39: "Memorandum by Dr. Mackie."

occupying British army took refuge at the hill of Moqattam.¹⁵ In 1918, the Public Health Department found it necessary to assign a reward of ten pounds for the first notification of cases, and the fear of medical authorities did not abate over the next several decades.¹⁶



1.1. Cholera in Boulaq, 1883. (Source: Wellcome Library, London)

¹⁵ Greene Pasha, "Mokkattam: A Sanatorium for Cairo," *The Lancet*, June 29, 1895, 1663-64.

¹⁶ Egypt, Ministry of Interior, Department of Public Health, *Instructions on Procedure in Outbreaks of Cholera* (Cairo: Government Press, 1918), 19. Youssef Chahine's 1896 film *al-Youm al-Sadis* [The Sixth Day], dramatized this relationship between people and medical authorities during cholera epidemics. The film is based on a novel by Andre Shadid that depicted the 1947 cholera outbreak, the last to hit Egypt. For the 1947 epidemic see Aly Tawfik Shousha, "Cholera Epidemic in Egypt (1947): A Preliminary Report," *Bulletin of World Health Organization* 1, 2 (1948).



1.2. Cholera in Boulaq, 1883. (Source: *Life*)

By the end of the nineteenth century, the colonies were the site of scientific rivalries among European colonial empires. As Richard Drayton noted, scientists were knowledge-making parasites of empire, “fattening their disciplines on its opportunities.”¹⁷ In 1883, Britain, France and Germany sent their scientists to Egypt to investigate cholera.¹⁸ A French commission organized under the auspices of Louis Pasteur arrived in August in order to determine the origin of the outbreak. Having lost one of its members to cholera, the commission returned to France without conclusions. The British responded by sending their own commission headed by Surgeon-General William Guyer Hunter, a firm believer in anti-contagionist theories. Unsurprisingly, Hunter reached the conclusion that cholera was as endemic to Egypt as India, and he blamed the unsanitary conditions in Egyptian towns and the habits of their inhabitants. In their turn, the German imperial government dispatched a scientific expedition headed by Robert Koch. During his stay in

¹⁷ Drayton, “Science, Medicine and the British Empire,” 274.

¹⁸ William Coleman, “Koch’s comma bacillus: the first years,” *Bulletin of the History of Medicine* 61 (1987): 317-23 and Ogawa, “Uneasy Bedfellows.”

Alexandria, Koch set up his own laboratory and was able to isolate a bacillus that appeared to be associated with cholera, yet he could not prove direct causation. As the epidemic subsided during the fall of 1883, Koch traveled to India. By reconstructing a small outbreak in Calcutta, the German scientific team was finally able to establish causation between the *comma bacillus* and cholera.

Koch's discoveries had enormous consequences on theories of public hygiene and practices of sanitary engineering, as they highlighted the role of sanitary infrastructures as the only effective measures against cholera. In India, Koch was also able to establish that drinking water contaminated with dejecta of cholera victims were the main vehicle through which the disease spread.¹⁹ And the Hamburg-Altona epidemic of 1892 was another opportunity to reassert his findings regarding the link between cholera and the water supply in a European context. Koch's discovery signaled the final, yet slow, decline of anticontagionism and miasmatic theories of disease more broadly. Additionally, he argued in 1894 that the Suez Canal was not the main route through which cholera reached Europe, but rather through land routes from southwestern Russia and via the Hajj. Subsequently, international medical authorities agreed on less invasive quarantine measures that relied more on the use of new technologies such as the telegraph and disinfection machines.²⁰ Koch argued that keeping Europe safe depended on the capacity of each state "to seize cholera by the throat and stamp it out."²¹ He demonstrated that large-scale interventions of sanitary engineering such as sewage networks and scientific control of the water supply were the most effective preventive measures. As Koch's theories gained acceptance, pointing to the incorrigibly unsanitary habits of "natives" increasingly lost its purchase in the colonies. British administrators

¹⁹ Howard-Jones, *The Scientific Background of the International Sanitary Conferences*, 48-77.

²⁰ Huber, "The Unification of the Globe by Disease?," 466-67.

²¹ Quoted in Howard-Jones, *The Scientific Background of the International Sanitary Conferences*, 76.

had to abandon their colonial medical anthropology and instead contemplate expensive engineering interventions into the urban environment.²²

In Egypt, the most immediate result of the 1883 epidemic on public health administration was the scrapping of the Board of Health and the creation of the Department of Public Health and Sanitary Services. Acknowledging that public health reform “is very urgently required,” Baring was glad that the new department could be organized on a non-international basis, as opposed to the Board of Quarantine, which allowed the British administration more freedom in exercising leverage on the new body.²³ The Public Health Department took all aspects of medical and hygienic administration in Egypt in its own hands in early 1884 under the directorship of Hassan Pasha Mahmoud. However, the real authority in the department was the sub-director, Fleming Mant Sandwith. The English doctor arrived to Egypt from India in 1883 as part of British efforts to stem the advance of cholera. In 1885, Sandwith became a professor of medicine at the Qasr al-Aini Medical School until 1900 when he moved to South Africa.²⁴ From 1885 to 1892 the Public Health Department was under the directorship of English doctor H. R. Greene.

Sanitary Geography of Cairo

The 1883 cholera epidemic sparked sustained efforts by the colonial administration to study systematically the sanitary infrastructure and the hygienic geography of Cairo. While theories and

²² However, policies of racial segregation were still gaining ground particularly in African colonial cities as a guarantee to the health of Europeans. See Daniel Headrick, *The Tentacles of Progress: Technology Transfer in the Age of Imperialism, 1850-1940* (Oxford University Press, 1988), 159-67.

²³ TNA, FO 407/32: From Evelyn Baring to Earl Granville, November 5, 1883.

²⁴ Sandwith wrote a number of medical studies on Egypt including *Egypt as a Winter Resort* (1889), *The Medical Diseases of Egypt* (1905), and several studies on pellagra.

practices of hygiene were shifting slowly during the two decades following Koch's discovery, there was widespread agreement among medical authorities that sanitation was the key to prevent infectious diseases, irrespective of the technical debate on disease etiology. The urban landscape became the subject of intense scrutiny by a new class of technoscientific experts, including doctors, epidemiologists, bacteriologists, chemists, engineers, geologists, and statisticians. These experts methodically investigated the sources and causes of Cairo's unsanitary conditions, probing its neighborhoods, canals, lakes, and roads, and its salient, everyday institutions such as mosques, baths, and drinking fountains. These systematic attempts signaled that public health authorities grasped that much was needed to make Cairo healthier, yet it did not necessarily mean that they possessed the power or the financial means to implement reforms. The Public Health Department's meager budget during the 1880s and 1890s clearly expressed how colonial decision-makers viewed the significance of Cairo's health, and public health in the country more broadly, in the grand scheme of colonial policy.

In 1885, the Public Works Ministry formed the *commission d'assainissement du Caire* in order to investigate the most common sources of unsanitary conditions in Cairo.²⁵ Presiding over the commission was Franz Engel, a resident in Egypt since 1879 and the former chief engineer of the Ministry of Charitable Endowments (*Awqaf*), which administered many of Cairo's mosques and public fountains (sing. *sabil*), as well as the director of medical statistics from the early 1880s until WWI. Other members were Egyptian doctor Ahmad Chaffey, who coauthored a report on cholera in Damietta a few years earlier, French engineer Julien Barois, then general secretary of

²⁵ Unless otherwise noted, all information regarding the 1885 sanitary commission is from the following archival sources: Dar al-Wathaiq al-Qawmiya [The Egyptian National Archive] (hereafter DWQ), Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037344 and 4003-037345.

the Public Works Ministry, Pierre Bey, director of the concessionary Cairo Water Company, Egyptian doctor Latif Selim, sub-Governor of Cairo, and A. H. Hooker, a doctor at the Public Health Department who served during the 1883 epidemic and studied the problem of trash and sewage disposal in the city.

A detailed account of Cairo's bifurcated sanitary geography emerged out of the meetings, discussions, and reports of the 1885 sanitary commission. It was clear to the commission members that private sanitation was an exception that was fully available only to the city's elites, thanks to the establishment of the Cairo Water Company and the introduction of new architectural forms with private conveniences during the previous two decades. However, the majority of Cairenes resorted to collective spaces of water provisioning and hygiene, such as mosques, public baths, and public fountains, collective institutions that had been indispensable for urban everyday life for centuries. Focusing on these sites and on urban services more broadly, the commission methodically investigated what could be done to remedy the city's unhealthy conditions.

Mosques were one of the most prominent sites of sanitation in the country. They commonly contained latrines, courts of ritual ablution (sing. *maida*), and sometimes baths (sing. *maghtas*) in which the entire body was submerged under water. First, commission members came to realize to what extent mosque latrines functioned as the main public latrines for neighboring residents, and mosques were very evenly distributed in the city. In some cases, latrines of big mosques like al-Azhar received more than eight thousand visitors daily. These latrines were connected either to cesspools or to pipes for discharging waste into nearby bodies of water including the Nile and its derivatives. Cesspools were usually constructed with porous masonry in order to allow surrounding soil to absorb liquids and to decrease the need for having to clear them more frequently. And they were cleared very irregularly, sometimes every eight or ten years. The

commission saw this practice as dangerous to public health as it infested surrounding soil with foul liquids. Some percolating cesspools consisted of tunnels that extended underneath nearby streets with no manholes or ventilation vaults, but gas build up eventually escaped above ground. Second, courts of ablution constituted an equally significant problem. Most *maidas* consisted of basins whose water was changed periodically, and water was usually discharged in cesspools to infiltrate the soil. In 1883, the vast majority of mosques acquired water from their own shallow wells, stored their own water, or bought it from water carriers. Commission members believed that ablution water was usually foul and considered it a source of infection. During their discussions, the members discussed the possibility of prohibiting basins and supplying mosques with faucets in order to prevent accumulation of dirty water. In May 1884, authorities ordered mosques to substitute their basins with faucets, and the decision gave rise to objections from some religious authorities when it was enforced in the mosque of Sayyida Zainab as an experiment, ultimately requiring the intervention of the grand mufti.²⁶ The insistence of public health authorities to inspect and monitor mosque latrines and ablution basins, and the closure of some mosque, led to friction with religious authorities. Nonetheless, hygienic conditions at mosques were not significantly better by 1892 when an international sanitary commission convened in Cairo. Only few mosques had replaced their percolating cesspools with waterproof ones and only ten out of Cairo's 279 mosques used water supplied from the Cairo Water Company, which most experts considered better than crude water from the Nile, canals, or shallow wells.²⁷ Also in 1892, the government

²⁶ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037345 and 4003-033238. Circular from the Interior Ministry, dated May 7, 1884, *Qararat wa Manshurat* (Boulaq: al-Matba'a al-Amiriya, 1884), 43-4.

²⁷ "Rapport de la commission internationale de l'assainissement du Caire," *Journal Officiel*, Supplement to No. 51 (16 April, 1892).

issued regulations to all existing mosques, ordering them to universalize waterproof cesspits within three years and to change water in ablution basins at least once a week. According to the new regulations, all new mosques with latrines and ablution basins had to acquire a permit (*rokhsa*) from the Public Health Department after showing plans of sanitary arrangements.²⁸ However, experts agreed that these regulations could only address unsanitary conditions to a limited extent in the absence of a system of sewage disposal and abundant water supply.

Investigating public baths (sing. *hammam*) provided the mostly foreign sanitary experts with a glimpse of the interconnected economies of bodily hygiene, waste reutilization, and food supply in Cairo. Baths were essential to the majority of Cairenes who had no access to abundant supply of water at home. As the 1885 commission members also realized, public baths used trash as fuel in order to heat their boilers. Trash was cheap and abundant, and public baths usually bought large amounts from Cairo's trash collectors, the *zabbaleen*. Three issues worried the commission: first, that trash was filthy often containing animal corpses, second, that *hammams* stored large amounts of trash sometimes up to several months in their nearby depots, which were close to densely-populated areas, finally that they burnt trash on a very low heat in order not to damage their boilers, causing a "nauseating smoke" that usually escaped furnaces. Under these conditions, public baths were dangerous to the health of residents in their immediate surroundings.²⁹ Adolph Smith, the special sanitary commissioner of the London *Lancet*, visited Cairo more than two decades later to find Cairo's baths in very similar conditions. He noted that baths usually purchased 189 cartloads of trash out of Cairo's 600 cartloads. Smith recognized that this was indeed an

²⁸ Decree concerning the cesspits of mosques and public latrines, dated November 9, 1892, *Qararat wa Manshurat* (Boulaq: al-Matba'a al-Amiriya, 1892).

²⁹ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037344.

ingenious arrangement, except for the fact that trash usually contained carcasses and domestic organic waste that gave rise to “dangerous nuisance.”³⁰ Even more shocking for Smith was that bath furnaces not only heated water, but also cooked pots of fava beans (*fuul*) in the process—fava beans being one of the most essential staples of Egyptian diet. Small restaurants and street vendors usually brought beans in large narrow-necked jars that baked in the low heat of boiler rooms for hours.

Conditions of housing constituted another crucial dimension to the sanitary geography of the city, and it was connected to questions of sewage disposal and the impurity of Cairo’s subterranean strata. The 1885 commission noted that even in rich neighborhoods houses were hygienically deplorable since the majority of cesspits they investigated were not waterproof and healthy air circulation was commonly lacking. The problem was that there were no regulations to force proprietors to comply with sanitary standards, and the government acknowledged that regulations were difficult to enforce particularly on existing houses, not only due to potential considerable costs that proprietors may not be able to afford, but also due to the extraterritorial privileges of foreign proprietors under the capitulations.³¹ In 1892, an international commission visited a so-called “middle class” Arab house. The toilet was a hole in a pavement, and the hole was connected to a percolating cesspool that extended under a hallway. Cleaning the cesspool sometimes required removing parts of the hallway pavement, a process that the commission found

³⁰ [Adolphe Smith], “The Cleansing of Cairo (From Our Special Sanitary Commissioner),” *The Lancet*, June 19, 1909, 1782. Smith was a socialist journalist who coauthored a series of articles in 1876-77 entitled ‘Street Life in London’ on the city’s working class and its precarious population. For more on his life including his stay in Paris during the Commune and his 1905 articles on Chicago’s meat-packing industry see Emily Kathryn Morgan, ““True Types of the London Poor”: Adolphe Smith and John Thompson’s *Street Life in London*” (PhD diss., The University of Arizona, 2012), Ch. 2.

³¹ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037344.

defective because it led to considerable nuisance.³² Traditionally, the city's nightsoil men (*sorabatiyya*), who formed a guild like other traditional crafts and service workers in Egypt, cleared cesspools. The process involved throwing sand in order to absorb liquids before shoveling contents into baskets and barrels and transporting them to the city's outskirts in large carts. Nightsoil men then sold dried waste as fertilizer to surrounding rural areas.³³ For sanitary experts, percolating cesspools continued to be a major source of infection over the next decades, and replacement by waterproof cesspits was limited to a fraction of the modern buildings that began to populate elite neighborhoods.

These conditions led to a widespread belief among sanitary experts that Cairo's soil posed danger to the city's health. Abbate Pasha, an Italian doctor and longtime resident of Egypt, pointed in 1881 to the near absence of waterproof cesspools in Cairo and to the resulting contamination of soil with waste, arguing that the city's soil was "a permanent abode for pestilence under one's house."³⁴ Nearly a decade later Abbate reasoned that "Cairo is already a vast sponge" due to its porous soil, which had been thoroughly soaked with waste that it was a source of disease.³⁵ In 1889 sanitary engineer Baldwin Latham estimated that 139,100 cubic meters of waste infused with the city's soil annually.³⁶ The 1892 international commission arrived at a similar conclusion, estimating that out of 170,000 cubic meters of annual toilet refuse only 30,000 cubic meters were

³² "Rapport de la commission internationale de l'assainissement du Caire."

³³ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037345.

³⁴ Abbate Bey, "Questions hygiéniques sur la ville du Caire," *Bulletin de l'Institut Égyptien* (1881), 63.

³⁵ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037344.

³⁶ *Résumé du Rapport de M. Baldwin Latham sur la Drainage du Caire* (Le Caire: Imprimerie Nationale, 1890).

transported out of the city, while the rest was left to rot in the soil.³⁷ Fifteen years later, this belief in the dangerous nature of the soil had only become stronger, and another sanitary engineer claimed that “the subsoil and subsoil-water in Cairo were strongly impregnated with sewage of many generations.”³⁸ The annual rise and fall of underground water, which followed the annual flood cycle of the Nile, compounded the unsanitary nature of Cairo’s soil. In 1909, Adolph Smith came to the sinister conclusion that elite residents of the so-called European quarters stood and lived on soil contaminated by the waste of residents of the native quarters. He argued that sewage from old quarters infused the soil and “passes through the European quarter as it follows the natural flow of the subsoil water from the more elevated, more crowded, and filthy native quarters [in the east] finally to reach the Nile [in the west].”³⁹

In 1885, there were five underground sewers running underneath Cairo’s elite quarters. Dating back to Khedive Ismail’s urban expansion, the sewers were designed to collect storm and surface water only.⁴⁰ Two of these drains serviced Muhammad Ali street, two were for the elite Ismailiya and Abdin quarters, and one for the quarter of ministries. Three of these drains discharged their contents in the Khalig Canal, two in the Nile, and one in the Ismailiya Canal. The 1885 commission learned, however, that residents living close to these sewers made unauthorized drainage connections, and in the absence of a flushing mechanism, the pipes were effectively turned into slow moving cesspools. As fissures and cracks appeared in the masonry and sewage

³⁷ “Rapport de la commission internationale de l’assainissement du Caire.”

³⁸ Correspondence on Charles Carkeet James, “The Main Drainage of Cairo,” *Minutes of Proceeding—Institution of Civil Engineers* 202 (1916), 138.

³⁹ [Adolphe Smith], “The Drainage of Cairo (From Our Special Sanitary Commissioner),” *The Lancet*, April 24, 1909, 1210.

⁴⁰ Ali Mubarak, *Al-Khitat al-Tawfiqiyya al-Jadida li Misr al-Qahira* [Tawfiq’a New Plans] (Bulaq, Cairo, 1305 AH), Vol. 9, 56.

seeped to surrounding soil, Greene Pasha deplored how these sewers “have attained such a degree of foulness as to render them veritable “foyers d'infection,” as well as the source of the noxious smells that exist perpetually in their neighborhood.”⁴¹ The 1885 commission recommended repairing these sewers and extending the network to neighboring quarters under strict conditions. Only household water and storm water would be admitted into the sewers, and property owners seeking to establish connections would have to prove to the Public Works Ministry that their houses conformed to the required sanitary standards. Few years later, however, Greene concluded that these sewers were hopeless when he received reports on their conditions after sanitary inspections. When a government engineer visited the Abdin sewer, he realized that it lacked proper incline, and he also learned that three sewer men were asphyxiated by sewage gases when they tried to access the sewer for cleaning. In 1887, the government discontinued the use of these five sewers.⁴²

The urban landscape was scattered with small ponds and waterways that sanitary experts considered sources of nuisance and disease, particularly due to the poor’s continued reliance on them for drinking purposes. The Khalig Canal, which bisected the city and ran through most old quarters, was already infamous as the most unsanitary feature of Cairo, although some residents later recalled its charm with nostalgia.⁴³ The 1885 commission realized that the canal was a “public utility” of a dual nature.⁴⁴ It served as the source of potable water for inhabitants of the densely

⁴¹ Greene Pasha, “The Sanitation of Cairo,” *The Provincial Medical Journal*, January 2, 1888, 9.

⁴² DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037345; “Sanitary Administration in Egypt,” *The British Medical Journal*, September 22, 1888.

⁴³ “Old Khaleeg, Cairo,” in W. G. Kemp, *Egyptian Illustration: A Pictorial, Psychologic, Personal, Pithy and Political Miscellany* (Cairo: G.G. Zaccharia & Co., 1908), 88.

⁴⁴ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037345. For public health discussions on the Khalig before the British colonial period see Khaled Fahmy, “An Olfactory Tale of Two Cities,”



1.3. The Khalig Canal. (Source: Marcel Clerget, *Le Caire*.)

populated old quarters. Yet it also served as an open sewer and a collector of waste. The commission found out that numerous houses and three public baths drew their water directly from the canal. There were 39 lines supplying 77 house cisterns with about 20,000 cubic meters of water annually. At the same time, 503 pipes discharged sewage and household water in the very same waterway. As foreign experts related, Egyptians believed that this situation did not necessarily endanger public health if the following arrangement was observed. Private houses and mosques were supposed to discharge sewage only during times when drawing water from the Khalig was

In *Historians in Cairo: Essays in Honor of George Scanlon*, ed. by Jill Edwards (Cairo: The American University in Cairo Press, 2002), 171-73.

prohibited. As the low Nile of the summer approached, the canal became a stagnant ditch, if not completely dry. But as water rose again and as soon as the Nile reached sixteen degrees of height at the Roda Nilometer around the middle of August, water was allowed to flow into the canal by opening a dam at its mouth, an event that marked the popular celebration of the “cutting of the Khalig.” Property owners were then allowed to discharge the contents of their drainage pipes before sealing them again for ten days. During this period, fresh Nile water poured into the canal, flushing the unseemly content that had accumulated over the previous months as well as the discharge from houses and mosques. And after ten days, water was considered pure enough for drinking and for storing in cisterns. Yet this ideal arrangement was flawed in practice as discharge pipes were not always hermetically sealed. More importantly, poorer inhabitants who did not own cisterns remained dependent on water from the Khalig long after the official time for drawing water was over and as discharge pipes were reopened.⁴⁵ Sanitary experts viewed the Boulaqiya Canal, which ran along the populous and disease-prone quarter of Boulaq, in similar terms. The narrow waterway was liable to contamination from its crowded surroundings. And the same went for the numerous ponds that existed in the city, which authorities began to fill up since the mid-nineteenth century due to concerns for public health.⁴⁶ By 1894 and in light of the now incontrovertible findings of Koch and others that linked cholera to contaminated water supply, experts were not surprised that Boulaq, Old Cairo, and Sayyida Zainab were most affected by the

⁴⁵ Memo on the sanitation of Cairo by Greene Pasha, director of the Public Health Department. Dated November 12, 1887 in DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037345.

⁴⁶ Fahmy “An Olfactory Tale of Two Cities,” 176.

disease in 1883 since poor residents of these crowded neighborhoods depended largely on crude water drawn from the Nile, the Khalig, and the Boulaqiya.⁴⁷

Rainfall posed a challenge at the intersection of sanitation and the organization of roads, despite being rare occurrences happening four to five times annually. In 1885, the majority of roads in the densely populated old quarters were unmacadamized, and they were composed of sand and other materials densely packed by traffic. Compounded with the absence of a regular service of street sweeping and sprinkling, roads of old neighborhoods constituted an irregularly leveled network. And due to lack of provisions for surface water drainage, roads absorbed occasional showers, turning them muddy and impassable. William Willcocks, the well-known civil engineer behind the Aswan Dam, inspected the conditions of roads after rain showers in 1897 when he was in the process of designing a sewage system for Cairo. Willcocks “put on fishing-boots and walked through the poor quarters of the town” around Muski street, a busy commercial thoroughfare.⁴⁸ He found out that Muski was higher than surrounding secondary streets, which were still higher than tertiary ones. Rainwater ran down these streets to gather at dead ends of tertiary streets, where Willcocks saw “some extra ordinary sights.” Streets were submerged under two or three feet of water. House owners attempted to prevent water from entering their properties, whose first floor was usually below street level, by constructing sand and brick banks at the pavement and by constantly guarding these banks. The wet excursion convinced Willcocks that it was necessary to include surface drainage provisions in his project. In 1909, Charles Carkeet James, the engineer who designed the city’s first sewage system, made a similar visit to Sayyida Zainab describing the

⁴⁷ J. B. Piot, “La question de l'eau d'alimentation dans les villes du Caire et d'Alexandrie,” *Bulletin de l'Institut Égyptien* (1894).

⁴⁸ William Willcocks, *Sixty Years in the East* (Edinburgh and London: William Blackwood and Sons, 1935), 170.

havoc and disruption of traffic caused by such rare occurrences, including photographs of muddy, submerged streets in his report.⁴⁹



1.4. A Street in Sayyida Zainab after Rain, circa 1909. (Source: See note 49)

Finally, sanitary experts were concerned with how to regulate unhealthy and dangerous establishments that lead to nuisance in their surroundings. In 1885, the Public Health Department classified these establishments into two categories, establishing a regime of permits, monitoring, and fines. The 1885 commission noted that the city's dung cake (*gella*) factory and depot were too close to inhabited areas. Dung cake was commonly used as cheap fuel for cooking, one of the few things that the *Lancet* found admirable about Cairo's sanitary economy.⁵⁰ The 1885 commission recommended removing the factory outside of the city, yet not too far from the dwellings of the poor who usually worked in these industries.⁵¹ The same went for other dangerous industries and

⁴⁹ Ministry of Public Works, *Sewerage of Cairo, First Section, Report and Drawings* (Cairo: National Printing Department, 1909), 14-16.

⁵⁰ "The New Sanitary Direction in Egypt," *The Lancet*, March 29, 1884, 593.

⁵¹ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037344.

establishments such as limekilns, the tannery, the slaughterhouse, salt fish (*fesikh*) depot, and barns among others. These dangerous establishments tended to cluster close to Boulaq and in Old Cairo. Both riverside neighborhoods were inhabited by Cairo's poorest populations who worked as casual laborers in these and other industries. And both quarters were separated from the town proper by stretches of undeveloped lands and connected via one or two major roads. The comments of the 1885 commission revealed that Cairo's sanitary experts understood to some extent the interconnected hygienic, spatial, and economic patterns of the city.

When Hygiene Became Public

During the first two decades of British rule, there was mounting pressure on the colonial regime to address the unsanitary conditions of Cairo. While moneyed residents and foreign communities spearheaded this pressure, middle class Egyptians, businessmen interested in tourism and urban development, and the medical and sanitary community, including the government's own, joined the ranks. Critics pointed to the city's urgent need for pure water supply, sewers, healthy housing, reforms of mosques and public bathrooms, and more regular street sweeping and sprinkling. The expansion of the press made possible a nascent public debate on hygiene, where the city's biological crisis was the subject of much writings. Other writings on cleanliness made explicit how upper and middle class Egyptians experienced epistemological shifts in understanding health and disease. Medical statistics became an important tool for both the government and its critics as they appeared in official reports, newspapers, and journals, and Cairo's high death rate was often cited as a shorthand for everything wrong with health conditions in the city, as well as its medical and sanitary administration.

During the decades following the 1883 cholera epidemic, a discourse on health materialized through new forms of printed newspapers and journals. The expansion of the press created space for a nascent public to voice, conceptualize, and debate ideas and practices of health, cleanliness, and bodily fitness. Protracted global contestations of medical theory between supporters of miasmatic conceptions of disease and proponents of bacteriology stoked writings on public and private hygiene in general and specialized journals. And Egypt was one of the many sites of these global contestations of ideas and practices due to its proximity to Europe. The proliferation of Arabic writings on hygiene ran parallel to the country becoming a hub comparable to India, China, and the Caribbean for doctors, bacteriologists, and epidemiologists seeking to study infectious diseases. These developments led to the convocation of the First Egyptian Medical Congress in 1902.

While medical subjects were staples of general scientific periodicals, new specialized journals took up themes of hygiene, from the most private questions of diet to the most public ones of epidemiology. Issues of *al-Muqtataf* and *al-Hilal*, the most prominent Arabic scientific journals at the forefront of the popularization of science in Egypt, usually featured pieces discussing a wide variety of medical themes. Shibli Shumayyil, one of the renowned contributors of *al-Muqtataf* who introduced Darwin to Arabic readership, founded *al-Shifa* ' in 1886, the first Arabic medical journal in the country.⁵² Until 1892, the periodical published articles covering the entire gamut of medicine and other related subjects. Annual issues commonly included articles on a range of infectious and non-infectious diseases and their possible prevention or cure, reports on medicinal substances,

⁵² Notably the founders of these journals including Ya'qub Sarruf and Faris Nimr (*al-Muqtataf*), Jurji Zaydan (*al-Hilal*), and Shumayyil were Levantine émigré intellectuals trained in protestant colleges. For more on these figures and on the popularization of science in Egypt see Marwa Elshakry, *Reading Darwin in Arabic, 1860-1950* (Chicago: The University of Chicago Press, 2013), Ch.1.

chemical compounds, physiological and psychological abnormalities, human evolution, and mental disorders, news on contemporary medical discoveries, pedagogical articles on pregnancy and hygienic handling of food, and pieces covering many other miscellaneous issues including the “sanitary habits” of peoples, medical education, anatomy, demography, agriculture, and epidemiology.

Arabic medical journals expressed the growing concern of elite residents and the medical community, including most significantly the government’s own experts, at unsanitary conditions in Cairo and other Egyptian leading cities. In 1887, Hassan Bey Rifqi, an inspector at the Public Health Department, and Ibrahim Bey Mustafa, a professor at Qasr al-Aini medical school, founded the “hygienic and scientific” monthly *al-Sihha* (Hygiene or Health). The editorial board included some influential medical and sanitary experts such as Greene, the director of the Public Health Department, Salem Pasha, the director of the defunct Cairo Board of Health, John Price, a sanitary engineer of the Public Health Department who was involved in neighborhood and slum inspection in Cairo, Muhammad Durry Pasha, a celebrated surgeon and author of 1882 monograph on infectious diseases in Egypt, and Frank Milton, professor of clinical surgery at Qasr al-Aini. The journal published Arabic translations of papers and lectures by foreign sanitary authorities such as Paul Brouardel and Max von Pettenkofer.⁵³ It covered news of outbreaks in Cairo such as that of dengue fever in 1887-88, and it published a number of pieces on the poor quality of potable water in Cairo and on various methods of water filtration. Price wrote a series of articles introducing Arabic readers to the “science of hygiene” and its practical implications, namely, the purifications

⁵³ For instance, Paul Brouardel’s speech on potable water in “Maa’ al-Shorb” [Potable Water], *al-Sihha* 1, 2 (1887): 33-45.

of air, water, and soil from “poisons.”⁵⁴ And he argued that while it was difficult to understand the timing of outbreaks of infectious diseases, it was incontrovertible that they were linked to overcrowding and absence of drains—conditions that his readers would have immediately associated with Cairo’s poorest quarters and slums. In March 1888, the journal published a long article on housing from a hygienic point of view, detailing requirements and sanitary arrangements for healthy housing, including proper air circulation, exposure to sunlight, isolation from groundwater, placement of bathrooms and kitchens, and proper drainage.⁵⁵ The article presented a model of modern healthy housing, leaving it to the reader’s imagination to confront the unsanitary houses populating Egyptian towns with this knowledge.

Since the 1890s, new Arabic journals with varying readership introduced its growing elite and *effendi* readers to the latest debates in medical science and highlighted the insufficiency of medical and sanitary administration of Cairo, and the country more broadly. In 1891, Chalhoub Bey, a Maronite doctor living in Cairo founded the monthly *al-Fawayed al-Sihhiyya* (Hygienic Benefits), which closely followed the news of cholera in Asia and Europe. In 1892, the journal featured a series of articles on the link between public hygiene and urban layout, contrasting principles to present conditions in various cities including Cairo, where streets were narrow, unmacadamized, undrained, and poorly ventilated. Between 1896 and 1905 Alfred Eid founded two medical monthly journals, *Tabib al-‘A’ila* (The Doctor at Home) and *al-Tibb al-Hadith* (Modern Medicine). Eid studied medicine in Paris and was the son of Georges Eid, the Syrian-born Belgian consul of Cairo, and both were heavily involved in urban land development and the

⁵⁴ “Qanun al-Sihha” [Laws of Hygiene], *al-Sihha*, 1:2 (1887): 45-6.

⁵⁵ “al-Maskan” [The House], *al-Sihha*, 1:8 (1888): 225-35.

property bubble of 1897-1907. Eid was particularly interested in the medical applications of X-ray photography, which he introduced in Egypt.⁵⁶ His journals featured articles on personal hygiene, diet, physical exercise, physiological abnormalities, and infectious diseases, a series of short biographies of famous doctors including Louis Pasteur and Alexander Yersin, and a number of articles on X-ray photography.

In 1901, Adib al-Zayyat, a Levantine doctor residing in Cairo, founded *al-Majalla al-Sihhiyya* (Journal of Health or Hygiene), which targeted a more general audience of a growing middle class anxious for practical advice on health. The monthly journal commonly featured articles on obesity, the health of children, common eye diseases in Egypt, the health benefits of fruits and vegetables, longevity, and a question and answer section. However, its most innovative contribution was a section entitled ‘Chemistry at Home’ (*al-kimia’ fi al-bayt*), where the journal offered medicinal recipes for various issues including intestinal parasites and home disinfection, or explained the basic chemistry of water and the chemical impact of distribution pipes on water. In 1917, Ali Ibrahim, a young doctor who belonged to the generation of *effendi* anticolonial mobilization, founded *al-Majalla al-Tibiyya al-Misriya* (The Egyptian Medical Journal). The journal featured a series of articles on the most celebrated doctors in the country, focusing on Egyptians including Hassan Mahmoud, Muhammad Durry, and Ibrahim Hassan as well as articles on the history of medical education in Egypt. By shedding light on Egyptian doctors as equal to their foreign peers, the journal supported nationalist mobilization among doctors who complained from colonial policies that blocked their professional mobility, demanding a larger role in medical education and in the hygienic administration of the country. Almost a decade earlier *al-Jarida*

⁵⁶ Arnold Wright and H. A. Cartwright, eds., *Twentieth Century Impressions of Egypt: Its History, People, Commerce, Industry and Resources* (London: Lloyd’s Greater Britain Publishing Company Ltd., 1909), 116.

published articles on medical education in Egypt, protesting the discrimination against Egyptians in government service. The journal specifically referred to the events of 1898 when the colonial regime switched the language of instruction at the Medical School from Arabic to English and replaced several Egyptian with foreign professors.⁵⁷ After conditional independence in 1922, Ali Ibrabim became a minister of health and the director of Fouad al-Awal (later Cairo) University.

The meeting of the First Egyptian Medical Congress in December 1902 confirmed that Egypt was one of the many sites where ideas and practices of health were produced and debated. Presiding over the congress was Ibrahim Hassan Pasha, who served on the 1897 scientific expedition sent by the Egyptian government to Bombay in order to study an outbreak of plague, which was commonly seen as endemic to Egypt. During the four days of the medical congress, Egyptian and foreign doctors working inside and outside of Egypt presented and debated the latest medical developments on a range of subjects including cholera, the plague, yellow fever, tuberculosis, malaria, prophylactic medicine, veterinary medicine, sanitation, climate, narcotics, toxicology, and the history of medicine. The opening ceremony was held in the Opera house in Azbakiya and attended by Khedive Abbas Hilmi II. Local newspapers and scientific periodicals actively covered the conference and its internationally recognized contributors, such as doctor Ronald Ross whose work on malaria in the Suez Canal and the Caribbean had earned international acclaim during the same year.⁵⁸ The conference was a culmination of decades of medical research in Egypt and of the more recent formation of a public discourse on medicine and sanitation, which captured the imagination of elites and *effendis*.

⁵⁷ “Fi Madrasat al-Tibb” [At the Medical School], *al-Jarida*, January 22 and January 30, 1910.

⁵⁸ *Comptes Rendus de Premier Congrès Égyptien de Médecine*.

The proliferation of writing and public debate on hygiene was coterminous with slow yet profound transformation of the epistemologies of health and disease in Egypt. Modern-educated middle class Egyptians particularly felt the tug of these developments. New conceptions of disease, health, and cleanliness expressed the formation of modern bourgeois subjectivity that demanded reshaping the material world—both the physical, urban landscape and the body—according to new standards. And the normalization of a new scientific rationality wrought new ways of circumscribing and understanding native medical traditions and local practices of healing.

The rise of bacteriology during the late nineteenth century engendered novel categories and epistemologies of health. New concerns with hygiene, diet, and bodily fitness expressed the extent to which modern scientific rationality became dominant among educated middle class Egyptian. While traces of epistemological transformations abound in contemporary writings, Muhammad al-Muwaylihi's *Hadith Isa Ibn Hisham* (The Discourse of Isa Ibn Hisham, *A Period of Time*) represents one of the most vivid attempts to critically capture these developments in fictional form.⁵⁹ By staging an impossible encounter between a pasha from the time of Muhammad Ali (r. 1805-1848) and Isa Ibn Hisham, recast as a late nineteenth century intellectual, al-Muwaylihi offered a critical snapshot of society undergoing material and cultural transformations. The text critiqued colonial institutions and highlighted the limitations of the past embodied in the ghost of the pasha. As the conversation between the two protagonists turned to themes of health and disease, the encounter became more ambiguous, for while it was easy for the pasha to ridicule turn-of-the-century excessive concern for health and diet, he was struck by scientific discoveries and technological innovations that could have prevented the horrors he saw in his own past. *A Period*

⁵⁹ Roger Allen, *A Period of Time: A Study and Translation of Ḥadīth 'Īsā ibn Hishām by Muḥammad al-Muwayliḥī* (Reading: Ithaca Press, 1992), 71-94.

of Time condemned the proliferation of ineffective and counterfeit drugs prescribed by contemporary, westernized doctors. It scorned what it portrayed as excessive concern for the purity of water, air, food, and clothes. And it criticized the new trend of taking residence in purportedly healthy modern housing that was in supply by the turn of the century.⁶⁰ As the protagonists traveled to Alexandria, they heard news of an outbreak of plague, a reference to the outbreak of 1900. Recounting gruesome scenes of plague-stricken Egypt in 1844, the ghost of the pasha was surprised to know that the disease was no longer as lethal as in his own time. Isa Ibn Hisham explained that while people in the past ridiculed quarantines, cordons, and disinfections and tried their best to avoid them, current medical knowledge demonstrated why they were necessary. For plague was not caused by a prick of a demon's spear (*wakhathat al-jinn bi rimahiha*) as laypeople (*'amat al-nas*) thought back during the pasha's time, but "by soldiers who cannot be seen by the naked eye."⁶¹ Ibn Hisham then took the pasha to a chemical laboratory in order to show him the invisible microbes (*mikrobat*) that only scientists were able to see under their microscopes. As the pasha inspected a drop of water under the magnifying device, he saw "thousands and thousands of vermin floating in it" and he prostrated himself to God in awe. Ibn Hisham complained to the pasha that even though scientists had discovered what caused diseases such as cholera and plague, laypeople still resisted the government, preferring to face the bayonets of soldiers guarding sanitary cordons than follow the directive of the government and its experts. The fictional encounter underscored that modern technology and scientific rationality were gaining purchase among comfortable, modern educated Egyptians, shaping how they understood health, purity, and

⁶⁰ Muhammad Al-Muwaylihi, *Hadith Isa Ibn Hisham* [The Discourse of 'Isa Ibn Hisham] (Cairo: Hindawy Publishing, 2013 [1907]), 110-11.

⁶¹ *Ibid*, 117.

their own bodies. The encounter also made explicit the discomfort of *effendis* at persisting “unscientific” attitudes to health that were still prevalent among lower classes and peasants.

Modern educated Egyptians felt the urge to recast their relationship to inherited medical traditions and common practices of health. Judged by the standards of a new regime of scientific rationality, modern *effendis* understood many popular practices of healing as superstition at worst and as occasionally useful but often counterproductive remnants of an ancient past at best. As they turned their gaze inwards, they found Islamic medical traditions as a valid source of knowledge even if it was surpassed by modern science. What was most troublesome for them was lay health practices that combined Galenic medicine, miasmatic influences, and the supernatural among other elements. Such practices were especially common among the lower class and in the countryside. In 1892, Abd al-Rahman Ismail Effendi, a graduate of the Qasr al-Aini Medical School, published *Tibb al-Rekka* (Distaff Medicine), a three-volume compendium of Egyptian healing practices covering a bewildering array of topics from remedies for common ailments to methods of protection against evil eye (*hasad*) and spells. Ismail framed his encyclopedic efforts as an attempt to educate his readers on common superstitions and to advise them against charlatans seeking to defraud patients. However, his ethnographic approach was remarkable given his purpose, and he consciously dedicated the third volume to common practices in Upper Egypt as he acknowledged that the first two volumes were exclusively drawn from research he conducted with the help of healing women and barbers from Lower Egypt.⁶² Ismail occasionally digressed in order to compare

⁶² Abd al-Rahman Ismail, *Tibb al-Rekka* [Distaff Medicine] (al-Qahira: al-Matba'a al-Bahiya, 1892), vol. 2, 45. As Ismail wrote, the ‘rekka’ was a wooden tool for working with flax, which traditionally fell under women’s responsibility. Sharing medicinal recipes presumably took place at gatherings of women as they labored on *rekkas*, which was why, according to Ismail the term also referred to traditional healing practices in general. Ismail, *Tibb al-Rekka*, vol. 1, 7-8.

with modern medicine or to comment broadly on a certain subject. In the section “Fraud in the Name of Civilization,” he acknowledged that lay suspicion of modern medicine may have some justification in light of the abundance of impostors clad in modern trappings. Even worse, it was common for modern apothecaries to sell drugs with foreign names that claimed to heal multiple ailments or cause longevity. For Ismail, this was fraud and superstition under the thin veneer of modern science, and he called for stricter government regulation and monitoring on drugs and pharmacies.⁶³ More than two decades later other Egyptian doctors such as Jurji Sobhi, an assistant surgeon at the School of Medicine who also studied medical archaeology, argued that there was a distinct ancient Egyptian lineage to some local remedies for common fevers and other diseases such as measles. And he probed these practices in order to extract few useful medical tips from the majority of useless or counterproductive practices.⁶⁴

Unhygienic Cairo constituted a lucrative market for medicines, especially among the upper and middle classes who were increasingly anxious for their health. Newspapers in wide circulation among urban *effendis* such as *al-Mu’ayyad* commonly featured sections devoted entirely to advertisements, including those for drugs. Nearly half of *al-Majalla al-Sihhiyya* was devoted to commercials for drugs and health beverages. For instance, the June 1901 issue included advertisements for drugs claiming to cure gonorrhea, fatigue, constipation, ocular diseases, skin conditions, and common flu, as well as various natural supplements and elixirs for general well-

⁶³ Ibid., vol. 1, 103-111.

⁶⁴ Jurji Sobhi, “Bahth fi Tibb al-Rekka ‘aw (al-wasfa al-baladiya) wa Tarikhuha wa Muqaranatuha bi al-Tibb al-Misri al-Qadim” [A Study on Distaff Medicine or ‘the Native Recipe’ and Its History, and a Comparison with Ancient Egyptian Medicine], *Al-Majalla al-Tibiyya al-Misriya* 1:2 (1917): 31-6.

being.⁶⁵ And in this frenzied market, it was necessary for commercials of reliable drugs to highlight that they were approved by the Public Health Department.

Vital statistics constituted a new form of objective knowledge that served as the basis for arguments over public hygiene, including most importantly the case for sanitary infrastructures as major requirements for healthy cities. Over the four decades of British rule, vital statistical became an essential component of annual reports of the Public Health Department. The Statistical Department collected and tabulated births, deaths, vaccine registration for the entire country, publishing weekly, quarterly, and annual vital statistics in addition to occasional reports in the event of epidemics.⁶⁶ Franz Engel, who headed the 1885 *commission d'assainissement du Caire*, was responsible for one of the first attempts to create exhaustive demographic and medical statistics for the years 1880-1884. For Engel, the city's alarming death rate, even discounting cholera deaths, clearly reflected Cairo's unhealthy conditions.⁶⁷ Mortality rates were generally in the 40s (per one thousand), reaching 63 in 1883 during the cholera epidemic. Comparisons were staples of statistical knowledge, and Engels supplied the 1884 death rates of London, Paris, and Berlin, which were 20.6, 26, and 27.1 respectively. These figures constituted incontrovertible evidence that public health administration was deeply flawed in Cairo. Engel argued that the most important health requirement missing in the city was a modern system of waste disposal. And he supplied further statistics for twenty-eight English towns showing how their health improved between 1850s and 1880s as a result of sewage systems. A few years later, Ali Mubarak, the Egyptian engineer who held a number of government posts during the reign of Khedive Ismail and

⁶⁵ *Al-Majalla al-Sihhiyya* 1:6 (1901).

⁶⁶ Wright and Cartwright, eds., *Twentieth Century Impressions of Egypt*, 418.

⁶⁷ Franz Engel, "Essai de Statistique Sanitaire de l'Égypte," *Journal Officiel*, Supplement to No. 85 (25 July, 1885).

who was involved in the urban development of Cairo in the 1860s and '70s, drew on the same statistics to argue for the need for better urban infrastructure of sanitation.⁶⁸ However, when the 1892 international commission investigated the city's unsanitary conditions, it found the city's death rate to be unsurpassed except by India's Madras, and it confirmed the idea that such conditions were results of lack of drains and pure water supply.⁶⁹

Pressure mounted on the British administration to invest in sanitary infrastructures and to put an end to Cairo's unhygienic conditions. Foreign communities, Egyptian upper and middle classes, businessmen invested in urban development and tourism, and most importantly the government's own sanitary experts lamented the chronic underfunding of the Public Health Department and the seemingly indefinite postponement of largescale projects of urban sanitation. In 1888, Grant Bey, a Scottish doctor living in Egypt since the 1860s, criticized the British administration for lack of essential sanitary reforms, particularly in Cairo, where drains were absent, dwellings "pestilential," and the water supply under constant threat of contamination. The real problem for Grant was that the government did not take seriously the advice of the Public Health Department, habitually avoiding action by sending back the department's recommendations on major sanitary reforms for further studies.⁷⁰ An article that appeared in the *British Medical Journal* in 1890 argued that it was a "disgrace" to the British administration and to Lord Cromer himself that death rates in Cairo were so high and that major urban centers lacked pure water and drainage systems. The article claimed that Cromer "can scarcely point to a single

⁶⁸ Mubarak, *Al-Khitat al-tawfiqiyya*, Vol. 1, 99.

⁶⁹ "Rapport de la commission internationale de l'assainissement du Caire."

⁷⁰ Grant Bey, "The Sanitary Conditions of India and Its Teachings," *The Sanitarian* 234 (1889): 400.

material improvement in the sanitary condition of the country.”⁷¹ And the author pointed to the glaring lack of expenditure on health compared to other reforms taken up by the administration, a line of argument that particularly resonated with the grievances of foreign communities in Cairo. In addition, critics argued that improving the health of the city was crucial for its growing tourism industry. Cromer acknowledge this in one of his reports: “it is necessary to proceed at once with the drainage works on account of the native inhabitants, and the requirements of the yearly increasing army of British visitors must also be taken into consideration.”⁷² As late as 1910, when the sewage system was under construction, the *British Medical Journal* reminded Egypt’s colonial administrators that while Cairo became ever more popular as a winter resort, sanitary requirements were still deficient, as the death rate was still in the 40s.⁷³ By this time, even government publications catered to the interconnected tourism and urban development industries, as when *Winter in Egypt: Illustrated Guide of the Egyptian State Railways* advised tourists and potential foreign migrants to visit healthy suburbs and marvel “the phenomenal extension of Cairo in all directions.”⁷⁴

Urban middle class *effendis* who filled the ranks of the anticolonial movement, presented a similar critique of official inaction supplemented by a more specific critique of colonial inequalities. They charged that while sanitary measures and urban services were generally insufficient, they were reserved for elite neighborhoods while conditions at old, “native”

⁷¹ “Sanitary Administration in Egypt,” *The British Medical Journal*, August 30, 1890, 510-11.

⁷² Quoted in “English Hygiene and Egyptian Authorities,” *The British Medical Journal*, May 6, 1893, 964.

⁷³ “Sanitary Matters in Cairo,” *The British Medical Journal*, April 30, 1910, 1057-60.

⁷⁴ Egyptian State Railways, *Winter in Egypt: Illustrated Guide of the Egyptian State Railways* (Cairo: National Printing, [After 1905]).

neighborhoods were worthier of attention. An article in *al-Majalla al-Sihhiyya* pointed to the fact that while the city's landscape was changing rapidly in 1903, public urinals still clustered around Azbakiya, "where tourists stroll during winter."⁷⁵ At the same time, there was not a single public bathroom in the increasingly popular middle class neighborhood of Faggala. Egyptian writers continued to make this argument about the unevenness of services in the city during the entire colonial period.

Cholera Strikes Again: 1895-96 and 1902

By the turn of the century, the British regime had been subject to much critique of its medical and sanitary administration of Cairo. And even regime proponents agreed that thorough sanitary reforms, most importantly a pure water supply and a sewage system, were long overdue, irrespective of where they placed the blame for the delay. Two more cholera epidemics in 1895-96 and 1902 substantiated and lent additional urgency to these arguments.

The 1895-96 epidemic was far less lethal than that of 1883, a testimony to advancing medical knowledge of the disease and of the effectiveness of preventive measures taken by sanitary authorities during the outbreak. The question of etiology and the debate over importation and its precise course were no longer viewed as decisive for preventing and suppressing cholera, but rather as theoretical issues that could be resolved by epidemiologists and bacteriologists in the future. By 1895, the relationship between cholera and water supply contaminated by dejecta of cholera patients had become incontrovertible thanks to Koch and others. Thus, only effective sanitary

⁷⁵ "Mabawel al-Qahira" [Cairo's Urinals], *Al-Majalla al-Sihhiyya* 3, 11 (1903): 240.

measures that could maintain the purity of the water supply merited the consideration of medical authorities.

John Rogers Pasha, the English director of the Public Health Department from 1892 to 1899, reported on the cholera epidemic of 1895-96, dividing the course of the outbreak into three distinct periods, a winter, spring, and summer epidemics. This periodization was important because it connected the progression of cholera in Egypt to the cycle of the Nile, which constituted a single interconnected source of water supply for the entire country. During the summer, water of the Nile and its derivative canals was at its lowest, therefore water supply was most polluted and most amenable to the spread of cholera on epidemic scale. Rogers summarized the unsanitary conditions of Egypt, stating that “not a town or village in Egypt is drained, not one has a satisfactory water supply,” and while filtered water was available in five cities, filtration was imperfect and access to filtered supply was restricted to a fraction of urban residents due to high cost.⁷⁶ During the winter epidemic, or between September of 1895 and January of 1896, suspicious cases began to surface in the province of Sharqiya followed by the towns of Damietta and Alexandria. Bacteriological examination settled initial confusion when H. Bitter and Paul Kaufmann declared it was indeed cholera, as they followed Koch’s axiom that the presence of any *comma bacillus* was evidence of cholera. Rogers quickly formed an emergency committee composed of Horace Pinching, W. P. G. Graham, Keating, Milton, and Wilson. The first two were doctors at, and future directors of, the Public Health Department, while the latter three were professors of medicine at Qasr al-Aini School.⁷⁷ The Public Health Department immediately

⁷⁶ Ministry of Interior, *Report on the Epidemic of Cholera in Egypt During the Years 1895 & 1896*, 3.

⁷⁷ Ministry of Public Instruction, *Records of the Egyptian Government, School of Medicine* (Cairo: National Printing Department, 1901).

handled the few cases that appeared in Cairo starting from November 1895, hospitalizing families of victims and monitoring them for six days before releasing them when they showed no symptoms. During the spring phase, cholera largely subsided, but Rogers was certain that unreported cases existed in the Delta. “The rule,” he regretted, “is concealment of disease as long as possible.”⁷⁸

The last phase of the epidemic, or between May and October 1896, was more serious, and it bore lasting consequences on Cairo’s landscape. By mid-May, cholera claimed dozens of lives each week until September. Unsurprisingly for sanitary authorities, cholera’s recrudescence in Cairo began from Old Cairo. The neighborhood’s notoriety for unsanitary conditions was unmatched except by Boulaq, and both were at the center of previous cholera outbreaks. Both semi-isolated neighborhoods were river ports. The point of intake for the city’s water supply was between Old Cairo and Boulaq, which was most alarming to authorities as it made water liable to contamination from big boats. Thus, the first preventive measure was to prohibit sailing within a safe distance from the point of intake. The second was to protect the point of intake from contamination from land, since it was on the foreshore. Observers had always complained that lower class Cairenes washed their clothes, their animals, and themselves in the Nile and in urban canals. The government responded by erecting barriers to prevent people from approaching the point of water intake. In Boulaq and Old Cairo, authorities selected locations from which inhabitants could draw water and constructed wooden stages in order to facilitate drawing water from slightly midstream. In addition, the government provided Old Cairo with three standpipes distributing free filtered water from the Cairo Water Company, each providing thirty tons (30,550

⁷⁸ Ministry of Interior, *Report on the Epidemic of Cholera in Egypt During the Years 1895 & 1896*, 4.

liters) of water per day. It also installed a pumping engine for drawing water from midstream and distributed it freely to Old Cairo's residents. Rogers knew that "the saving of Old Cairo meant the saving of the entire city."⁷⁹ Finally, the government established three temporary hospitals or "cholera huts" in Old Cairo, Boulaq, and Abbasiya—another neighborhood increasingly known for its unsanitary slums—to receive and hospitalize patients.



1.5. Cholera Huts in Old Cairo. (Source: See note 78)

Yet the disease had already spread to other neighborhoods of Cairo, and the Public Health Department began contemplating more thorough measures including filling up the Khalig Canal—a project that had been put off for many years out of fear of offending native attachment to the canal. As we saw above, the Khalig was the source of potable water for a great number of Egyptians living in Cairo's old quarters, and houses bordering the canal commonly featured water cisterns (*saharig*) for storing water. Rogers put together the following facts: the Khalig was "cut" on August 13, water for drinking was drawn by inhabitants starting from August 23 (if not unofficially before that date), and cholera mortality began to rise on August 28. For him, this was a clear indication of the role of the canal in the propagation of the disease and he ordered closing the mouth of the canal permanently. Sanitary authorities then disinfected the entire canal with milk

⁷⁹ Ibid., 45

of lime before letting it dry. On September 17, the bed of the Khalig was completely dry and one of the most enduring features of the urban landscape had forever disappeared. Authorities also



1.6. The Khalig Canal in 1896. (Source: *The Photographic Memory of Cairo*. Bibliotheca Alexandrina, 2009)

disinfected parts of the Boulaqiya Canal passing through Boulaq with milk of lime yet without closing it because it was still the source for irrigating lands north of the city. In both cases, laypeople believed “that the water was being poisoned by the Sanitary Department,” and for Rogers this produced an “excellent result” insofar as people avoided drinking the water of both canals. As we will see later, these rumors, which authorities did not deny because it served their purposes, came to haunt the government a decade later when the water supply was at the center of a controversy. For Rogers, “no canals, to whose banks the population have free access, should be

allowed to pass through the city,” and it was due to measures to protect the water supply that cholera began to subside again from mid-September.⁸⁰

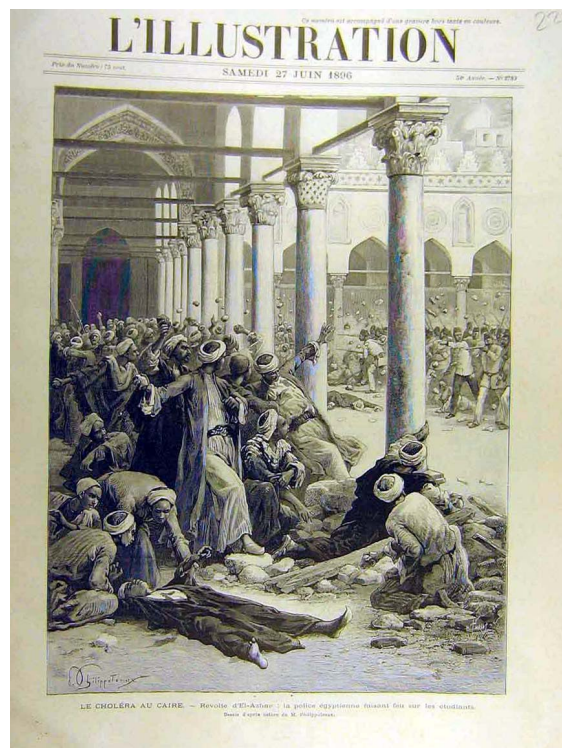
The time of cholera outbreaks were ripe for the spread of rumors about colonial regime officials inflicting harm on Egyptians, and as Luise White astutely argued in a different colonial context, such rumor’s “very falseness is what gives them meaning,” for they were idiomatic expressions of the colonial experience.⁸¹ A messy web of rumors revealed how Egyptians understood the nexus of colonial power and modern medicine, disclosing their experience of powerlessness and vulnerability. Aside from rumors that medical authorities “poisoned” the Khalig and the Boulaqiya, there were stories of functionaries of the sanitary administration throwing handkerchiefs on the faces of whom they desired to remove to hospitals, allegedly incapacitating them before carrying them away. These patients were purportedly never to be seen again. There were also reports that authorities interfered with religious customs of washing and burying the dead, and such reports were based in part on real interventions by medical authorities in everyday spaces of ritual significance such as mosques and cemeteries. And there were other rumors that authorities distributed poisoned sweetmeats (*melabis*) in the streets of Cairo and provincial towns in order to spread the disease. Rogers expressed his frustration at how widespread these apocryphal stories were. And he complained that seemingly one long-standing custom or another stood in the way of necessary sanitary reforms. For him, the department had no choice but to offend Egyptians, among whom “passive obstruction to sanitary measures was the rule.”⁸²

⁸⁰ Ibid., 60

⁸¹ Luise White, *Speaking with Vampire: Rumors and History in Colonial Africa* (Berkeley: University of California Press, 2000), Ch. 2. Cholera also gave rise to similar rumors and theories of class conspiracy in Europe. Briggs, “Cholera and Society in the Nineteenth Century,” 88.

⁸² Ministry of Interior, *Report on the Epidemic of Cholera in Egypt During the Years 1895 & 1896*, 96-7.

Yet not all obstruction was passive, and mounting tensions caused by the interference of sanitary authorities in a range of religious practices led to rioting of the students of al-Azhar seminary school. The Public Health Department had been tightening its grip on mosques since the 1883 cholera outbreak, inspecting their latrines, ablution basins, and baths. Since 1892 sanitary authorities required old mosques to redesign their internal sanitary arrangements including installing waterproof cesspits and faucets and compelled owners or the Ministry of Charitable Endowments, which administered many mosques, to change ablution water once a week and apply for a permit to build new mosques. Interference by doctors and engineers, many of whom were foreigners, into one the most vital institutions of everyday life and religious practice had led to friction. In June 1896 violence erupted when al-Azhar students resisted the removal of a Syrian colleague suspected of cholera to the government's hospital. When medical authorities called in the police, angry students stoned the Governor of Cairo and the Head of the Police. In turn, the



1.7. Al-Azhar Cholera Riots in 1896. (Source: *L'Illustration*)

police opened fire on demonstrators, killing three students, wounding two, and arresting more than a hundred suspected of resisting orders. After the scuffles, a number of students were tried while authorities reproached the head of al-Azhar University for not using his influence to sway the minds of demonstrators.⁸³

In the conclusion of his report, Rogers was content that the emergency measures taken by his department were effective, yet he realized that long-term sanitary reforms were needed, and he joined the ranks of medical experts and moneyed residents demanding overdue measures from the colonial regime's decision makers. Comparative figures between 1883 and 1895-96 testified to the idea that protection of the water supply from contamination was decisive. In 1883, virtually no measures were taken to protect the water supply and to ensure access of Cairo's poorest residents to pure water, and the result was the death of nearly 8,000 in Cairo and between 80,000 and 100,000 countrywide. In 1895-96 the death toll was 1,343 in Cairo and 18,105 countrywide.⁸⁴ These figures spoke for themselves concerning the efficiency of temporary emergency measures. But Rogers was weary of constant criticism of the work of his department, while the real problem was lack funding to implement sanitary reforms on a large scale, reforms that he viewed as necessary and could no longer be put off. Addressing his superiors, including the Minister of Interior and Cromer himself, Rogers argued that "sanitation is unfortunately expensive, but expenditure on sanitary works cannot be classed as unproductive. An Egyptian life, as any other life, has an economic value, and Egypt is by no means an over populated Country."⁸⁵ Rogers

⁸³ Ibid., 97-8. See also "Hadithat al-Azhar" [The Azhar Incident], *al-Muqtataf* 20, 7 (1896): 558-59.

⁸⁴ Ministry of Interior, *Report on the Epidemic of Cholera in Egypt During the Years 1895 & 1896*, 61, 130.

⁸⁵ Ibid., 135. This was an oblique reference to other colonies such as India, which colonial administrators construed as overpopulated, justifying *laissez faire* policies during times of epidemic and famine as letting demographic,

reminded his superiors that “the commercial classes of Cairo largely depend on the influx of tourists for their prosperity, and the Country itself benefits by tourist expenditure.”⁸⁶ Cholera was certainly harmful to the growing reputation of Egypt as a winter resort. Finally, he hoped that the decision makers of the colonial regime would give his recommendations serious consideration and “remove the financial and other difficulties which have hitherto stood in the way of any serious Sanitary progress. Should this be the result of the 1895-96 epidemic, it will not have occurred in vain.”⁸⁷

The cholera epidemic of 1902 confirmed the same conclusions regarding the critical role of the water supply and the need for permanent solutions to prevent its contamination. During this year, the first cases of cholera were recorded in Mousha, a village of 9,000 close to Assiut in Upper Egypt. Bacteriologist H. Bitter was certain that cholera reached the village from Hijaz, since the outbreak occurred immediately after the return of Mecca pilgrims on May 25 and 26.⁸⁸ The first cholera victim in Cairo was a woman who arrived to the city from Mousha on July 17, where she stayed in Boulaq. The disease spread rapidly after her death on July 22. On July 23, three cases were discovered; July 24, 38 cases; July 25, 79 cases. The Public Health Department, now under the directorship of Horace Pinching, reconstructed the outbreak, showing how it rapidly spread in Boulaq before reaching the quarter of Abdin. Bitter was certain that the quick dispersion of the disease in Boulaq could only mean that the water supply was locally polluted. It turned out that

Malthusian cycles take its course. See Mike Davis, *Late Victorian Holocausts: El Nino Famines and the Making of the Third World* (Verso Books, 2002).

⁸⁶ Ministry of Interior, *Report on the Epidemic of Cholera in Egypt During the Years 1895 & 1896*, 136

⁸⁷ *Ibid.*

⁸⁸ Bitter, “Le choléra et la peste en Égypte,” 225.

the woman from Mousha stayed in a house nearby the Nile, at a location where Boulaq residents usually washed dishes and clothes but also drew water. Authorities were sure that washing the polluted clothes of the first victim contaminated water drawn by neighbors, which explained the severity of the epidemic in the few blocks around the house where she stayed. W. P. G. Graham, the acting director of the Public Health Department, took immediate measures after July 22 to protect the water supply. Authorities prohibited access to the Nile for purposes of drawing water, barricading the river at Boulaq and posting police guards to prevent people from approaching. Within two days, the department installed sixty-two free water taps distributing filtered water from the Cairo Water Company throughout the city.⁸⁹

Other measure for stemming the spread of cholera highlighted the government's need to coordinate with the Cairo Water Company in order to tighten its physical and technoscientific control of the city's supply. The government permanently barricaded the Nile at Old Cairo in order to prevent residents from drawing water. At Graham's urging, the Interior Ministry issued a decree prohibition bathing, washing clothes or animals, and drawing water from the Nile and the Ismailiya Canal in all of Cairo. At the threat of arrest, imprisonment, and fines, people were ordered to avoid proximity to the Nile and the canal except in order to cross.⁹⁰ In addition, the Public Health Department ordered all water carriers to bring their waterskins and carts to the company's waterworks for disinfection by sulphuric acid and steam. No water carrier was allowed to fill skins and carts from standpipes unless they showed government stamps proving disinfection. Sanitary authorities destroyed earthen drinking vessels (sing. *zir*) of infected quarters and replaced them

⁸⁹ TNA, FO 407/161: From the Earl of Cromer to the Marquess of Lansdowne, February 26, 1903.

⁹⁰ Decree by the Interior Ministry, dated July 21, 1902, *Qararat wa manshurat* (Boulaq: al-Matba'a al-Amiriya, 1902), 333.

with new ones at their expense. Finally, authorities closed numerous shallow wells and inspected the filters of the Cairo Water Company, placing their workers under medical surveillance.⁹¹

As with the 1895-96 outbreak, the government took a series of emergency measures addressing the unhygienic conditions of Cairo, which underscored lack of enduring infrastructures of sanitation and regular municipal services. Authorities temporarily closed ablution basins, baths, mosque latrines of Boulaq and Abdin, as well as large markets. Daily sprinkling and sweeping services were universalized for the entire city instead of being limited to elite quarters. Another feature of the urban landscape disappeared as a result of the epidemic when Pinching and Graham advised the Public Works Ministry to fill up parts of the Boulaqiya. The waterway passed through “one of the most crowded and dirty parts of the town” in Boulaq and served as the quarter’s public latrine.⁹² The ministry followed the advice of sanitary authorities, filling up parts of the canal while connecting the rest of it to the Nile by means of another mouth further north in order to avoid disrupting downstream irrigation.⁹³ Due to these measures, the severe phase of the epidemic subsided in Cairo by the end of July. Lasting between July and September, the outbreak claimed 1,489 lives in Cairo. In 1904, concern for public health and official interest in urban growth intertwined when authorities also filled up the Ismailiya Canal between Boulaq and Abbasiya, where property speculation was rampant.

Conclusion

⁹¹ W. P. G. Graham, “Taqrir ‘an sir al-Kolera fi al-Qutr al-Misri” [A Report on the Course of Cholera in Egypt], dated July 28, 1902, *Qararat wa manshurat* (Boulaq: al-Matba’al-Amiriya, 1902), 338-40.

⁹² TNA, FO 407/161: Extract from a Report by Sir Horace Pinching, February 3, 1903.

⁹³ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-059336 and 0075-037406.

Cholera outbreaks released forces that shaped colonial policies and the urban landscape. The 1883 epidemic stretched the capacities of a colonial regime that had just begun to establish itself to their limit and exposed its unpreparedness for such biological disasters. Two more epidemics exposed the continuing unwillingness of colonial decision makers to prioritize Cairo or to give it nearly the same attention it gave to the countryside where the regime invested substantially in the material and legal infrastructures of monocrop agriculture. Pressure mounted on the colonial regime during the first two decades of the occupation as its inaction only became more unjustifiable. By the opening years of the twentieth century, government proponents before its critics acknowledged that the city's unhealthy conditions required more sustained official intervention into the urban landscape and its sanitary infrastructures.

Yet just as contagion exercised pressure on the colonial regime, it created opportunities for capital. The most outstanding public health issues by the turn of the century were lack of a sewage system, exercising monopoly and scientific control over the water supply, congested urban layout of old quarters, and housing conditions. Alfred Eid wrote an article that revealed how urban developers attempted to draw the line between what was public and what was private, offering healthy housing in healthy neighborhoods for those who could afford it as an antidote to Cairo's unsanitary conditions. Published during the cholera epidemic in May 1896, the article advised readers not to panic in the face of cholera as long as they observed hygiene at their homes, which constituted the first front line of protection while public health measures taken by authorities were secondary.⁹⁴ As we will see in the following chapter, urban developers capitalized on health anxieties of moneyed Cairenes, proposing modern housing in healthy suburbs as a solution to

⁹⁴ Alfred Eid, "al-Wiqaya min al-Kolera" [Protection from Cholera], *Tabib al-'A'ila* 1, 7 (1896): 215-6.

living in the diseased city. And as the third and fourth chapters will show, it was partially in recognition of the gravity of Cairo's health conditions and as a result of mounting pressures particularly from elite residents and business interests that authorities embarked on schemes to modernize sanitary infrastructure and reorder the urban landscape. Contagion unleashed forces that ultimately reshaped how the colonial regime understood and governed Cairo.

CHAPTER TWO

HOUSING THE CITY: HEALTH, SPECULATION, AND CRISIS

Introduction

Widely considered to be the first reliable census operation of modern Egypt, the 1897 census listed all the districts (*aqsam*; sing. *qism*) and quarters (*shiakhat*; sing. *shiakha*) of Cairo, including Boulaq, the city's most populous district of 76,000 residents.¹ According to the census, nearly 14,000 of Boulaq's residents lived in slums, or clusters of "huts" or '*eshash* (sing. '*eshsha*), as they were called by Egyptians, urban administrators, and colonial observers.² Other significant settlements of '*eshash* occupied lands in Old Cairo or between this neighborhood and Sayyida Zainab, while others were built on semi-agricultural lands close to the northeastern neighborhood of Abbasiya. Government experts considered '*eshash* to be some of the most unsanitary sites of Cairo, if not essentially diseased spaces that constantly threatened the entire city. And the fact that Boulaq and Old Cairo suffered the most during cholera epidemics seemingly substantiated these views. Throughout the colonial period, urban authorities attempted, without success, to establish alternatives to the '*eshash* or to wipe them out. However, makeshift housing persisted, relocated, or proliferated in parallel to the spectacular growth of the city during the colonial era.

¹ Cairo's total population in 1897 was 570,062. Gouvernement Égyptien, *Recensement Général de l'Égypte, 1^{er} Juin 1897—1^{er} Muharrem 1315* (Le Caie: Imprimerie Nationale, 1898). The word 'district' (*qism*) refers to an administrative area. In the following I use neighborhood, quarter, and area interchangeably in a non-official sense. Nearly all of Cairo's twelve and later thirteen official districts comprised smaller neighborhoods. Nearly all demographic analyses of Egypt during the period comment on the inadequacy of the 1882 census, which was conducted in the midst of the political turmoil of the summer of 1882 when the country was nearly run by Ahmad 'Urabi and the Assembly of Delegates (*Majlis Shura al-Nuwwab*) immediately prior to the British occupation. There was a general agreement during the colonial period that the 1882 census was an underestimate, yet it was still used as a helpful parameter.

² '*Eshash* is still used to refer to slums and informal housing along with the newer term '*ashwa'iyat*, which derives from the word '*ashwa'i*, literally 'random.'

By the turn of the twentieth century, capital was the most significant agent of Cairo's transformation, and the urban landscape became the site of financial investment and accumulation. On one level, capital provided an answer to the city's unhygienic conditions. As we saw in the previous chapter, housing was inseparable from concerns for health. Weary of the regime's neglect of the city's health, comfortable residents sought houses with modern sanitary conveniences in healthy neighborhoods in order to protect themselves from the diseased city. Financiers responded to the anxieties of moneyed residents by developing new neighborhoods and suburbs with better sanitary standards. Yet capital's entry into urban space functioned with its own logic of accumulation and speculative investment. Cairo witnessed an unprecedented property bubble between 1897 and 1907 followed by a housing crisis. The city expanded to swallow surrounding deserts and hinterlands, while rents and property values soared as a result of uncontrolled speculation. Housing became an expensive commodity, and as the boom grinded to a halt, capital had already cemented a new spatial and social distribution onto urban space.

This chapter argues that capital responded to the colonial regime's initial disinterest in Cairo and took charge of urban growth in a way that ultimately alarmed the regime as it created a housing crisis. By reconstructing the history of the colonial city through the lens of housing, understood as a spatial and social category, this chapter makes three main points about the city's capital-led growth. First, poor and comfortable housing pushed the city in different directions, yet in relation to each other. Neighborhoods and suburbs that offered healthy housing to moneyed and middle class Cairenes were the answer of urban developers to the congestion and insalubrity of Cairo's old neighborhoods and slums. Second, the speculative bubble unleashed dynamics that redistributed the urban population and led to marked shortage of affordable housing. The city's

boosters and urban developers relied on an imagined demography of continuing supply of comfortable residents. Accordingly, they invested in the upper end of the housing market, developing forms of housing suitable for comfortable classes. The housing crisis that followed the bubble proved them wrong, for Cairo was not the new El Dorado they imagined, but also a space of impoverishment. Finally, this chapter brings the contradictions of urban development under capital's profit-maximizing logic to the foreground.

Drawing on a range of cross-disciplinary scholarship on housing, speculative bubbles, and contemporary urban informality, this chapter develops its argument over seven sections.³ The first examines Cairo's slums, underscoring both the logic of their placement and the way authorities framed them as centers of biological hazard, while the second focuses on unsuccessful attempts to regulate them. The third makes explicit how health concerns of moneyed residents led to early suburban expansion. The fourth probes economic and demographic currents at the background of capital-led expansion of the city during the property boom that the fifth section examines. The sixth probes how the commodification of housing in Cairo led to urban redistribution that sharpened the contradictions of the colonial city, while the final section focuses on the housing crisis that followed as a result.

³ For literature on housing and property booms see William Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: W. W. Norton & Company, 1991), Elizabeth Blackmar, *Manhattan For Rent, 1785-1850* (Ithaca: Cornell University Press, 1989) and idem, "Accountability for Public Health: Regulating the Housing Market in Nineteenth-Century New York City," in *Hives of Sickness: Public Health and Epidemics in New York City*, ed. David Rosner (New Brunswick: Rutgers University Press, 1995), R. Forrest and P. Williams, "The Commodification of Housing: Emerging Issues and Contradictions," *Environment and Planning* 16 (1984), Mary Pattillo "Housing: Commodity versus Right," *Annual Review of Sociology* 39 (2013), David Harvey, *Rebel Cities: From the Right to the City to Urban Revolution* (London: Verso, 2012), Ch. 2, and Manuel Aalbers and Brett Christophers, "Centering Housing in Political Economy," *Housing, Theory, and Society* 31 (2014). For literature on urban informality see Matthew Gandy, "Learning from Lagos," *New Left Review* 33 (2005), Ananya Roy, "Slumdog Cities: Rethinking Subaltern Urbanism," *International Journal of Urban and Regional Research* 35 (2011), Lisa Björkman, "Becoming a Slum: From Municipal Colony to Illegal Settlement in Liberalization-Era Mumbai," *International Journal of Urban and Regional Research* 38 (2014), and Alexander Vasudevan, "The Makeshift City: Towards a Global Geography of Squatting," *Progress in Human Geography* 39 (2015).

Geography of Slums

By the closing decades of the nineteenth century, slums became a significant form of urbanization in Cairo. The *'eshash* were houses constructed with mud brick, wood, tin, thatch, and other less common materials such as dried dung cakes (*gella*) that were used as inexpensive fuel and were left to dry on the wall or roof. They also piled up rubbish on their roof for heat isolation.⁴ These were constructions by the poor and for them that used an economy of available means to house casual laborers, impoverished servicemen, as well as rural and even regional migrants. In Cairo, the norm was for each *'eshsha* to house an entire family including in many cases some animals or fowl. The *'eshash* were markedly different from the houses of older neighborhoods, no matter how decrepit the latter were.

The location of these settlements revealed an interconnected pattern that was simultaneously hygienic, spatial, and economic. Cairo's poor rented cheaply from landowners, constructed their houses on untenured lands, or occupied neglected lands many of which were administered by the Ministry of Charitable Endowments (*awqaf*, singular, *waqf*). The choice of where to settle was based on calculations of availability of land, resources, and employment. Slums were built on peripheral areas away from residential districts, where land was abundant, yet they were close enough to various sources of employment for the casual wage earners and servicemen who inhabited them. Large *'eshash* were located at the outskirts of the city and in-between spaces

⁴ [Adolphe Smith], "The Cleansing of Cairo (From Our Special Sanitary Commissioner)," *The Lancet*, June 19, 1909, 1782-1784. During the latter decades of colonial rule, officials and engineers became increasingly interested in the vernacular Egyptian architectural styles. See Ernest Richmond, "Building Methods in Egypt," *Journal of the Royal Institute of British Architects* 18 (1911). Much later, the Egyptian architect Hassan Fathy appropriated a variant of the mud house for his village studies. See Hassan Fathy, *Architecture for the Poor: An Experiment in Rural Egypt* (Chicago: The University of Chicago Press, 1973 [1969]).

that were deemed too unhealthy for proper housing due to proximity to flooding areas or dangerous industries.

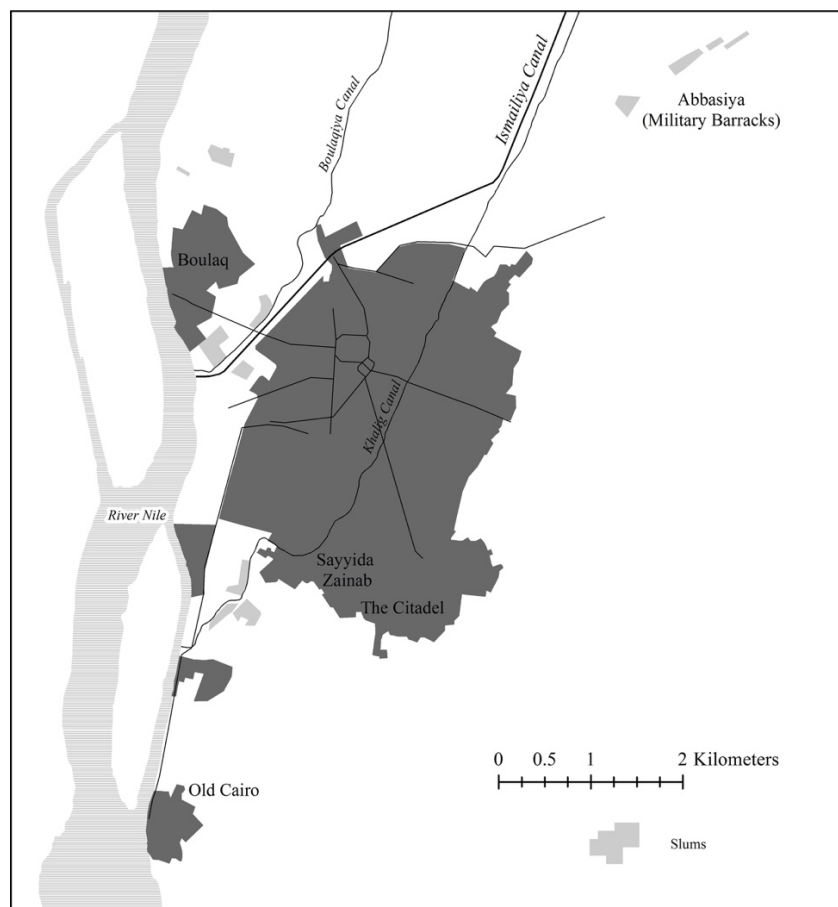
The slums of Boulaq occupied what was for long considered as the no man's lands either north of the old residential quarter or south of it, close to the Boulaqiya and Ismailiya canals—a marshy area that was exposed to Nile flooding and rising levels of underground water. Dating back to the early 1880s, the Sharkas and Turguman slums inhabited semi-agricultural lands where there were only few warehouses and lots owned by the Ministry of Charitable Endowments and the Coptic Patriarchate. Boulaq attracted a variety of craftsmen and low-wage workers due to the presence of a variety of establishments including the main railway repair and maintenance depot [*'anabir*], the Printing Press, warehouses, royal stables, a dung cake factory and depot, the school of arts and crafts, and various workshops. Boulaq also featured many wood depots, cafes, and *bouza* shops, and continued to develop as a working-class neighborhood with a strong concentration of craftsmen and transportation workers.⁵ A number of large slums populated spaces between Sayyida Zainab and Old Cairo, where there were cemeteries and unhealthy industries, such as the slaughterhouse, the tannery, a salted fish (*fesikh*) depot, the large trash collection depot of Abu al-Sa'ud, pottery making (*al-Jayyira*), and limekilns.⁶ These industries offered means of livelihood to the area's squatters. Finally, some noteworthy slums inhabited the distant lands north of Abbasiya, including a number of Sudanese and Nubian squatting settlements.

Makeshift urbanization created patterns for expansion and connected disjointed parts of the city. The urban poor surveyed, claimed, and transformed the urban landscape independently of

⁵ *Bouza* was a cheap and popular alcoholic beverage made from barley and bread.

⁶ See Untitled Plan and Survey of Cairo, 1:1000, 1:500, 1:200, 353 sheets (1892-94), *Cairo City*, 1:1000 (Cairo: Survey Department, 1909-1913), and *General Map of Cairo*, 1:15,000 (Cairo: Survey of Egypt, 1920).

authorities. While Cairo witnessed little formal expansion during the first decade of the British occupation, clusters of *'eshash* pushed the limits of the city and made use of vacant areas between semi-isolated quarters. Until the mid 1890s, it was common to consider Boulaq and Old Cairo as distant extensions of Cairo proper. And while Old Cairo was indeed far, Boulaq was separated from the city proper by the Boulaqiya and Ismailiya canals, both which were filled up by the authorities between 1902 and 1904. The two neighborhoods were connected to the city through major arteries that traversed canals and areas commonly viewed as unsuitable for residence. Similarly, Abbasiya remained a distant neighborhood of palaces and military barracks. For decades, only slums populated undesirable spaces between these neighborhoods and the city, until capital-led urban growth in conjunction with sanitary authorities forcibly removed many of them.



2.1. Cairo's Slums, circa 1880s.

Colonial authorities first encountered Cairo's squatters during the fateful summer weeks of the 1883 cholera epidemic. As we saw in the previous chapter, the outbreak was a short yet destructive episode that authorities were able to contain relatively quickly. When British officials, doctors, and engineers visited the most heavily stricken areas of Boulaq, Old Cairo, and Sayyida Zainab they found numerous conglomerations of makeshift houses that invoked common tropes of describing indigence, slums, and disease. Across the board, colonial observers and experts described the poor and their huts in terms that may have applied to any poor, crowded, disease-ridden slum from Cairo to Bombay, New York, and London.⁷ The same observations about ventilation and overcrowding were relentlessly repeated. Prevailing medical theories as well as class and colonial sensibilities combined to produce an anthropology of the urban poor where doctors and engineers played ethnographers providing detailed descriptions of the dwellings, food, and customs of an urban tribe.

As soon as government experts entered Boulaq and Old Cairo, they started taking measurements and writing field notes, seeing that usual nuisance of Cairo's "native quarters" was particularly severe. Streets were particularly narrow, houses were poorly ventilated, and drains were completely absent—ripe conditions for the generation and spread of infectious diseases according to dominant medical theories. These problems were compounded with "the low, dirty, filthy habits of the natives," who lived in mud-built "hovels" usually measuring eight by eight feet at the base and six feet in height.⁸ The huts, officials and experts argued, were "dens of misery and

⁷ See for instance Stephen Legg, *Spaces of Colonialism: Delhi's Urban Governmentalities* (Oxford: Blackwell Publishing, 2007), Ch. 4, Seth Koven, *Slumming: Sexual and Social Politics in Victorian London* (Princeton: Princeton University Press, 2006), and Alain Corbin, *The Foul and the Fragrant: Odor and the French Social Imagination* (Cambridge: Harvard University Press, 1988), Ch. 6-9.

⁸ Government of Great Britain, *Commercial. No. 34 (1883). Correspondences respecting the cholera epidemic in Egypt, 1883* (London: Harrison and Sons, 1883), 62: "Vice-Consul Borg to Sir E. Mallet."

squalor” that could only breed disease. Each *‘eshsha* was usually occupied with a family of five, six, or more in addition to their poultry, sheep, and cattle. The entrance was excessively small, and the roof was covered with “filth of all description”—likely a reference to dung cakes and rubbish that inhabitants commonly stored on the roof. The huts were built in rows facing each other at a distance of six to eight feet. And inhabitants usually drew polluted water from surrounding canals, ponds, and the Nile’s foreshore.

Authorities conducted sanitary inspections on infected houses and gave particular attention to the slums of Boulaq, Sayyida Zainab, and Old Cairo. Boulaq posed a particular challenge due to the large size of its slums. After ruling out disinfection using traditional means, officials ordered “the total evacuation of these quarters.” Doctors and sanitary engineers inspected the various kinds of dwellings in Boulaq more closely and pronounced them unfit for future habitation. Authorities adopted slum clearance as the only viable solution to the neighborhood’s hygienic problems and accordingly large areas of Boulaq and other similar *‘eshash* were set on fire.⁹ As the government evacuated around 6000 people from their neighborhoods, it forcibly housed most of them in two camps in Torah and the Nile Barrage. The camps provided food and medical assistance to the slum refugees, and when cholera subsided only those who could prove a fixed occupation and means of obtaining lodging in Cairo were allowed to return.

Regulating Slums

During the 1880s and 1890s urban authorities unsuccessfully attempted to enforce public health and land use regulations on various urban spaces including slums. It was often small outbreaks of

⁹ Government of Great Britain, *Commercial. No. 39 (1883) Correspondences respecting the cholera epidemic in Egypt: 1883* (London: Harrison and Sons, 1883), 48-51: “From Messrs. Gibson and Ornstein to Sir E. Mallet.”

diseases in areas of makeshift housing that woke up government officials to the changing reality of the city. The government devised plans to construct model tenements for the poor on hygienic principles. However, these plans lay fallow for the next few decades until they were taken up again at the end of World War One.

In the wake of the 1883 cholera outbreak, urban authorities extensively discussed the question of poor housing and the need to establish sanitary alternatives to *'eshash*. Plans to build hygienic “workmen’s dwellings” in order to house cholera refugees surfaced in 1883, and they were meant to provide an authorized blue print for constructing housing for the poor on hygienic principles.¹⁰ The Public Works Ministry issued the ‘Ministerial Decree Concerning the Construction of Workmen’s Dwellings’ in October 1883, according to which constructing slums like those of Boulaq was completely prohibited.¹¹ The decree required submitting engineering plans to the government in order to obtain an official permit (*rokhsa*) to build on premises. Significantly, it also contained detailed sanitary requirements including sufficient air circulation. The *'eshash* had to be provided with public or private bathrooms connected to sealed cesspools that were cleared regularly. Minimal specifications for each *'eshsha* in order to obtain a permit were four by three meters at the base and three in height. And future owners were threatened with speedy clearance in the case of non-compliance.

It is impossible to assess the degree to which urban authorities genuinely believed that people who were so destitute as to occupy lands in order to build makeshift houses would care to

¹⁰ Ibid. See also Robert Ilbert, “Egypte 1900, Habitat Populaire, Société Coloniale,” in *Etat, ville et mouvements sociaux au Maghreb et au Moyen-Orient: actes du colloque C.N.R.S.-E.S.R.C.*, ed. Kenneth Brown (Paris: L'Harmattan, 1989), 270-271.

¹¹ Dar al-Wathaiq al-Qawmiya [The Egyptian National Archive] (hereafter DWQ), Nizarat al-Dakheliya (Ministry of Interior), file number: 2001-018157.

follow the government's elaborate sanitary regulations or even know of them. As the decree was under discussion in the autumn of 1883, sanitary experts noted that rigorous enforcement and policing were required to prevent Cairo's squatters from rebuilding shortly after demolition, which was precisely the case with the slums that the government destroyed during the epidemic.¹² Residents had no choice but to return to the same or similar vacant lands and to rebuild their houses. The flexibility of *'eshash* and their low-cost and abundant construction material were indeed appropriate for the transient mode of life of Cairo's poor.

When the Public Works Ministry formed the *Commission d'assainissement du Caire* in 1885 in order to investigate unsanitary conditions in Cairo, *'eshash*, housing, and ruins and vacant lands came under discussion.¹³ Commission members noted that the problem of slums was in fact part of the broader problem of unhealthy housing in Cairo. And they learned that despite the 1883 *'eshash* decree, Cairo's makeshift houses had multiplied. Aside from lack of enforcement, the decree suffered from a legal loophole as it merely specified regulations for future *'eshash* and model tenements for the poor, while remaining silent on how to deal with existing ones. This made it particularly ineffective to deal with slums that paid rents to landowners. Members of the commission argued that if the slums could not be cleared then, at the very least, *'eshash* owners should be forced to provide public latrines connected to waterproof cesspits.

Vacant lots and ruins (sing. *kharaba*) dotted the landscape of late nineteenth century Cairo. Many of these spaces were administrated by the Ministry of Charitable Endowments, and as charitable endowments, *awqaf* were inalienable and could not be legally developed for purposes

¹² DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-033254.

¹³ Unless otherwise noted, all information regarding the 1885 Sanitary Commission are from the following sources: DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037344 and 4003-037345.

than that specified by their founders. Ruins that contained remains of collapsed buildings were commonly utilized as local dumping grounds or occupied by squatters.¹⁴ In its final report, the commission urged the government to clear these spaces completely. All dangerous materials such as trash and cesspools of collapsed buildings had to be removed immediately at the expense of the government, the Ministry of Charitable Endowments, or the putative landowner. Once cleared these spaces must be walled off to prevent squatters from reoccupying. Ultimately, however, these recommendations concerning the *'eshash* decree, vacant lands, and ruins fell on the government's deaf ears.

Slums continued to come to the attention of urban authorities due to disease outbreaks. In March 1889, H. R. Greene—Director of the Public Health Department from 1885 to 1892—wrote to the Minister of Interior to inform him of a small outbreak of typhoid fever in the “village” of Abbasiya.¹⁵ Urban officials were surprised to learn that the city's poor had populated the distant, uninhabited suburb, constructing various clusters of slums around a small lake (*birka*), which was one of the numerous lakes and ponds that existed in Cairo at the time. The department took necessary measures, but it needed the help of the Interior Minister in order to fill up the lake. Greene was sure that the stagnant body of water was to blame for the typhoid fever. The government learned that many water carriers draw their water from the very same lake that received dirty water from nearby army barracks. Later in March, a committee composed of Doctor A. H. Hooker from the Department of Public Health, Cairo Governor Chouhdy Pasha, and Colonel Hayes Bey from the Egyptian Army visited Abbasiya to further examine the origin and

¹⁴ Ali Mubarak, *Al-Khitat al-Tawfiqiyya al-Jadida li Misr al-Qahira* [Tawfiq'a New Plans] (Bulaq, Cairo, 1305 AH), V. 9, 52-3.

¹⁵ DWQ, Nizarat al-Dakheliya (Ministry of Interior), file number: 2001-018153 and 2001-025493.

development of the outbreak. They first toured a field hospital that was established for the purpose of treating typhoid patients. Next, the committee visited the neighborhood's slums. There were mainly four settlements of makeshift houses bordering the lake whose occupancy ranged between 600 and 1000 inhabitants each. While the committee made an extensive list of the families that occupied the *'eshash*, it deemed them completely uninhabitable from the sanitary point of view.

To the surprise of the committee, the *'eshash* of 'Ezbet al-Mohammadi and 'Ezbet al-Adly, which was also called Ezbet al-'Abid (literally, the 'Ezba of the Slaves), primarily housed Nubians and Sudanese immigrants.¹⁶ In the lists of residents compiled by the committee, Sudanese families were marked by "the Sudanese" (*al-Sudani*), for instance, 'Rizq the Sudanese and his family' or 'Fatima the Sudanese and her family'. Greene wrote to the Interior Minister again suggesting that in addition to filling up the lake, the slums had to be completely cleared. In fact, Greene urged the Interior Minister to pressure other relevant authorities, such as the Public Works Ministry, to enforce the inactive 1883 *'eshash* decree. He reminded him that these slums were close enough to the dense neighborhoods of Cairo that all necessary measures had to be taken to prevent typhoid fever from reaching the city. In addition, the government needed to establish gratuitous water fountains in order to circumvent drawing water from the lake by water carriers or the inhabitants themselves. Greene offered to pay a modest sum from his department's coffers for setting free water fountains, and while he recognized that more could be done, he reminded the Interior Minister that his budget was limited.¹⁷

¹⁶ The word *'ezba* commonly referred to agricultural estates where serving tenants lived and rented small lots. As Cairo encroached upon its agricultural hinterland, the word was mostly used to refer to slums that occupied semi-rural areas. The word is still used today to refer to urban informal settlements.

¹⁷ DWQ, Nizarat al-Dakheliya (Ministry of Interior), file number: 2001-018153 and 2001-025493.

Within a month, the Interior Ministry destroyed two of Abbasiya's slums. Later in April 1889, Greene was still not pleased with conditions at Ezbet al-Mohammadi and Ezbet al-'Adly. His assessment was that they were hopeless and could not be improved from a hygienic point of view. Nonetheless, his department installed two gratuitous fountains distributing filtered water. A year later typhoid fever resurfaced in another Sudanese slum, Ezbet al-Manashi, which was inhabited by over 900 people. The Public Health Department reiterated the same points about poor air circulation, unsanitary housing, overcrowding, and contaminated water supply as the perfect environment for the generation and transmission of infectious diseases. In response, the government demolished these *'eshash*.¹⁸ Capturing how Cairo's moneyed residents reacted to slum clearance with relief, An Egyptian resident sent a letter to the daily *al-Qahira* (Cairo) to thank urban authorities for taking the necessary measures to prevent typhoid from reaching the city.¹⁹

In response to the repeated complaints of Greene Pasha, the Ministries of Interior and Public Works established a joint commission in 1890 to further study the problem of slums and to make recommendations on improving their sanitary conditions. The commission visited various areas where there were concentrations of *'eshash* such as Boulaq, Old Cairo, Sayyida Zainab, and Abbasiya as well as vacant lands and ruins strewn across the city. It recommended amending the 1883 law in a way that would give the government the right to demolish existing *'eshash* that were constructed before the 1883 decree was passed.²⁰ In July 1891, the government promulgated a new law that clearly stipulated that all existing slums had to meet the technical requirements specified in the 1883 law irrespective of when they were built. Circulating drafts of the law referred to

¹⁸ DWQ, Nizarat al-Dakheliya (Ministry of Interior), file number: 2001-018925.

¹⁹ *Al-Qahira*, May 26, 1889.

²⁰ DWQ, Nizarat al-Dakheliya (Ministry of Interior), file number: 2001-018157.

Boulaq, Old Cairo, Abbasiya, and Shobra as particularly dangerous given the density of their *'eshash* and their poor hygienic conditions—the latter two areas became increasingly popular with middle class Cairenes two decades later as their slums were cleared. The law stipulated that existing slums that were built without permits or did not meet the technical and hygienic requirements would be evacuated by force, if needs be, and destroyed within six months. Two delegates from the Public Health Department and the Public Works Ministry would review all decisions to evacuate and destroy unlawful slums.²¹ In addition, all *'eshash* had to be provided with public latrines that were well ventilated and connected to waterproof cesspits. While the new law gave the government the power to demolish unsanitary slums, it expressed official resignation that the *'eshash* had become near permanent features of the urban landscape. Urban authorities mostly hoped that slums abided by a minimum of hygienic arrangements.

In January 1892, two field visits by John Price, a sanitary engineer of the Public Health Department, and Saleh Sobhi, an Egyptian doctor, underscored the extent to which Cairo's squatters had ignored the 1891 law. They visited many slums including *'Eshash al-Kharboutli*, which was centrally located in Faggala, close to the railway station and midway between the elite neighborhood of Azbakiya and newer developments in the direction of Abbasiya. The slum contained 118 huts "in extremely filthy conditions," at least ten of which were newly constructed without proper permits. The *'eshash* had no latrines and inhabitants made use of adjacent streets and near vacant lands. The two visitors deemed the slum dangerous to public health and gave orders to clean the rubbish, level the ground, whitewash huts and provide them with proper ventilation, and construct hygienic public bathrooms. John Rogers, then Director of the Public

²¹ DWQ, Nizarat al-Dakheliya (Ministry of Interior), file number: 2001-018371.

Health Department, complained that huts demolished last year were rebuilt within four months. His department was only responsible for sanitary inspection and reporting violations while the responsibility to demolish unlawful *'eshash* devolved on the Public Works Ministry. In any case, he stressed that the construction of public latrines had to gather pace in the future, as the slums did not disappear.²²



2.2. 'Eshash al-Kharboutli. (Prepared by the author on an extract from *Plan of Cairo Shewing Naming of Roads*)

Surveys of Cairo often included a field visit to a slum that functioned as a representative sample. In order to comprehend the housing conditions of the city, the 1892 international sanitary commission visited “Arab houses of diverse categories, a ghetto of *'eshash* in the neighborhood of Faggala, numerous houses of diverse classes, a very luxurious old palace, a new middle class

²² DWQ, Nizarat al-Dakheliya (Ministry of Interior), file number: 2001-018925.

house inhabited by Europeans.”²³ Although not named in the report, the commission likely visited ‘Eshash al-Kharboutli in Faggala, where they found conditions “beyond imagination.” Families lived in huts four by five meters at the base and three meters in height in rows three meter apart and with one or two cross lanes in the middle. A shallow well surrounded by trash and dirty street washings supplied the neighborhood with water. Indeed, the slum represented everything that was unsanitary in Cairo, right in the heart of the city.

Early Residential Suburbs

The desire of urban elites to escape the diseased city found expression in the development of residential suburbs during the early 1890s. Cairo’s suburban expansion and capital-led investment in transportation infrastructure began to reshape the residential map of the city in response to moneyed residents’ search for modern, healthy housing. Transportation, water, and gas companies as well the construction industry began to cater to the desire for exclusive, healthy residence. The government’s role in these developments was largely subsidiary to private capital.

In the absence of a Cairo Municipality, the Cairo City Inspectorate, also referred to as the Tanzim Council or Department, formed an essential branch of the city’s disjointed administration along with the Public Health Department and the Cairo Governorate.²⁴ Placed under the Public Works Ministry, the Tanzim’s meager budget during the first two decades of British rule allowed

²³ “Rapport de la commission internationale de l’assainissement du Caire,” *Journal Officiel*, Supplement to No. 51 (16 April 1892).

²⁴ The Tanzim Council dated back to 1844 when Mehmed Ali created *majlis tanzim al-mahrousa*, literally Cairo Organization Council, and tasked it with constructing and maintaining roads, issuing building permits, and devising public health regulations. The Tanzim was initially part of the Department of Education. Starting from 1866 and during the entire British colonial period it was organized under the Ministry of Public Works. See Khaled Fahmy, “Modernizing Cairo: A Revisionist Narrative,” In *Making Cairo Medieval*, eds. Nezar Alsayyad, Irene Bierman and Nasser Rabbat (Lexington Press, 2005), 181.

the department to perform limited, yet regular services including, most importantly, road construction and maintenance, street lighting, and building permits. As Jean-Luc Arnaud shows, the Tanzim's sole regulatory innovation during the early colonial period was the classification of roads and lands as public utility, which gave the department the power to expropriate lands and demolish buildings in order to widen streets and adjust alignments. The department did not always go through with the procedure due to the potentially high costs of compensating proprietors. Yet when it did, those who wanted to build or rebuild on lots bordering streets declared as public utility were required to present plans showing the limits of their property in relation to the street. The procedure expressed the Tanzim's desire to maintain urban connectivity and workable street alignments in the congested old neighborhoods of the city. It also shows the department's efforts to create new spaces for various purposes through street making. The Tanzim used this procedure as much as its budget allowed, and by 1893 1125 streets were declared public utility.²⁵ Three decades later urban authorities realized that these interventions were too uncoordinated and too piecemeal to ensure urban circulation and connectivity, particularly in the old quarters. In addition, the Tanzim exerted modest efforts to development new areas during the 1880s and early 1890s. The department levelled, subdivided, and established the street layout of Tawfiqiya, Birket al-Baghghala, and Faggala.²⁶ As an extension of existing elite neighborhoods, Tawfiqiya was deliberately developed as an upper-class neighborhood, while the southern neighborhood of Birket al-Baghghala was subdivided as a checkerboard featuring small blocks with no public squares or diagonal streets—the mark of a socially inferior type of neighborhood. And while the Faggala

²⁵ Jean-Luc Arnaud. *Le Caire, mise en place d'une ville moderne, 1867-1907: Des intérêts du prince aux sociétés privées* (Aix-en-Provence: Actes Sud, 1998), 232.

²⁶ Janet Abu Lughod, *Cairo: 1001 Years of the City Victorious* (Princeton: Princeton University Press, 1971), 116.

developments were very modest, they began a trend of eastward residential urban expansion towards Abbasiya.

While Cairo's disjointed urban administration resulted in generally poor urban services, the neglect of old quarters inflicted an additional layer of urban inequality. For instance, the Department of Street Sweeping and Sprinkling was first part of the Public Works Ministry when it was created in 1884. Two years later, it was transferred to the Public Health Department under the Ministry of Interior. The move led to some debate as some officials within the two ministries questioned the logic of separating tasks that belong together, namely road construction, maintenance, and sweeping, between two ministries.²⁷ Meanwhile, the disparity of municipal services between new and old quarters gradually became a source of grievance for the inhabitants of the latter. Notables, merchants, and comfortable residents who had not yet relocated to newer quarters were naturally most vocal about lack of service. In 1886, a short angry article that appeared in the daily *al-Qahira* argued that the Department of Street Sweeping and Sprinkling only cared about the wealthy neighborhoods of ministries and foreign residents. The article deplored the department's neglect of the old, popular quarters despite the fact that their residents paid taxes on their property. The author also claimed that eye diseases became common in congested neighborhoods due to increased levels of dust.²⁸ As the city greatly expanded two decades later, the disparity of municipal services between new and old neighborhoods became one of the most recurring themes of anticolonial agitation.

²⁷ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-033272.

²⁸ *Al-Qahira*, October 4, 1886.

Suburbanization in Cairo dated back to the late 1880s when some of Cairo's elite residents began populating the distant semi-rural lands of Matariya and Zaitoun. Matariya was then a village located in the city's northeastern hinterland and the site of Pharaonic ruins, agricultural estates, and an ostrich farm. Significantly, it was so greatly admired for the purity of its air that by the late 1880s it became popular among urban elites and tourists.²⁹ The government's construction and pavement of the Abbasiya-Matariya road in 1888 undoubtedly encouraged moneyed Cairenes to consider moving to the distant suburb.³⁰ By the early 1890s, the government had subdivided a stretch of land reaching from Abbasiya all the way to Marg, including lands in Zaitoun, Matariya, and Kafr al-Gamous before selling the lots for explicitly residential purpose. And as the government extended the state railway to Matariya, private gas and water companies followed suit.³¹ As Arnaud remarked, Matariya and Zaitoun offered a particular type of urbanization where elite residents usually lived in villas surrounded by small gardens.

However, the most important reason for suburban development was not to search for space but to escape the diseased city. Matariya already enjoyed an established reputation as one of Cairo's healthiest spots. In 1895 Greene Pasha—then former Director of the Department of Public Health—wrote that Moqattam should become like Matariya and Helwan, “a respite, as it were, from the foul smells and coprophagous microbes of the undrained city.”³² The efforts to escape

²⁹ For a sample of the then growing literature of health tourism see Greene Pasha, “Mokkatam: A Sanatorium for Cairo,” *The Lancet*, June 29, 1895, 1663-64, Fleming Mant Sandwith, *Egypt as a Winter Resort* (London: Kegan Paul, Trench and Co., 1889), and Egyptian State Railways, *Winter in Egypt: Illustrated Guide of the Egyptian State Railways* (Cairo: National Printing, [After 1905]). As we saw in the Chapter One, both Sandwith and Greene served as directors of the Public Health Department.

³⁰ Arnaud, *Le Caire*, 188 and 274.

³¹ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037314.

³² Greene Pasha, “Mokkatam: A Sanatorium for Cairo,” 1663.

the disease-ridden landscape of the city led moneyed Cairenes to consider relocating from their old, unhealthy quarters to sparsely populated new quarters such as Ismailiya, or to distant suburbs such as Zaitoun and Matariya.

A dispute between Matariya residents and the Ministry of Public Works bore witness to the health concerns behind the residential move to Matariya and other suburbs. The origin of the dispute lay in a sewage system scheme prepared by Julien Barois in 1894. The engineer proposed a project that featured a sewage farm, a land where all the city's waste was collected and used as a fertilizer.³³ In the spring of 1894 elite residents of Matariya were shocked to learn that the proposed location of the sewage farm was none other than the fields east of their neighborhood. In March 1894, a letter from "M. D., a Matariya resident" appeared in the daily Arabic newspaper *al-Mu'ayyad*, which was at the forefront of nascent anticolonial agitation. The author railed against the proposed scheme:

We, residents of Matariya and its suburbs, receive this news with astonishment because until now we consider ourselves to be residents of Cairo and we think that the same level of attention directed to the city should also be directed towards us. Currently, most of us are Cairenes who chose to live in the suburbs because of the dryness and purity of its air. Why is it then that the Ministry of Public Works views the capital's retreat as the discharge site of the city's waste and rotten substances?...How can [the government] justify itself to the few thousand inhabitants in whose air it is spreading poison, a poison that will in time spread and damage everything it surrounds? This poison will also spread to the people of Cairo due to the direction of the wind, sending to them from above what the sewage system sent away from below.³⁴

The author pointed out that Barois should have known that due to the geological nature of Matariya and the adjacent village of Kafr al-Gamous sewage would not be completely absorbed in the soil. Rather, it would necessarily flow to the nearest low-lying lands, which led to one of the branches

³³ See Chapter Four for more on Barois' drainage scheme.

³⁴ "Masaref al-'Asima" [The Capital's Drains], *Al-Mu'ayyad*, March 25, 1894.

of the Ismailiya Canal, the source of potable water for agricultural villages located downstream in the provinces of Qalioubiya and Sharqiya. Poisoning the drinking water of villagers with Cairo's sewage was unacceptable, for "has anyone said that people's stomachs need fertilizers?"³⁵ Shortly afterwards, William Garstin, the Under-Secretary of the Public Works Ministry, read a French translation of this letter, which he promptly forwarded to Barois along with a terse message: "M. Barois, you may care to read this."³⁶

It turned out that Wilfrid Blunt was one of the elite residents of Matariya who traded proximity to the city for pure air.³⁷ In March 1894, Blunt sent a letter directly to Lord Cromer, the British Consul-General and the de facto ruler of Egypt from 1883 to 1907, where he condemned the drainage project.³⁸ Blunt charged that Barois had not given much thought to how the population of these districts would be affected by his scheme. He also claimed that the proposed location of the sewage farm was not simply a desert as Barois seemed to think, as the land had become occupied during the last few years. Finally, it was in the best interest of Cairo in its entirety to keep Matariya sewage-free as it was situated windward of the city. A sewage farm in Matariya would blow poisonous air at Zaitoun and Qobba before reaching the city proper.

As if this was not enough, Matariya residents raised a collective petition to Khedive Abbas Hilmi (r. 1892-1914) that requested his intervention, and the petition underscored the health concerns behind suburban expansion.³⁹ The signatories of the petition were a mix of well off

³⁵ Ibid.

³⁶ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037314.

³⁷ Blunt was an English writer and poet who wrote polemics against British imperial expansion and personally supported many Egyptian proto-nationalists and nationalists.

³⁸ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037314.

³⁹ Ibid.

Europeans and Egyptians as well as many provincial officials—*omdas* (governors) and *sheikhs* (headmen)—of surrounding rural villages including Khanka, Marg, Qalag, Minieh, Kafr al-Basha, Bawageer, and Khosos. The petition began with the following remark: “as Cairo’s inhabitants increased and its health conditions changed when deadly infectious diseases continued to spread for extended periods of time, the city’s inhabitants took the initiative to search for a healthy refuge to protect them and their children from the ravages of these diseases, and while some chose Helwan others chose Matariya.”⁴⁰ The petition thanked the government for the work of subdividing the land and extending gas mains and state railways to their neighborhood, which reached “the zenith of urban development” [*fi ghaya men al-‘umariyya*] as a result. Residents, the petition claimed, paid dearly and endured the difficulties of moving to “such desolate places” [*al-jihat al-qahila*] in order to enjoy pure air and protection from the “rottenness of the city” [*‘ufunat al-madina*]. Reiterating the same objections, the petition discredited the choice of the location of the sewage farm point by point and the upshot of its argument was that the proposed location posed grave dangers to the health of the entire city and its neighboring villages. While making a broader claim about the potential health hazards to all of Cairo, the petition did not shy away from expressing the particularistic grievances of Matariya inhabitants. The sewage farm was clearly going to be a nuisance to them as it would create a reservoir of deadly “germs” [*jarathim*] and “microbe” [*mikrobat*] that would poison the soil and surrounding water sources. In addition, the sewage farm would be responsible for “the loss of reputation of the best spot in Egypt and depriving Cairenes of the healthiest location north of the city.”

⁴⁰ Ibid.

Conspicuously absent from the Matariya dispute was the question of property values despite its growing importance. Residents understood that the value of their property would inevitably decline as a result of the creation of a sewage farm in their neighborhood. The petitioners chose to organize their opposition to the drainage scheme solely on the grounds of public health because they could garner more support this way, as it allowed them to make claims about the disadvantages of the project to the city in its entirety. As it stood, the argument was not disingenuous, since most ordinary people still associated foul smells with infectious diseases, even if this association was being recast into a new idiom of microbes and germs. However, the argument stopped short of spelling out the financial consequences of the loss of reputation of their neighborhood as a healthy residential location. It would have meant that all the difficulties they purportedly went through to move out of the city came to naught. Not only was their area going to be disease prone like the rest of Cairo, but also the land they bought, and perhaps hoped to resell at a higher price, was going to depreciate as a result of proximity to the sewage farm.

The commodification of Cairo's housing was a gradual process initially put in motion by increasing demand for healthy housing with modern amenities. By the 1890s the residential geography of the city was slowly changing. Purity of air and distance from congested neighborhoods and notorious slums became ever more desirable. At the same time, land and property values started to rise. While this trend was only beginning in the 1890s, capitalists, speculators, and urban investors took this trend to its illogical conclusion with the property bubble of 1897-1907.

Relocating to healthy quarters required the extension of capital-intensive mass transportation and utilities, which were the early sites of capital investment and accumulation into

the urban landscape.⁴¹ The introduction of mass transportation revolutionized Cairo as it introduced new patterns of habitation, work, communal affiliation, and conviviality among ordinary Cairenes. Coachmen, carters (*'arbajiya*), and horse-drawn cabs and omnibuses were traditionally the most common means of transportation.⁴² Railways began to reshape the city when in 1889 the government constructed its own suburban lines connecting Matariya to the main railway station of Bab al-Hadid. In 1890, the government extended the line to Marg village, and by 1906 two-way rail lines integrated the entire suburban system that included stops in Zeitoun and Demerdash.⁴³ In 1888, a Jewish-Egyptian business consortium composed of Egypt's leading banking families—the Suarès, Cattai, and Menashe—acquired a concession to build and operate a railway line linking the capital to Helwan, a popular health resort whose sulphur baths were praised for their wholesome qualities.⁴⁴ The same group of businessmen later developed the residential area of Maadi along this rail line.

⁴¹ As Robert Vitalis argued, the colonial regime established an economy based on the distribution of rents, concessions, and monopolies, from which local, urban-based business groups initially benefitted the most before they were later joined by an influx of foreign investors. Robert Vitalis, *When Capitalists Collide: Business Conflict and the End of Empire in Egypt* (Berkeley: University of California Press, 1995), Ch. 1.

⁴² Owned by the Suarès family, the Omnibus Company offered the first regular service of public transportation along fixed routes by means of horse-drawn carriages. The omnibus came to be known by the owners' name and were called "sawaris" by Egyptians. See John Chalcraft, *The Striking Cabbies of Cairo and Other Stories: Crafts and Guilds in Egypt, 1863-1914* (Albany: State University of New York Press, 2005), 132-141. Motorized omnibuses began operating in Cairo in 1907. See Dr. Saadeh Bey, "Motor Progress in the Land of the Pyramids," *The Horseless Age*, August 21, 1907, 239-241.

⁴³ Marcel Clerget, *Le Caire: Etude de géographie urbaine et d'histoire économique* (Cairo: E. & R. Schindler Press, 1934), T. II, 110.

⁴⁴ The Helwan hotels were built during the reign of Khedive Ismail to receive royalties and winter tourists. The Cairo-Helwan railway started operating in 1890, connecting Bab al-Louq in Ismailiya to Sayyida Zainab, Fumm al-Khalig, Old Cairo, Maadi, Torah, and Helwan, and the line was owned by the Cairo Metropolitan Helwan Railway Company. In 1896, the company secured a concession to exploit the hotel and the sulphur baths of Helwan, both previously state-owned. Arnold Wright and H. A. Cartwright, eds., *Twentieth Century Impressions of Egypt: Its History, People, Commerce, Industry and Resources* (London: Lloyd's Greater Britain Publishing Company Ltd., 1909), 183.

The arrival of tramways in 1896 created new patterns of urban connectivity and made possible the rapid, capital-led development of distant suburbs that catered to comfortable residents. The idea of constructing tramlines in Cairo began to circulate in official circles starting from the mid 1880s.⁴⁵ In 1896, Baron Empain's Cairo Tramway Company acquired tramline concessions for fifty, later extended to eighty, years. By the end of 1896, the company had constructed and inaugurated six tramlines with Ataba al-Khadra square in Azbakiya as the main station from which all lines extended. The choice was hardly surprising since the elite neighborhood of Azbakiya had become a focal point between old neighborhoods and Khedive Ismail's western expansions and the center of commerce, banking, and tourism. The six tramway lines transported commuters to the citadel, Boulaq, Bab al-Louq and Nasriya, Faggala, Qasr al-'Aini Medical School and Old Cairo, and the main railway station of Bab al-Hadid.⁴⁶ Shortly after, the company extended the Faggala line to reach Abbasiya and constructed a new line to the popular Giza Pyramids. In 1902, the company acquired another concession to extend a tramline to the increasingly popular northern neighborhoods of Shobra and Rod al-Farag.⁴⁷ Between 1902 and 1909 the number of annual users

⁴⁵ One of the solutions to the Khalig's insanitary conditions that A. H. Hooker proposed in 1885 was to fill it up and to construct a tramline for transporting passengers as well as trash to Old Cairo. DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037345. In 1890, the government granted concessions to a Belgian entrepreneur giving him the right to construct several tramlines. Three years later, the government unilaterally rescinded the concessions as the businessman had not started the work, justifying his inaction by financial jitters in London due to the Baring crisis of 1890 and the South American debt crisis, which made bank loans more difficult to secure. DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-008605 and 0075-008609.

⁴⁶ The extension of tramways by Baron Empain's business empire is well known from the excellent accounts of Marcel Clerget and Janet Abu Lughod. See Clerget, *Le Caire*, T. II, 107-108 and Abu Lughod, *Cairo*, 279-85. Baron Empain was a Belgian entrepreneur who invested in urban transportation in Europe, Russia, China, and the Belgian Congo. He was the largest shareholder of the giant Belgian group *Société générale des chemin de fer économique*, which owned the Cairo Tramway Company. See Emile Boulad, *Les Tramways du Caire* (Cairo: Paul Barbey Press, 1919), 3.

⁴⁷ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-059301.

of the company's lines jumped from 19 million to 49 million, and in 1917 there were nearly 91 kilometers of tramway tracks that annually transported 67 million passengers.⁴⁸

Discussions on the Khalig line—perhaps the most important tramline concession the government offered to the company—bore witness to the convergence of capital and health concerns in the making of new spaces in Cairo. As we saw in the previous chapter, the Khalig Canal was a waterway that bisected many of the city's oldest quarters, and it was considered by authorities as an enduring source of disease. The concession gave the Tramway Company the right to construct and operate a line running along the Khalig from Sayyida Zainab to Daher on the condition of filling up the canal at the company's own expenses. In January 1897, a memorandum from the Public Works Ministry to the Council of Ministers explained the advantages of the Khalig line. The government had already closed the canal after the 1895-96 cholera epidemic. This was the government's chance to have the Khalig filled up without suffering expenses as the company pledged to construct and macadamize a six-meter wide road and to compensate owners for expropriations. An artery traversing Cairo's congested quarters would enhance traffic and improve public health by creating air circulation. Last but not least, the street "will increase the value of properties" where it extended, which certainly compensated for the purported local attachment to the Khalig that colonial officials thought was so strong as to foreclose its suppression.⁴⁹ By 1898

⁴⁸ Boulad, *Les Tramways du Caire*, 1-4.

⁴⁹ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-008608. In his report for the year 1898 Cromer wrote: "it was believed that the native population generally would regard the permanent closure of the Khalij with disfavor. As time went on it became clear that the degree of interest which was presumed to prevail in the continued existence of the Khalij had been a good deal exaggerated... The Khalij has now disappeared; it has been filled up with earth from end to end, and has been turned into a public road. The native population of Cairo has regarded the matter with complete unconcern." The National Archives of the United Kingdom (hereafter TNA), FO (hereafter FO) 407/164: Lord Cromer to the Marquess of Salisbury, dated February 27, 1898.

the Khalig had vanished and regular tramway service connecting Sayyida Zainab to Daher began in 1900.

The transportation infrastructure of the turn of the century opened up the urban landscape. It set the stage for subsequent urban and suburban development that was driven by the desire to live in healthy areas away from congested neighborhoods and slums. Businessmen, some of whom had investments in the infrastructures of transportation and utilities, subsequently ventured into the housing industry.

Urban Demography and Economy

Understanding urban demographic and economic currents at the turn of the 20th century is necessary to account for the property bubble of 1904-1907 and grasp the roots of Cairo's housing crisis. The city's population increased considerably during the four decades of British colonial rule primarily as a result of rural and regional migration. At the same time, the city's artisans, craftsmen, and service workers generally suffered downward mobility as the system of guilds that supported their livelihood slowly disintegrated, particularly starting from the 1890s. These demographic and economic processes were spatially uneven.

Trends of demographic growth and migration increased the demand for affordable housing in Cairo. The city attracted thousands of migrants from inside and outside Egypt during the last decades of the nineteenth century. Greeks, Italians, Austrians and various British and French subjects moved to Egypt's largest cities as they were encouraged by the legal and financial privileges they enjoyed under the system of capitulations and by the economic opportunities that the Suez Canal and the cotton trade created. The economic bubble of the turn of the century particularly drew foreigners to Cairo as a financial center. Major Egyptian cities also received

regional migrants from Ottoman provinces, Syria, Armenia, Nuba and Sudan. Nubians and Sudanese for instance came to Cairo to work as domestic servants, porters, building guards, coachmen, cabbies, as well as employees of the Public Works Ministry for street pavement.⁵⁰

Especially Cairo and Alexandria grew at a pace far exceeding the rest of the country due to rural migration. Thousands of peasants from Lower Egypt came to Cairo in search for economic opportunities and to escape harsh conditions of the countryside. Landlessness and indebtedness haunted modest and landless peasantry, whose lives were tied to circuits of credit and debt that made them subjects to landlords and lending institutions.⁵¹ Southerners (*sa'idis*) moved to the north to escape the economic marginalization that marked the agriculturally and economically poor southern provinces. Between 1882 and 1897 the urban population of Egypt increased by thirty-eight percent, or from 1,219,000 to 1,685,000.⁵²

C. C. Lewis, the director of the 1907 census operation, highlighted the unprecedented demographic growth of Cairo and Alexandria, whose population reached 654,000 and 370,000, increasing at a rate of 14.8 and 15.7 percent respectively. These rates of growth were ahead of most English, colonial, and world cities such as Madras, Paris, London, Bombay, Calcutta, and Berlin, which was unexpected “especially given the nonindustrial character” of the two cities.⁵³

⁵⁰ See Chalcraft, *Striking Cabbies*, 61, 72, and 155 and Jean Vallet, *Contribution à l'étude de la condition des ouvriers de la grande industrie au Caire* (Valence: Imprimerie Valentinoise, 1911), 7-8.

⁵¹ Khedive Ismail's taxation and agricultural policies resulted in rural indebtedness and landlessness. See Roger Owen, *Cotton and the Egyptian Economy, 1820-1914* (Oxford: Clarendon Press, 1969), Ch. 5, 7-9 and 'Ali Barakat, *Tatawur al-Milkiya al-Zira'iyah fi Misr wa Atharahu 'Ala al-'Haraka al-Siyasiya, 1813-1914* [The Development of Landed Property in Egypt and its Effect on Politics, 1813-1914] (Cairo: Dar al-Thaqafa al-Jadida, 1977).

⁵² TNA, FO 407/143: Lord Cromer to the Marquess of Salisbury, dated June 3, 1897.

⁵³ Egypt, Ministry of Finance, *Te'dad Sukkan al-Quṭr al-Misri fi Sanat 1325 Hijriya-1907 Miladiya* [The Census of Egypt in 1325 Hijri-1907 AD] (Cairo: Boulaq Press, 1909), 26. Breaking down the increase of Cairo's population from 1897 to 1907, Lewis estimated that 37,000 were due to natural increase and 47,000 due to immigration.

Considering migratory trends offers a picture of the demographic influx in Cairo. Out of the city's 654,000 inhabitants, 243,000 (37%) were born outside of Cairo. The city's migrants could be broken down into a variety of noteworthy ways:⁵⁴

- 75,000 were born outside of Egypt; 168,000 were internal migrants.
- Of foreign migrants, 14,500 were born in Greece, 13,500 Sudan, 13,500 Syria, 9,500 Ottoman Provinces, 6,500 Italy, and 5,500 British Islands.
- Of internal migrants, 145,000 were born in places other than Egypt's major northern towns (Alexandria, Tanta, Zaqaq, Damietta, Mansura, Port Said, and Ismailiya).
- Of internal migrants, 93,000 were born in Upper Egypt. 20,000 were born in Giza, or what later became the western bank of Cairo. 30,000 were born in the southern province of Assiout.

These figures show ongoing rural immigration to the capital and a migratory trend from Upper to Lower Egypt. The same trends were operative by the time of the 1917 census.⁵⁵

These demographic trends fed into a growing housing market in Cairo. Urban elites, foreigners, and upwardly mobile middle classes sought after healthy, modern housing. At the same time, a continuous pool of more numerous local and regional migrants who sought affordable housing shaped the geography of urban poverty and squatted spaces. Conflicting speculations on urban demography gave rise to opposing arguments about how authorities and urban developers should respond to these pressures or opportunities.

⁵⁴ See Egypt, *Te'dad Sukkan al-Qutr al-Misri fi Sanat 1325 Hijriya-1907 Miladiya* [The Census of Egypt in 1325 Hijri-1907 AD], 34 and Egypt, Ministry of Finance, Department of General Statistics, *Annuaire Statistique de l'Égypte 1914* (Le Caire: Imprimerie Nationale, 1914), 42. Demographic categorization could be confusing. 'Place of birth' aggregated all nationalities, thus counting Egyptians and foreigners (to foreign parents) born in Egypt without distinction. For instance, according to these sources, there were 18,000 Sudanese in Cairo in 1907 but only 13,500 of them were born in Sudan, while the rest were born in Egypt, including Cairo.

⁵⁵ The city's population grew to 791,000, out of which 231,000 were internal migrants, 77,000 were born outside of Egypt, and 483,000 were born in Cairo. For the first time, areas on the western bank of the Nile including Imbaba, Giza, and the island of Gezira were counted as part of Cairo. Egypt, Ministry of Finance, Department of General Statistics, *Annuaire Statistique de l'Égypte 1921-22* (Le Caire: Imprimerie Nationale, 1923), 9-26.

Concomitant economic trends that saw the downward mobility of traditional artisans left an uneven impact on Cairo's landscape whereby old neighborhoods fell into poverty. The guilds have been the subject of superb studies that chart the transformation of guild members into wage earners.⁵⁶ The studies also show that guilds were largely able to protect urban artisans and service workers until the late nineteenth century when their influence gradually diminished until they disappeared during the first decades of following century. The colonial period witnessed marked impoverishment of Egypt's crafts and service workers due to severe competition from European commodities and lack of protection. For guild members, this meant lower wages and exploitation at the hands of guild headmen (*sheikhs*) and labor contractors, and the guilds were gradually abandoned as their administrative and social significance dwindled. Skilled craftsmen and unskilled laborers began looking for opportunities in an expanding urban labor market and became wage earners in railway, construction, transportation, utility, and cigarette manufacturing industries. A pioneering sociological treatise on the conditions of the working class in Cairo by Jean Vallet estimated the size of the wage-earning population in 1911 to be 400,000 (out of the

⁵⁶ Traditionally, the guilds (*tawa'if*, sing. *ta'ifa*) were administratively recognized, urban specific corporations where practitioners of the same trade were trained and organized under the guidance of a *sheikh*. The guilds mediated between networks of urban craftsmen and service workers and the state as the *sheikh* of each guild was responsible for estimating and collecting taxes from members, setting prices for goods and services, and imposing conditions of entry into the trade among other things. The reasons for the decline and dissolution of guilds are subject to debate, yet suffice it here to say that the guilds were abandoned due to a conjuncture of causes: first, government regulations diminished the guilds' authority and prerogatives, second, changing tastes largely favored European products, and finally, craftsmen were unable to compete with cheaper European goods in the absence of state protection. The guilds were neither suppressed by law nor did they disappear overnight. Joel Beinin and Zackary Lockman, *Workers on the Nile: Nationalism, Communism, Islam, and the Egyptian Working Class, 1882-1954* (Princeton: Princeton University Press, 1988), Ch. 2, Chalcraft, *The Striking Cabbie*, Ch. 6, and Vallet, *Contribution à l'étude de la condition des ouvriers*.

city's 654,000)—a sizable figure in light of their relative poverty.⁵⁷ Labor “was cheap, abundant, and largely unprotected.”⁵⁸

The effects of these economic trends were spatially uneven. In an often-quoted passage Cromer recounted that:

The difference must be apparent to any one whose recollection of Egypt goes back for some ten or fifteen years. Quarters that were formerly hives of busy workman...have shrunk to attenuated proportions, or have been entirely obliterated. Cafes and small stores retailing European wares are now to be found where productive workshops formerly existed.⁵⁹

However, this assessment ought to be qualified. First, neighborhoods were affected unevenly. Thus, traditional neighborhoods such as Darl al-Ahmar, Bab al-Sha'ariya, Khalifa and Gamaliya, which housed the city's artisans and craftsmen and their workshops, suffered the most.⁶⁰ Second, the service sector, where there was no European competition, was less affected by these developments as barbers, doormen, domestic servants, porters, coachmen, and cabbies continued to make a livelihood. Finally, changing urban geography of residence and labor created new sites that absorbed the new laboring classes. Transportation workers, domestic servants, and doormen were in demand. The construction industry, which surged since 1897 to become the second employer of Egyptians after agriculture, employed 21,744 skilled and unskilled workers in 1907.⁶¹

⁵⁷ Significantly, Vallet was perceptive of the gendered nature of labor. He counted women who were employed as onsite unskilled workers (especially in the construction industry) as well as housewives as domestic laborers. He also counted working children under the age of twelve (who were often employed by artisans in workshops). Vallet, *Contribution à l'étude de la condition des ouvriers*, 2. On working children see Germain Martin, *Les bazars du Caire et les petits métiers arabes* (Cairo: Cairo University, 1910), 72-4.

⁵⁸ Chalcraft, *Striking Cabbies*, 111.

⁵⁹ TNA, FO 407/165: The Earl of Cromer to Sir Edward Grey, March 8, 1906.

⁶⁰ See the portrait of a carpenter's family who lived in Bab al-Sha'ariya in 1910 in Vallet, *Contribution à l'étude de la condition des ouvriers*, 28-32. See also Martin, *Les bazars du Caire*, 74.

⁶¹ Vallet, *Contribution à l'étude de la condition des ouvriers*, xii and 113-126. Egyptian Government, Ministry of Finance, Statistical Department, *The Census of Egypt, Taken in 1917* (Cairo: Government Press, 1920), Vol. 2, 22. For the Cairo building industry see Roger Owen “The Cairo Building Industry and the Building Boom, 1897-1907,”

These demographic and economic currents left a significant impact on urban space. Internal, regional, and foreign migration reshaped the residential landscape of the city and gave rise to rival arguments about what the city could and should be. The downward turn of the city's craftsmen and artisans engulfed the traditional neighborhoods that housed them. And by the first decade of the twentieth century, the urban landscape became the site of intensive, yet contradictory processes of impoverishment and capital accumulation.

“The Magic of English Security:” The Property Boom

Cairo witnessed an unprecedented property boom between 1897 and 1907 that created a speculative housing market and unleashed dynamics that transformed the city spatially and socially. Entitled “Richer Egypt. Magic of English Security. A Land Boom. The Potent Harem. Villa and Flat in Cairo,” an article that appeared in *The Egyptian Gazette* in July 1906 appropriately captured the contemporary mood of capitalist confidence in Cairo's property boom that reached its zenith between 1904 and 1907. The author claimed that the year 1898 marked “the commencement of an era of material prosperity...hitherto unknown in the valley of the Nile.”⁶² Egypt was in the midst of an episode of financial euphoria, and economic boosters commonly considered the country a new El Dorado for investors. Business-friendly observers compared Egyptian cities, particularly Cairo, to mushrooming American cities that seemed to have no limits on their demographic and spatial growth, which turned out to be a misleading comparison. European capital surged in Egypt, establishing mortgage and land development companies and

in *Colloque internationale sur l'histoire du Caire* (Cairo: Ministry of Culture of the Arab Republic of Egypt, 1972), 337-349.

⁶² “Richer Egypt. Magic of English Security. A Land Boom. The Potent Harem. Villa and Flat in Cairo,” *The Egyptian Gazette*, July 2, 1906.

banks. Speculative investment in stocks and land became widespread, and the value of urban lands and properties doubled, tripled, and more, in a matter of few years.⁶³ In the sequel article, “Land Boom in Egypt. Speculative Builder in Cairo. Desert Suburbs,” the same author confessed qualified skepticism. “Shares which go up, so to speak, in a balloon,” he cautioned, “are, according to my experience, certain to come down as a parachute.”⁶⁴ A bust, he admitted, was inevitable, despite the assurance of “local experts.” After 1907, Lord Rathmore, President of the Bank of Egypt, reflected that back during the bubble “people were apparently mad.”⁶⁵

As the crash of the summer of 1907 hit Egypt, and as the financial crashes followed in Chile, Japan, Germany, and the United States, it became clear that the world that finance capital had created became more connected and more vulnerable in new ways.⁶⁶ Finance capital had been forcefully pushing to invest away from saturated Europe in ways that, according to some, changed the nature of capitalism itself.⁶⁷ By the end of the nineteenth century, the English capitalist was no longer the entrepreneurial factory owner, but the financier of overseas business ventures. The crash of 1907 and its consequences bore witness to this change.

⁶³ Alexander Noyes, “A Year After the Panic of 1907,” *The Quarterly Journal of Economics* 23, 2 (1909), 203.

⁶⁴ “Land Boom in Egypt. Speculative Builder in Cairo. Desert Suburbs,” *The Egyptian Gazette*, July 4, 1906.

⁶⁵ Quoted in Noyes, “A Year After the Panic of 1907,” 203.

⁶⁶ Alexander Noyes wrote presciently that the financial world had become organized as a “chain of credit” that could be undone from where the link was weakest, as in Egypt and Chile, or where the strain was greatest as in New York. Noyes, “A Year After the Panic of 1907,” 206. Others pointed out how the fall of prices of railway stocks in the United States in the spring of 1906 sparked dynamics that eventually led to the global panic. Pierre Arminjon, “La crise financière égyptienne actuelle,” *Revue des deux mondes* 41 (1907), 202. See also Robert Bruner and Sear Carr, *The Panic of 1907: Lessons Learned from the Market’s Perfect Storm* (Hoboken, New Jersey: John Wiley and Sons, 2007), 14.

⁶⁷ As when Lenin argued that imperialism, understood as the monopolistic search for outlets of capital away from oversaturated Europe, was “the highest stage of capitalism.” Vladimir Lenin, *Imperialism: The Highest Stage of Capitalism—A Popular Outline* (London: Penguin Books, 2010 [1916]).

Guardians of the economic order argued that the crisis, while painful in the short term, would make the future Egypt a better place for capital by purging the country of reckless economic practices.⁶⁸ Even during the height of the crash, officials declared that “the country is as prosperous as ever,” arguing that the agricultural basis of prosperity in Egypt was sound.⁶⁹ Yet, the boom left a permanent mark on the urban landscape and the housing market as the city expanded rapidly and as rents and property values spiraled upwards. The president of the Anglo-Egyptian Bank noted in 1908 that liquidation of urban land and property companies was not forthcoming and that “the value of urban and suburban land and properties must still be considered quite nominal.”⁷⁰ In other words, in contrast to stocks whose prices violently fell, the values of urban and suburban lands and properties did not adjust after the crash. Not doubling in value in a single year was enough adjustment for investors.

Circumstances ripe for speculative euphoria intertwined in Egypt during the decade before the crisis. Boosters made various political, economic, and demographic arguments for why the bubble expressed real economic progress. They argued that British investment in the infrastructures of irrigation and transportation signaled that the occupation became permanent. These infrastructures created a well-oiled machine for producing, transporting, and exporting cotton.⁷¹ Increasing value of cotton exports further encouraged investment despite the fact that this

⁶⁸ “Egyptian Finance. Panic the Result of Overspeculation and Fictitious Bourse Values,” *The Washington Post*, Dec 8, 1907.

⁶⁹ “Egypt Suffers from Overspeculation,” *San Francisco Chronicle*, Aug 13, 1907.

⁷⁰ Quoted in “Anglo-Egyptian Bank. State of the Country,” *The Times of India*, Dec 17, 1908. See also Noyes, “A Year After the Panic of 1907,” 209.

⁷¹ A. E. Crouchley, *The Investment of Foreign Capital in Egyptian Companies and Public Debt* (Cairo: Government Press, 1936), 50-51.

was due to not only good crops but also rising international prices between 1902 and 1907.⁷² Alfred Eid, who was one of colonial Cairo's most unreserved boosters, pointed to the British reoccupation of Sudan in 1898 as another cornerstone of "political stability" that encouraged investors.⁷³ The ultimate gesture of political stability, however, was the Anglo-French Entente Cordiale of 1904, which made Egypt a near exclusive sphere of British political influence and a sphere for European, most importantly British, finance capital. For businessmen, financiers, and speculators, this provided assurance that the money they invested in Egypt was safe. Last but not least, there was the demographic argument for urban development. Boosters such as Eid argued that the constant influx of Greeks, Italians, and other relatively more comfortable migrants created new demands for modern housing in Cairo. The "local experts" argued that these developments would keep the urban property boom in business for the foreseeable future.⁷⁴ The new El Dorado was seemingly unstoppable.

The influx of foreign capital made possible urban development on a new scale in Cairo and fueled speculation. "An avalanche of capital" hit Egypt due to this conjuncture of circumstances, at the same time that "Europe regorged with capital in search of profitable employment."⁷⁵ In 1897, the total capital of joint-stock companies operating in Egypt, excluding the Suez Canal, was LE 13,885,000. In 1907, it reached a staggering LE 87,176,000. From 1900 to 1907 more than half of

⁷² 'From an Egyptian Correspondent', "War and Finance in Egypt," *The Economic Journal* 25, 97 (1915), 79-80.

⁷³ Alfred Eid, whom we met in Chapter One, was the son of Georges Eid, the Syrian-born Belgian consul of Cairo. Alfred was a doctor by training and he served as the Belgian vice-consul. Both Eids were heavily involved in urban land development and speculation. Alfred Eid, *La Fortune immobilière de l'Égypte et sa dette hypothécaire* (Paris: F. Alcan, 1907), 70.

⁷⁴ "Land Boom in Egypt," *The Egyptian Gazette*, July 4, 1906. See also George Foucart, "Le Caire et la spéculation," *La nouvelle revue* 47 (1907).

⁷⁵ Crouchley, *The Investment of Foreign Capital in Egyptian Companies*, 52.

the total capital of new companies was employed in urban and rural land companies while the rest was mostly invested in mortgage banks, financial companies, mining, and commercial and industrial companies.⁷⁶ In the countryside, agricultural and mortgage banks heavily invested in providing credit to the peasantry.⁷⁷ Generally speaking, British capitalists invested in banking and mortgage institutions as well as the agricultural sector, and their French counterparts concentrated much of their investment in the *Crédit Foncier Égyptien*, the country's largest agricultural mortgage institution. While Belgian capital came a distant third, it was marked by a distinctively urban concentration. Belgian capitalists heavily invested in urban land development and transportation.

The creation of the Cairo Stock Exchange in 1903 institutionalized speculation. Previously, the limited trading of stocks in Cairo took place among brokers who informally congregated at the New Bar in the Opera Square of Azbakiya.⁷⁸ Some observers noted that brokers and intermediaries benefitted the most out of the financial abuses that took place between 1903 and 1907.⁷⁹ In 1903, there were 19 companies whose stocks were traded at the Bourse. In 1905, the number increased to between 40 and 50, while in 1907 the number jumped to 240 companies.⁸⁰ Inflation of the price of shares was common. *The Wall Street Journal* quoted a speech by Ali Bey Fahmy, the vice president of the Nationalist Party, where he attacked British capital and its intermediaries at the

⁷⁶ Ibid., 53.

⁷⁷ TNA, FO 407/172: Note by the Financial Adviser on the Budget of the Egyptian Government for the Year 1908, December, 1907.

⁷⁸ Crouchley, *The Investment of Foreign Capital in Egyptian Companies*, 62.

⁷⁹ Pierre Arminjon, a professor at the Khedival School of Law, was of this opinion. Arminjon, "La crise financière égyptienne actuelle," 204-5.

⁸⁰ "Speculation in Egypt," *The Wall Street Journal*, November 1, 1907.

Bourse. He charged that brokers had abused the system so much that the aggregate values of the shares of British companies reached ten times its issued capital, and he concluded the speech by an appeal to the creation of a national bank.⁸¹ During 1904 alone the registers of the Cairo Stock Exchange recorded the following increase in prices of shares: National Bank of Egypt £16 3/8 to £22 3/4; Delta Light Railway £10 1/4 to £13 7/8; Helwan Railway £16 1/4 to £28; Behera Land Company £29 1/2 to £50.⁸²

The property bubble was made possible by three interdependent processes. First, increasingly more urban land and property companies were established. Second, prices of lands and properties spiraled upwards. Finally, the city expanded horizontally and vertically. As we saw above, private capital had already made important headway into the urban landscape before the bubble. Cairo's infrastructures of transportation and utilities, including gas and water, were private ventures. The Belgian group of Baron Empain held a monopoly on urban tramways, while the Suarès group who owned the Helwan Railways also owned considerable lands in the elite Ismailiya district. Baron Jacques Menasce, an influential Egyptian Jewish businessman, was the head of the largest Egyptian urban development venture, the *Société anonyme des immeubles d'égypte*, which was established in 1884 and mostly developed lands in Alexandria. While these investments were noteworthy, they paled in comparison to those of the boom decade.

Urban development ventures absorbed a substantial portion of investment capital in Egypt. Pierre Arminjon argued that what partially drew the attention of foreign capitalists to Egypt was that its development was checked by "the lack of necessary capital to improve its lands and to

⁸¹ "Egypt's Burden of Debts and the Financial Crisis," *The Wall Street Journal*, August 1, 1908.

⁸² Crouchley, *The Investment of Foreign Capital in Egyptian Companies*, 52.

clean up its numerous urban centers.”⁸³ In 1899, Belgian and Egyptian businessmen, including the local Belgian contractor and businessman Leon Rolin, established the *Société belge égyptienne de l’Ezbekieh* and by 1901 the company had already bought considerable lands in central areas of Cairo where it intended to build shops and houses. Numerous other companies that dealt exclusively or partially with urban lands and properties soon joined the race to invest. Here I mention only few notable companies and their board members: *Compagnie immobilière d’Égypte* (1900, Suarès and Eid), Egyptian Delta Land and Investment (1904, Felix Suarès, Jacques Menasce, Moise Cattai, and Elwin Palmer, former financial advisor of the Egyptian government), Egyptian Enterprise and Development (1904), Cairo Suburban Building Land Company (1906, Eid and Rolin), Egyptian Constructions (1906), Cairo Electric Railway and Heliopolis Oasis Company (1906, Baron Empain and Rolin), and Koubbeh Gardens Building Land Company (1907, Mansour Shakour, a Syrian businessman, Rolin, and Eid).⁸⁴ This clique of capitalists was internally heterogeneous and aggressively competitive.⁸⁵ Besides this cast of businessmen, there were numerous other urban land and property owners who jumped on the speculative bandwagon.

The values of urban properties spiraled upwards during the boom decade. Recurring cycles of quick buying and selling whereby urban properties changed hands four times a year were

⁸³ Arminjon, “La crise financière égyptienne actuelle,” 201.

⁸⁴ See Crouchley, *The Investment of Foreign Capital in Egyptian Companies*, 110-111, Pierre de Boissieu, *Coup d’œil sur le développement de l’Égypte au cours des dernières années* (Paris: Bonvalot-Jouve, 1906), 60-61, Stefano Poffandi, *Indicateur égyptien administratif et commercial* (Alexandria: Imprimerie Générale A. Maurés, 1904), 128-9, and Wright and Cartwright, *Twentieth Century Impressions of Egypt*, 115-116, 183-185, 312-313, and 397.

⁸⁵ For instance, the Eids (the Belgian Consul and Vice-Consul) often disagreed with Baron Empain, the most influential Belgian entrepreneur in Cairo. The latter sought to expand and protect his monopoly over urban transportation in Egypt, while the former used every chance to express disagreement with Empain’s grand suburban development scheme during its early phases.

common.⁸⁶ Prices often rose dramatically solely due to this process, while conditions of lands—sometimes empty lots in the desert—and properties remained virtually the same. Eid reflected that housing was a strange commodity whose value was difficult to determine. For him, rural properties offered an objective basis for valuation, namely crops, while the value of urban property fluctuated based on fortuitous circumstances, making it an essentially speculative enterprise.⁸⁷ Some examples of rising land and property values are indicative of the astounding gains that financiers made during the bubble. At a high extreme, Qasr al-‘Aali palace, located close to the exclusive riverside neighborhood of Qasr al-Dobara where the British Agency was situated, was worth £80,000 in 1902. In 1906, it was sold for £700,000. A small property worth £2,000 was sold in 1906 for £32,000 after being sold four times within the span of few years.⁸⁸ Arminjon estimated that doubling and tripling in value was the norm for urban properties between 1904 and 1907, and values jumped much higher in some cases.⁸⁹ In 1907, about half of Cairo’s developed terrains were worth 2.5 to 5 pounds per square meter.⁹⁰ In parts of Tawfiqiya and Qasr al-Dobara, the value of a square meter jumped from 25 piasters to 25 pounds in a few years. In the commercial and banking center of Ataba al-Khadra, where the main tramway station was located, the square meter was as expensive as 130 pounds. In the elite area of Ismailiya, the meter was worth between 40 and 60 pounds.⁹¹ In 1906, an Arabic article entitled “The Egyptian Financial Boom: Illusory or Real?”

⁸⁶ Foucart, “Le Caire et la spéculation,” 487-8.

⁸⁷ Eid, *La Fortune immobilière de l’Égypte*, 65.

⁸⁸ “Land Boom in Egypt,” *The Egyptian Gazette*, July 4, 1906.

⁸⁹ Arminjon, “La crise financière égyptienne actuelle,” 204, 211.

⁹⁰ Eid, *La Fortune immobilière de l’Égypte*, 47.

⁹¹ Foucart, “Le Caire et la spéculation,” 492-3.

noted how semi-agricultural suburban lands that were previously sold cheaply by the *feddan* were now the object of much speculation.⁹² These circumstances whet the appetite of smaller speculators who borrowed—and credit was readily available—in order to buy and sell quickly at gain. None of this however shook Eid’s confidence that the situation was still “quite healthy.” He acknowledged that there must be a period of adjustment after the bust, yet he insisted that lands would eventually regain their values. Attempting to reassure other investors, he pointed out that there were still plenty of lands to be developed in and surrounding the city.

The boom time construction industry reconfigured Cairo’s landscape as the city expanded horizontally and vertically. Housing projects populated the Abbasiya desert northeast of the city and encroached on semi-rural lands all the way to Matariya. In between spaces such as the area between Boulaq and Tawfiqiya, which was populated by slums, were now subject of uncontrolled speculation. Between 1905 and 1907 the Nile Land and Agricultural Company developed the riverside area south of Qasr al-Dobara and called it “Garden City” after Ebenzer Howard’s now popular concept. The neighborhood of Shobra, situated north of the main railway station, greatly expanded as it became increasingly popular, attracting a mix of upwardly mobile middle class Egyptians and modest Europeans. Distant suburbs such as Maadi and Heliopolis sprang up during and immediately after the boom. In 1906, the Heliopolis Oasis Company, which was under the management of Baron Empain and Boghos Nubar—the son of the former Prime Minister—secured an enormous stretch of desert land (2,5000 hectares that were later increased to 7,000) from the government at a low price to be developed into a satellite town. Eid still believed that Cairo was abundant with undeveloped spaces, about 41% of urban lands. Arminjon remarked enthusiastically

⁹² “*Al-Nahda al-Maliya al-Misriya: Wahmiya hiya am Haqiqiya?*” [The Egyptian Financial Boom: Illusory or Real?], *al-Hilal* 14 (1906), 453-55.

that surrounding old Cairo “a new city emerged from the soil...affirming its vitality each year and attracting movement and commerce.”⁹³

The vertical expansion of Cairo and the densification of urban space were equally visible during the period of speculative frenzy. While two- and three-story buildings had dominated the urban skyline, four- and five-story buildings came to replace old ones, particularly in wealthy neighborhoods such as Azbakiya and Ismailiya. In elite quarters “whole streets of houses, which were quite new in 1903, were being pulled down [in 1906] in order to make room for new houses with additional storeys.”⁹⁴ Even before the boom, apartment buildings as a mode of collective residence began populating the urban landscape, replacing villas, traditional houses, and traditional mixed use constructions like *wekalas*.⁹⁵ Developers eliminated or restricted previously spacious internal courtyards and constructed new buildings that used property limits up to sidewalks. Old villas surrounded by large gardens that were once common in the sparse quarter of Ismailiya were replaced by tall and imposing apartment buildings.⁹⁶ Urban densification took place so rapidly that for residents and visitors it seemed as if another city was imposed on top of the old one. George Foucart disapproved of the boom architecture for more than one reason. First, the piling up of such tall buildings has shut air and light from the street—a danger to public hygiene as they blocked air circulation. Second, the boom architecture was aesthetically monstrous. Generic European buildings that could be found in Charing Cross or Calcutta effaced the “poetry of the orient.” New

⁹³ Arminjon, “La crise financière égyptienne actuelle,” 215-6.

⁹⁴ “Richer Egypt,” *The Egyptian Gazette*, July 2, 1906.

⁹⁵ The *wekala* was a traditional construction for mixed residential and commercial use where buildings surrounded a courtyard onto which shops and offices opened.

⁹⁶ Arnaud, *Le Caire*, 334-350.

buildings like the Savoy and the Semiramis hotels were “brutal and cyclopean” constructions that resembled “fortresses,” so much so that the Azbakiya would soon come to resemble a “neighborhood of tall barracks.”⁹⁷ Yet even for an aesthetic objector, the brutal elimination of uncommodified space was an ideal business strategy, even if it threatened the city’s oriental charm. And the author of *The Egyptian Gazette* admitted his regret for not owning property that he could have sold for handsome profits.⁹⁸

Boosters advanced a noteworthy demographic justification of the boom, which relied on a misleading comparison between Cairo and American cities. They hoped to make a case for Cairo as another New York or Chicago—the mushrooming American cities seemed to have no limits on their capacity for growth. Writing before the full findings of the 1907 census were published in 1909, Eid cast doubt on the preliminary findings of the census. For him it was implausible that Cairo had grown only by 70 or 80 thousand people between 1897 and 1907.⁹⁹ Instead of 650,000, he estimated Cairo’s population to be between 800,000 and 850,000. Eid’s evaluation was based on figures for Cairo’s houses provided in an article published in the monthly *al-Hilal*. The upshot of Eid’s argument was that the influx of well off Egyptians and foreign migrants, which he blatantly overestimated, created unprecedented demand for modern housing, thus justified the property bubble.

The Cairo-New York comparison, which *al-Hilal* made more explicitly, occasioned a debate between boosters and census officials. According to the preliminary results of the 1907 census, Cairo’s population was close to 650,000 not 900,000 as *al-Hilal*’s editor Jurji Zaidan

⁹⁷ Foucart, “Le Caire et la spéculation,” 489.

⁹⁸ “Richer Egypt,” *The Egyptian Gazette*, July 2, 1906.

⁹⁹ From 570,000 to 650,000.

previously claimed. Defending its position, the journal published “Statistics and the Financial Boom,” where it blamed the 1907 census for severely undercounting Egypt’s leading metropolis.¹⁰⁰ While conceding abnormal speculation in urban property, the article argued that the rise in property values was not a result of speculation, but rather an expression of real demand created by robust increase of comfortable urban population. Comparing the demographic growth rates of Cairo to New York over the latter half of the nineteenth century, the article claimed that up to 1900, Cairo “most resembled” New York in being a “shelter of migrants and the destination of those who sought to make economic gains.” It was therefore highly unlikely that the cities’ path diverged during the following seven years. The argument critically hinged on the latest figures of Cairo’s houses. If the number of houses increased, and assuming the same rate of occupancy of people per house as in 1897, then Cairo’s population in 1907 should be about 900,000. According to the journal, casual observations on the increase of multistoried buildings, traffic congestions, the proliferation of markets, and rising rents corroborated the conclusion that the 1907 census underestimated Cairo’s population. However, the article seemed to be unaware of official uncertainties of enumerating houses. Census officials explained that they used ‘house’ to refer to a family rather than to a physically distinct, numbered construction, as Zaidan thought.¹⁰¹ Finally, to the extent that there was indeed a demand for modern housing, only Cairo’s elites and a fraction of the upwardly mobile middle class were able to afford it.

The Cairo-New York comparison made explicit a salient characteristic of the property bubble that constituted a blind spot for boosters. While there was overbuilding for the higher end

¹⁰⁰ “*Al-‘Ihsaa’ wa al-Nahda al-Maliya*” [Statistics and the Financial Boom], *al-Hilal*, (June 1907), 538.

¹⁰¹ Egypt, *Te’dad Sukkan al-Quṭr al-Misri fi Sanat 1325 Hijriya-1907 Miladiya* [The Census of Egypt in 1325 Hijri-1907 AD], 3.

of the housing market, there was little or no investment in affordable housing for the more numerous modest residents of Cairo. The idea of a city that was being flooded by wealthy and middle-class future homeowners corresponded to how the boosters imagined the potential of the city, not its reality. There was indeed a demand among elite and middle class residents and migrants for healthy, modern housing. Yet, because the majority of those who migrated to Cairo over the course of previous decades were poor, they could not afford to reap the benefits of increased supply of modern housing. And investors were not keen on meeting the housing needs of poor Egyptians and modest regional migrants. In other words, the rapid transformation of the built environment between 1904 and 1907 catered to a speculative future, not the reality of the city.

The final results of the 1907 census further undermined the arguments of boosters and the basis of the Cairo-New York comparison. The census director explicitly addressed skepticism towards the operation he directed. Foreign and local migration was responsible for about 57 percent (47,000 out of 84,000) of Cairo's population growth between 1897 and 1907. For Lewis, Cairo's growth was robust despite the high death rate. In general, population growth in Egypt compared favorably to disease and famine stricken India. However, Lewis argued that comparisons to American cities did not make sense. He pointed out that the total number of migrants to Egypt over dozens of years "approaches the total migrants to the city of New York alone during a single year, estimated at 200,000."¹⁰²

Lewis made a number of acute observations regarding foreign migration and the distribution of urban populations. First, Egyptian cities saw a limited, yet distinct influx of high-

¹⁰² Ibid., 25.

income foreigners, especially Greeks. Second, this influx exercised influence on the movement of both foreigners and Egyptians among neighborhoods. However, the impression that poor Egyptians could soon be driven out of Cairo and Alexandria *en masse* was false. Third, while Cairo and Alexandria exhibited all the vestiges of “success and fortune with respect to urban development (*al-‘umran al-madani*) such as the construction of houses, shops, and the like,” the census was based on a systematic operation not informal observations of mostly elite neighborhoods.¹⁰³ For Lewis, final census results demonstrated to critics that Cairo’s population was not as high as boosters claimed based on their casual observations on the increased visibility of foreigners and comfortable classes.¹⁰⁴ In short, Cairo was not anywhere near New York. The city’s demography could not justify the property boom.

The financial crisis of 1907 directly followed the bubble. “Instead of the projected New York, we only see ruins and rubble,” remarked a cynical Belgian official in Cairo in late 1907.¹⁰⁵ The crisis was a shock to a system based on speculative investment and imagined high demand on elite housing. While the property boom had a remarkable impact on the urban landscape, the next section will show that Cairo’s transformation went deeper than spatial expansion and into the realm of social relations.

Urban Redistribution

¹⁰³ Ibid., 28.

¹⁰⁴ Ibid.

¹⁰⁵ Quoted in Robert Ilbert, *Héliopolis, Le Caire, 1905-1922: genèse d'une vill* (Paris: Editions du C.N.R.S., 1981), 17.

Understood as a social relation, housing encompassed the entirety of the city.¹⁰⁶ It differentiated Cairo's landscape and redistributed its population among old and new neighborhoods, cementing relations of inequality across urban space. It established parameters, zones of exclusivity, and new forms of cohabitation. Rents, property values, and health concerns were forces that reshuffled the urban population during the first two decades of the twentieth century.

The dynamics that redistributed Cairo's population were violent. First, the rise of property values and rents moved Cairo's dwellers across neighborhoods either willingly or unwillingly. High property values were desirable for elites and comfortable classes as they generally indicated a zone of privilege and social exclusion, and they were financially reassuring for those who sought to invest in real estate. For middle class *effendis* or rural landowners who migrated to the city, rents and property values signaled upward social mobility. For wage earning tenants, access to housing was restricted to old neighborhoods or slums. Second, concerns for salubrity were decisive for the choice of neighborhood and continued to be so during and after the boom. This went in tandem with the redefinition of housing standards—water, gas, and modern sanitary conveniences became necessities. Land values and rents were high in what was marketed as salubrious and socially exclusive neighborhoods at a distance from old quarters and slums. Congested old quarters with their labyrinthine alleys were thought to evade the salubrious effects of air and sunlight as well as capital, which required smoother traffic flows. The lower classes were squeezed into unhealthy old quarters and diseased slums. Third, slums that occupied what the property bubble turned into potentially lucrative lands faced forced eviction and demolition. Rents and health worked in tandem to displace the poor and rationalize the violence to which they were exposed. On the other

¹⁰⁶ See Aalbers and Christophers, "Centering Housing in Political Economy" and Blackmar, "Accountability for Public Health."

hand, propertied Cairenes lauded slum clearance as an act of sanitary improvement and wise financial management.

Far from the dual city model that dominates the historiography of Cairo and other Middle Eastern cities, capital created a more differentiated urban landscape. A typology of Cairo's neighborhoods by the first decade of the twentieth century is necessary to understand the city's transformation. First, Azbakiya was a broadly defined business and commercial district. Featuring Cairo's largest public park, luxurious hotels such as the Shepherds and the Continental, the prime commercial thoroughfare of Muski, as well as the opera house and department stores, the neighborhood became the center of nightlife including bars, restaurants, cafes, and sex work. It was also the location of the central tramway station of Ataba Square, and it housed a number of banks and financial institutions. Second, there were elite mixed commercial and residential neighborhoods such as Ismailiya and Tawfiqiya. The development of these two neighborhoods, where a significant number of Europeans lived, reflected a Parisian residential model that favored apartment buildings close to the city's center.¹⁰⁷ A relatively new and peripheral neighborhood during the early 1890s, Tawfiqiya became at the center of the property boom. Third, there was a variety of peripheral quarters that were either newly developed or have become residential districts only recently. The most notable examples of this category were Qasr al-Dobara, Shobra, Abbasiya, Daher, and Munira. Boasting the British Agency, Qasr al-Dobara was subdivided and sold by the Tanzim at very restrictive conditions. All commercial ventures were banned from the neighborhood in order to guarantee social exclusivity. Meanwhile, less expensive rents and land values attracted the Egyptian middle class and modest Europeans to Shobra, Abbasiya, Daher, and

¹⁰⁷ Robert Fishman, *Bourgeois Utopias: The Rise and Fall of Suburbia* (New York: Basic Books, 1987), 106.

Munira. Particularly Shobra and Abbasiya grew exponentially as they absorbed residents moving out of old quarters. Fourth, there were distant residential suburbs inhabited by Europeans and Egyptian elites such as Maadi, Zaitoun, Matariya, Qobba, and Heliopolis. Despite their architectural and social differences, such neighborhoods were variants of classic suburbia that catered to bourgeois conceptions of domesticity and created socially exclusive spaces for leisure.

Fifth, there were the old, mostly Egyptian, neighborhoods that colonial observers commonly lumped together as the “native” or “Arab” quarters. Such neighborhoods constituted a substantial part of the city, which included Boulaq, Old Cairo, and the strip of lands extending along the Khalig street from Sayyida Zainab in the south all the way to Bab al-Sha’ariya and Huseiniya in the north. The communal residential framework of traditional neighborhoods was severely shaken by the property boom. Historically and up to the early decades of the twentieth century, the *harat* (sing. *hara*, literally alley) formed the common denominator of the residential geography of the old city. Each neighborhood comprised a number of *harat* that fell under the authority of a *sheikh* or headman. The relatively closed structure of the *hara* provided protection for its residents and facilitated internal policing and administration of the city. The *sheikhs* determined how to collect the taxes that were levied on the *hara* as a whole. The *hara* historically shaped the communal life of Cairenes. It was instrumental for resolving conflicts and making decisions concerning everyday details of collective life such as urban services or maintenance of mosques, baths, and roads. Aside from the *sheikh*, a *futuwwa*, or a local strongman, protected and racketeered the *hara*.¹⁰⁸ During the entire colonial period old neighborhoods were most congested

¹⁰⁸ André Raymond, *Cairo*, translated by Willard Wood (Cambridge: Harvard University Press), 233-4. For more on the *futuwwa* see Wilson Chacko Jacob, *Working Out Egypt: Effendi Masculinity and Subject Formation in Colonial Modernity, 1870-1940* (Durham: Duke University Press, 2011), Ch. 8.

as well as most neglected by urban authorities. The compact layout of the traditional city could not accommodate increasing traffic, and urban authorities were able to construct only few major arteries to alleviate congestion—the Khalig being the most important. During the first two decades of the 20th century the populations of these neighborhoods either increased very slowly or stagnated. Indeed, many of the middle class and moneyed residents of these neighborhoods moved out of the *hara* in search for neighborhoods that were less congested, healthier, upwardly mobile, and better connected to transportation and services. Shobra, Abbasiya, Daher, and Munira absorbed most of them. In rare cases like Hilmiya, the Tanzim created spaces for modern housing by demolishing old palaces and selling their lands for construction. On the other hand, monuments of traditional wealth became spaces of privation and poverty as large houses and palaces now housed the poorest classes of Cairo. The internal courts and gardens became occupied by *'eshash* and spacious dwellings were subdivided into flat tenements (sing. *shaqqa*).¹⁰⁹

Finally, there was the medley of makeshift housing and slums, which constituted a substantial element of urban society. Such settlements offered housing to those who could not afford the rents of old neighborhoods. With the property boom, many squatting settlements in Abbasiya and between Faggala and Daher were demolished. These slums were too small and they occupied areas that became too desirable to remain unscathed. Other clusters of *'eshash* were too large and too entrenched that they were able to withstand encroaching urban development, such as those in Boulaq. And others remained because they occupied places that interested no speculators or land companies, as was the case with area between Sayyida Zainab and Old Cairo, which were perceived as unhealthy and socially inferior.

¹⁰⁹ Yacoub Artin, *Essai sur les causes du renchérissement de la vie matérielle au Caire dans le courant du XIXe siècle (1800 à 1907)* (Le Caire: Imprimerie de l'Institut français d'archéologie orientale, 1907), 113.

Rising rents and property values affected residents across the board, leading to calls for government intervention and regulation. Rent was only one dimension of increasing prices of basic commodities and foodstuffs. According to *al-Hilal*, the average apartment rent in Cairo doubled between 1892 and 1907.¹¹⁰ Yacoub Artin examined the link between the boom and rising prices of necessary commodities. Recalling the traditional role of the *muhtassib* (market inspector), who until the middle decades of the nineteenth century was the regulatory arm of the government as he fixed prices of necessary commodities, Artin was unsurprised by nationalist calls for the government to fix prices of basic goods. According to his calculations, rents in 1907 reached 2.5 times their 1882 values, and the price of construction material increased more than five times during the same period.¹¹¹ Significantly, rents also increased in the old, undesirable neighborhoods. In Hosh al-Sharqawi, one of the city's empty yet centrally located courts—which served in the past as the lavish house of a Sharqawi family—space for *'eshash* construction was leased in 1907 at sixteen times as much as the early 1880s. By 1910, the Tanzim had constructed roads and subdivided the entire space for residential purpose. And the humble residents of Hosh Ma'ruf in Tawfiqiya had long been chased away by rents and land prices, as the meter of what now became a desirable location was as expensive as LE 20.

Nationalist writers dwelled upon the contradiction that the property bubble created, namely that there was plenty of housing on offer in Cairo, but not for those who needed it. They argued

¹¹⁰ “*Al-Ghalaa' wa Irtifa' al-As'ar*” [Inflation and The Rise of Prices] *al-Hilal* 15 (1907), 477-8. The article dwelled at length on the famine of 1199 (595 *hijri*), quoting extensively from Abd al-Latif al-Baghdadi's firsthand account where he described how the urban poor formed gangs that abducted and ate lost or homeless children. Abd al-Latif al-Baghdadi, *Rihlat Abd al-Latif al-Baghdadi fi Misr* (al-Qahira: al-Hay'a al-'Ama al-Misriya li al-Kitab, 1998 [1203-04 *hijri*]), 132-142. Zaidan implicitly pointed to how far Egypt moved away from these conditions due to what he viewed as the progress of Egypt during the recent past.

¹¹¹ Artin, *Essai sur les causes du renchérissement*, 131.

that oversupply at inflated prices spawned a housing crisis. In 1903, the prominent nationalist journalist Ahmad Hilmy wrote an article entitled “Urban Development of the Capital” where he deplored the effects of rising rents on the urban poor. He charged that urban development did not cater to the needs of most Cairenes, but was rather driven by a profit-seeking class in ways contrary to “the laws of nature” (*nawamis al-tabi‘a*).¹¹² Oversupply of elite housing did not match the needs of a majority of modest residents. Speculators and urban developers could build “a thousand house each day” in order to make profits, but this did not mean more affordability, and the poor would continue to be squeezed in congested old quarters through market dynamics. Mohammad Farid, a notable nationalist, pointed that instead of fixing old neighborhoods, the government constructed roads and extended utilities to sparsely inhabited areas, which only benefited speculative land companies that “brought ruin unto the nation.”¹¹³ Ahmad Hilmy’s urban trajectory was itself typical of Cairo’s upwardly mobile *effendi*. He grew up in Hussein (part of Darl al-Ahmar) and lived much of his late life in Shobra.¹¹⁴

Market driven rents and land values were underwritten by conceptions of social purity. In a study on the 1907 crisis, F. Legrand noted that rents and land values dictated the social compositions of new residential suburbs.¹¹⁵ In 1912, Shakour Pasha explained his rationale for developing the Koubbeh Gardens suburb, where he argued that “the opening of grocer and butcher shops, furniture stores, etc. all of a rather inferior order, has effectually spoilt the various suburbs

¹¹² “‘*Umran al-‘Asima*” [Urban Development of the Capital], *al-Liwa’*, April 28, 1903.

¹¹³ Quoted in ‘Abd al-Rahman al-Rafi’i, *Mohammad Farid: Ramz al-Ikhlās wa al-Tad’hiya* [Mohammad Farid: A Symbol of Loyalty and Sacrifice] (Cairo: Dar al-Ma’arif, 1984 [1941]), 148.

¹¹⁴ Where a central street is named after him.

¹¹⁵ F. Legrand, *Les fluctuations de prix et les crises de 1907 et 1908 en Egypte* (Nancy: Imprimerie Typo-litho J. Coube, 1909), 4-5, 19.

of Fagalla, Abbassieh, Obesi and Tewfikieh.” In the face of this infiltration of lower classes and proliferation of mixed use spaces, “the Kasr-Dubara quarter alone remains an exception to this rule, the reason being that the land belonged to Government and stringent rules were laid down for its development. For this very reason, the value of land in this quarter rose to prohibitive prices.”¹¹⁶ The suburb of Koubbeh Gardens was supposed to be expensive and far enough from the city as to prevent the encroachment of “inferior” classes, and accessible enough for elites in order to compete with prestigious, centrally located quarters such as Qasr al-Dobara.

Concerns for salubrity and the sanitary conditions of houses remained crucial determinants of the choice of neighborhoods. As Artin noted, moneyed Cairenes viewed new standards of housing, including access to utilities and hygienic conveniences, as necessities rather than luxuries.¹¹⁷ The early development of distant suburbs such as Matariya bore witness to how claims of salubrity that often harkened back to older theories of disease were decisive for the marketing and success of new neighborhoods. Qasr al-Dobara’s fame was partly due to the government’s extremely stringent regulations put forth in 1892 regarding the sanitary arrangements of houses down to position of toilets, pipe specifications, and ventilation requirements. Maadi—the “popular English suburb”—boasted proximity to Helwan where residents could enjoy “delightful cool evenings and pure desert air” as well as the open-air sulphur swimming baths.¹¹⁸ Similarly, Heliopolis offered its elite and middle class residents the salubrious effects of the sun and the arid

¹¹⁶ Note by Shakour Pasha dated March 9, 1912. Quoted in Samir Raafat, *The Egyptian Bourse* (Cairo: Zaitouna Press, 2010), 76.

¹¹⁷ Artin, *Essai sur les causes du renchérissement*, 112.

¹¹⁸ A recurring commercial in *The Egyptian Gazette* during January, 1910.

wind of the northeastern desert.¹¹⁹ The company's publicity detailed the sanitary arrangement of buildings and promised complete water provision, sewerage, and utility coverage in the entire suburb. Such promises were no small matters to residents of the diseased city.¹²⁰ By 1903, businesses such as Max Steiner and Company supplied private sanitary appliances including bathtubs and toilets and fitted them into the houses of elites who were able to afford connection to the Cairo Water Company.¹²¹

The desire of middle class and wealthy Egyptians to escape unsanitary conditions and congestion drove an exodus out of old neighborhoods. Astute observers argued correctly that the search for better health and middle-class privacy and comfort animated the exodus.¹²² It was also a result of the efforts of the Egyptian middle class to distance itself from spaces of poverty. As we saw in the previous chapter, the British colonial era witnessed important changes in the way moneyed Egyptians understood health and comported their bodies, which reflected on their relationship to lower classes. These epistemological shifts and new concerns for health and bodily hygiene reflected on where the Egyptian middle class sought residence, namely in modern spaces that were fit to house modern subjects.

¹¹⁹ Ilbert, *Héliopolis*, 9.

¹²⁰ Gurdun Kramer's account of elite Jewish families in Cairo provides a glimpse into a typical pattern of movement and relocation of the comfortable classes in general. Wealthy Sephardi Jewish families (Suarès, Mosseris, and Cattaouis) who had lived in Cairo's *haret al-yahud* (the Jewish quarter) since the first half of the 19th century left the *hara* in the 1860s for the exclusive residential area of Ismailiya, where the Suarès heavily invested. By the late 19th century, well to do Egyptian Jews moved to the neighborhoods of Shobra and Abbasiya, but as the latter "lost their character as exclusive residential enclaves for the rich and became middle-class neighborhoods" during the years before WWI, the wealthiest of Egyptian Jews relocated to Garden City, the Gezira Island, or Maadi. At the same time, middle class Egyptian Jews continued to populate Shobra, Abbasiya, and Heliopolis, while the lower middle class moved on to 'Abdin, Bab al-Louq and Daher/Sakakini. Kramer's account shows that Egyptian Jews largely moved between Cairo's neighborhoods according to their social class. Gurdun Kramer, *The Jews in Modern Egypt, 1914-1952* (London: I. B. Tauris, 1989), 63-66.

¹²¹ Wright and Cartwright, *Twentieth Century Impressions of Egypt*, 362.

¹²² Artin, *Essai sur les causes du renchérissement*, 113.

Nationalist writers often blamed the unsanitary conditions of old neighborhoods on the neglect of urban authorities and the skewed priorities of investors. Hilmy condemned the total neglect of native quarters and wondered why the Tanzim's limited budget was reserved for maintaining elite areas. If urban development truly responded to needs as boosters alleged, he wondered, why didn't capitalist invest in improving old neighborhoods instead of eagerly injecting money into desert suburbs. Old neighborhoods desperately needed "opening new streets and widening and straightening old ones in order to renew the air and to purify these streets by means of finding ample and sufficient outlets for the diseased emanations that decimate the lives of healthy natives."¹²³ Similarly, an article in the government-friendly *al-Ahram* praised ongoing urban activities including the development of the Gezira Island and the construction of Nile bridges and tramlines to Shobra. However, the article condemned the "abhorrent" neglect of "native quarters."¹²⁴ Another article argued that congestion and narrowness of streets hindered the development of old neighborhoods and threatened their ruin. Lack of air and traffic circulation brought these quarters to a social and financial halt. And the government did nothing to supply old neighborhoods with public parks, whose scarcity was a danger to public health and an anomaly among other comparable cities. The article concluded that the government generously spent money supplying services (*marafiq*) to the European residents of Ismailiya and Azbakiya at the expense of six hundred thousand native residents of the city.¹²⁵ While nationalists condemned the official neglect of old quarters, Cairo's elites and middle classes already deeply believed that these quarters

¹²³ "'Umran al-'Asima' [Urban Development of the Capital] *al-Liwa'*, April 28, 1903.

¹²⁴ "'Umran al-Qahira" [The Urbanization of Cairo], *al-Ahram*, May 12, 1904.

¹²⁵ "*Madinat al-Qahira wa Mustaqbaluha al-Zahir bi al-'Umran*" [Cairo City and its Flourishing Urban Future] *al-Mu'ayyad*, December 13, 1903.

had become too unhealthy for them. J. I. Craig—the director of the 1917 census operation—justified the need for a new census partly on the basis of the need for updated vital statistics. Only this knowledge would determine if the popular Shobra, for instance, was a healthy neighborhood or not.¹²⁶

Calls for equal municipal services to Cairo's old quarters reached a high pitch. Members of the increasingly oppositional General Assembly (*al-Jam'iya al-'Umumiya*), such as Hassan Pasha Madkour, constantly raised the problems facing old quarters including scarcity of street lighting and irregularity or absence of street sweeping. Madkour accused the government of providing better services to newer neighborhoods even though it taxed all equally.¹²⁷ Another Assembly member complained that “the areas of Zamalek and Qasr al-‘Aali [Garden City] are well lit and extremely clean despite the sparsity of their buildings,” while “we see the areas of Qamish and Laz public gardens close to Sayyida Zainab in darkness with no sprinkling or sweeping service, despite their central location and the great number of houses surrounding them.” Such negligence was “greatly harmful to health,” and the absence of public lighting was “one of the strongest incentives to crime.” A minimum of services to old quarters was necessary before universalizing services in new, low-density areas.¹²⁸

Eid saw the exodus of moneyed Egyptians out of old neighborhoods as inevitable. As a businessman on the board of many urban development companies, his investment strategy of

¹²⁶ J. I. Craig, “The Census of Egypt,” *L'Égypte Contemporaine* 8 (1917), 210.

¹²⁷ The General Assembly called for a variety of legislations that the government was under no obligation to follow. In 1907, Muhammad Sukkar Bey proposed equal municipal services across Cairo (DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-016468). In 1909, Hassan Madkour Pasha made a similar proposal (DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-016075). In 1910, there was a third similar proposal (DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-01672).

¹²⁸ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-016852.

choice was to develop empty areas in neighborhoods that were already within the limits of the city, not to venture too far into the desert or create satellite towns from scratch as Baron Empain did with Heliopolis. His strategy, he believed, would “allow even the middle class to become suburban proprietors.”¹²⁹ He also advocated the development of more neighborhoods like al-Munira, where the Tanzim constructed roads and subdivided the neighborhood leaving the rest to private capital. The neighborhood accommodated “rich and comfortable” Egyptians looking for salubrious housing with modern amenities.

During the early decades of the twentieth century, concerns for health and urban growth intertwined to close in on the slums and displace their residents. Urban officials and elites promoted and celebrated slum clearance as a requirement for salubrity and prosperity. The reporter of *The Egyptian Gazette* mused that “everywhere one sees new and handsome stone houses replacing the old lath and plaster tenements, and even the mud-built huts of my early recollections.”¹³⁰ Eid applauded that “entire roads bordering modern constructions were laid out where recently one would encounter only miserable huts and abandoned gardens.”¹³¹ By 1907, the government demolished large parts of slums in Boulaq, Abbasiya, and Old Cairo to make room for urban developments geared towards comfortable classes, without clear plans to rehouse those who were evicted.¹³² Once again, however, displaced squatters ventured into peripheral areas away from the purview of the government and the interests of capital. By the first decade of the twentieth

¹²⁹ Eid, *La Fortune immobilière de l'Égypte*, 70.

¹³⁰ “Richer Egypt,” *The Egyptian Gazette*, July 2, 1906.

¹³¹ Eid, *La Fortune immobilière de l'Égypte*, 61.

¹³² TNA, FO 371/248: Parliamentary Question from Mr. MacNeill, dated June 18, 1907.

century there were slums in the western bank of the Nile, which was slowly being integrated into Cairo proper by means of a number of bridges.¹³³

Population figures per district provide further evidence for early twentieth century urban redistribution. Unsurprisingly, the most spectacular demographic growth took place in Shobra and Abbasiya—districts where the property boom catered to a broad range of middle class Egyptians and foreigners. The population of Shobra was 33,000 in 1897 and by 1907 it grew to 49,000. From 1907 to 1917, however, the population increased 65 percent reaching 81,000. The district of Waily, which administratively included Abbasiya, Qobba, Zaitoun, and Matariya, housed 79,000 people in 1917 compared to 37,000 only two decades earlier. The population of the elite district of Azbakiya, which administratively included Tawfiqiya and parts of Ismailiya, also grew from 36,000 in 1897 to 47,000 in 1907 to 56,000 thousand in 1917. Crucially however, the Azbakiya district remained one of the least densely populated, coming second only after Helwan—the health resort suburb.¹³⁴ The old Egyptian district of Sayyida Zainab, which included Munira, grew moderately—from 54,000 in 1897 to 65,000 in 1907 to 77,000 in 1917.¹³⁵

Cairo's oldest neighborhoods underwent little or no growth, while remaining the most demographically saturated quarters during the same two decades. The most congested districts in 1911 were Boulaq, Darl al-Ahmar, Gamaliya, Bab al-Sha'ariya, Mouski, Old Cairo and Khalifa.¹³⁶

¹³³ [Adolphe Smith], "The Cleansing of Cairo (From Our Special Sanitary Commissioner)," *The Lancet*, June 19, 1909.

¹³⁴ Egypt, *Te'dad Sukkan al-Qutr al-Misri fi Sanat 1325 Hijriya-1907 Miladiya* [The Census of Egypt in 1325 Hijri-1907 AD], 19. In Cairo and Alexandria, the census recorded the average number of rooms in used houses per neighborhood and calculated urban density on this basis.

¹³⁵ Egypt, Ministry of Finance, Department of General Statistics, *Annuaire Statistique de l'Égypte 1914* (Le Caire: Imprimerie Nationale, 1914), 28 and Egypt, *Annuaire Statistique de l'Égypte 1921-22*, 9.

¹³⁶ Clerget, *Le Caire*, T. 1, 275.

The population of Darl al-Ahmar, an already congested quarter in 1897, remained at 69,000, while that of Gamaliya increased from 58,000 to only 62,000. Old Cairo housed 32,000 people in 1897 compared to 35,000 in 1917.¹³⁷ The population of Khalifa increased from 47,000 in 1897 to 58,000 in 1907 before slowing down to 60,000 in 1917. Given natural growth, these figures reveal that Cairo's old, unhealthy, and therefore undesirable neighborhoods underwent different degrees of demographic attrition. Boulaq, however, continued to be the city's most populous area, attracting service workers and wage earners as an industrial neighborhood. Its population grew from 76,000 in 1897 to 112,000 in 1917.

Housing Crisis

As the effects of the speculative bubble and its aftermath materialized on the urban landscape, city officials realized that capital-led urban growth has led to a housing crisis in Cairo. As we will see in Chapter Five, the crisis forced the government to consider various forms of intervention from solutions to chronic congestion of old quarters to public housing geared towards middle and lower classes. In other words, the crisis underscored the need for the colonial administration to take charge of the city's growth and implement reforms that did not interest urban financiers.

British administrators began to show signs of unease at the speculative bubble in 1904. Cromer admitted that "the harm that is done by reckless speculation is undeniable," and the government formed a commission to study the phenomenon at the Cairo and Alexandria Bourses. Nonetheless, for the British Consul-General "it is practically impossible, by legislation, to put a

¹³⁷ Egypt, *Te'dad Sukkan al-Quṭr al-Misri fi Sanat 1325 Hijriya-1907 Miladiya* [The Census of Egypt in 1325 Hijri-1907 AD], 19.

stop to speculation without, at the same time, causing great hindrance to trade in general.”¹³⁸ At most, the government hoped that it could issue regulations with the agreement and assistance of leading commercial associations to mitigate speculative excess. Ultimately, the government decided it was impossible to prevent speculation without also hindering legitimate investment. A year later, Cromer felt the need to respond to scathing critiques of the direction that Egyptian finances took during the recent past. He understood the view of critics, namely that “the present prosperity of Egypt is a mushroom growth of the type of which history affords abundant examples, that is due to temporary and ephemeral causes, and that when these causes cease to exist, a collapse will ensue.” And he conceded that the country witnessed feverish speculation that unreasonably increased land values. It was natural that “company-mongers will continue to prey on unwary investors.” And inflated prices of stocks and lands may collapse in the event of a financial crisis. For him, however, the material prosperity of the country stood on solid grounds and was safely ensconced in agriculture and state finance.¹³⁹ In the annual report of 1906, which Cromer drafted a few months before the crisis, he noted the “remarkable” rise in the value of urban property in Cairo and Alexandria. However, he ventured the simplistic diagnosis that such increase drove those with modest incomes to the suburbs, even though “suburban land has also increased enormously in value.”¹⁴⁰ A year later, Eldon Gorst—Cromer’s successor—was confronted by a full-fledged financial crisis. He admitted that liquidation on properties would be a lengthy and difficult process, and credit would be no longer forthcoming.¹⁴¹

¹³⁸ TNA, FO 407/164: The Earl of Cromer to the Marquess of Lansdowne, March 15, 1905.

¹³⁹ TNA, FO 407/165: The Earl of Cromer to Sir Edward Grey, March 8, 1906.

¹⁴⁰ TNA, FO 407/170: The Earl of Cromer to Sir Edward Grey, March 3, 1907.

¹⁴¹ TNA, FO 407/172: Sir Eldon Gorst to Sir Edward Grey, March 7, 1908.

As will be seen in Chapter Four, it was in 1906—at the peak of the property boom—that the government took the decision to provide the city with a sewage system. This was a response to Cairo’s persistently unhygienic conditions and to increasing demand for a healthy urban environment that was appropriate for a changing residential geography. A drainage system would not only catch up with the city, but also remove barriers impeding the city’s future growth and more influx of investment capital.

After the financial crisis and during World War One, the Tanzim Department felt the pressure to implement a variety of urban reforms, and the department began preparing schemes of public housing, town planning, and constructing new arteries to relieve the congestion of old quarters. Yet the department was limited by both its low budget, which shrank during wartime, and the disjointed structure of Cairo’s administration among branches of the central government. City officials called for better organization among the Tanzim, the Public Health Department, the Cairo Governorate, and the Finance Ministry on future schemes.

The financial stringency of the war forced the Tanzim to abandon ambitious schemes that began to surface a few years earlier, including town planning schemes and projects of “laying out the native quarters on more modern lines.”¹⁴² During wartime, the Tanzim was only able to continue with its regular tasks of upkeep of streets, bridges, public gardens, and street lighting. House inspection and street construction were kept at a minimum.¹⁴³ While the Tanzim’s budget shrank, the pressure to respond to deteriorating urban conditions increased. During the winter of

¹⁴² See Ministry of Public Works, Egypt, *Report of the Under Secretary of State on the Ministry of Public Works during 1914-1915* (Cairo: Government Press, 1916), 68, idem, *Annual Report, 1915-1916* (Cairo: Government Press, 1917), 32, and idem, *Annual Report for 1918-1919* (Cairo: Government Press, 1922), 46. See also TNA, FO 141/633: Note by Murdoch MacDonald dated May 23, 1915.

¹⁴³ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-006331.

1916 it was feared that high Nile flood that penetrated under foundations would damage the houses of the poor riverside neighborhoods. The Tanzim conducted thorough inspections and 350 houses, mostly in Boulaq, were found dangerous and were demolished.¹⁴⁴ During the war period, the department issued 1319 demolition orders for fear of public safety and in order to deter jerry-building.

British officials openly acknowledged the presence of a housing crisis in Cairo, which assumed serious proportions as the war came to a close. Increasing urban population and chronic congestion of old quarters combined with a slowdown of construction activities. Between 1905 and 1911, the Tanzim issued an average of 938 new building permits annually. As the property boom subsided the figure decreased to 699 annually between 1912 and 1914, and decreased still more to 464 between 1915 and 1919. By the end of the war, C. W. Haswell, the Tanzim's Controller-General, estimated that there was a shortage of 8,000 houses.¹⁴⁵ He argued that "to-day the housing problem has become an acute one, likely to stay in the future."¹⁴⁶ Thus during the last decade of British rule, it was increasingly evident that the colonial regime needed to invent and implement new solutions to Cairo problems, and to take charge of the city's development.

Conclusion

This chapter rereads the history of colonial Cairo through the lens of housing in order to uncover social relations that underwrote urban space. Examining the geography of residence makes explicit how concerns for health shaped the spectacular capital-led development of the city. And it shows

¹⁴⁴ Ministry of Public Works, Egypt, *Annual Report for 1916-1917* (Cairo: Government Press, 1921), 19.

¹⁴⁵ C. W. Haswell, "Town Planning and Housing in Cairo," *Garden Cities & Town Planning* 11 (1921), 258.

¹⁴⁶ Egypt, *Annual Report for 1918-1919*, 48.

how the urban landscape became the site of capital accumulation and investment, which reached new heights with the property bubble of 1897-1907. Far from a passing cycle, the bubble had enduring consequences on Cairo. First, intensive commodification of housing led to urban redistribution. A new spatial and social configuration materialized in Cairo as upper and middle classes sought residence in healthy neighborhoods that offered housing with better sanitary standards. One of most notable consequences of this trend was the exodus of moneyed Cairenes and the emergent modern educated *effendis* from congested old neighborhoods to neighborhoods such as Shobra and Abbasiya. These new spaces offered the Egyptian middle class the material conditions for a new subjectivity, that is, for the fulfillment of new desires for privacy and comfort, and the satisfaction of new standards for health and cleanliness. Another notable consequence was that the city's poor were squeezed into neglected old neighborhoods and slums, which were constantly chased away by urban authorities and capital. Second, the property bubble led to a housing crisis whose severity was acknowledged by city officials. While boosters and financiers overinvested in the upper end of the housing market, Tanzim officials came to the conclusion that Cairo suffered from shortage of affordable housing.

The interplay between capital and the colonial regime was more central to Cairo's growth than existing accounts of the colonial city admit. Capital filled in the spaces created by the colonial regime's initial disinterest in, and retreat from, cities. It offered healthy housing in healthy neighborhoods as a solution to unsanitary conditions that fed the health anxieties of moneyed Cairenes. The regime welcomed, aided, and subsidized capital's entry into the urban landscape, yet it ultimately did not approve of the result. By the last decade of colonial rule, capital-led urban growth alarmed authorities as it led to a housing crisis and spawned uncoordinated development. Nor could capital be trusted to willingly solve the city's outstanding problems, namely the

congestion of old quarters and unhealthy conditions caused by absent or deficient sanitary infrastructures. The perceived excesses and shortcomings of capital-led development led the regime to rethink its model of urban governance and to attempt to assume responsibility for the city's future growth.

The following chapters build upon and further probe other dimensions of this uneasy relationship between the regime and capital. Chapter Three offers an account of the relationship between the regime and the concessionary Cairo Water Company, which controlled the city's supply of filtered water. Chapter Four traces how the regime embarked on a large-scale infrastructural project, namely the sewage system, in response to the new residential geography of the city. Finally, Chapter Five reconstructs efforts by regime to take charge of urban growth while engaging capital on the regime's terms. These efforts led the colonial regime to reevaluate its model of urban governance and to rethink the disjointed administrative framework that managed the city during the previous decades. They also created space for reopening the politically charged question of Cairo's lack of an institution of local self-government or a municipality.

CHAPTER THREE

CONFLICT ON THE NILE: TASTE, TECHNOSCIENCE, AND THE WATER CONTROVERSY

لحن السقاين
[Song of the Water Carriers]

دول شقياين	ع السقاين	يعوض الله	يهون الله
دى صنعة أبونا	م الكوبانية	متعفرتين	خواجاتها جونا
وخضرة وزرقه	ليه بيرازونا	حايطفشونا	دي شركة غلسه
وفوسفات كبريت	يا خلايقي	ما تعبرونا	إخيه عليها
دى ميتى نيلى	تلقاها حدقه	ميتهنا نجسه	يا بنت ياللى
ويجب لك زير	دي لهجة	وقال إيه رايقه	روحي الوى بوزك
	كربونات ونييت	بيحطوا فيها	
	هأ أو أو	وبودرة عفريت	
	ما تندهى لى	واقفة ع البهلى	
	يعوض الا	إشربي وإدعى لى	
	خليه يطير	فى وش جوزك	
	فى الحنفيه	وإنزلى تكسير	

Introduction

Written by Badi' Khairy in 1918, the 'Song of the Water Carriers' is a testament to a now forgotten controversy concerning the taste and purity of drinking water that engulfed British colonial Cairo during the first decades of the twentieth century. The controversy pitted Cairenes against water experts of the government and the concessionary Cairo Water Company who were involved in the technoscientific control of the city's supply. Taste became the unwitting site of tenacious opposition to British modernizing schemes. The song was a product of the legendary artistic collaboration between Khairy, actor Najib al-Rihany, and musician Sayyid Darwish on the eve of the 1919 revolution, and it was part of a series of popular songs that voiced the grievances of craftsmen and service workers, who traditionally organized under corporate guilds.¹ The song

¹ The songs drew on a variety of folk traditions and repertoires. They were written in the colloquial Egyptian dialect and they adopted the group's voice to express grievances in a witty, sympathetic fashion. Other songs in the series included ones for butchers, servants, carters, milk sellers, and boatmen. More comic variants took up the consumers of hashish, cocaine, and *manzoul* (a local synthetic chemical drug that was popular at the time), or inheritors of wealth as if they formed a homogeneous corporate group. Other serious songs took up labor militancy and the anticolonial struggle. See Hasan Darwish, *Badi' Khairy: al-Azgal al-Badi'a wa al-Alhan al-Raihaniya, Dirasa Fanniya Siyasiya Ijtima'iya* (al-Qahira: al-Majlis al-A'la li al-Thaqafa, 2001) and Nabil Bahgat, *Badi' Khairy: al-A'mal al-Shi'riya al-Kamila* (al-Qahira: Dar Mirit, 2010).

began with the traditional call of water carriers, “*yi’awwad allah*,” which announced their presence to people in their homes and neighboring streets. Literally meaning “may God compensate,” the call pleaded for sympathy with water carriers as they plodded through Cairo’s streets with loads of water on their backs. The toiling carriers were furious at the foreign company that chipped away at their livelihood since its establishment in 1870. The song continued: the foreigners (*khawajat*) of the company drove away the water carriers, even though “it is the profession of our fathers.” The next line introduced peculiar claims about the qualities of the filtered water of the company: “it is an annoying company/its water impure/you’ll find it brackish/green and blue.” The word *negsa* (*najis* in classical Arabic) refers to substances that are foul or ritually impure, which disqualifies the water for the purpose of religious ablution. Trusting that the listener would recognize the tongue-in-cheek exaggeration, which was nonetheless based on a recent history of shared negative perceptions, the song advanced even wilder claims about substances and chemicals that the company added to filtered water, making imaginative leaps that the listener would have immediately understood as facetious: “[the company] adds/carbons and wine/sulphur phosphate/genie’s powder.”² The penultimate line addressed an imaginary female bystander and invited her to drink from the water carrier instead of the company. The song then incited her to crush the public taps of the company (“*we enzili taksir fi al-‘hanafiya*”), and advised her to urge “her husband” to buy a *zir*, a large earthenware pot traditionally used for filtering and storing water.

Trouble began when the Cairo Water Company altered its source of intake at the behest of the Egyptian government, drawing water from deep wells instead of the Nile. Scientists and officials touted the modernizing scheme’s potential for complete mastery of water, reducing the

² Genie’s powder (*bodret ‘afrit*) was a common name for popular powder remedies usually sold at traditional apothecaries or spice shops.

city's susceptibility to epidemics of cholera that had plagued it for decades. The project was the government's response to mounting critique from public health experts and elite residents concerning the purity of filtered supply and the need to sever the reliance of the city's lower classes on the Nile. At stake was the health and prosperity of a growing city at a time of urban transformation. However, to the astonishment of experts and officials, the new water was received by the stubborn and visceral disfavor of Cairo's residents. For five years (1905-1910), experts and officials attempted to unravel and address the deceptively simple claim that the new water tasted disagreeable. They also attempted to circumvent the problem by technologically modifying well water in order to suit the taste of Egyptian consumers. Ultimately, however, they gave up on the project altogether, and returned to the Nile under improved standards of intake, filtration, and distribution. Taste was the unlikely site of opposition to a colonial technoscientific scheme to master the water supply.

This chapter reconstructs the controversy and situates it within three broader developments concerning the regime's turn towards the infrastructural reorganization of Cairo and its reception. First, projects to control and improve the city's water provisioning expressed the British regime's changing approach towards the city. After two decades of neglect, authorities responded to Cairo's biological crisis and to the opportunities and challenges of capital-led growth by constructing and modernizing public health infrastructures. And while the well water project failed, the subsequent return to the Nile was increasingly popular as it avoided the shortcomings of previous schemes. Second, the Cairo Water Company was a particularly glaring example of monopolistic companies that controlled vital urban infrastructures and exercised a form of sovereignty over everyday life, creating and deepening structural inequalities. Because of the company's exorbitant rates, the urban landscape was characterized by a sharp disparity between elites, who as private individuals

privately enjoyed ample supply, and the collectivized middle and lower classes who obtained and consumed their inferior water allowance from and at collective spaces. The unavailability of pure water to the majority spurred protests over the power of monopolistic companies that controlled public services and strategic infrastructures. Third, the mixed reception of colonial schemes to improve the water supply generated a field where the transformation and interplay of categories and epistemologies of health could be studied, even if this field was underwritten by colonial power. As modern scientific rationality became increasingly normalized, Egyptians across social classes repositioned themselves and reformulated their relationship to medical traditions and lay practices and epistemologies of health.

Against the colonial view that the controversy was intelligible only as a conflict between science and superstition, this chapter argues that the controversy was generated by the advance of modern scientific epistemologies and technologies into the everyday world of water consumption, a domain populated by lay epistemologies and practices however tangled and informal. And the asymmetries of colonial power formed an inextricable background to the controversy. On the one hand, foreign water experts derived their authority from the modern sciences of chemistry and bacteriology. Their knowledge was christened in the space of the laboratory where entities unobservable to lay people were isolated, manipulated, studied, and enumerated.³ Modern expertise was based on a distance from the categories and vocabulary of everyday experience, from the realm of the senses and common sense, positing an ontologically prior realm accessible

³ See for instance Martin Melosi, *The Sanitary City: Urban Infrastructure in America from Colonial Times to the Present* (Baltimore: Johns Hopkins University Press, 1999), Ch. 7 [Water Supply as a Municipal Enterprise, 1880-1920], Jean-Pierre Goubert, *The Conquest of Water: The Advent of Health in the Industrial Age* (Princeton: Princeton University Press, 1989), 34-51, Christopher Hamlin, *A Science of Impurity: Water Analysis in Nineteenth Century Britain* (Berkeley: University of California Press, 1990), M. N. Baker, *The Quest for Pure Water: The History of Water Purification from the Earliest Records to the Twentieth Century* (New York: The American Water Works Association, 1948).

only to experts.⁴ On the other hand, a messy web of lay categories of purity and water practices was more evenly distributed among ordinary people. Local traditions relied on the natural cycle of the Nile and on the senses including most importantly taste as trustworthy guides to knowledge of water. However, this chapter does not attempt to present popular practices and categories as if they formed a systematic body of knowledge.⁵ Instead, it presents them in their messiness and insofar as they offer insights into why particularly lower class consumers found well water distasteful and believed it to be harmful. Distaste and the perceived “technological” nature of the water triggered red flags for the urban poor. And colonial observers ultimately came to suspect that rejection of well water was premised on a competing claim to knowledge, however implicit. Yet colonial power and the colonial experience were inextricable from the reception of the new water supply. As we saw in Chapter One, the nexus of colonial power and medicine fed into the sense of vulnerability of the urban poor, and measures taken by medical authorities gave rise to rumors, most notably that authorities poisoned the water of canals. Moreover, water carriers, who may be considered the local authorities on water, had every reason to resent the actions of the company and the government. Unlike stories of mediation and brokerage between knowledge traditions, this chapter probes an instance when lack of recognition constituted a tension that is evocative of imperialism and everyday opposition to it.

⁴ On scientific expertise see H. M. Collins and Richard Evans, “The Third Wave of Science Studies: Studies in Expertise and Experience,” *Social Studies of Science* 32, 2 (2002) and Steven Shapin, *Never Pure: Historical Studies of Science as If It Was Produced by People with Bodies, Situated in Time, Space, Culture, and Society, and Struggling for Credibility and Authority* (Baltimore: Johns Hopkins University Press, 2010), Ch. 13 [Trusting George Cheyne: Scientific Expertise, Common Sense, and Moral Authority in Early Eighteenth-century Dietetic Medicine].

⁵ Such attempts would be flawed because they would risk imposing external standards of rationality on historically heterogeneous categories. For instructive discussions on local knowledge traditions in Africa see Luise White, *Speaking with Vampire: Rumors and History in Colonial Africa* (Berkeley: University of California Press, 2000) and Helen Tilley, *Africa as a Living Laboratory: Empire, Development, and the Problem of Scientific Knowledge, 1870-1950* (University of Chicago Press, 2011).

Significantly, taste has been historically viewed as the most subjective of the senses, thus as the least likely to impart objectivity. “There is no disputing about taste”—the familiar maxim cautioned that taste was too arbitrary to be the basis of sound arguments. As will be seen below, the foreign experts in Egypt concurred, defending their turf against what they viewed as ethereal and incommunicable lay claims based on taste. They argued that only they could access the reality of water and manipulate it in their laboratories. In fact, only recently did scholars of science and technology approach forms of subjectivity and embodied practices not as impurities to objectivity but as modes of knowing, both historically and in modern cultural practice.⁶

This chapter examines water provisioning and its controversies over four sections. The first provides necessary background on the traditional system of water supply and the formation of the Cairo Water Company. The second sketches pertinent popular water practices and lay categories of purity in parallel to official efforts to exercise scientific control over the water supply. The third section examines the unfolding of the 1905-1910 controversy, underscoring the various attempts by the government and its experts to understand and resolve lay claims anchored in taste and local traditions. And the final section probes the political economy of service provision in Cairo, showing how critiques of high rates, uneven service distribution, and the power of monopolistic companies animated politics.

Birth of the Water Company

⁶ For recent scholarly work on taste and an account of philosophical discussions of the senses as guides to certainty see Steven Shapin, *Never Pure*, Ch. 13, idem, *Changing Tastes: How Things Tasted in the Early Modern Period and How They Taste Now* (Uppsala: Uppsala Universitat, 2011), idem “The Sciences of Subjectivity,” *Social Studies of Science* 42, 2 (2012), idem “A taste of science: Making the subjective objective in the California wine world,” *Social Studies of Science* 46, 3 (2016) and Christopher J. Phillips, “The taste machine: Sense, subjectivity, and statistics in the California wine world,” *Social Studies of Science* 46, 3 (2016).

The traditional system of water supply in early nineteenth century Cairo depended on an elaborate network of water carriers (sing. *saqqa*) who drew water from the Nile and its derivatives. Water carriers filled their skins, which were made out of cowhide or goatskin, and loaded them onto camels and donkeys for transportation to a few central locations in Cairo. From there, retail carriers sold water by the cup or delivered to homes. Delivery was based on a subscription system where carriers either drew lines representing quantities of skins delivered on the client's door, or provided the client with a number of blue stones from which they subtracted one per waterskin upon delivery. Inside the house, water was stored in marble cisterns and clay pots of various sizes. Earthenware pots like *zir* and the small *qulla* were also used as filtration devices as impurities were left to settle on their narrow bottoms. Aside from water provisioning, carriers were also instrumental in suppressing fires.⁷

Gratuitous fountains (sing. *sabil*) were another important feature of water provisioning. In the 1870s there were about two hundred fountains that occupied main thoroughfares. Established by wealthy patrons to distribute water freely, fountains were traditional monuments of piety as they were meant to demonstrate their founders' dedication to service the anonymous passersby and the less fortunate classes. Architecturally, *sabils* contained three parts. The first was an underground cistern made of marble or stone into which the carriers poured water. The second was the distribution chamber, which was at the street level or slightly above. And the third was a traditional school that occupied a second floor, where pupils were taught the Quran, reading, and writing. Because of their generally large capacity to hold water and their geographic dispersion, fountains were crucial during low Nile (*ta'hariq*) when the river most stagnant. Most of these

⁷ Nabil al-Toukhy, *Tawa'if al-Hiraf fi Misr* (al-Qahira: al-Hai'a al-Misriya al-'Ama li al-Kitab, 2009), 87-90.

fountains were owned, maintained, and administered by the Ministry of Charitable Endowments (*Awqaf*), which was generally unable to maintain all of them equally over the years.⁸

To a lesser extent, Cairo's water supply depended on well water, particularly for non-drinking purposes. Many houses and mosques in late nineteenth century Cairo featured a shallow well that commonly supplied brackish water. The quality of the water depended on many conditions that could not be predicted, including the nature of the subsoil and the kind of water that was allowed to percolate in the vicinity of the well. Water was particularly brackish in August when the subsoil water level was at its lowest. During most of the year and for most Cairenes this water was used for cleaning purposes. However, some fountains depended on wells and it was common for slums to have a communal well whose water was used for drinking and other domestic purposes.⁹

The establishment of the concessionary Cairo Water Company under Khedive Ismail (r. 1863-1879) set new conditions for urban water distribution. In 1865, the French engineer Jean-Antoin Cordier obtained a ninety-nine year concession from the Egyptian government to supply water to Cairo, only a few years after obtaining a similar concession for water supply in Alexandria. He established the *Société des Eaux du Caire* (Cairo Water Company), which began operating in 1870. Cordier's business partner was none other than the Egyptian-Armenia future Prime Minister Nubar Pasha who signed the agreement with the former in 1865 in his capacity as

⁸ André Raymond, *Cairo* (Cambridge: Harvard University Press, 2000), 245-47; Ali Mubarak, *Al-Khitat al-Tawfiqiyya al-Jadida li Misr al-Qahira* [Tawfiq'a New Plans] (Bulaq, Cairo, 1305 AH), Vol. 1, 97.

⁹ See "Rapport de la commission internationale de l'assainissement du Caire," *Journal Officiel*, Supplement to No. 51 (16 April, 1892), Marcel Clerget, *Le Caire: Etude de géographie urbaine et d'histoire économique* (Cairo: E. & R. Schindler Press, 1934), T. 1, 48-55, and Raymond, *Cairo*, 245-7. There were only few water springs in and around Cairo, and their water was insignificant for the purpose of water supply. Some springs were known for their healing qualities such as in Helwan. Others were surrounded by myths such as 'Ain al-Sira and 'Ain Abou al-Su'ud. A. Azadian, *Les Eaux d'Égypte* (Le Caire: Imprimerie Nationale, 1930), 75-90.

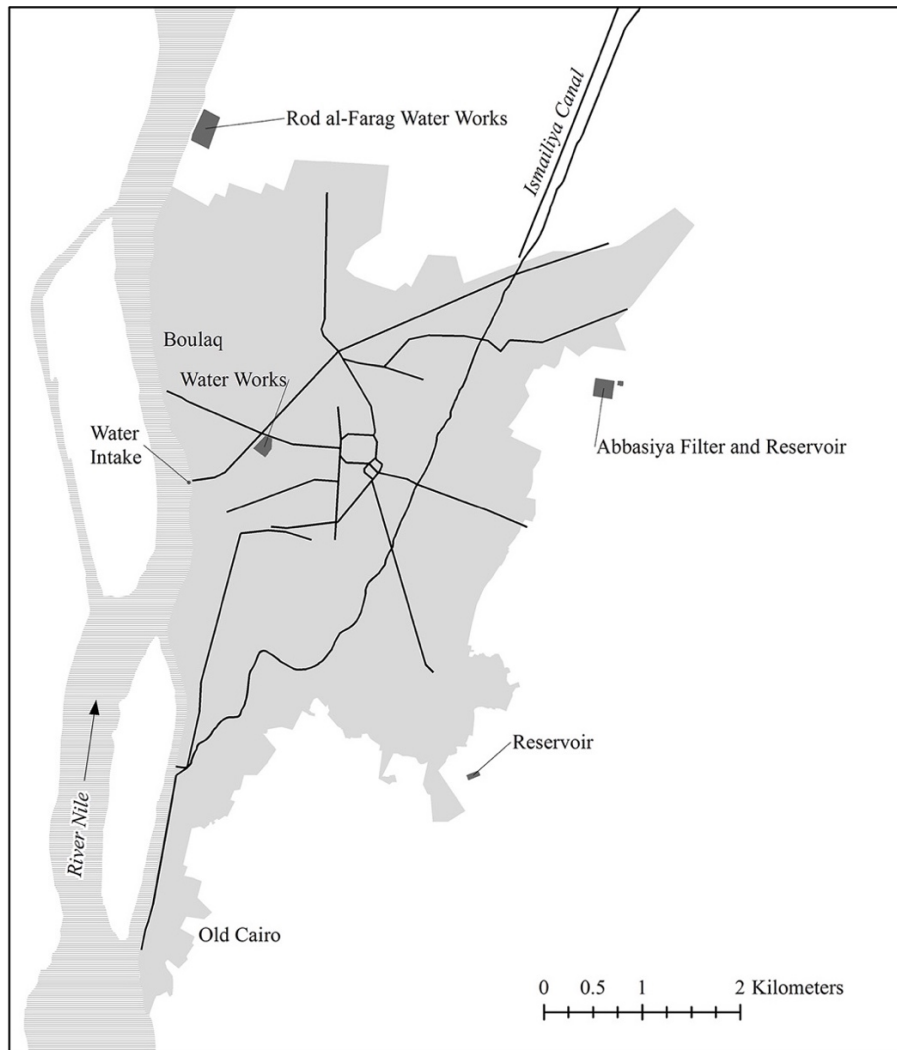
a Minister of Public Works. The collaboration yielded enormous privileges and accrued large profits to the private company. Subsequent negotiations during the following decades merely sought to moderate the company's inflated privileges.¹⁰ The company cheaply acquired eight hectares of land in the south of Cairo in order to establish its works, and by 1870 it proceeded to lay its pipes under all major streets. Water became a technological commodity.

In theory, the concession did not entail a monopoly, which meant that the traditional system of crude water distribution by carriers did not immediately lose its legal status—nor was this possible given the exorbitant rates that the water company charged to provide its elite subscribers with filtered water. However, carriers were gradually squeezed between the company's growing operations and the government's tightening control in response to epidemics of water borne diseases. Under this dual pressure, and due to the loss of power and significance of the guilds, carriers lost their independence and increasingly became middlemen between the company and consumers over the next decades. While most carriers switched to sale of filtered company water, others continued to draw crude water from the Nile and the city's canals and ponds against the directives of public health officials. From the main suppliers of water, carriers came to form a secondary, yet widespread system of supply that catered to middle and lower class residents who could not afford to subscribe to the service of the company. Such loss of independence came at a

¹⁰ The company's financial prerogatives began with the equipment and the land it acquired to set up the waterworks. The agreement with the government stipulated that all equipment necessary for water intake and distribution, including pumping machines and iron mains, were free from customs. Ministère des Finances, *Recueil général de contrats* (Le Caire: Imprimerie Nationale, 1908), "Firman autorisant l'établissement d'une distribution d'eau du nil au Caire et ses faubourgs," May 27, 1865. Dar al-Wathaiq al-Qawmiyya [hereafter DWQ] (The Egyptian National Archives). Nizarat al-Dakhiliya (Ministry of Interior), file number: 2001-009559 and 2001-0096112.

price, as when during the 1902 cholera epidemic, the government ordered carrier to bring skins and carts for disinfection before allowing them to distribute water.¹¹

The considerable expansion of the company's operations during the following half-century reflected the growth of Cairo. By 1874, the designated point of water intake was at the mouth of the Ismailiya Canal and the sand bed filters were located in the eastern desert of Abbasiya.



3.1. Map of water infrastructure, showing city limits, circa 1904.

¹¹ The National Archive [hereafter TNA], Foreign Office [hereafter FO] 407/161: From the Earl of Cromer to the Marquess of Lansdowne, dated February 26, 1903. See the government circular to Cairo's districts in *al-Mu'ayyad*, July 28, 1902.

Pumping machines elevated Nile water from the Ismailiya canal through a masonry aqueduct across the city to the Abbasiya filters, from where filtered water was distributed by force of gravity.¹² In 1886, the government negotiated new arrangements with the company, whereby the latter constructed a new cast-iron aqueduct that ran parallel to the old one. The company also established a new location of intake and began to draw water from a point where the Nile met the Ismailiya canal. The new location was supposed to ensure the ability to draw water during low Nile.¹³ By 1887, the company's cast iron mains running underneath the city totaled 150 kilometers in length.¹⁴ By 1892, the company owned two water reservoirs in Abbasiya and Imam and two more in the neighborhood of the Citadel from where filtered water was distributed to neighborhoods depending on their elevation. The largest of these reservoirs were subdivided into parts used for storage, filtration, and cleaning.¹⁵ Anticipating the development of residential suburbs in Abbasiya and the northeastern areas beyond it, the company acquired a new concession in 1903 to supply Qobba, Zaitoun, and Matariya with water, and after 1907 it supplied Heliopolis with water sold in bulk from its Zaitoun wells. In 1904, the company enlarged their ice and refrigerating rooms business by forming a sister company, *Compagnie Frigorifique d'Égypte*, and established a refrigerating plant in Boulaq that in a few years yielded 23,750 tons of ice annually.¹⁶ Aside from the Boulaq plant, the company acquired land in the riverside northern neighborhood

¹² Ministère des Travaux Publics, Direction Générale du Tanzim, *Compte rendu de l'exercice 1886* (Le Caire: Imprimerie Nationale, 1887), 18.

¹³ Ibid; Ministère des Finances, *Recueil général de contrats* (Le Caire: Imprimerie Nationale, 1908), "Arrangement pour l'établissement d'une nouvelle prise d'eau," February 1, 1886.

¹⁴ Mubarak, *al-Khitat*, Vol. 1, 83.

¹⁵ "Rapport de la commission internationale de l'assainissement du Caire."

¹⁶ Arnold Wright and H. A. Cartwright, eds., *Twentieth Century Impressions of Egypt: Its History, People, Commerce, Industry and Resources* (London: Lloyd's Greater Britain Publishing Company Ltd., 1909), 340-1.

of Rod al-Farag where it set up its ill-fated wells in 1905, before reutilizing the same plant for filtering Nile water in 1910.

One of the most striking aspects of water supply in colonial Cairo is how expensive the company's filtered water was in a city located on the river Nile. At a time when private water companies in European cities were increasingly brought under a regulatory framework or municipalized to lower prices, the Cairo Water Company charged up to double the rates of its foreign counterparts—a fact that critics of the British colonial regime, including the nascent anticolonial movement, were keenly aware of.¹⁷ In the original 1865 agreement between the government and the company, the maximum rate for filtered water was set at one French franc per one cubic meter of filtered water. After the 1883 cholera epidemic the new British colonial regime engaged in a round of negotiations with the company in order to lower rates. In 1887 both parties reached an agreement that lowered the maximum rate of filtered water to the still very expensive 0.7 franc (2.7 piasters or 27 milliemes) for one cubic meter.¹⁸ In Paris of the turn of the century the rate was 0.4 franc for one cubic meter.¹⁹ The company devised a subscription system that was based on the choice of either unlimited monthly plans whose fees varied according to the nature of the establishment and the number of occupants, or sale of filtered water by the meter, which

¹⁷ See note 3 above. See also Vanessa Taylor and Frank Trentmann, "Liquid Politics: Water and the Politics of Everyday Live in the Modern City," *Past and Present* 211, 1 (2011), Robert Millward, "The Political Economy of Urban Utilities," in *The Cambridge Urban History of Britain*, ed. Matrin Dauton (Cambridge: Cambridge University Press, 2000), idem, "Emergence of Gas and Water Monopolies in Nineteenth-century Britain: Contested Markets and Public Control," in *New Perspectives on the Late Victorian Economy*, ed. James Foreman-Peck (Cambridge: Cambridge University Press, 1991), Pedro Schwartz, "John Stuart Mill and Laissez Faire: London Water," *Economica* 33 (1966), and David Soll, *Empire of Water: An Environmental and Political History of the New York City Water Supply* (Ithaca: Cornell University Press, 2013), Ch. 1-2.

¹⁸ Ministère des Finances, *Recueil général de contrats* (Le Caire: Imprimerie Nationale, 1908), "Firman autorisant l'établissement d'une distribution d'eau du nil au Caire et ses faubourgs," May 27, 1865.

¹⁹ Goubert, *Conquest of Water*, 187-88.

required the installation of water meters by the company. Since its establishment, the company set up a number of paying taps and standpipes fitted with meters for sale to those who could not afford to subscribe to the service. Cairo's residents and water carriers bought filtered water from these locations. In 1892, there were only fifty-three standpipes in all of Cairo, which was not enough to sever the link between ordinary consumers and water carriers.

Attempts to lower water rates bore witness to the government's inconsistent desire and limited power to place the Cairo Water Company under regulations to the benefit of consumers. As a result of another agreement in 1897, the company lowered the rate of unfiltered Nile water for sprinkling and street sweeping and it pledged to supply up to one hundred cubic meters per day freely from its drinking fountains and standpipes in the event of an epidemic. This, however, came at a price as the government pledged not to negotiate with the company over the base rate of filtered water established by the 1887 agreement until the end of the concession period in 1969.²⁰ As we will see in the final section, only after conditional independence in 1922 that the company's privileges began to be challenged.

Water rates created vastly unequal patterns of consumption, which formed the basis of service distribution. In 1890, only 2,600 out of Cairo's 52,000 houses were connected to the company mains and the proportion of connected houses did not increase significantly before the 1920s.²¹ Sixty fountains out of the city's roughly 200 subscribed to the company's filtered water and provided water freely to the public. And out of Cairo's 279 mosques, only ten subscribed to

²⁰ Ministère des Finances, *Recueil général de contrats* (Le Caire: Imprimerie Nationale, 1908), "Réduction du prix de l'eau non filtrée pour l'arrosage public de la villa," March 23, 1897.

²¹ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037344.

the company's service while the rest depended on wells and carriers to fill their ablution basins.²² A study of Cairo's water supply in 1894 by Jean-Baptiste Piot, a board member of the Cairo Water Company, highlighted unequal access to filtered water, presenting it as natural in light of the purported limited needs of the lower class.²³ Piot estimated that about 200,000 of Cairo's inhabitants (570,000 in 1897) utilized the company's filtered water to varying extents, either directly through subscriptions or indirectly through fountains, retail water carriers, and free public fountains. The company supplied its moneyed subscribers with water on the basis of an estimated consumption of 180 liters per head per day, which compared favorably to water allowance in European cities. For the rest, the company supplied water to standpipes and free fountains based on an estimated consumption of three to four liters per head per day for all drinking and culinary purposes.²⁴ As Piot recognized, the "indigenous classes" depended on many other sources next to the company's meager allowance, including fountains, carriers dealing with crude water, and water cisterns. Piot however concluded that "the need for greater quantities of water is not felt by the lower classes."²⁵

Colonial officials recognized the urgency to make filtered water more available to Cairo's less fortunate classes, especially during times of public health crises, yet this also required the cooperation of the concessionary company. By the 1890s, there were only five government-controlled fountains that supplied filtered water freely, which was clearly insufficient to fulfill

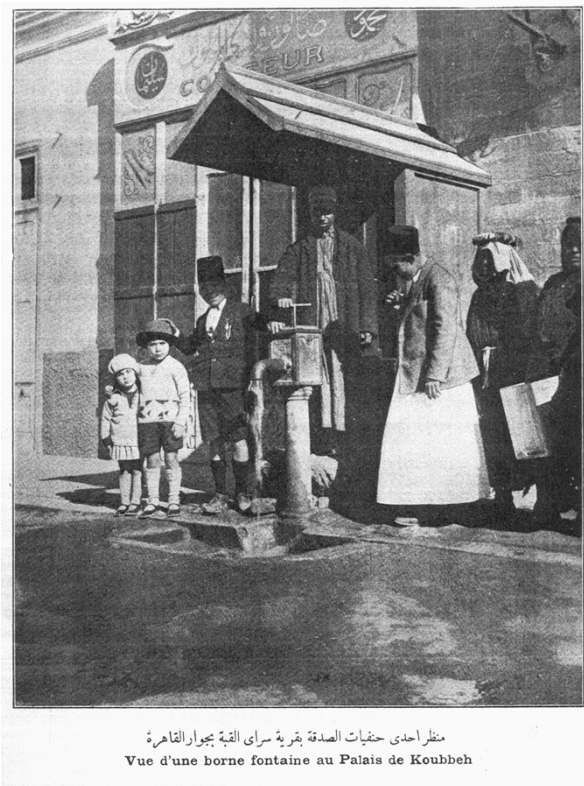
²² "Rapport de la commission internationale de l'assainissement du Caire."

²³ Piot was an author of articles and a monograph on veterinary services in Egypt and a longtime member of *Institute Égyptien*—the scientific society whose institutional history dated back to the French occupation of Egypt under Napoleon.

²⁴ J. B. Piot, "La question de l'eau d'alimentation dans les villes du Caire et d'Alexandrie," *Bulletin de l'Institut Égyptien* (1894), 268-9.

²⁵ *Ibid.*, 269-70.

needs. During the 1902 cholera epidemic, officials negotiated with the company to distribute water freely from some of its metered standpipes and established a total of sixty-four gratuitous fountains. Yet the number decreased to thirty-five immediately after the outbreak subsided.²⁶ By 1908 there were fourteen free public fountains in Boulaq, six in Old Cairo, three in Sayyida Zainab, five in the vicinity of the main railway station, and sixteen placed along the Khalig street with a concentration in Bab al-Khalq around the Abdin Palace.²⁷ Public health officials realized that as long as filtered water remained expensive and inaccessible, Cairo would continue to be liable to cholera.



3.2. A standpipe in Qobba, circa 1920s. (Source: A. Azadian, *Les Eaux d'Égypte*)

²⁶ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-033494.

²⁷ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-016485.

Water provisioning sustained a bifurcated urban landscape. Elites who could afford the company's rates were able to consume ample supply of pure water privately as they connected their houses to the company mains. For the less fortunate classes however, water provisioning became more fragmented than prior to the establishment of the company, as they obtained their inferior water allowance from carriers, free fountains, retail standpipes, shallow well, and the Nile and its derivatives.

Liquid Epistemologies

Scientific control and filtration of water became increasingly more contentious topics in unhealthy Cairo. During the four decades of British rule, the Nile became the subject of scientific research that investigated its cycle and its chemical and bacteriological composition in order to assess its purity and suitability of drinking. Vociferous elites who were anxious for their health demanded stricter supervision on the water supply by the government. They also charged that the powerful company economized at the expense of the health of the city.²⁸ Meanwhile, scientific control over water began to rub against popular practices and lay epistemologies that were still prevalent, particularly among the lower class. Carriers and ordinary people possessed some knowledge of how to purify Nile water and recognized some sensory markers to judge its potability. For government and company, bacterial counts and chemical analysis of minerals and organic substances in official laboratories were the true measures of purity, even if experts did not fully agree on standards.

²⁸ Grant Bey, "The Sanitary Conditions of India and Its Teachings," *The Sanitarian* 234 (1889): 398; Pyramid, "The Drainage of Cairo," *The Provincial Medical Journal*, June 1, 1895, 301.

Contemporary Egyptian doctors and colonial experts repeatedly returned to the fifteenth century chronicler al-Maqrizi and eleventh century doctor Ibn Radwan in order to get a sense of practices that survived in some form up to the colonial era. However, no serious observer argued that there was a strict continuity between historical practices and those of the turn of the century. There was, however, a practical dimension to this, as contemporary manuals of health geared towards the general public often reviewed historical practices and recommended some of them, while rejecting others.²⁹

The natural cycle of the Nile was closely connected to drinking water practices. Historically, the Nile went through a uniform natural cycle, which sustained agriculture in the Nile valley and supplied its inhabitants with water for drinking and domestic purposes. Once a year the Nile in Egypt was subject to a great accession of water caused by the summer rain at Ethiopian mountains from which stemmed one of the Nile's main tributaries. In Egypt, water began to rise during the late summer and swept through the entire course of the river for the three following months. The river regained its calm during the winter month of January and February and, with rising temperatures, water began to decrease until the summer. From May to July the Nile entered a critical phase when its water became lowest and most stagnant at the same time that temperatures generally reached its highest in July. In August, the flood cycle began anew with another wave of fresh water from the south.

²⁹ For an account of water practices during the fifteenth century Mamluk era see al-Maqrizi, *al-Mawaiz wa al-I'tibar bi dhikr al-Khitat wa al-Athar* (al-Qahira: Madbouli, 1998), Vol. 1, 175-190. For late nineteenth century accounts of traditional water practices see Abd al-Rahman Ismail, *al-Taqwimat al-Sihhiya 'Ala al-'Awa'id al-Misriya* (al-Qahira: Matba'at Bulaq, 1895), 26-7; Yacoub Artin, "Ma' al-Nil wa al-Miyah al-Batiniya I," [Nile and Underground Water I] *Tabib al-'A'ila* 2, 1 (1896), 3-7 and idem, "Ma' al-Nil wa al-Miyah al-Batiniya II," [Nile and Underground Water I] *Tabib al-'A'ila* 2, 2 (1896), 24-29. See also Huda Lutfi, "Coptic Festivals of the Nile: Aberrations of the Past?," in *The Mamluks in Egyptian Politics and Society*, eds. Thomas Phillip and Ulrich Haarmaan (Cambridge: Cambridge University Press, 1998).

The solar Coptic calendar served as the basis of the agricultural cycle, a marker of weather patterns, and to regulate traditional practices of potable water. Nile water was generally considered to be of agreeable taste and good digestive qualities, yet water was considered purest for drinking and storage purposes during the Coptic month of Touba (January 9-February 7) when water flowed calmly and uniformly. It was common to boil water starting from the 10th of Ba'ona (the 16th of June) when the river was most stagnant. However, water was also considered dangerous for drinking purposes during the most active phase of the flood, when the river acquired a red color due to the presence of large amounts of silt. When water acquired a green color, its taste and smell were considered foul and it was not consumed directly without treatment. Egyptians then usually boiled water and cooked it with apricot and peach kernel, alum, and other medicinal substances, before letting water settle in earthenware pots in order to attain acceptable taste and purity.

Agreeable taste and “light” composition of water were noteworthy criteria for salubrity. Abd al-Rahman Ismail Effendi, a modern educated doctor and author a health manual, advised his imagined middle class audience who were concerned with water purity to buy a filter, such as the ‘Soleiman Effendi Shawqi’ filter or the Pasteur-Chamberland filter, the cutting-edge water filtering technology that appeared on the market in 1884.³⁰ Yet for those who could not afford to buy filters, a category that included most Cairenes as Ismail recognized, water should be filtered using the time-honored remedies of Ibn Radwan, who advised boiling Nile water and filtering it with local medicinal substances before letting it settle overnight. For modern educated *effendis*, popular practices were a second best after the unaffordable purity of modern science.

³⁰ Unfortunately, Ismail did not discuss the making, availability, and use of the Egyptian filter. Ismail, *al-Taqwimat al-Sihhiya*, 26-7.

Foreign hygienists such as Paul Kaufmann and Jean-Baptiste Piot observed and reported on traditional water filtration technologies, and while they praised their effectiveness for removing objectionable taste and smell, they cautioned that local knowledge was inadequate for removing bacteria.³¹ Particularly Kaufmann praised a common decantation and filtration procedure for treating green Nile water as effective for ridding it of disagreeable sensory qualities. The method required crushing a piece of alum (*shabba*) and rubbing it on the inner walls of a large earthenware pot (*zir*) before pouring and shaking the water and letting it settle. The same treatment was sometimes performed with peach kernel. As a result, suspended matter and water separated inside the earthenware vessel and the treated water lost much of its disagreeable qualities. Both Kaufmann and Piot warned, however, that the decantation procedure was not in any way suitable for removing pathogenic bacteria. Kaufmann acknowledged, parenthetically, that for the great majority of Egyptians the cost of buying a Pasteur filter to bacteriologically treat crude water was prohibitive.³²

The first notable discussion on the purity and availability of drinking water during the British colonial era took place a few years after the 1883 cholera epidemic, when the *Commission d'assainissement du Caire* met in 1885 to discuss measures for improving the health of Cairo. During the first session, commission members decided that authorities should fill up the Khalig Canal or at least suppress it as a source of drinking water. During the second session, Latif Selim Bey, the Under-Governor of Cairo, objected to the resolution of the first meeting. The upshot of

³¹ Aside from being a board member of the Cairo Water Company, Piot authored articles and a monograph on veterinary services in Egypt. He was a member of *Institute Égyptien*—the scientific society whose institutional history dated back to the French occupation of Egypt under Napoleon.

³² Paul Kaufmann, “Sur le prétendu Nil vert,” *Revue d'Égypte* 4 (1897): 107-112. See also Piot, “La question de l'eau,” 269-70.

his argument was that filling up the Khalig, aside from producing an ugly and irregular street and would rob the city of one of its most distinctive features, would deprive poor neighborhoods of a crucial source of water for drinking and domestic purposes. His solution was to enforce regulations in order to stop the canal from being used as a sewer or to limit such use to a minimum. While house connections could be abolished, mosques that served a large public could open and close their connections at scheduled times regulated by the authorities and monitored by the police and local vigilantes. However, commission members largely ignored Selim's input and the main suggestion of their final report was to suppress the canal and turn it into a street.³³

At the other end of the spectrum, Cairo's elites voiced two major complaints against the filtered water of the company. They argued that the Nile was contaminated with waste and organic material for which the company's filtration process was not adequate, and that the location of intake was unsanitary since it was downstream of the city where water was potentially most impure. By the early 1880s the original point of intake was at the mouth of the Ismailiya Canal. For moneyed Cairenes, this location was too close to the slums of Boulaq, and even company officials observed that the Ismailiya Canal had become the "public wash house of the quarter."³⁴ These conditions surrounding the intake site of the water supply became even more intolerable after the 1883 cholera epidemic. As a result of the 1886 negotiation with the government, the company switched to the new point of intake where the Nile met the Ismailiya Canal. For critics,

³³ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037345. Two years later, there was another proposed temporary solution to the Khalig's sanitary problems, namely to connect the canal to the Nile via a supplementary channel that would keep water running in the Khalig throughout the year, thus improving the purity and potability of its water. Nothing, however, came out of this suggestion. DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-002561.

³⁴ DWQ, Nizarat al-Dakhiliya (Ministry of Interior), file number: 2001-017065. See also the cynical article in *al-Shifa'* on "the company's experiments on people." "Ma' al-Qahira," [Cairo's Water] *al-Shifa'* 1, 4 (1886): 125.

the new location was still flawed as it was too close to the riverbank. And it still risked contamination because it was downstream from the city. One article charged that the powerful company, which made the government pay LE 20,000 for laying new pipes, economized at the expense of water purity.³⁵ For J. A. S. Grant, a Scottish doctor who lived in Egypt since the 1860s, the company's water during summer months "may be truthfully designated sewage-water" that was contaminated by "organic matter thoughtlessly thrown into it by the natives."³⁶ *The British Medical Journal* was appalled that the 1886 agreement took place under the sanction of "an English government" who had the experiences of Calcutta and Bombay at its disposal.³⁷ And when members of the International Sanitary Commission of 1892 visited Cairo, they registered their objection to the intake location, advising the company to relocate their feeding pipe to south of the city, preferably at a distance from the river bank.

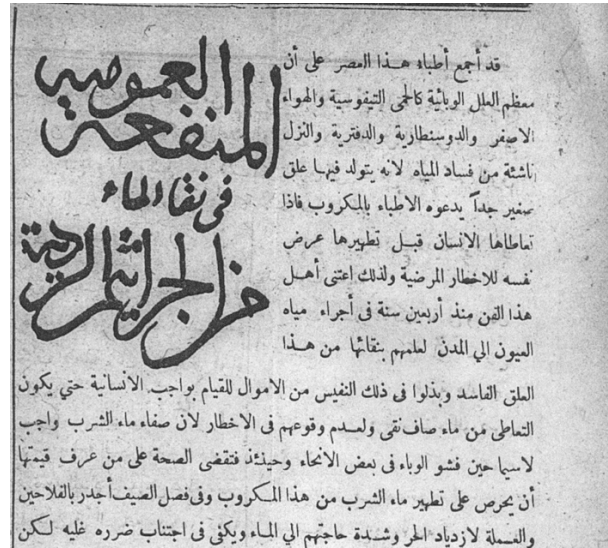
The interest of the nascent Egyptian middle class in water purity and availability expressed the formation of a new subjectivity that occupied an uneasy position in relation to modern scientific rationality and local medical traditions and practices. Modern educated *effendis* shared the same anxieties of the upper class concerning the purity of drinking water. While they availed themselves on the filtered water of the company and new filtering technologies as much as they could afford, they preached what they called "old science" of water filtering and native filtering devices as second best options for those who could not afford it. In 1887, *al-Sihha* (Health or Hygiene) published two articles on potable water, the first of which was an Arabic translation of a lecture

³⁵ Pyramid, "The Drainage of Cairo," 301.

³⁶ Grant Bey, "The Sanitary Conditions of India and Its Teachings," *The Sanitarian* 234 (1889): 398. Grant was a Scottish doctor and a graduate of the University of Aberdeen.

³⁷ "Sanitary Administration in Egypt," *The British Medical Journal*, August 30, 1890, 511.

by the public hygienists Paul Brouardel on the history of potable water from a public health perspective. At the end of the piece, the editors—Hasan Bey Rifqi, an inspector at the Public Health Department and Ibrahim Bey Mostafa, who taught at the School of Medicine—provided advice tailored to their Egyptian audience. They recommended the Pasteur-Chamberland filter, the popular portable filter of porcelain exterior that could be used at home. If buying one of these devices was not possible, then the authors recommended using a large earthenware pot (*zir*) as a water-filtering device, which Piot and Kaufmann praised.³⁸



3.3. Advertisement for drinking water anti-bacterial drops. (Source: See note 39)

Commercial products such as mineral water and dubious anti-bacterial remedies that targeted educated Egyptians signified the class and epistemological remove of its target audience from the urban poor and fed off new concerns for hygiene and bodily fitness. One advertisement for such remedies that appeared in *al-Mu'ayyad*, an Arabic newspaper associated with the rising Egyptian middle class, imaginatively illustrated to its readers the infinitesimal pathogenic

³⁸ “Maa’ al-Shorb” [Potable Water], *al-Sihha* 1, 2 (1887): 33-45. See note 34 above.

monstrosities that only experts were able to see in laboratories and under microscopes.³⁹ Similarly, when the Greek-Egyptian company of Spiro Spathis advertised carbonated water products that were sold at their Azbakiya outlet, they assured their customers that the water they used was purified by the Pasteur filters.⁴⁰ During the same period, bottled mineral water became available in Cairo. A photo of Ataba Square shows two large advertisements for Vittel and Perrier mineral water companies that strategically stood at the entrance of Muski commercial thoroughfare.



3.4. Ataba Square, circa 1910.

By the close of the nineteenth century water became the object of a new regime of technoscientific management whereby official judgment of purity was concentrated in the hands of experts and their laboratories. Producing scientific knowledge of the Nile and technologically controlling its water rested on a number of institutions whose operations were vital for managing the biological life of Cairo. Chief among them were the Khedivial Chemical Laboratory, the

³⁹ *Al-Mu'ayyad*, February 2, 1900.

⁴⁰ Muhammad Sayyid Kilani, *Teram al-Qahira* (al-Qahira: al-Hai'a al-'Ama li Qusur al-Thaqafa, 2010 [1968]), 41.

Bacteriological Laboratory, the Survey Department Laboratory, and the laboratory of the Cairo Water Company. These laboratories analyzed water samples and constantly watched for sudden changes in the chemical and bacteriological composition of water as a sign of potential contamination. Notable early efforts dated back to the first half of the nineteenth century. The first well-documented chemical examination of Nile water took place under the guidance of Mostafa Magdaly in 1849-1850.⁴¹ Other prominent instances of chemical studies of water supply included ones by Henry Letheby in 1874-75 and Ernst Pollard in 1888-89.⁴²

Participating in global debates of water analysis, the foreign water experts in Egypt rethought and adapted standards and methods of sampling and examination to suit local conditions. Shared scientific ethos mediated the occasional disagreements of experts, who by choosing to ally themselves with the company, the government, or elite consumers, engaged in technoscientific arguments not easily separable from the “impurities” of politics. In his 1894 study, Piot drew on the work of Paul Kaufmann to defend the maligned water of the company. Kaufmann was a bacteriologist who studied in Berlin, Zurich, and Strasburg during the 1880s, took a position as professor of Pathology and Bacteriology at the School of Medicine in Cairo (1892-1896) while also holding the position of the Bacteriological Surveyor of the Cairo Water Company (1894-1896). According to Kaufmann’s microbiological analysis, water at Qasr al-Nil, or the location of water intake, contained an average of 4755 microbes per centimeter. After filtration using the company’s sand beds, the microbe count decreased to a minimum of 23 and a maximum of 328,

⁴¹ Mostafa Magdaly, “Analyses quantitatives de l’eau du Nil, pendant 10 moi de l’année,” *Mémoires de l’Institut Égyptien* (1862). See also Alfred Lucas, *The Chemistry of River Nile* (Cairo: National Printing Department, 1908), 9 and Azadian, *Les Eaux d’Égypte*, 30.

⁴² Henry Droop Richmond, “Contributions to the Chemistry of River Waters: The River Nile,” *The Journal of Analytical and Applied Chemistry* 7 (1893): 212-3. Henry Letheby was a consultant at a London water company. See Hamlin, *A Science of Impurity*, Ch. 7.

but as a general rule it was less than 100 per centimeter, the new standard set by Robert Koch for considering water sufficiently pure. Piot also drew on the work of C. Piefke, a chemist who worked under the supervision of Koch to study sand filtration. Piefke demonstrated that fine sand was the best filter, not because of the mechanics of how water passed through sand but because of a slippery film formed by a lattice of algae and microorganisms on the sand's surface that caught impurities. Whatever passed from this layer was likely to get caught by other layers of coarse sand and gravel. The company's sand bed filter was composed of a 20-25 centimeter of fine sand and a 50-centimeter layer underneath it, which was composed of stones and gravel placed in an order of increasing size. Both layers were, in Piot's assessment, sufficient for keeping bacterial count below the required hundred per cubic centimeter. Finally, the company reshuffled and washed the sand periodically in order to prevent the surface layer from becoming too thick—also in line with practices in Europe.⁴³

Established in 1882, the Khedivial Laboratory became part of the Public Health Department in 1886, and it conducted routine analyses on dairy products offered for sale in Cairo, drugs and chemicals, and water samples from Egyptian towns.⁴⁴ Under the directorship of Chief Chemist Alfred Pappel the laboratory regularly analyzed samples of Nile water from Cairo and other towns. The laboratory enumerated all samples and searched for the presence of sulphuric acid, ammonia, chlorine, nitrates, bacteria, and organic material in suspension. When the laboratory traced dangerous substances, it declared water undrinkable and advised the Public

⁴³ Piot, "La question de l'eau," 270-272.

⁴⁴ Wright and Cartwright, *Twentieth Century Impressions of Egypt*, 417.

Health Department and the Ministry of Interior to promptly search for the reasons of contamination.⁴⁵

Pappel's 1892 *Note sur l'eau au point de vue de l'alimentation pour la ville du Caire* was the first statement of its kind by an influential expert to condemn the Nile as essentially unfit for drinking purposes.⁴⁶ He debated whether the so-called English or French method of water analysis, which searched for traces of albuminoid ammonia and absorbed oxygen respectively, was better for assessing the purity of Nile water. Yet according to both methods, "Nile water should be considered suspect and of absolutely no good quality" on account of presence of organic materials.⁴⁷ Examining a variety of water samples from the Nile at Qasr al-Nil, filtered water from the Abbasiya reservoir, and company filtered water from the faucet of the Khedivial Laboratory, Pappel found varying levels of albuminoid ammonia and oxygen that approached those that may cause diarrhea and nausea and generally made the water unfit for drinking. Aside from the essentially dangerous qualities of the water, the Chief Chemist criticized the filtration procedure of the Cairo Water Company. The sand bed filters were uncovered, placed at the ground level, and unfit to catch the silt in suspension in the Nile—the organic material that otherwise made Nile

⁴⁵ DWQ, Diwan al-Sihha al-Umumiya (Public Health Department), file number: 4008-003107. Scientific disagreements between experts occurred, as when Pappel expressed disapproval of the quality of the opium and its morphine content, which Hill & Son Company sent to the Public Health Department in 1886. The government hired an outside expert, doctor Schmidt, who consulted German, British, and Egyptian Pharmacopeias to see if there were potential differences in standards. DWQ, Diwan al-Sihha al-Umumiya (Public Health Department), file number: 4008-004859.

⁴⁶ DWQ, Diwan al-Sihha al-Umumiya (Public Health Department), file number: 4008-004860: 'Note sur l'eau au point de vue de l'alimentation pour la ville du Caire' by A. Pappel, dated January 20, 1892.

⁴⁷ Pappel was cognizant that measuring the harmfulness of water was the subject of a bitter dispute among chemists in London and elsewhere. See Hamlin, *A Science of Impurity*, 184-202. In a posthumous paper Pappel summarized his findings on the best methods of analysis that were suitable specifically for the Egyptian water supply. See Egypt, Department of Public Health, *Reports and Notes of the Public Health Laboratory*, No. 1 (Cairo: Government Press, 1918), 85-111.

water agriculturally fertile. In addition, high chlorine levels in filtered water indicated that the company did not properly wash sand used for filtration. Pappel concluded that while the Nile was generally unfit for drinking, the company could do more to mitigate the presence of organic material. And he suggested increasing the thickness of filter beds to 1.5-2 meters or construct a tunnel for rapid filtration before the final round of filtration at Abbasiya.

Working as a Second Chemist under Pappel at the Khedival Laboratory between 1889 and 1892, Henry Droop Richmond conducted chemical analysis on Nile water and reached very different conclusions.⁴⁸ In 1891, Greene Pasha, then Director of the Public Health Department, asked Richmond to examine the potability of Nile water in response to outcries specifically against the quality of water in Cairo. Richmond gathered and analyzed samples from Cairo all the way to the southern regions of Minya, Assiout, Qena, Aswan, and Wadi Halfa, taking the samples from mid-stream using the same procedure, except in Cairo where he drew samples from the location of the company's intake at Qasr al-Nil. Publishing his findings after resignation, Richmond openly undermined the credibility of his former chief deeming his findings "unreliable" even though they were received with authority in Egypt. First, evidence that Nile water was unsuitable for drinking was weak given that it had "been drunk by generations during six thousand years." Second, the Nile underwent "slight but distinct pollution" in its passage through Cairo. Third, analysis of the filtered water of the company showed evidence of "considerable purification." Thus, Richmond allied himself with the company, which was open to "reasonable suggestions" regarding how to improve the water supply.⁴⁹

⁴⁸ DWQ, Diwan al-Sihha al-Umumiya (Public Health Department), file number: 4008-004861; DWQ, Nizarat al-Dakhiliya (Ministry of Interior), file number: 2001-017573.

⁴⁹ Richmond, "Contributions to the Chemistry of River Waters," 218-223. After his resignation, Richmond became an expert in the chemistry of dairy products.

The Bacteriological Laboratory was another institution whose judgment carried weight in matters of the purity of water supply. First headed by Paul Kaufmann from 1892 to 1894, one of the laboratory's most important functions was the diagnosis of infectious diseases and preparing cultures of various pathogenic bacteria such as those of cholera and diphtheria.⁵⁰ Another was conducting regular bacteriological examinations of the water supply of Cairo and of large provincial towns. H. Bitter, who assumed the directorship of the laboratory after Kaufmann, also held the position of Professor of Hygiene at the Medical School of Qasr al-‘Aini and the University of Würzburg, Germany. As we will see below, Bitter was heavily involved in water supply schemes in Cairo, Alexandria, and Tanta.

In his capacity as the bacteriological surveyor of the Cairo Water Company (1894-96), Kaufmann directed his efforts towards studying the causes of the “green Nile” phenomenon and its consequences for the water supply of Egypt. Nile water turned visibly green for almost two weeks each year beginning roughly from the second half of June. Extensive laboratory research led Kaufmann to believe that the green color was caused by an enormous mass of microscopic algae that were, most probably, formed above Wadi Halfa, at the north of Sudan. The number of microscopic algae was so great that for two weeks about nine hundred kilometers of the river, from Wadi Halfa all the way to Cairo, turned green. Kaufmann was able to identify three distinct species of algae that produced the green color, one of which acquired its scientific name after the bacteriologist: *aphanizomenon Kaufmanni*.⁵¹ Most importantly however, while the algae imparted disagreeable sensory qualities to the water, it did not make it bacteriologically impure and green

⁵⁰ Wright and Cartwright, *Twentieth Century Impressions of Egypt*, 417. See also “Egypt (From our own Correspondent),” *The Lancet*, July 9, 1892, 120.

⁵¹ Kaufmann, “Sur le prétendu Nil vert,” 105-7.

water remained drinkable. As we saw above, Kaufmann praised popular treatment of green water using clay pots and alum as effective for ridding it of disagreeable smell and taste. Meanwhile, treating green water with the water company's sand filters posed serious challenges and the bacteriologist conducted a number of inconclusive experiments with treatments such as frequent washing of filters.

By 1908 when Alfred Lucas wrote *The Chemistry of the River Nile*, the river had been established as the domain of regimented laboratory work. Before becoming a celebrity chemist, Lucas worked at the Survey Department Laboratory in 1898 and published several studies on the chemistry of soil and the deterioration of building materials in Egypt.⁵² Pointing to methodological deficiencies of all previous water sampling efforts in Egypt, Lucas felt the need to begin the investigation of the chemical composition of the Nile and its annual variations from scratch. Under a new strict regime of sampling, the Survey Laboratory collected weekly samples for chemical and bacteriological analysis of Nile water starting from 1904.⁵³

Only in 1915 and in recognition of “the desirability of a Service which would interest itself especially in the various problems connected with drinking water supply in Egypt,” did the Public Health Department create the Water Service Bureau. In collaboration with the Public Health Laboratory, this centralized bureau was responsible for inspecting all potable water under

⁵² After his work at the Survey Department's laboratory, he focused on the application of chemistry to criminal investigation, publishing a textbook in 1920 on the topic. His role as a forensic expert in criminal proceedings led The Egyptian Gazette to dub him “the Sherlock Holmes of Egypt.” In 1923, he was a member of the King Tutankhamun excavation expedition where he took charge of the scientific examination and preservation of antiquities. During the expedition, Lucas established a makeshift laboratory where he conducted chemical examinations on a wide range of samples from ancient Egyptians tombs including pots, their contents, hair, skin, coffins, and building materials. See Mark Gilberg, “Alfred Lucas: Egypt's Sherlock Holmes,” *Journal of the American Institute for Conservation* 36, 1 (1997).

⁵³ Lucas, *The Chemistry of the River Nile*, 9.

municipalities, companies, government, and private individuals. In addition, the bureau standardized the conditions of drawing and examining weekly samples. In 1920 C. Todd, then director the Public Health Laboratory, declared that the Water Service had gathered considerable information on water supplies, which was now available for interested parties including medical officers and sanitary experts.⁵⁴

The latter decades of the nineteenth century witnessed the normalization of modern scientific epistemology and the introduction of scientific standards and technologies into the everyday world of water consumption. This world was not a clean slate. Far from it. It was a field inhabited by a confusing array of popular practices and lay categories that still informed perceptions and beliefs concerning water purity. And while these practices and categories could not be dismissed by modern educated Egyptians, they defined purity for the lower class and the urban poor. Traditional markers of purity depended on the sensory qualities of water and on an understanding of its source whereby running water was privileged. Expert debates, on the other hand, had moved well beyond discrediting the senses as a guide to knowledge and naturally well beyond what could be understood by laypeople.

Colonial power added another layer to these developments as it informed how Egyptians, particularly of the lower class, received the actions of public health authorities. In their efforts to address unsanitary conditions and manage the city during cholera epidemics, sanitary authorities destroyed slums, shut down mosques and baths, quarantined patients in hospitals, barricaded Nile banks to prevent residents from drawing water, and filled up sources of water including canals and

⁵⁴ Egypt, Department of Public Health, *Reports and Notes of the Public Health Laboratory: Egyptian Water Supply*, No. 3 (Cairo: Government Press, 1920).

ponds on which the poor relied.⁵⁵ Rumors that health officials poisoned water sources like the Khalig and Boulaqiya Canals and abducted cholera patients expressed the sense of vulnerability of the colonized. And they came to haunt the government as it attempted to exercise more rigorous technoscientific control of the water supply.

Unhealthy conditions and cholera epidemics gave rise to ceaseless scrutiny of drinking water. Moneyed Cairenes began to inhabit modern residential enclaves that distinguished themselves from spaces of poverty and disease. But they still feared that they were liable to waterborne diseases if the Cairo Water Company did not reform its system of intake and filtration. At the same time, contagion forced urban administrators to recognize the fundamental problem of the economic and organizational difficulty of supplying safe water to the poor, who were in fact most liable to cholera. The government's solution to these challenges was twofold: to increase the number of free public fountains and to modernize Cairo's water supply in conjunction with the company by switching to a source of water that could not be contaminated.

Epicures and Experts

When the Cairo Water Company altered its source of water from the Nile to deep wells as a result of a new agreement with the government in 1905, the scheme was hailed as a modernizing project that would decisively end decades of anxiety over the purity of potable water. Doctors, hygienists, and bacteriologists shared the excitement as they had been eagerly expecting this development for some time. A few years later, the new water supply was surrounded by a maelstrom of controversy that forced the government and the company to reverse course and return to the Nile as a source

⁵⁵ See Chapter One.

of water supply. For a period of five years Cairo's water supply was seemingly on everyone's minds, animating debates that were simultaneously and inextricably scientific, political, social, and economic.

Shallow wells were familiar features of the domestic and communal landscape of Cairo, and their water had a generally bad reputation, thus used mostly for cleaning purposes and drunk only by the poorest. In 1887, doctor Mahmoud Mostafa Bey, an editor of the Arabic periodical *al-Sihha*, published an article to educate the readers about everyday use of wells and their potential dangers. Common wells tapped into subsoil water that could usually be found at a depth of six meters below the surface. There was no doubt that this was Nile water that infiltrated the soil. Subsoil water slowly rose several meters closer to the surface and descended back to its normal levels following the river cycle. Cairo's residents were already familiar with this observation as ground water rose in low riverside neighborhoods to such an extent that it overtook ground levels, submerged cesspits, and created marshy areas. For Mostafa, the annual rise and fall of subsoil water had grave consequences for public health as water infused layers of soil that were saturated with filth and organic material. In addition, wells were often placed too close to latrines in mosques, public baths, and private homes.⁵⁶ It was, however, clear that only the poorest of Cairo drank this water as a last resort.⁵⁷ The Public Health Department attempted to suppress shallow wells as part of its efforts against the 1895-96 and 1902 cholera epidemics.⁵⁸

The scientific study of Cairo's geology, the composition of its soil, and the fluctuation of its underground water were vital to questions of water supply, health, and civil engineering.

⁵⁶ Mahmoud Mostafa, "Miah al-'Abar bi al-Mahrousa," [Well Water in the Capital] *al-Sihha* 1, 2 (1887): 60-2.

⁵⁷ *Al-Qahira*, 28 May, 1889.

⁵⁸ "Cairo's Water Supply," *The Egyptian Gazette*, February 8, 1910.

Attempts to bore deep wells in Cairo dated to the early decades of the nineteenth century. There were three attempts to find artesian water in Cairo during the 1830s under the rule of Mehmed Ali. Such attempts were not successful as they were incapable of drilling deep enough to perforate what was later believed to be a stratum of impermeable clay that existed deep below the surface, presumably separating infiltration water above from pure water-bearing strata below. These early attempts only resulted in the familiar brackish water of shallow wells. Other attempts to bore artesian wells took place in the oases of Egypt's western desert. Between 1883 and 1886 a corps of English engineers under the direction of Major R. H. Williams unsuccessfully attempted other deep borings in the Delta region.⁵⁹

The experimental borings and geological studies of scientists and engineers during the second half of the nineteenth century led to the discovery of pure water deep under Egyptian soil, creating ripples of excitement among bacteriologists and water analysts.⁶⁰ It led urban officials to believe that they may have found the long-desired supply of water that, as opposed to the Nile, stood no chance of contamination. In 1894, Paul Kaufmann and Ernest Sickenberger—the latter was a notable pharmacologist who also studied Egyptian geology and methods of water sterilization—pointed out that experimental borings would have to drill much deeper than before

⁵⁹ Azadian, *Les Eaux d'Égypte*, 19. Clerget, *Le Caire* T. 1, 55.

⁶⁰ There were numerous studies of subsoil water and its fluctuation in Cairo. In 1867-68, Sir Benjamin Baker, the English civil engineer who later worked on the Aswan Dam project, kept daily records of water in a well situated about eleven miles away from the river in order to study the fluctuation of subsoil water. In 1894, the Public Health Department published a diagram showing the fluctuation of water levels in three different Cairo wells between 1890 and 1892 and since 1894 the Tanzim took weekly observations of subsoil water levels from six wells that were administered by the department. In 1907, Alfred Lucas synthesized much of the information that had been gathered during the previous decades. Alfred Lucas, "Note on the Fluctuation of the Water Level in Some Wells in Cairo," *Cairo Scientific Journal* 1, 6 (1907): 194-96 and idem, "The Level of Subsoil Water in Cairo," *Cairo Scientific Journal* 2, 24 (1908): 311-13.

in order to reach the then hypothesized pure water-bearing strata.⁶¹ It was Tanta, Egypt's third largest town after the capital and Alexandria, that led the way to what was seen by experts as a revolution of water supply in the country. There, the German water engineer Karl Abel was successfully able in 1896 to tap into an underground source of water beneath an impermeable stratum of clay forty meters below the surface, which qualified the water as "artesian."⁶² Experts including Pappel, Kauffman, and Bitter were pleased to announce that water was practically sterile and excellent from the chemical point of view. Naturally, they recommended that Cairo should follow suit if it was possible to find the same kind of water underneath its soil.⁶³

Scientists, officials, and observers close to the administration were aware that switching to deep wells as a source of drinking water may produce tensions in light of local practices and sentiments that privileged the running water of the Nile. Some argued that "old science" vouched for the viability of well water or that at least there was a space in the native medical tradition for rehabilitating deep well water as desirable for drinking purposes. Others attempted cultural rapprochement through the opposite extreme, by arguing that artesian wells had reached what should be considered as another Nile, or a subterranean river that shared the same source as the surface one, yet whose water did not communicate with surface strata. In late 1896, *Tabib al-'A'ila* [The Family Doctor], presented a summary of a lecture by Yacoub Artin on potable water. Artin acknowledged that the common wisdom was that running Nile water was better for drinking than

⁶¹ Clerget, *Le Caire* T. 2, 62. On Ernest Sickenberger see "Old and Time-Honored Pharmacists," *Meyer Brothers Druggist* 27 (1896): 292.

⁶² Azadian, *Les Eaux d'Égypte*, 20.

⁶³ Kaufmann, "Sur le prétendu Nil vert," 119 and H. Bitter, *Observations hygiéniques sur l'approvisionnement en eau de la nappe souterraine - projeté pour la Ville de Tantah par M. l'Ingénieur K. Abel* (Le Caire: Typ. Lithographie A. Costagliola, 1897).

well water. Referring to the Egyptian practice of boiling water from June till October, it was notable for Artin that “our ancestors reached through surveillance and observations the same conclusions prescribed today by the best of scientists and the most renowned of researchers of the purification of potable water.”⁶⁴ More importantly, there were notable dissenting voices in the medical tradition on the issue of water source, and a doctor as renowned as Ibn Sina (Avicenna) (980-1037) was dubious of the potability of the Nile, categorically declaring the water of fresh springs better, a point that, argued Artin, was confirmed by modern bacteriologists and hygienists.⁶⁵ Expecting some opposition to deep tube water, Artin claimed that the excitement over artesian wells was not contradictory to “old science” [*al-‘ilm al-qadim*] and the best of medical traditions.

Bitter and Karl Abel became the spokesmen of what they considered to be a vanguard water technology. In 1896, they conducted deep well experiments in Alexandria, submitting a report to the city’s municipality where they claimed that deep wells successfully tapped into a bacteriologically and chemically pure water that resembled that of Tanta.⁶⁶ When Abel met members of the Alexandria municipality in order to pitch the idea of a new source of water supply, he pointed out that he did not merely reach a water-bearing stratum, but rather an underground running stream that stemmed from the very same sources as the Nile.⁶⁷ Abel, Bitter, Artin, and others believed that engineers have tapped into an enormous, hitherto unknown reservoir of water,

⁶⁴ Artin, “Ma’ al-Nil wa al-Miyah al-Batiniya II” [Nile and Underground Water II], 25.

⁶⁵ Artin, “Ma’ al-Nil wa al-Miyah al-Batiniya I” [Nile and Underground Water I], 5.

⁶⁶ Artin, “Ma’ al-Nil wa al-Miyah al-Batiniya II” [Nile and Underground Water II], 26-27.

⁶⁷ *Ibid.*, 28.

a “second river” that flew in the Nile valley below and independent of the Nile.⁶⁸ They believed that deep underground water was hygienically pure because it did not communicate with surface strata. For Artin, such a discovery “initiated a new era for Egyptians,” and its benefits ought to encompass the entire country.⁶⁹

All eyes were now on Cairo and the British administration responded with an ambitious scheme to modernize the city’s water supply. After the 1902 cholera epidemic all the elements that galvanized city officials into action coalesced. The science and technology of providing an incontestably better water supply were available, and a precedent had been established in Tanta with the blessings of water experts. The government and the company entered a new round of negotiations and in 1903 agreed on a draft of the ‘Convention to Supply the City of Cairo with Artesian Well Water’. Authorities required increasing the pressure of the new supply in order to cope with Cairo’s ongoing vertical growth.⁷⁰ The government also allocated LE 10,000 to install more free water taps for the poor, a very modest effort towards encouraging them to abandon the Nile for the safe new water.⁷¹ Both the government and the company were certain that there was enough water under Cairo’s soil for the city’s future expansion, as two experimental wells yielded 4000 cubic meters of water per day without interruption during a trial period of two years.⁷² And company representatives claimed that the well water supply was “as constant as the movement of

⁶⁸ “Cairo Water Supply—Official Report (*suite*),” *The Egyptian Gazette*, 18 July, 1906. See also Lucas, *The Chemistry of River Nile*, 40.

⁶⁹ Yacoub Artin, “Le premier puits artésien dans la vallée du nil,” *Bulletin de l’Institut d’Égypte* (1896): 29-33.

⁷⁰ Ministère des Finances, *Recueil général de contrats* (Le Caire: Imprimerie Nationale, 1908), “Convention pour l’alimentation de la ville du caire par l’eau de puits artésiens,” April 25, 1903.

⁷¹ TNA, FO 407/161: From the Earl of Cromer to the Marquess of Lansdowne, dated February 26, 1903.

⁷² “Cairo Water Supply—Official Report,” *The Egyptian Gazette*, July 17, 1906.

the Nile.” The new arrangement was also more economical for the company as it made double canalization for filtered and unfiltered water unnecessary.⁷³ The new water supply began reaching the city’s taps in 1905

Urban authorities and hygienists received the new system of water supply with unreserved enthusiasm. Sir Horace Pinching, the director of the Public Health Department, praised the efforts to supply pure water to Egyptian towns as “the most important step taken up to the present by the government in the direction of improving the general hygienic conditions of the country.”⁷⁴ And the correspondent of *The Lancet* declared that “Cairo is now to be congratulated upon having for the first time a pure supply of drinking water,” a supply that was “practically sterile.”⁷⁵

The new waterworks consisted of twenty-two deep wells that reached between thirty and sixty meters into the subsoil of the northern neighborhood of Rod al-Farag. Attached to the intake tubes were three layers of wire gauze that acted as strainers and rough filters of the water that was pumped from the surrounding soil. In 1904, the Cairo Water Company drilled other wells in the northeastern desert of Cairo in order to supply water to the new urban developments of Zaitoun, Matariya, and Heliopolis. A report by *The Lancet* found the Rod al-Farag well water to be clear, odorless, with a pleasant taste, and having a near constant temperature of 73 Fahrenheit.⁷⁶ Confident of the new supply, the government published results of analyses conducted at its own chemical and bacteriological laboratories. Bacterial counts ranged between 0 and 25—far below

⁷³ Ministère des Finances, *Recueil général de contrats* (Le Caire: Imprimerie Nationale, 1908), “Procès-verbal de l’assemblée générale extraordinaire de la société anonyme des eaux du caire approuvant la convention passée le 25 avril 1903.”

⁷⁴ Quoted in “The Earl of Cromer’s Report on Egypt for 1905,” *The Lancet*, May 12, 1906, 1339.

⁷⁵ “Egypt (From our own Correspondent),” *The Lancet*, June 9, 1906, 1648.

⁷⁶ “Egypt (From our own Correspondent),” *The Lancet*, June 9, 1906, 1648, and [Adolphe Smith], “A Crisis in the Water-Supply of Cairo (From Our Special Sanitary Commissioner),” *The Lancet*, April 3, 1909, 1014-16.

the acceptable minimum count of 100.⁷⁷ City officials and experts congratulated themselves that Cairo's water supply was finally impervious to contamination and pathogenic microbes. With the limited expansion of free fountains to serve the poor, the government hoped to circumvent remaining carriers who still supplied crude Nile water, thus to make the city more immune to cholera episodes in the future.

It did not take long for a controversy to surround the colonial project. At the center of the controversy were issues of the perceived technological nature of well water and the capacity of consumers to distinguish the taste of different water supplies. When unfavorable consumer reactions to well water began to surface, officials and experts initially found it difficult to assess the seriousness and scientific viability of the complaints they received. Authorities that for years encouraged and applauded the project were in disbelief that the new system of water supply could be the subject of such diverse complaints as it was in Cairo.⁷⁸ According to a report published in 1906 by the Public Health Department, it was significant that "only after it became public knowledge that the Water Company supplied well water instead of Nile water that different objections were formulated against the new supply."⁷⁹ And the sheer variety of objections was indeed bewildering, as they were most probably the source of inspiration of Badi' Khairy's opening song more than a decade later. It was said that the water was difficult to digest, that it tasted disagreeable, that it could not be used for domestic purposes as it prevented the foaming of

⁷⁷ Ministry of Interior, Department of Public Health, Cairo, "Results of Chemical Analysis of Cairo Water Supply (Well water from Rod El Farag)," *Journal Officiel* 33, 140 (1906): 1.

⁷⁸ "Cairo Water Supply—Official Report," *The Egyptian Gazette*, July 17, 1906.

⁷⁹ *The Egyptian Gazette* published the Public Health Department's report of 1906 in two parts. "Cairo Water Supply—Official Report," *The Egyptian Gazette*, July 17, 1906.

soap, and that it had a yellowing effect on linens.⁸⁰ The government was not sure how to address such an array of complaints, but a first step was to distinguish serious grievances from other spurious, unfounded allegations.

Public health authorities adopted a twofold line of defense. They argued, first, that the water was hygienic and, second, that between Nile water and deep well water there were “no very pronounced differences”—only the kinds of differences that chemists could detect in their laboratories, which otherwise could not be sensed by ordinary consumers. The report insisted on the bacteriological purity of the water supply. This was after all the government’s topmost priority and the idea that guided the project from the beginning. However, there were in fact important differences in the chemical composition between Nile and well water. The latter was “harder” than the former, meaning that it contained more soluble minerals on average. The hardness of well water varied by season and due to the surrounding subsoil. During high Nile, well water was two and a half times harder than Nile water, while the difference diminished during low Nile reaching a minimum in May. This was still in line with the theory that artesian wells tapped into an independent underground supply, and did not necessarily mean that wells drew infiltration water from the surface.

It was important for experts who advocated the new water supply to dissociate the hardness of water from purported harmful effects. They argued that while well water was indeed hard compared to the very soft river water, this did not mean that well water was hard in absolute terms. In fact, Rod al-Farag well water should still be considered soft by absolute standards and it was softer than well waters of major European cities, against which there were no complaints. Because

⁸⁰ “Cairo Water Supply—Official Report (*suite*),” *The Egyptian Gazette*, July 18, 1906.

hardness was within acceptable limits according to European manuals of water analysis, allegations that water was difficult to digest or that it was harmful in any way were completely unfounded.⁸¹ The *British Medical Journal* implied that the problem laid in the physiological constitution of the claimant—or “the delicate stomachs of some water-drinkers”—not the chemical composition of water.⁸² With respect to the claim that well water prevented the foaming of soap, the report rapidly dismissed it as false.

More significant was the experts’ dogged insistence that the difference in hardness could not be detected by the senses, a claim that *ipso facto* dismissed complaints against the disagreeable taste of the new water supply. Experts viewed as least credible the allegation that Egyptians found water bad tasting. For them it was a meaningless claim that, if anything, revealed an irrational attachment to the Nile, an unreasonable reaction by consumers to the mere knowledge that they were drinking different water from that which inhabitants of the Nile valley drank for centuries. The experts insisted that “the taste of Nile water does not sensibly differ from that of well water.”⁸³ In fact, the Public Health Department had attempted to preempt this allegation by conducting its own informal observations. The report assured readers that the chemical difference between Nile and well water was too slight to be detected in the mouth, and that many who drank the latter vouched for its agreeable taste.

Above all, the experts were deeply incredulous of suggestions that taste led to any knowledge of the reality of water. They dismissed the idea that disagreeable taste could be an indicator of unwholesomeness as simplistic and unscientific. Meanwhile, reports confirmed that

⁸¹ Ibid.

⁸² “Egypt (From our own Correspondent),” *The British Medical Journal*, June 9, 1906, 1648.

⁸³ “Cairo Water Supply—Official Report (*suite*),” *The Egyptian Gazette*, July 18, 1906.

lower class Egyptians refused to drink even freely from gratuitous fountains. Boycotting the new supply expressed opposition that was anchored in a mixture of physical repulsion and distrust in technologically induced underground water, both of which loosely signaled undrinkable water according to a matrix of popular water practices, at a time of increasing friction with sanitary authorities specifically concerning drinking water. These elements at the background of the controversy were impossible to disentangle. The scientists insisted that the reality of water and its health effects were accessible only to experts who were able to access what laypeople could not through mere sensory experience or comprehend through traditions.

Authorities were convinced that consumer reactions to well water had their origin in the superstitious nature of Egyptians. As the 1906 report explained, between 1903 and 1905 when both the company and the government ran two experimental wells at Rod al-Farag, water was served to residents of the neighboring Boulaq, Cairo's poorest and most populous quarter, without any complaints. The report did not mention if the residents were informed about the source of water. In any case, "it is impossible for most people and precisely for the natives to distinguish between the two waters with certainty." According to the report, a number of "direct experiences" already proved this.⁸⁴ However, the report did not provide details on such experiences. If the scientists failed to submit their procedures to scrutiny, against their professed ideal whereby the process by which sure knowledge was attained was as important as knowledge itself, then it was perhaps because of what they viewed as the essentially unscientific nature of the problem. The bacteriologists and chemists were in an odd position to answer to what they took to be native

⁸⁴ Ibid.

superstitions and to respond to complaints that would not have surfaced had knowledge of the source of the new supply did not become public.

Yet the assurance of urban officials and water experts could not detract from the palpable dissatisfaction with the taste of well water that was in evidence and that continued to gather momentum. In the Arabic scientific journal of *al-Muqtataf*, an article about the influential businessman Felix Suarez, who invested in urban development and utility companies among others, discussed the Tanta Water Company, the businessman being one of the most important shareholders. When the company began to supply artesian well water in 1898, wrote the authors in 1906, the difference in taste between the new supply and the water of the Ja'fariya Canal, a derivative of the Nile, was widely felt among the inhabitants of Tanta. Initially, residents did not welcome the new supply, even though the rates charged by the company were inexpensive compared to its counterpart in the capital. In fact, the authors themselves, members of the modern educated middle class, admitted that they disliked the taste of well water even though they acknowledged its absolute purity. Suarez sought the government's assistance to prevent carriers from drawing water from canals, and the Tanta Company established a number of gratuitous fountains that were critical during the 1902 epidemic. Only due to these circumstances and lower rates of water in Tanta did well water become more acceptable. Nonetheless, complaints against the taste of Tanta water continued to resurface during the following decade. For the authors this was a matter of getting used to a different taste, yet it also required assistance from the government

and the cooperation of the company to suppress old methods of water supply and make well water more affordable.⁸⁵

The only complaint to which the Public Health Department conceded some truth was concerning the yellowing effect of the new water supply on linens. The problem was due to high levels of iron in suspension in the water, yet iron came not from the water-bearing strata, but from the pipes of the company. Moreover, this problem was due to the growth of iron-related bacteria (crenothrix) and the increased pressure of water that detached rust from old pipes. Water analysts proclaimed that the amount of iron in the water was not detrimental to the health of consumers, even if it was enough to yellow linens. The report assured the public that authorities collaborated with the company on the best methods of removing iron. Meanwhile, the company advised its subscribers to affix a temporary cotton filter to their home water taps.⁸⁶ Ultimately, however, authorities were confident of the new supply and of their ability to fix what they viewed as a minor problem, assuring the public that bacteriological and chemical examinations were now a daily responsibility of the government's laboratories.⁸⁷

To the dismay of advocates of the new supply, complaints against well water intensified in 1907 to such an extent that the government conceded that the problem was more resilient than they previously thought. Some ratepayers now complained that the water had a purple tint. In addition, there were reports that the new water caused women's hair to fall excessively and that some doctors

⁸⁵ Yacoub Sarruf and Faris Nimr, "Regal al-Mal wa al-A'mal: Felix Suarez," *al-Muqtataf* 31, 5 (1906): 363-5. For later complaints by Tanta residents see *Mahader Jalasat al-Jam'iya al-'Umumiyya* [Minutes of Proceedings of the General Assembly] (al-Qahira: Matba'at Dar al-Kutub wa al-Watha'iq al-Qawmiya, 2011), Vol. 2, 159-60.

⁸⁶ "Cairo Water Supply—Official Report (*suite*)," *The Egyptian Gazette*, July 18, 1906 and "Cairo Water Supply," *The Egyptian Gazette*, July 24, 1906.

⁸⁷ TNA, FO 407/170: The Earl of Cromer to Sir Edward Gray, March 3, 1907.

advised patients not to use the water.⁸⁸ In April 1907 Lord Cromer—the British Consul-General—wrote to Edward Grey of the Foreign Office that the debate on the new water supply had been dominated by “imaginary properties the native population believe it to possess—one idea being that it produces sterility among their women.”⁸⁹ The dissatisfaction with the new supply that was first expressed by the lower classes began to spread to moneyed Cairenes and it was virtually uncontainable.

Under this pressure, a second phase of the controversy unfolded when the government decided in mid 1907 to appoint an international commission of experts to study the water supply. Specifically, authorities asked the commission to provide opinions regarding the potability and purity of well water and to make recommendations in case it found the current water supply unsatisfactory. The three members were A. C. Houston, Director of the Water Examination at the Metropolitan Water Board of London that was created in 1904 as it consolidated the city’s fragmented water supply, Dr. Dienert, who was nominated by the Pasteur Institute in France, and Professor Gärtner, Director of the Institute of Hygiene at the University of Jena. The findings of the commission were a mixed bag of praise and critique, supporting some of the government’s central claims while providing a scientific basis for the idea that well water was tangibly different.⁹⁰

First, the commission rejected the theory of an independent underground river. Rather, “the Rod-el-Farag is undoubtedly Nile water” that percolated to the lower strata of the soil, even though

⁸⁸ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-016454 and 0075-033494.

⁸⁹ TNA, FO 371/248: From Lord Cromer to Sir Edward Grey, dated April 2, 1907.

⁹⁰ Professor Gärtner, Dr. Dienert, and Dr. Houston, “A Report on the Water Supply of Cairo,” *Journal Officiel*, Supplement to No. 149 (December 30, 1907). All information on the findings of the commission comes from this report unless otherwise noted.

it was impossible to determine the course water took before reaching the wells without further examination. However, due to the depth of wells, water was bacteriologically pure. After conducting their own analyses and consulting results of the Survey Laboratory, the commission concluded that well water was “a very much safer source of supply from the epidemiological point of view than the artificially filtered Nile water.” The conclusion vindicated the government and its experts. Second, the commission found the system of distribution inefficient and condemned the fragmented provisioning of water to poor residents in the strongest terms. The commission recommended abolishing provision based on standpipes, gratuitous fountains, and carriers and advised the government to oversee installing water taps inside all houses.

Most importantly, the findings of the experts seemed to provide a basis for the negative reception of the taste of well water, reformulating the causes of this reaction in the language of science. The commission agreed with the already widely accepted view that well water was harder than Nile water, yet the hardness was “in no way excessive” compared to European underground supplies of water. Rod al-Farag’s water contained amounts of iron and manganese, a defect that was necessary to remedy even though it did not endanger public health. Crucially, however, the presence of minerals and a benign fungoid growth in well water led to a “slight smell of sulphureted hydrogen” and “the faint metallic taste complained of.” The commission recommended conducting thorough experiments on the most efficient and least expensive methods of removing iron and manganese from water, which was not practically difficult. There were also a number of effective methods to remove objectionable smells and tastes from the water, including “softening” the water with lime, adding active oxidizing agents, aeration, and subsequent rapid filtration.

The profound irony of these recommendations was clear. After dismissing Egyptians' negative reaction to the taste of water as superstitious and irrational, water experts now sought to explain scientifically why a taste community found water disagreeable and to technologically manipulate water in order to satisfy the taste of consumers. Accordingly, Eldon Gorst, the new British Consul-General, gave orders to "determine what practical and reasonably economical methods can be adopted in order to convert Rod-el-Farag water into a high-class potable water, approximating in character to that of the Nile."⁹¹ While the problem of taste had led to a confrontation with a difference that could not be bridged by scientific debate or translation, the commission's recommendations revealed a decisive faith in the power of technology. If well water could be "converted" into a water that tasted similar to the Nile, then the problem could be solved without having to go through the trouble of disputing the implicit belief that bad taste was the marker of harmful water.

By the time authorities decided to embark on this technologically daring enterprise, there was more evidence that Egyptians actively avoided well water and were increasingly suspicious of its source. Adolph Smith, the special sanitary commissioner of *The Lancet*, wrote in 1909 that this was "no longer merely a sanitary and scientific problem," but one with a "political and sentimental aspect with which it is now necessary to reckon." He reported that "among the native population there was a superstition against drinking what they denominate "dead water." They will often prefer to drink extremely foul surface water to a pure water coming from underground where they say it is dead and buried."⁹² The fact that water tasted disagreeable and came from wells as

⁹¹ TNA, FO 407/172: Sir E. Gorst to Sir Edward Grey, dated March 7, 1908.

⁹² [Adolphe Smith], "A Crisis in the Water-Supply of Cairo (From Our Special Sanitary Commissioner)," *The Lancet*, April 3, 1909, 1014-16.

opposed to the running water of the Nile signaled everything contrary to what laypeople recognized to be healthy. Ironically, Egyptians were now drinking even more crude Nile water through carriers, who were not unhappy about the widespread negative reception of the new supply, as it meant more freedom to them. Water carriers temporarily gained the upper hand in the struggle with the concessionary company. In the countryside, while well water generally faced less opposition, there were incidents of sabotage of deep tube wells as when inhabitants destroyed pumps and forced rubbish down water tubes.⁹³

Due to the inconclusive findings of the 1907 commission, the government set up another commission in early 1908 and tasked the latter to conduct the necessary experiments and to provide practicable solutions. Headed by Arthur Webb, advisor at the Public Works Ministry, the commission also included W. P. G. Graham, the new director of the Public Health Department. There were two main issues for the commission to investigate. First was to explore the best ways to remove iron and manganese from well water in order to “convert” it into a supply that “approximated” the taste of Nile water. Second, to further investigate the permanence of the supply as the yield of some wells began to decrease.⁹⁴ As the government realized, the work of the second commission would be lengthy, and indeed it took it eighteen months of investigation and experimentation to present its report in July 1909. Gorst decided to hide the report from the public until a careful decision was reached in order to avoid more controversy.⁹⁵ Meanwhile, during these eighteen months, the dispute over well water raged. So much so that it became common for high profile officials and observers such as Gorst or William Willcocks to openly acknowledge that

⁹³ TNA, FO 407/161: Extract from the Report by Sir Horace Pinching, K. C. M. G., dated February 3, 1903.

⁹⁴ TNA, FO 371/662: Sir E. Eldon Gorst to Sir Edward Grey, dated July 3, 1909.

⁹⁵ The report was never published yet its conclusions were widely circulated.

everyone in Cairo, including most importantly lower class Egyptians prone to dealing with carriers disliked well water.⁹⁶

Published in 1908, Lucas' *The Chemistry of the River Nile* directly spoke to the ongoing controversy and posed three conclusions of direct relevance to the comparison between well and Nile water. First, well water was only Nile water that had infiltrated deep into Cairo's subsoil. The borings made in the process of constructing the Roda and Embaba bridges showed that there was no impermeable layer of clay underneath Cairo, which was thought to separate artesian water below from infiltration water above. The clay stratum that was found in Tanta was possibly quite local and should not be universalized across the geology of the entire Nile valley. Second, well water varied in hardness and, in some cases, it was much harder than Nile water. Lucas provided a summary of chemical analyses of Rod al-Farag wells during the past three years showing that the amount of soluble salts in underground water varied considerably from place to place and even from well to well in the same vicinity. Chemical variations were due to the surrounding soil—a largely uncontrollable condition—not to a different origin of the water. Finally, and most importantly, the Nile was not essentially diseased nor was it liable to wholesale contamination. For Lucas, the river was not connected to serious sources of contamination as it received no significant amount of storm water nor was there yet a sewage system in Cairo to pollute the river on a massive scale. Contamination from houses and the army barracks on the banks of the Nile were very limited and did not warrant the general anxiety that resurfaced among both the scientific community and Cairo's elite residents.⁹⁷ In addition, by studying the bacterial content of Nile

⁹⁶ TNA, FO 407/174: Sir E. Gorst to Sir Edward Grey, dated March 27, 1909. William Willcocks, "Bab al-Zera'a," *al-Muqtataf* 33, 2 (1908): 159-66. Ministry of Interior, Department of Public Health, *Annual Report for 1909* (Cairo: National Printing Department, 1910), 72-78.

⁹⁷ Lucas, *The Chemistry of River Nile*.

water, Lucas showed that the bacterial content of the Nile was low during much of low Nile, rising only in June and with the coming of the flood. This meant that Nile water was as potable in May as it was during the winter months. Thus, the findings of Lucas paved the way for scientists and officials to rethink their position on Nile water in ways that resonated with widespread lay sentiments.

After eighteen months of thorough experimentation on techniques to chemically manipulate well water in order to satisfy the taste of Egyptian consumers, the experts and the government gave up and decided to revert to the Nile as the source of Cairo's supply. Public dissatisfaction for "real and imaginary drawbacks" was too strong. Iron and manganese in high quantities led to the growth of black mold that discolored the water causing the yellowing of linen. Such factors contributed to the "belief in the public mind" that this was due to contamination of water by sewage, "a belief which was, however, absolutely groundless." For months, the commission conducted expensive experiments on removing iron and manganese and on softening well water. There were two main factors that prompted the decision to revert to the Nile. First, the yield of Rod al-Farag wells started to decrease significantly due to buildup of siliceous matter, which rapidly became cement like and near impossible to remove, on the metallic gauze of the intake tubes. From 4500-5000 cubic meters per day, the supply of some wells dwindled to less than half.⁹⁸

Second, and more decisively, there was the problem of taste in all its tenacity. The commission became convinced that with such widespread rejection of well water even the removal of iron and manganese might not be sufficient. Graham wrote the most revealing memorandum on

⁹⁸ Department of Public Health, *Annual Report for 1909*, 72-8.

the controversy.⁹⁹ He explained to the British Consul that Egyptians complained from a range of physiological conditions that had their origin in the taste of well water and that in turn gave rise to the popular conviction that water was harmful. Aside from complaints that the taste and smell were unpleasant, there were also claims that water “failed to satisfy thirst” and led to “a sensation of weight and fullness after drinking.” The project to convert well into Nile water was doomed to failure, because it was difficult for analysts to scientifically gauge visceral assertions and bodily sensations felt by Egyptian consumers. Graham wrote that “it is, unfortunately, impossible to reproduce human idiosyncrasy and precise physiological conditions in a laboratory; processes which pursue a given course when carried on in vessels of glass or of metal may readily produce surprises if modified by the presence of a personal and physiological factor.” On another front, Graham began to believe that Egyptians were indeed able to taste the difference between the two supplies and that it was not far-fetched to believe that their bodies were negatively affected by well water. He even resorted to the old language of dietetics whereby food and beverages “agreed” with different physiological constitutions or bodily types.¹⁰⁰ Because Egyptians drank Nile water “since time immemorial” it was “perfectly reasonable to consider that, constitutionally, their physiological economy has become so habituated to its character as to resent the access of a water of a different type.” In other words, Graham finally grew skeptical of the claim that native superstition was behind the unpopularity of well water.

⁹⁹ TNA, FO 371/662: “Memorandum by Mr. Graham on some Hygienic Aspects of the Cairo Water Question,” dated June 25, 1909.

¹⁰⁰ On dietetics see Shapin, *Changing Tastes*.

It was certain that Egyptians avoided well water at all costs. “You may take an Egyptian to the well water, but you cannot make him drink,” another British official exchange summed it up.¹⁰¹ By mid 1909 there was no dearth of evidence that Egyptians boycotted well water and were now drinking more unfiltered Nile water, which made Cairo liable to cholera more than ever. Graham reported that people now obtained unfiltered Nile water for drinking purposes from garden and street sprinklers. An Egyptian member of the General Assembly was willing to bet that sales of bottled mineral water soared since the turn to well water.¹⁰² Reliance on carriers, who informally sold Nile water, became widespread despite the fact that free water-taps distributing well water were available in poor quarters. According to a count taken by the Public Health Department on the 22nd of June 1909, at least 300,000 liters of water “which would certainly be used for drinking purposes” were drawn directly by carriers from the Nile at ten different places. Water was drawn from the worst possible locations, namely from the immediate foreshore where it was easiest to obtain. Graham lamented that a water supply that caused Egyptians “to perpetually suffer “distaste”” could not be maintained.¹⁰³

Graham’s reflections on the controversy took a subversive turn. The impenetrability of taste for scientific analysis, which first led experts to dismiss Egyptian negative reaction as a sign of superstition, now led them to suspect that taste constituted a peculiar modality of knowing. Particularly the refusal of lower class Cairenes to drink even from gratuitous fountains revealed that something more fundamental than superstition was taking place. Hesitantly, Graham reasoned

¹⁰¹ TNA, FO 371/662: Cairo Water Supply, dated July 12, 1909.

¹⁰² *Mahader Jalasat al-Jam’iya al-‘Umumiyya* [Minutes of Proceedings of the General Assembly], V. 1, 546.

¹⁰³ TNA, FO 371/662: “Memorandum by Mr. Graham on some Hygienic Aspects of the Cairo Water Question,” dated June 25, 1909.

that taste could indeed impart knowledge to lay consumers understood as a taste community. Such knowledge was subjective yet shared among a community. It was akin to the knowledge of “epicures” whose trained tongues could distinguish subtle differences between wines, coffees, and foods. In an astonishing, and cautiously worded passage he wrote:

Further, it may fairly be claimed that by adopting an efficient system of filtration the Nile water can be rendered sufficiently pure for all practical purposes and to satisfy all reasonable requirements; that by supplying water from this source and of such a character there is little doubt that the people will gladly take it, and therefore the danger arising from the present consumption of crude Nile water will be very largely reduced, even if not entirely eliminated; that the complaints concerning digestive troubles and unfitness for domestic uses will cease, and the Government will avoid the odium of forcing an unwelcome commodity upon a public which may fairly claim to have some voice in selecting that necessity of life which of all things is most important to an Egyptian, and in which he is both an epicure and an expert.¹⁰⁴

Authorities were finally convinced in 1910 of the need to abandon the well water scheme. “The bacteriological purity of well water,” wrote the British Consul, “is of little practical advantage from the hygienic standpoint if the population will not drink it.”¹⁰⁵ The ill-fated project to modernize Cairo’s water infrastructure had come to an abrupt end as the government ordered the Cairo Water Company to revert back to the Nile under new conditions of intake and filtration. As *The Lancet* sanitary commissioner remarked, the decision was apt in the politically charged aftermath of the Denshwai incident when the British administration would do well to seize any chance to gain popularity.¹⁰⁶

¹⁰⁴ Ibid.

¹⁰⁵ TNA, FO 407/175: Sir E. Gorst to Sir Edward Grey, dated March 26, 1910.

¹⁰⁶ [Adolphe Smith], “A Crisis in the Water-Supply of Cairo (From Our Special Sanitary Commissioner),” *The Lancet*, April 3, 1909, 1014-16. The Denshwai incident was a violent confrontation that took place in 1906 between British military officers on a hunting trip and locals of the town of Denshwai, which led to a number of casualties followed by summary trials of Egyptian defendants. The incident is commonly seen as a turning point for the nationalist movement in Egypt, marking a period of more open contestation of colonial authority in the country.

The return to the Nile in 1910 initiated a second controversy when the location of intake and the method of filtration took center stage of an acrimonious scientific, political, and economic debate. During the first three months of 1910 newspaper articles, letters, business-financed pamphlets scrutinized the decisions of the government—whose credibility had suffered greatly due to the debacle of Rod al-Farag wells. In a rare occurrence of public official discord, even past directors of the Public Health Department wrote to newspapers condemning the decision of the incumbent director to draw water from the Nile downstream from Cairo, conveniently close to the company's current works at Rod al-Farag, instead of upstream where water was presumably purer. Reports and rumors of officials favoring different filtration methods led to accusations, particularly from the nationalist press, of inappropriate economy and business favoritism. The two leading water filtering firms, one American and another French, attempted to sway officials and public opinion to their filters.

A wave of accusations of economy at the expense of public health greeted the news, which became public in January 1910, that the new point of intake for Cairo's water supply was likely to be the Nile at Rod al-Farag. On January 31, Pinching, the former director of the Public Health Department, wrote that the return to the Nile was generally "the most retrograde step," but the choice of the location of intake was particularly egregious in a city that suffered from cholera in the past and was likely to see more of it in the future. Instead of drawing water from the Nile at a point upstream, namely south of Cairo, the government and the company seemed to favor a point in the north where the Nile had passed through the entire city and presumably accumulated all its filth. Pinching wrote that at Rod al-Farag the water had already collected all kinds of waste, including the filth of "crowded streets and factories" of the dangerous, adjacent neighborhood of Boulaq as well as street washings and the filth of cargo boats and steamers. For Pinching, this

decision could only be explained on financial grounds. The new location of intake was meters across the company's current works of Rod al-Farag.¹⁰⁷ A letter signed by "Common Sense" made the same allegations, arguing that one did not need to be a water analyst to recognize that it was safer to draw water from south of Cairo.¹⁰⁸ Meanwhile Graham, the incumbent director, gave an interview to the French newspaper *Progrès*, where he estimated that drawing water from south of Cairo would add LE 100,000 to the cost of the project and that in his opinion only "sentimental and traditional reasons" made it preferable to draw water upstream. In his opinion, the quality of Nile water did not vary significantly between up and downstream of Cairo. Graham was also making an allusion to the centuries old, yet defunct, Fatimid water aqueduct in the south of Cairo. Pinching wrote a rejoinder where he reminded Graham that the 1902 cholera epidemic was linked to the contamination of Nile water at Boulaq.¹⁰⁹ In February 1910, John Rogers Pasha, past director of the department from 1892 to 1899, weighed in publicly denouncing Graham's decision and arguing that the latter should have given the government his scientific opinion irrespective of financial considerations. In addition, he reminded Graham of the "lessons" of the 1896 epidemic when "an entire village which threatened the water supply was destroyed, and every boat was moved down stream of the intake of the Water Company, then at Kasr-el-Nil, with the happiest results."¹¹⁰ For government's critics, the choice of the location of intake was proof that the health of the city was being sacrificed for economy and for the convenience of the powerful company.

¹⁰⁷ "Cairo's Water Supply—Letter from Sir H. Pinching," *The Egyptian Gazette*, January 31, 1910.

¹⁰⁸ "Cairo's Water Supply" [A letter to the Editor], *The Egyptian Gazette*, February 1, 1910. See also the letter from Arthur Kirby in "Cairo's Water Supply" [A letter to the Editor], *The Egyptian Gazette*, February 2, 1910.

¹⁰⁹ "Cairo's Water Supply—Sir Horace Pinching's Views—Reply to Dr. Graham," *The Egyptian Gazette*, February 8, 1910.

¹¹⁰ "Cairo's Water Supply—Letter from Sir John Rogers," *The Egyptian Gazette*, February 9, 1910.

The government's counterargument was that the position of intake was irrelevant and that filtration was everything. In the *Egyptian Gazette* a pro-government letter argued that "it is equally unsafe to drink the water of the Nile at any spot between Assouan [at the extreme south of Egypt] and the [Mediterranean] sea" without adequate filtration. The difference in the purity of water before filtration between north and south of Cairo was not so considerable as to justify additional expenses. What was crucial, however, was a secure and trusted method of filtration. The author argued that "sanitary science" was making great strides, so much so that the position of intake would be of little practical importance.¹¹¹ Written by Graham, the 1909 annual report of the Public Health Department defended the decision more thoroughly. First, because the system of water supply was not designed on a "tabula rasa" financial concerns had to be weighed against the "axiom" of upstream intake. Second, the Nile was not liable to wholesale contamination. Unlike other rivers, it did not receive considerable storm water, seasonal melting of snow, or the sewage of an entire city, nor was it liable to prolonged droughts for that matter. Pollution from ships and boats were rare and local events. Third, everyone agreed that the Nile was much safer during high water and that cholera epidemics took place during the critical period of low water when the river was filled with deleterious contents. However, roughly between May and early August, the river was so low that it "becomes an extensive lake reaching many miles to the south of Cairo." Pumping water from a point south of Cairo facing Tora during the critical period would still not fulfill the conditions associated with "upstream intake." In fact, during the summers of 1908 and 1909 the department compared samples from various points in the south, middle, and north of Cairo and found no marked difference in favor of a particular site. Fourth, the location of intake would be a

¹¹¹ "Cairo's Water Supply," *The Egyptian Gazette*, February 17, 1910.

hundred meter in-stream at Rod al-Farag where it could be placed under constant supervision. Finally, efficient filtration and an emergency sterilization plant would further eliminate all risks.¹¹² The report, however, did not settle the debate.¹¹³ By the time the Consul-General wrote his annual report in March 1910, he was sensibly irritated with these debates, dubbing the position of those who accused the government of economizing one fit only for “the man in the street.”¹¹⁴

If, according to the government, filtration was the key to safe potable water, then the type of filter was of paramount significance. The main competition in Egypt was between two filters. Developed by the *Société Henri Chabal & Cie*, the Puech-Chabal filter mixed English and French methods and was adopted in many French cities, including Paris, and in England by many companies including the East London Water Company shortly before its municipalization in 1904. The competitor was the Jewell filter, which was developed in the United States by the Jewell Export Filter Company, which organized in 1900 primarily on the basis of exploiting overseas markets, founding offices in England, Germany, Austria, Holland, Russia, and Egypt. The two filters competed for Egyptian towns—Alexandria, Damietta, and Mansoura adopted the Jewell filter while Port Said, Ismailiya, and Suez adopted the Puech-Chabal.¹¹⁵ The two methods demanded different facilities and plant arrangements. The Puech-Chabal filtration system depended on multiple filtration and aeration followed by slow, sand filtration as a final stage. The system was slow and it required large sand bed filters whose size depended on the desired yield.

¹¹² Department of Public Health, *Annual Report for 1909*, 73-77.

¹¹³ “Cairo Water Supply—The Question at Issue,” *The Egyptian Gazette*, February 22, 1910 and “Cairo Water Supply—Sir Horace Pinching’s Reply,” *The Egyptian Gazette*, February 23, 1910.

¹¹⁴ TNA, FO 407/175: Sir E. Gorst to Sir Edward Grey, dated March 26, 1910.

¹¹⁵ Azadian, *Les Eaux d’Égypte*. Edmund Weston, “The American System of Filtration at Mansourah, Egypt,” *The Engineering Record* 53, 6 (1906): 146-8 and idem, “The American System of Filtration Plant at Damietta, Egypt,” *The Engineering Record* 55, 18 (1907): 536-9.

In addition, the sand bed filters had to be cleaned manually on a regular basis. On the other hand, the Jewell system used rapid sand filters housed inside a building. The operation of the filter depended on pressure to force water through the sand and often required a preliminary stage of decantation to separate suspended matter in the water by means of a chemical agent.¹¹⁶

The competition between the two filtering companies was fierce inside and outside Egypt. In 1903, the New York Continental Jewell Filtration Company set up an experimental plant in Alexandria, where the influential doctor Bitter conducted experiments on the best methods of filtering the water of the Mahmoudiya Canal. The Alexandria municipality adopted the Jewell system after Bitter enthusiastically praised it as technically and hygienically superior to its alternatives.¹¹⁷ News that Cairo was planning to revert to artificial filtration of Nile water whetted the appetite of both companies. When Henri Chabal learned that officials at the Public Health Department, including Graham and Bitter preferred the Jewell filter, he tried everything he could to battle unfavorable tides. Remarkably, Chabal attempted to win public opinion on his side by sending pamphlets detailing the advantages of his system over the American competitor to foreign and Arabic newspapers in Egypt.¹¹⁸ When the *Egyptian Gazette* received one these pamphlets in January 1910, its editors were not impressed. It was only natural for Chabal to praise his own system, but for the editors the pamphlet did not do justice to the Jewell filter, which had been working satisfactorily in Alexandria since Bitter approved it in 1903. In addition, the editors argued that the Jewell filter is superior to Peuch-Chabal in one other important aspect. The latter

¹¹⁶ Baker, *The Quest for Pure Water*, 222, 226-7, 260-1.

¹¹⁷ Dr. H. Bitter and Henry Blagden, *Filtration Experiments at Alexandria, Egypt: Report on the Efficiency of the "Jewell" Filter* (New York: New York Continental Jewell Filtration Co., 1903), 13.

¹¹⁸ One of the Arabic pamphlets was authored by François Cottarel, a former engineer at the Paris Water Company. François Cottarel, *Bahth Tarshih Miah al-Nil al-Mo'ada li al-Shorb* (al-Qahira: Matba'at Paul Perrier, 1910).

system necessitated the employment of a number of men to clean the filters, who usually worked “with their naked feet and possibly insalubrious clothing” while the American filter was cleaned mechanically.¹¹⁹ This was significant because of an incident when a few years earlier the death of an employee working at the Alexandria Water Company from cholera caused a scare.¹²⁰ Another article in the same newspaper pointed out that another disadvantage of the Puech-Chabal filter was that it required usually exposed large sand bed filters, and “it is well known how dangerously full of disease germs the dust of Cairo is.”¹²¹

The “battle of the filters” was clearly unfolding to the advantage of the American company, even though different views among urban officials and the Cairo Water Company began to appear.¹²² News surfaced that the Jewell filter would cost between LE 140,000 to LE 150,000, two thirds of which would be paid by the government according to a new agreement that was being drafted. Outbidding his competitor, Chabal’s initial offer was only at LE 70,000. A few weeks later Chabal raised the ante with another bid that put the government in an embarrassing situation. For LE 140,000—the same as the Jewell filter—Chabal pledged to pump water from Tora in the south of Cairo into a fourteen-kilometer feeding pipe that led to the Rod al-Farag plant where the Puech-Chabal filter would be installed. He was confident that he would win the bid if the government consulted with the same experts it hired in 1907 or even if it consulted a recent report on the water supply of Pittsburgh—the American city had just switched to the Puech-Chabal

¹¹⁹ “The Filtration of Nile Water,” *The Egyptian Gazette*, January 18, 1910.

¹²⁰ [Adolphe Smith], “A Crisis in the Water-Supply of Cairo (From Our Special Sanitary Commissioner),” *The Lancet*, April 3, 1909, 1014-16.

¹²¹ “The Filtration of Nile Water,” *The Egyptian Gazette*, February 9, 1910.

¹²² The phrase is from “Cairo’s Water Supply—The Battle of the Filters—Attitude of Ministers,” *The Egyptian Gazette*, February 19, 1910.

system.¹²³ Support for the Jewell filter came from Graham, Bitter, Armand Ruffer, member of the quarantine board, and presumably from Gorst, the British Consul-General himself. Chabal however was able to sway the men of the Cairo Water Company such as Boghos Nubar and Joseph Saba Pasha to his side, particularly because he planned to make use of the Abbasiya land owned by the company and to modernize its defunct filters.¹²⁴ Meanwhile, with the heightening of political tensions in Egypt, the nationalist Arabic press—which now constantly reminded the government of the debacle caused by the Rod al-Farag wells—supported the Chabal filter. *Al-Jarida*, for instance, argued that the difficulties of the past five years were due to the “autocracy” (*hokm al-fard*) of the British administration, which refused the nationalist demand for a parliament or even a Cairo municipality where Egyptians were represented.¹²⁵ There were fears that business competition, and business partnership with city officials, came at the expense of the city’s health.¹²⁶ *Al-Mu’ayyad* denounced that the government consulted the same experts who a decade earlier oversaw the switch to the ill-fated wells, such as Bitter.¹²⁷ Chabal was also able to win the support of the increasingly oppositional members of the General Assembly who lamented the lack of an independent committee to study the proposals instead of depending on a few government

¹²³ “Mashrou’ Jadid li Tanqiyat Miyah al-Nil” [A New Project for Filtering Nile Water], *al-Mu’ayyad*, February 21, 1910 and “Hawl Mas’alat Miyah al-Shorb bi al-Qahira” [On the Question of Drinking Water in Cairo], *al-Mu’ayyad*, March 13, 1910.

¹²⁴ Cottarel, *Bahth Tarshih Miah al-Nil*, 9; “Cairo’s Water Supply—The Battle of the Filters—Attitude of Ministers,” *The Egyptian Gazette*, February 19, 1910; “Cairo Water Supply—The Question at Issue,” *The Egyptian Gazette*, February 22, 1910; “La Question de l’Eau,” *Le Progrès*, February 19, 1910.

¹²⁵ “Bayan Labudd Minhu” [A Necessary Statement], *al-Jarida*, October 18, 1909.

¹²⁶ “Mas’alat Miyah al-Shorb fi al-‘Asimah” [The Question of Drinking Water in the Capital], *al-Jarida*, January 10, 1910; “Al-‘Awd ila Miyah al-Nil” [The Return to Nile Water], *al-Jarida*, March 15, 1910.

¹²⁷ *Al-Mu’ayyad*, January 12, 1910.

experts whose opinions had been discredited in the past few years.¹²⁸ Ultimately, the government ignored the critique and by the end of 1911 the Jewell filters had arrived to Cairo, the dredging work for laying the intake twin conduit was finished, and the entire installation was working in full force.

The controversy over Cairo's water supply died out suddenly by March 1910. This was partially due to the political violence that stirred public opinion when Ibrahim al-Wardani, a trained chemist and a pharmacologist, assassinated Prime Minister Botros Ghali in late February of the same year. To a large extent, urban authorities were able to settle the technoscientific controversy. The Jewell filter and the return to the Nile, even if under suboptimal conditions according to government critics, subdued the complaints of Egyptian consumers. And while socioeconomic contestations spurred by uneven distribution of service continued to shape discussions on water provisioning, Cairo's upwardly mobile middle classes increasingly came to benefit from the colonial infrastructure after conditional independence during the 1920s. However, the grievances of the five years during which the controversy gripped the city and its inhabitants continued to inform the broader anti-colonial movement and the popular imagination.

“Vampire Capital”

Examining the relationship between the government and the Cairo Water Company could bring to the surface entirely different questions regarding the political economy of service provision in colonial Cairo and the power that capital exercised on urban life. During the last decade of British rule discussions on the limited availability and disproportionate distribution of pure water were

¹²⁸ “Legislative Council,” *The Egyptian Morning News*, February 6, 1910. *Mahader Jalasat al-Jam'iya al-'Umumiyya* [Minutes of Proceedings of the General Assembly], V. 2, 227.

part of broader debates on the power of foreign capital on infrastructures of service provision. The upshot of many of these debates was that a number of powerful companies enjoyed a form of sovereignty over the population, a sovereignty that was enshrined in legal agreements. Because they largely controlled prices and methods of distribution, utility companies for water and gas were exposed to the indignation of Egyptians, particularly the upper and middle classes who sought a larger share of what was now considered the amenities and requirements of modern life. Ultimately, British administrators felt the need to devise a regulatory framework for concessionary companies in infrastructural and utility sectors, even if they lacked the political will and the power to do so. This was partly due to imperatives of public health, as in the case of the water company. Yet, it was also in order to capture a share of the handsome profits of these companies.

Tensions between consumers and the water company over rates and availability were set against the backdrop of unease towards the power of concessionary companies and foreign capital in Egypt. This was especially the case in light of the proposal to extend the concession of the Suez Canal Company and the intensification of the political conflict in Egypt during the 1910s. A debate at the meeting of the General Assembly in 1907 revealed these tensions. The Assembly, a consultative institution composed of moneyed Egyptians that was organized in 1885 in lieu of a parliament, had become increasingly oppositional to policies of the British regime and outspoken regarding foreign privileges. Hassan Madkour argued that the mistreatment of Egyptians at the hands of the powerful Cairo Water Company required serious consideration since the company's rates had not significantly decreased since its establishment, and particularly in light of the rapid spatial and demographic growth of the city and the company's rising profits.¹²⁹ Madkour suggested

¹²⁹ Hassan Madkour was a notable Egyptian merchant who owned a lighting store among other things. See Stefano Poffandi, *Indicateur Égyptien administrative et commercial* (Alexandrie: Imprimerie Générale A. Mourès, 1904), 197.

that the Cairo company should lower its rates based on the precedent of water companies of other towns like Alexandria and Tanta, where municipalities were more successful at negotiating with public utility companies. The public health benefits of lower water rates would be considerable since more people would be able to connect their houses to the company mains, which would result in “the cleanliness of their bodies, cookware, clothes, and houses.” In addition, the company would also benefit from the expected rise of subscriptions, as was the case with other services. At the same time, the thirty-five or so free water taps to service the poor were utterly insufficient. Finally, Madkour pointed out that analogous arguments could be made about gas and electricity companies in Cairo, whose rates were much higher than those of Alexandria and other towns, thus limiting the service to the richest class of Cairenes.¹³⁰

For government critics, including nationalists, the power of concessionary public utility companies in Cairo reflected a crisis of urban governance. The demand that utility companies including water, gas, and electricity lower their rates became one of the nationalists’ pet themes, which was intimately connected to the critique of uneven urban services across neighborhoods. According to this line of critique, only a representative municipality for Cairo could resolve these problems. The Egyptian nationalist congress that met in 1912 explicitly debated the problem of foreign capital in concessionary companies. Nationalists condemned the “tyranny” [*istibdad*] of monopolistic companies in Cairo and Alexandria, including the tramway, water, electricity, and gas companies.¹³¹ Meanwhile, the government, which was theoretically the only power capable of negotiating rates, declared that its hands were tied by agreements and terms of concessions. In

¹³⁰ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-016454 and 0075-033494. *Mahader Jalasat al-Jam’iya al-‘Umumiyya* [Minutes of Proceedings of the General Assembly], V. 1, 417-19.

¹³¹ ‘Abd al-Rahman al-Rafi’i, *Mohammad Farid: Ramz al-Ikhlās wa al-Tad’hiya* [Mohammad Farid: A Symbol of Loyalty and Sacrifice] (al-Qahira: Dar al-Ma’arif, 1984 [1941]), 296-300.

response to Madkour's suggestions in 1907, the government replied that "according to the agreement [between the government and the company] of 1897, the government does not have the right to demand lowering rates," but it would still communicate with the company in order to convey Madkour's suggestions.¹³² The government also pointed out that it did not possess the legal power to force gas and electricity companies to lower their rates due to similar agreements.¹³³

In this charged context of uneven distribution and intensified critique of monopolistic private ventures, the company's decision to increase dependency on water meters and to install meters at sites of collective consumption such as paying standpipes and mosques chafed at Egyptians. Shrewdly anticipating a different pattern of water consumption due to construction of a sewage system in 1915, the Cairo Water Company used what was seen as backhanded mechanisms to force subscribers to use the more expensive meter instead of unlimited monthly subscriptions based on the number of occupants. The company justified this move as a disincentive to waste while its profits soared as a result. Another song born out of the collaboration between Khairy and Darwish in 1919, expressed anger at the fact that Egyptians "lived in the valley of the Nile", yet drank water "according to millimeters and centimeters."¹³⁴ Metering only underscored the idea that foreign capital managed to sell to Egyptians what most abundant at a dear price.

¹³² *Mahader Jalasat al-Jam'iya al-'Umumiyya* [Minutes of Proceedings of the General Assembly], V. 1, 494.

¹³³ *Ibid.*, p 514. In response, the government particularly contested the need for growth of electricity services on the ground that Cairo and Alexandria were not industrial cities, thus electricity was used primarily for lighting. Based on average patterns of usage, people used electricity only during three to four hours of the night, and many of the company's elite subscribers travelled outside Egypt during the summer. An electricity system could not expand based on this limited and disproportional demand. However, the government's argument ignored the claim that lowering rates could lead to more subscriptions, making it economically worthy to the company.

¹³⁴ See Badi' Khairy's song *al Mo'atasemin* [The Strikers] in Darwish, *Badi' Khairy*, 149.

Conflicts surrounding another concessionary company, this time the British owned Suez Canal Company, which enjoyed exclusive rights to manage the strategic canal, accentuated the political character of debates on foreign capital in Egypt during the decade leading up to the 1919 revolution and after conditional independence. Late in 1909, the government and the Suez Canal Company prepared a scheme to extend the company's concession over the canal for another forty years, or from 1968 to 2008. The government justified the scheme on the basis of the need to improve the management of the canal while putting four million pounds in the government's coffers. The nationalist press, especially *al-Liwa'*, covered this story and denounced the decision of the colonial administration to provide more advantages to monopolistic companies instead of attempting to check their privileges. Critics pointed out that the scheme would give the government an insignificant share of the company's net profits until the period between 1968 and 2008 when profits would be divided in half. Under pressure, the administration decided to submit the scheme to the General Assembly, hoping to acquire legitimation through the approval of the Egyptian consultative body. Yet to the dismay of the government, even the moderate members of the assembly who usually kept a distance from the rhetoric and the confrontational politics of nationalists unanimously rejected the scheme in 1910.¹³⁵ Nationalist agitators such as Mohammad Farid publicly spoke out against how the Egyptian government sought to extend the terms of a concession that was disproportionately beneficial to the company, thus providing subsidies to British capital. At the same time, he claimed, European governments either municipalized companies that provided public services and controlled strategic resources, or they gave

¹³⁵ TNA, FO 407/175: Sir E. Gorst to Sir Edward Grey, dated March 26, 1910.

concessions to compatriots in order to check the predatory behavior of companies.¹³⁶ The topic galvanized public opinion and al-Wardani cited the Suez Canal scheme as one of his motivations behind assassinating Prime Minister Boutos Ghali in February 1910. The debate on foreign monopolistic companies continued to animate the anticolonial movement until the 1919 revolution and beyond. Offering views on the post-revolutionary Tanzim department and the Public Works Ministry in general, Mann Alcock reckoned in 1925 that “with respect to the foreign companies, such as the Cairo Tramway Company, Heliopolis Oasis Company, etc etc, xenophobia [sic] is clearly evinced, coupled with an ingrained belief in the vampire nature of foreign capital.”¹³⁷ What Alcock interpreted as xenophobia was the accumulation of grievances against the power of foreign companies.

As in many other cities during the turn of the century, the need for governments and municipalities to regulate private enterprise was felt the most in domains where service provision was relevant to public health—water being a prime example.¹³⁸ Debates on municipalization took place in European and American cities in response to needs to unify fragmented supply, protect customers, ensure purity and availability of water, and forestall the formation of powerful private interests in the management of urban life. Significantly, concessionary companies and their critics drew on an argument for “natural monopoly” in infrastructures. The argument, which is traceable to the liberal political economist John Stuart Mill, was that competition was undesirable and inefficient in the domains of utilities and infrastructure, including gas, water, electricity,

¹³⁶ Quoted in al-Rafi'i, *Mohammad Farid*, 159-162.

¹³⁷ TNA, FO 141/633: Note on the Tanzim Department by A. Mann Alcock, dated January 4, 1925.

¹³⁸ On London see Hamlin, *A Science of Impurity*, Taylor and Trentmann, “Liquid Politics,” and Millward, “The Political Economy of Urban Utilities.” On American cities see Melosi, *The Sanitary City* and Soll, *Empire of Water*, Ch. 1-2.

tramways, rail, and telegraph, as it would lead to inefficient replication of facilities and networks and to higher costs.¹³⁹ In fact, Mill developed this argument in the middle of the nineteenth century in the context of the “price wars” of London’s several water companies.¹⁴⁰ If financiers made this argument in order to extract monopolies from governments, proponents of municipalization used the same argument to show that public monopoly on infrastructures of service provisioning was the guarantee for inexpensive and dependable service. In Egypt, arguments by nationalists and marginal socialists aside, authorities expressed virtually no desire to entertain the possibility of public ownership or municipalization of public utility companies.

Only during the protracted period of decolonization (1923-1952) that consumers in conjunction with the government began to challenge the power of the Cairo Water Company, exposing its predatory behavior and the excessive profits it made in a growing metropolis. Inflated water rates remained uncontested until 1935 when a number of lawsuits by subscribers accused the company of forcing them to use meters instead of unlimited subscriptions, which was contrary to the terms of the 1887 agreement that gave ratepayers the choice. The government intervened to resolve this conflict, and after many rounds of negotiations the company offered to lower its fees from 27 to 16 milliemes and to give up LE 74,000 for public benefit under three conditions: universalizing the meter system, extending the term of the concession in order to make up for the company’s “sacrifice,” and maintaining the same rate until the end of the concession period.¹⁴¹ In

¹³⁹ Millward, “Emergence of Gas and Water Monopolies in Nineteenth-century Britain.” See also David Nye, *Electrifying America* (Cambridge: The MIT Press, 1990), Ch. 4 and Stephen Graham and Simon Marvin, *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition* (London: Routledge, 2002), 79 and 141.

¹⁴⁰ Schwartz, “John Stuart Mill and Laissez Faire: London Water.”

¹⁴¹ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-059294.

1937, the government hired S. R. Raffety a member of the British Institution of Civil Engineers as an expert in both the financial and technical aspects of water supply in large cities in order to estimate the cost of production of pure water in Cairo and to offer his opinion on “a reasonable margin of profit” for the company, that is to suggest a rate that would be fair to both consumers and the company. In his 1938 report, Raffety severely criticized the financial policies of the company. The report began by pointing out that the company’s profits rose steadily from 1888 to 1920 then rose sharply afterwards. The turning point towards a sharp increase in profits was significant because it was when the sewage system became functional in full capacity, and the water company forced houses connected to public sewers to install and use water meters. The company insisted that meters deterred waste, arguing that houses connected to public sewers and had unlimited subscriptions might act wastefully knowing that used water would be carried away, instead of flooding basement cesspits as in the past. Introducing the more expensive metered supply would prevent this behavior. Raffety acknowledged some truth in this position but argued instead that waste could be prevented by more regular inspections. He pointed out that “it is obvious that not only the introduction of main drainage but also the improvement of housing conditions generally would increase the average quantity of water used per person, which is a feature not peculiar to Cairo.” What was clear for Raffety was that the universalization of metered supply would result in a large increase of revenue for the company, an increase that would comfortably exceed the company’s alleged sacrifices. In short, the company’s offer was a deceptive attempt to capture more profits under the guise of lowering rates.¹⁴²

¹⁴² DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-059295.

Raffety placed the question of a “reasonable margin of profit” within the framework of the need to regulate monopolistic utility companies. He asserted that as a general principle a public utility company holding a monopoly should not make exorbitant profits, particularly for the supply of water, “the chief necessity of life and of vital importance to sanitation.” Already, the Cairo Water Company was making profits “which can only be described as excessive.” Moreover, these profits were expected to increase in the future since “so long as Cairo continues to grow, the receipts and profits of the company must increase if the price for water is not decreased from time to time.” There was, therefore, no justification for increasing such revenue further as the company hoped. If anything, the question for Raffety was how to cut down the company’s excessive profits. He pointed out that the solution was not to fix prices but to fix the company’s margin of profit. Capping the profits that the company was allowed to make at a certain level would protect consumers from the company’s predatory behavior and avoid all future problems and differences of opinion regarding the financial consequences of metering. Raffety also suggested to supply “small consumers” with an adequate amount of water at a fixed sum, not according to the meter. For him this would encourage more water usage for those with limited means, thus promoting better hygiene. He pointed out that similar developments took place in Alexandria under the municipality and in English towns where “ordinary house supplies are not permitted to be given by meter.” However, for this scheme to succeed, water rate for small consumers had to be discounted.¹⁴³ Expectedly, the company objected to Raffety’s report, rejected the notion of “reasonable profits” as the basis for a new agreement, and argued that it contradicted the terms of its original concession and its right of exploitation. Another phase of negotiations ensued when

¹⁴³ Ibid.

the company offered to further lower its rate to 14.5 millieme and to cede forty percent of net profits exceeding LE 400,000 to the government, yet still under the condition of universalizing meters. In 1941, the Mixed Court of Appeal ruled that the company had to give consumers the right to choose between meters and monthly subscriptions, and the government presented a draft law of yet a new agreement to the parliament.¹⁴⁴ By and large, the new agreement challenged the privileges of the company and lower rates allowed filtered water to enter the houses of Cairo's middle class more liberally.

Conclusion

The British regime took up efforts to improve and upgrade Cairo's infrastructure of water supply as a result of pressures unleashed by the city's unhealthy conditions. Cairo could not enjoy the prosperity promised by the regime, become a center finance, and attract tourists and comfortable residents shorn of safe and abundant water supply that would protect it from cholera. This chapter examined the technoscience and political economy of Cairo's infrastructure of water provisioning at a time when the British regime revised its approach to the city.

First, the need to protect and improve the standards of the water supply led to the proliferation of scientific institutions and activities and a technological turn towards a new source of water. The government and the company sought to exercise more scientific control over water through their experts and their chemical and bacteriological laboratories, and these efforts led to significant debates on standards of purity, methods of filtration, the potability of the Nile, and the quality of filtered water of the company. The government's decision to draw water from deep tube

¹⁴⁴ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-059294.

wells instead of the Nile was borne out of developments in geological research and water engineering that promised to offer a solution to problems that had surrounded the water supply for decades. By drawing water from a source that was dozens of meters deep into the soil, thus away from sources of contamination, the government mobilized science and technology to modernize the city's water infrastructure.

As we saw, however, Cairenes did not favorably receive the new water supply, which became the center of a controversy involving experts and laypeople concerning the taste and purity of water. Does taste constitute knowledge? Did distaste constitute knowledge in early twentieth century Cairo? While both questions fall outside the scope of this dissertation, this chapter follows how the new infrastructure led to debates on taste and its capacity to discriminate or provide some kind of knowledge. Two aspects of the new water supply militated against it for Cairenes, particularly of the lower class, namely the different taste of water and its origin. That water tasted disagreeable and was pumped instead of obtained from a running source made the new water supply suspect and undesirable particularly for the lower class who still understood water purity from within a loose framework of popular epistemologies and practices. Initially framing the controversy as between scientific authorities and superstitious Egyptians, British officials including those at the head of the country's public health administration came to suspect that a taste community loosely defined can indeed detect differences in taste between different water supplies, hence that implicit lay claims to knowledge of the water possessed some legitimacy. Yet while they rethought how they understood taste, British officials were never convinced that taste was an indicator of purity and potability, which were still the domains of chemists and bacteriologists. Nonetheless, authorities came to recognize the legitimacy of lay distaste as a result of five years of opposition, resistance, and silent boycott by ordinary Egyptians, which was enough

for the government to scrap the new project and return to the Nile. Moments of contradiction and lack of recognition were evocative of colonialism and the experience of colonial power, which constituted the inescapable context of the controversy.

Second, this chapter builds upon the previous one in probing the regime's policies towards private capital in urban sectors. The Cairo Water Company was a particularly glaring example of monopolistic companies that exercised a form of sovereignty over urban life through control of a vital service. As we saw, the government repeatedly negotiated with the company to lower its water rates, but success was limited. Only during the protracted period of decolonization that the government managed to expose the company's predatory behavior and cut down its excessive rates and profits. For the entire colonial period, however, the high rates of the company led to vastly unequal service distribution and created an overriding cleavage in water consumption between elites who enjoyed plentiful supply and used water in their private homes, and the less fortunate who obtained their remarkably inferior allowance from collective places. As we will see in the next chapter, this crucial distinction, which the Cairo Water Company helped create and sustain, set parameters for another infrastructural project, namely the sewage system.

CHAPTER FOUR

ENGINEERING CAIRO: SEWERS AND THE SOCIAL

Introduction

During the winter of 1912-1913 American civil engineer Elmer Corthell visited countries on both sides of the Mediterranean in order to survey significant works of engineering. In Cairo, he inspected new Nile bridges connecting Cairo proper to Giza on the western bank of the river before spending the majority of his time with engineer Charles Carkeet James, the Controller General of the Cairo Main Drainage, surveying the city's sewage system at a time when it was under construction. Corthell travelled along the entire network from Abbasiya to Khanka. He described Heliopolis, where "millions are being spent" to make it one of the most beautifully planned suburbs providing modern, healthy housing. He visited the "Virgin Tree" of Matariya and pondered the coexistence of great relics of the past with the sewers, the new technological wonder of British engineering. He described pipes, construction rails and highways, the main collector, the rising main, and the experimental nursery of the sewage farm in Khanka. However, he wondered if the "rather ignorant" Egyptians could be persuaded to use modern conveniences and take advantage of the reorganization of sanitary infrastructures that was in full swing in Cairo. In the final analysis, he was optimistic. If every house "however old and humble" had access to plenty of water and supplied with sanitary arrangements, the "habits of centuries" would gradually change. With the sewage system and ongoing slum clearance the "old Cairo" was disappearing, "the unsanitary

situation greatly improved and space given for a new city there.”¹ In Corthell’s assessment, “there is much of engineering interest in this city of three quarters a million, and rapidly growing.”²

This chapter traces the schemes, designs, construction, and reception of Cairo’s sewage network between 1880s and 1930s. It takes as its point of departure the idea that design and engineering are always already social and that social relations and power are “scripted in and enacted through” the flows of urban infrastructures.³ The chapter recovers and reconstructs debates among engineers and hygienists on a number of sewage schemes for Cairo. Such debates probed and interrogated the relationship between engineering, as a practice that mediates knowledge, action, and materiality, and the social world it sought to organize. The experts of colonial Cairo called into question not only the factual knowledge of their rivals but also their understanding of the social world to be ordered and patterned by their technological systems. I argue that the vision of engineering that ultimately triumphed with James’ project—the first full-scale urban drainage system in Cairo—expressed preference to a world where sharp colonial and class hierarchies were preserved. Yet cementing hierarchy in pipes was no guarantee for the endurance of its undergirding

¹ Elmer Corthell, “A Recent Trip to Italy, Egypt, Southern France and Spain. Interesting Facts and Personal Experiences,” *Professional Memoirs: Corps of Engineers, United States Army, and Engineer Department at Large* VII, 33 (1915), 263.

² *Ibi.*, 262.

³ Maria Kaika and Erik Swyngedouw, “Fetishizing the Modern City: The Phantasmagoria of Urban Technological Networks,” *International Journal of Urban and Regional Research* 24, 1 (2000), 121. For literature on engineering as social engineering see Michel Callon, “Society in the Making: The Study of Technology as a Tool for Sociological Analysis,” in *The Social construction of technological systems: new directions in the sociology and history of technology*, ed. by Wiebe Bijker (MIT Press, 1987), Bruno Latour, *Aramis, or, The Love of Technology* (Harvard University Press, 1996), Ken Alder, *Engineering the Revolution: Arms and Enlightenment in France, 1763-1815* (University of Chicago Press, 1997), John Tresch, *The Romantic Machine: Utopian Science and Technology After Napoleon* (University of Chicago Press, 2012), Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley: University of California Press, 2002), ch.1 & 3, David E. Nye, *Electrifying America: Social Meanings of a New Technology, 1880-1940* (Cambridge, Mass.: London: The MIT Press, 1992), Ch. 4, David Gilmartin, “Imperial Rivers: Irrigation and Visions of British Empire,” in *Decentering Empire: Britain, India and the Transcolonial World*, ed. Dane Kennedy and Durba Ghosh (Delhi: Orient Longman, 2006), and Andrew Barry, *Material Politics: Disputes Along the Pipeline* (West Sussex: Wiley-Blackwell, 2013).

colonial world. Urban infrastructures are sites where knowledge and authority are channeled and exercised, yet also contested. In Cairo, the unforeseen success of the sewage system during decades of decolonization (1920s and 1930s) among the upwardly mobile urban middle class who were misrecognized and largely excluded from the design, strained the system to the point of failure.

This chapter examines the epistemologies of engineers and the activity of engineering as knowledge in action. Design is at the intersection of knowledge, know-how, ideas of order and functionality, and materiality. It requires multiple shifts in scale and movements from the general to the particular and back. Engineers must come to terms with the lumpiness of the material world, which does not always receive their general principles like an abstract, mathematical space. The diversity of local circumstances is always in tension with the generalizability of science. And engineers face the problem of scale since models cannot be automatically extended without testing the ground and gauging what could and what could not be scaled up.⁴

By foregrounding the social nature of engineering, this chapter follows engineers as sociologists who investigate cities as social spaces. Designing urban infrastructures such as a sewage system is a process of translating living complexities and contradictions into few simple categories—pipes, pumps, liquids, gradients, sluice gates, screening chambers, manholes, etc.—regulating their interactions, and establishing causal relations and directions of flow. In line with contemporary manuals of sanitary engineering, Cairo’s engineers broke the urban landscape down into a number of givens and variables. Like sanitary engineers working on other cities, they began by examining the constraints of the physical landscape: geography, geology, and climate. Then they turned to more contingent information such as demography and average water consumption.

⁴ See Alder, *Engineering the Revolution*, 13-4 and Wiebe Bijker, “Dikes and Dams, Thick with Politics,” *Isis* 98 (2007).

Sooner or later designing urban drainage systems involved social and political conceptualizations, calculations, and projections. In a way that echoed pioneering urban surveyors and sociologists like Charles Booth and W. E. B. Du Bois notwithstanding radical differences of approach, sanitary engineers divided urban populations into classes and examined social norms, patterns of consumption, and housing conditions among other things.⁵ They also made projections concerning the future of cities and how their schemes would enable or sustain this future. And finally, civil engineers constantly compared cities against models and often debated the rationality of such comparisons.

In Cairo as elsewhere, colonial authorities presented their urban infrastructural projects as iconic monuments of progress and improvement and testaments to the empire's desire to use its technological prowess to modernize the colonies. After two decades of neglect of Cairo's sanitary conditions, which exposed the colonial regime to critique, the regime responded with a project that sought to reorganize urban space. Yet the universalist claim of sewerage the entirety of Cairo was contradicted by the disproportionate allocation of benefits, which mirrored the city's class and colonial inequalities. Cairo's first drainage system sharply divided the city into a minority of upper class elites who enjoyed water and sanitation privately and a majority of lower class residents who were largely denied bourgeois privacy and was projected to depend mainly on collective spaces of sanitation for the next quarter century. Ultimately, the perceived permanence of the British colonial regime was the guarantee for the fixity of this hierarchical colonial order encoded into the design

⁵ On Charles Booth as a sociologist see *Charles Booth on the City: Physical Pattern and Social Structure*, edited by Harold W. Pfautz (Chicago: The University of Chicago Press, 1967), Ch. 3: 'The City as a Physical and Social Structure.' See also Christian Topalov, "The City as *terra incognita*: Charles Booth's Poverty Survey and the People of London, 1886-1891," *Planning Perspectives* 8 (1993). On W. E. B. Du Bois see Aldon Morris, *The Scholar Denied: W. E. B. Du Bois and the Birth of Modern Sociology* (California: University of California Press, 2017) and Robert Vitalis, *White World Order, Black Power Politics: The Birth of American International Relations* (Ithaca: Cornell University Press, 2015), 30-33.

of Cairo's infrastructure.

The first section of this chapter provides an account of Cairo's aborted sewage system schemes between 1885 and 1905, tracing the debates surrounding them, as well as the multiple reasons for their rejection. The second section looks in depth at the design and implementation of Cairo's first sewage system, from the early phases of design (1906-1909) to its implementation and inauguration in 1915. The colonial administration presented the system as a solution to the city's enduring public health crisis and as a response to its changing residential geography particularly at the height of the property bubble (1897-1907). The final section briefly sketches the success and failure of the colonial infrastructure during the two decades following conditional independence in 1922.

Failed Schemes

For two decades, or between 1885 and 1905, the Egyptian Public Works Department received and commissioned proposals to construct a sewage system for Cairo, yet none of them were implemented. The government gave serious consideration yet eventually rejected a scheme by Baldwin Latham, another by an International Commission of engineers that Julien Barois drafted its final version, and a third by the Cairo Water Company when it was under the directorship of William Willcocks. As we saw in Chapter One, Cairo's elites, including its foreign and Egyptian residents, were frustrated by the lack of a sewage system, especially in light of the city's unhygienic conditions, which led to high death rates and three waves of short, yet intense cholera epidemics during this period. And as we saw in Chapter Two, a property bubble was in full swing starting from the final years of the nineteenth century. Capitalist and urban developers placed a high premium on urban sanitary infrastructures that would improve the health of the city,

unlocking the full potential of its housing market and the city's reputation as a new center of capital investment more broadly. The delay of Cairo's sewage system owed to a number of factors, including imperial business competition, lack of a municipal authority, anticipated difficulty of implementing sanitary reforms on foreigners with extraterritorial privileges, and most importantly, the agrarian focus of the policies of the British regime in Egypt.

Like many other cities, designing urban infrastructures in Cairo posed a series of social, political, and financial conundrums that demonstrate the mutually constitutive nature of technology and society. The discussions surrounding failed sewage system schemes during the first two decades of British colonial rule in Egypt drew on scientific and technical debates among engineers and public hygienists that simultaneously took place in many urban centers. For instance, engineers had to decide early in advance between the separate or the combined system, and the decision hinged on geological, meteorological, historical, and financial factors. As the name suggests, the separate system required clearing household, surface, and storm water separately from sewage, and the system acquired its reputation when it was adopted in Paris under Baron Haussmann's urban reorganizations of the mid nineteenth century. The combined system (*tout-à-l'égout* or 'all to the sewer'), however, was based on gathering toilet refuse, household water, and surface water in the same pipes and discharging them at the same site.⁶ There were debates among proponents of the two systems, yet by the turn of the century the combined system was gaining ground among engineers and cities in Europe.⁷ Another critical decision facing engineers

⁶ For a sample of contemporary sanitary engineering manuals see Hugh Sextus Watson, *Sewerage Systems, Their Design and Construction* (McGraw-Hill Book Company, 1911) and Prescott Folwell, *Sewerage: The Construction, Design, and Maintenance of Sewerage System* (New York: John Wiley and Sons, 1910).

⁷ For the debate between proponents of the separate and combined systems in Paris see Alain Corbin, *The Foul and the Fragrant: Odor and the French Social Imagination* (Harvard University Press, 1988), 119-120 and Donald Reid, *Paris Sewers and Sewermen: Realities and Representations* (Harvard University Press, 1991), Ch. 6. For a sample of

concerned the use of gravity as opposed to motive force or mechanical pumping. A system that exclusively relied on gravity implicitly postulated that an appropriate incline could be built into the system in order to engender efficient flow, regardless of potential geological and topographical obstacles of a particular urban landscape, including for instance ground water, impermeable geological strata, and concentrations of ill-constructed buildings. On the other hand, a system that relied exclusively on motive power had to decide on the use of water, air, or electric pumping and on the type of pump suitable for a city more broadly. These choices needed not be exclusive, and it was conceivable by the late nineteenth century to design a single sewage system that employed both gravity and pumping and drained areas using the separate and the combined systems for different sections of cities. Another question was what to do with the sewage of an entire city. In accordance with the 19th century injunction against waste, European sanitary engineers commonly designed farms for sewage irrigation. Such farms were seen as lucrative enterprises, while some went so far as to suggest that the technological reuse of waste as organic fertilizer could finally help realize the utopian dream to do away with the need for labor altogether.⁸

When the *Commission d'assainissement du Caire* held its meetings in 1885 in order to propose measures to redeem Cairo unsanitary conditions, the problems of sewage disposal and

this debate in Egypt see B. Bezault, "Assainissement général des villes. Cas particulier du Caire," *Bulletin de l'Institut Égyptien* (1907), 121.

⁸ Dana Simmons, "Waste Not, Want Not: Excrement and Economy in Nineteenth-Century France," *Representations* 96, 1 (2006); Timothy Cooper, "Peter Lund Simmonds and the Political Ecology of Waste Utilization in Victorian Britain," *Technology and Culture* 52, 1 (2011); Crosbie Smith and M. Norton Wise, *Energy and Empire: A Biographical Study of Lord Kelvin* (Cambridge; New York: Cambridge University Press, 1989); M. Norton Wise and Crosbie Smith, "Work and Waste: Political Economy and Natural Philosophy in Nineteenth Century Britain (I-III)," *History of Science* 27-8 (1989-1990).

surface water drainage were at the forefront of its program.⁹ French engineer Julien Barois, who served as a member of the commission, was of the opinion that Cairo was unsuitable for the combined system, a position that he changed less than a decade later. His objections were based on the city's lack of general incline and the dearth of rainwater, both of which threatened inadequate flushing of the proposed network, which could not depend on gravity or stormwater for securing efficient flow. Inefficient discharge was dangerous to public health because it allowed build up of sewer gases and threatened stoppages and flooding. The commission was unanimous in its rejection of a combined system, arguing that it created more problems than it solved, and declaring that toilet refuse should never be allowed into any future drainage system in Cairo.

The question then was how to deal with sewage disposal and whether it was the kind of service that was best left to private enterprise or could be supplied by the government. Sanitary experts deemed the current system of cesspits and night-soil men defective, and the general lack of coordination among urban municipal services compounded these problems. Doctor A. H. Hooker submitted a short report to the commission where he argued that organizing a sewage disposal service to replace the current system was necessary. And he maintained that a network of sewers carrying toilet refuse was a dangerous system from a hygienic perspective.

According to Hooker, there were three general options for how sewage disposal could be organized in Cairo. First, to establish a general receptacle or large open sewer somewhere in the center of the city into which house connections and smaller pipes discharged. From there, sewage could be transported to a distant location and used as a fertilizer. Second, Cairo could adopt a

⁹ Dar al-Wathaiq al-Qawmiyya [DWQ] (The Egyptian National Archive), Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037344 and 4003-037345. All information on the 1885 sanitary commission comes from these folders unless otherwise noted.

system using air pumps, such as the Liernur pneumatic pumps. The system was used in many European cities and Hooker thought highly of it. But it required installing expensive facilities including air pumps. It was possible to entrust a concessionary company with this task, yet the company would charge a fee for waste removal just like the water and gas companies did. For Hooker, this system was possible only in the “European quarters” of the city and its success would depend solely on the willingness of the proprietors to pay for service. He was sure that “native quarters” would meet the system with resistance and disfavor on account of expectedly high fees. Hooker was aware of potential complications of delegating a municipal service entirely to one company. Even more than in other countries, he argued, monitoring and policing monopolistic companies were extremely difficult partially due to legal complications and extraterritorial privileges of foreigners in Egypt. He was of the opinion that in sanitary matters the government or municipality must exercise full control. Third, there was the option of uniting sweeping and road services and entrusting the department with clearing cesspools and sewage disposal. Aside from administrative reorganization, this option required increasing the number of employees and equipment, construction and repair of waterproof cesspools and sewage reservoirs, and constant monitoring by police and sanitary inspectors. Waste could be transported by rail to a convenient location outside the city to be used as a fertilizer. For Hooker, this was the most practical method provided that it was placed under a capable administration.

Hooker’s report explored the possible geography and technology of sewage disposal in Cairo. As many other sanitary experts, he was of the opinion that current percolating cesspits that were placed in house basements had to be abolished immediately and replaced with water-tight reservoirs placed under the street. Reservoirs would receive sewage from entire buildings and would be supplied with a ventilation tube attached vertically to the building that allowed the release

of gases only at the top, or above the level where residents lived. Reservoirs should be easily accessible from the street by means of a clearing pipe supplied with a plug. Clearing these reservoirs could depend on carts using pneumatic air pumps supplied with a suction tube. Hooker had seen the likes of these closed pneumatic carts in Paris, Berlin, Dresden, and Darmstadt among other towns. These carts could clear the content of small reservoirs quickly once a week during the day or night without causing nuisance and transport it to larger sewage reservoirs at four stations along the Khalig Canal, namely Faggala, Bab al-Khalq, Darb al-Gamamiz, and Sayyida Zainab. From these four large reservoirs sewage could be transported to a farm where waste could be used as a fertilizer. The location of the sewage farm depended in part on what to do with the Khalig itself. The waterway could be turned into a covered sewer for transporting waste from these four reservoirs to a farm in the north where the Khalig met the Ismailiya Canal. Hooker was against this option, proposing instead to fill in the Khalig, construct large and small reservoirs along the process, and construct a railway line on top in order to transport sewage to Old Cairo in the south. A tax on houses on the Khalig waterway could partially finance this project, and Hooker thought this should not be problem given that the values of these properties would increase as a result of better sanitary conditions brought about by the project.

In its final report the *Commission d'assainissement du Caire* was indecisive. Its first preference was for a private company to handle sewage disposal along the lines Hooker suggested yet without filling in the Khalig. The report stated that sewage systems such as Lienur, Shone, and Berlier, which were common in European cities, were too complicated to be applied to the conditions of Cairo, except if an entrepreneur could make use of a sewage farm to partially fund the project. Otherwise, the commission cautioned the government against forcing “innovations”

of this kind on Cairo's denizens. Ultimately, however, the government shelved these recommendations because it was unwilling to fill in the Khalig.

Debates on the scheme gave rise to important discussions on the finances of costly urban projects and the potential role of private capital in setting up sanitary infrastructures. That any drainage project will have to rely in part on an increase of property tax was one of the most enduring ideas of financial management of large-scale urban infrastructural projects. It also posed a formidable challenge given the difficulties of levying and collecting taxes on European residents and property owners who enjoyed protection under the capitulations and who could not be taxed without the approval of the fourteen capitulatory powers. In this and other future drainage projects, officials constantly raised the political and diplomatic difficulties of increasing house taxes, sometimes as a ready excuse to dismiss the costly project, which was not among the priorities of colonial decision makers. The potential role of private capital was another important question that authorities had to contend with. Sanitary experts were weary of entrusting the project to a concessionary company that would charge high fees in exchange for sewage disposal service, which would have reproduced the same problems of water supply by the concessionary Cairo Water Company in the realm of waste collection. Hooker and others realized that high fees would have created a barrier against the extension of the service infrastructure to the poor neighborhoods that were most in need of the service and most at risk of infectious diseases as the cholera epidemic of 1883 had shown a few years earlier.

Business entrepreneurs in infrastructural and sanitary sectors sought to circumvent potential competition for lucrative contracts by initiating proposals for drainage schemes. The first recorded proposal to construct a sewage system for Cairo came from Josiah Cornish, director of the Alexandria Water Company, and his business partner John Wallace. In 1885, Cornish wrote to

the Public Works Ministry asking for information to help him design a drainage system, including urban population figures, general levels of streets along the Khalig and in different quarters. And he inquired if Boulaq—the populous semi-isolated quarter that contained numerous clusters of slums and was at the center of the 1883 epidemic—should be included in the scheme or treated separately.¹⁰ Cornish and Wallace also contacted Dr. Greene, the director of the Public Health Department to pitch their project. The proposal would cost £480,750 and would “render the capital of Egypt one of the most healthy cities in the world.”¹¹ The combined system depended on a network of watertight iron pipes that gathered surface water, household water, and waste into four central reservoirs before propelling sewage towards a farm south of Cairo. Given the city’s 54,000 houses, a tax of £1 per house per annum would suffice to finance the project. However, the government immediately rejected the project citing high cost and its inability due to the capitulations to levy taxes for sanitary improvement on all of Cairo’s houses and to legally oblige proprietors to change the sanitary arrangement of their properties.¹² Three years later, the government received numerous other drainage proposals for Cairo and Alexandria including one from John and Henry Gwynne, the British industrialists and makers of pumping machines.¹³

Other business entrepreneurs sought to capitalize on the government’s inability to provide efficient municipal services without going through the trouble of laying pipes. In 1885, engineer L. Imblon asked for a forty-year concession to clear waste from all government buildings in Cairo and Alexandria including most importantly mosques that fell under the Ministry of Charitable

¹⁰ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037313.

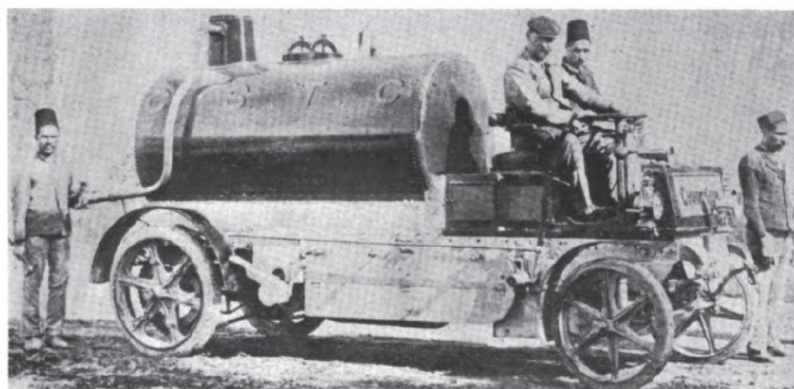
¹¹ Greene Pasha, “The Sanitation of Cairo,” *The Provincial Medical Journal*, January 2, 1888, 10.

¹² DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037345.

¹³ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037313 and 4003-037316.

Endowments. He promised to use a system of pneumatic carts transporting waste along routes fixed by the Public Health Department, and he asked for six francs per cubic meter of cleared sewage. He also demanded property rights on cleared contents, as he planned to use it for manufacturing natural fertilizer. Shortly after his first proposal, Imblon suggested broadening his scheme to extend the service to private houses under the condition that they used waterproof cesspits. He was aware that only houses in elite quarters of Azbakiya and Ismailiya were supplied with this feature, but he was of the opinion that his service would force the defective “Arab system” of waste removal to disappear gradually and propel proprietors to alter sanitary arrangements accordingly.¹⁴ The government, however, was not convinced and rejected the offer.

In 1886, the government signed a contract with the Cairo Sewage Transport Company, the first private company to provide services of waste disposal in the city. The company introduced a pneumatic carts system, much like Hooker described, in order to clear cesspits of all government buildings including public latrines, mosques, train stations, hospitals, and prisons in addition to private houses. The contract with the government was not a concession or a monopoly and the



Municipal Sewage Wagon used in Cairo, Egypt.

4.1. Pneumatic cart belonging to the Cairo Sewage Transport Company. (Source: *The Power Wagon* January, 1908)

¹⁴ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037344 and 4003-037345.

of its scientific treatment of waste and production of high quality fertilizer that was rich in nitrogen, phosphoric acid, and potash, winning a number of awards at local agricultural exhibitions.¹⁶

A proposed drainage scheme in 1890 led to a series of debates that made explicit how technological infrastructures were enmeshed in business competition, diplomatic contentions, and rival understandings of the mutually constitutive relation between engineering and the social. In 1889, the Public Works Ministry recruited Baldwin Latham to study the possibility of a sewage system for Cairo, which resulted in the first scheme to merit serious consideration from the government.¹⁷ Latham was a distinguished English sanitary engineer with extensive experience in studying sanitary matters in British Indian cities including Bombay and Benares and an author of sanitary engineering manuals. As such, he was one of the new experts of cities and infrastructures of sanitation whose career traversed the geography of the empire. Late in 1889 he submitted a report to the Egyptian Council of Ministers where he proposed a drainage scheme for Cairo. Because the city was generally flat except for high southeastern parts and low central parts, Latham's first decision was to employ mechanical power since gravity alone would not be sufficient to flush the system. The fluctuation of subsoil water and its effects on the soil had to be taken into consideration, and the system had to be both watertight and flexible. Against the recommendations of the 1885 *Commission*, Latham decided to utilize the combined system, which gathered storm water, household water, and toilet refuse in the same pipes.

¹⁶ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-008831; DWQ, Nizarat al-Dakhiliya (Ministry of Interior), file number: 2001-011516 and 2001-018962, *al-Mu'ayyad*, February 2, 1900, H. D. Parodi, "La fabrication des engrais au Caire," *Égypte Contemporaine* 1 (1910), 425-8.

¹⁷ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037344; Public Works Ministry, *Résumé du rapport de M. Baldwin Latham sur le drainage du Caire* (Le Caire: Imprimerie Nationale, 1890).

Calculations of current and future demography and water consumption opened the door for the most concrete sociological and political analysis of Cairo's landscape. Based on an estimated population of 414,155 Latham designed the project for a future city of a half million inhabitants. In a combined system in a city where rainfall was a rare occurrence, calculations of the total quantity of sewage to be disposed depended on water consumption. The engineer acquired information from the Cairo Water Company and the Public Works Ministry regarding average daily consumption, number of houses connected to the company's service, water allowance reaching the city's fountains and standpipes as well as other sources of water including shallow wells and water drawn from the Nile and its derivatives by carriers and residents. Significantly, Latham estimated that in the future Cairo 400,000 "natives" would consume 22.5 liters per head per day, while 100,000 elite "natives and foreigners" would consume 136 liters per head per day. The engineer was cognizant that his estimated future water consumption for Cairo's less fortunate classes was much higher than the current water allowance, which contemporary experts put at no more than three or four liters per head per day. Latham justified this decision on the assumption that filtered water will be more accessible in the future. The assumption was in line with contemporary manuals of sanitary engineering that cautioned system designers against not leaving room for future increase in water usage, which commonly resulted from the establishment of a sewage system. The logic behind this was that a drainage system gave residents incentives to seek water for sanitary and domestic purposes at their homes, and some engineers even warned of wasteful use of water as a result of sewage systems.

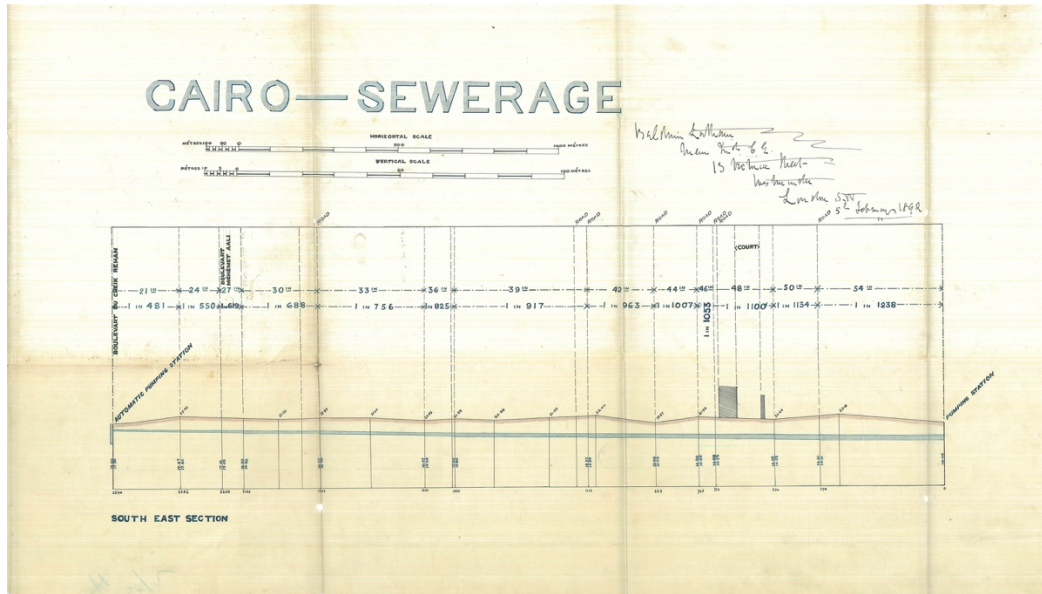
However, Latham's assumption of increased water usage collided directly with the sharp colonial and class realities of Cairo. As we saw in Chapter Three, access to filtered water was limited due to the rates of the concessionary Cairo Water Company, which enjoyed vast privileges

and near sovereignty over this and other related dimensions of urban life. Latham may not have fully realized this, but a project that foresaw, and implicitly demanded, that water distribution to the lower classes be multiplied nearly sixfold was socially daring and politically optimistic given Cairo's acute inequalities, no matter how invested the project was in a liberal politics of improvement with its emphasis on the civilizing influence of water.¹⁸

The combined system that Latham designed based on these givens and assumptions sought to encompass the entirety of Cairo. His project was based on a maximum daily capacity of 65,455 cubic meters of sewage per day and it required abolishing all cesspools of the city and universalizing house connections. The city was divided into 28 districts, each supplied with an underground sewage reservoir. Sewage would move into waterproof pipes from surrounding streets into the district reservoir by means of natural incline. From there, two hydraulic pumps connected to a central power station at Qasr al-Nil would propel sewage in cast iron pipes towards a main collector running underneath the Khalig until it reached a farm northeast of the city. Water used to generate hydraulic power would be carried away by a subsidiary system of pipes to flush the drains. The system was provided with 1755 manholes that could be used for screening, injecting water, or holding back sewage to allow for build up of momentum. Latham believed that manholes could be used for dumping sewage directly in poorer quarters where houses had no private bathrooms. Sewage would be used to cultivate a farm on 1,200 feddans at least three kilometers northeast of Abbasiya. Latham's estimated cost was £565,700, with an annual maintenance cost of £47,680, but he expected the returns of the sewage farm to defray much or all of the maintenance cost. Latham argued that the cost was not too high considering that the public

¹⁸ For similar developments in France see Jean-Pierre Goubert, *The Conquest of Water: The Advent of Health in the Industrial Age* (Princeton: Princeton University Press, 1989), Part I.

and the government currently paid the Cairo Sewage Transport Company between £71,800 and £102,564 annually only for a very limited operation of sewage disposal that left the city at the mercy of infectious diseases. The engineer also required the government to allocate £100,000 for work to be done inside houses of those too poor to pay for required sanitary arrangements, most crucially the installation of water closets to flush toilet refuse.



4.3. Longitudinal profile study for Baldwin Latham’s proposed scheme. (Source: Greater Cairo Sanitary Drainage Company)

Discussions on Latham’s project bore witness to the interdependence of the social and the technical in infrastructural projects, thus to the social nature of engineering. Sanitary experts critiqued the project on account of its assumptions regarding future water allowance and the possibility of including the “lower class” in the project more broadly. The Ministry of Public Works appointed a commission to study the project’s suitability for Cairo. A. G. W. Reid, engineer and director of the Barrage, presented an influential critique of Latham’s project that confronted the scheme’s “optimistic” assumptions with a colonial reality check. For Reid, Latham’s project was founded on a model applicable only to European cities, while Cairo was “partly European

partly Oriental.”¹⁹ Reid argued that 22½ liters (or 5 imperial gallons) per head per day were far too high for the needs of “the working and lower classes.” Latham, Reid argued, had not studied the population that the project targeted well enough, else he would have realized that “the poor of an eastern country possess no boarded floors to be scrubbed, no table equipment to be washed daily, no changes of linen to be sent to the laundry, no elaborate meals requiring large quantities of water for cooking—they bathe only at a river, canal, or a public bath.” Reid proposed to lower the estimated daily allowance of Cairo’s natives and lower classes to 4.5 liters, or one imperial gallon. The effect of this reduction would be substantial, since the expected volume of sewage would decrease considerably, leading to overall economy due to smaller pipes, weaker engines, smaller reservoirs, etc. Reid reminded Latham and the commission members that the government had no intention of freely supplying water to the poor who could not afford the company’s rates, nor was it willing to enter into negotiations over rates in order to make water accessible on a scale that Latham might have thought possible in the future. If water could not reach the houses of the poor in great quantities, then house drains would surely not function properly. Finally, Reid criticized Latham’s rainfall provision as too high and leading to unnecessary expenses.

Another significant critique was that a majority of Cairo’s lower classes could not afford restructuring internal sanitary arrangements in a way that allowed connection to public sewers, making the universal aspiration of the project superfluous. John Price, sanitary engineer of the Department of Public Health who was involved in neighborhood and slum inspection, weighed in. According to his figures, only about 22,800 out of Cairo’s 39,125 houses (excluding Boulaq and Old Cairo) paid less than LE 6 of annual rent, including 5,600 *‘eshash* (huts) that paid none. Price

¹⁹ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037344.

was sure that the owners of these inferior houses were too poor to install water closets, which were required to connect their houses to the drainage scheme. Price was aware that Latham allocated a sum of £100,000 for work on dwellings of the poor, yet he did not indicate how many of Cairo's inferior houses this amount could have covered.

At the bottom of this debate was the crucial question of the relationship between infrastructural engineering and the city's colonial and class inequalities. For Latham's critics, trenchant inequalities were fixed givens of the social order that placed constraints on engineering. For him, the government's critics discounted the effects that infrastructural technologies themselves have on patterns of consumption and demand for services. Engineers had to factor in social change—understood from the confines of late nineteenth century liberalism—into their projects. Latham's schemes required widespread changes in water availability and improving sanitary arrangements inside houses, or at least assumed that Cairo was moving in this direction. His project sought to alleviate the separation that characterized the urban sanitary geography between elite private individuals with access to private sanitary facilities and the city's collectivized natives who consumed water, washed, and relieved themselves in collective spaces, be they mosques, water fountains, and public baths and bathrooms. In other words, Latham conceived no fundamental obstacles standing in the way of Cairenes' becoming bourgeois private subjects who cared for their bodies in modern private spaces. As to the politics of this, Latham was silent. For his critics, he may have too easily assumed that the Cairo Water Company could be pressured to make water more available, while they remained skeptical of this possibility and of the government's willingness to engage in the necessary negotiations in order for this to happen.

The practical solution of Reid and Price was to adjust the design in ways that mirrored Cairo's social hierarchies. While they recommended the project, they argued that it had to be

purged of expectation that water and sanitation would be available to the majority of residents in their homes. Instead, they proposed to construct hundreds of public bathrooms connected to water and sewage networks in order to service Cairo's 400,000 less fortunate residents. Aside from upgrading mosque latrines, about 500 public bathrooms could be constructed by sanitary authorities along modern hygienic principles. The spatial distribution of public bathrooms would ensure that there is one at a maximum distance of a hundred meters from every home not connected to public sewers. Reid explicitly raised the question whether Egyptian women would use public bathrooms, arguing that they would. He believed "it to be more practicable to educate the female population of the town to use public latrines than to educate it into the use in a cleanly manner of private closets where no supervision or control is possible."²⁰ Doctor Grant Bey, who also served on the commission, agreed with these conclusions cautioning that mosque latrines should not be considered public since they were not frequented by women or children, not to mention lower class Copts, Greeks, Armenians, Syrians, and Jews. He proposed constructing 360 latrines in Cairo's old, native quarters and a 100 in Boulaq and Old Cairo. All members agreed that these recommended modifications would significantly reduce expenses and make the project feasible for poor neighborhoods where abundant supply of water did not reach houses.

Latham replied to these criticisms by defending the universality of engineering and the suitability of his project for Cairo. He was already on the steamship 'Bokhara' heading to India to study sanitary matters there when he wrote a seventeen-page reply that dismantled the criticisms of the Egyptian government's experts.²¹ First, he was not convinced that the scheme was

²⁰ Ibid.

²¹ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-021820.

inapplicable to the “Oriental population of the city.” He designed the layout of sewers in such a way as to require as little water as possible for conveying large amounts of waste, and he did the same for Indian cities where less Europeans resided compared to Cairo. In Indian cities there was a system of “native closets” that worked well without large amounts of water. Latham argued that Reid’s comments were too pessimistic presenting a black and white vision of the city, while he saw the possibility of introducing sewers into houses without connecting them to the water company. Second, Latham pointed out that he did not really insist on “house to house sewerage,” as his report made room for use of manholes and gullies for dumping waste from buildings that were impossible to connect to sewers, such as the infamous “huts.” Public bathrooms could be constructed on a limited scale to service this population instead of the undue importance Reid gave them. Third, there was the question of how to account for future growth, which Reid never dismissed. “If in the future,” Reid hypothesized, “the wealth and standard of comfort of the people rise sufficiently to establish a demand for private closets then they can be built and the necessary pipes laid down.” For Latham, this very probable growth needed to be factored into the system. Dealing with it at a later stage entailed more expenses and less functionality. In addition, large sewers could do the work of small sewers but not the opposite. Therefore, Latham argued that his scheme was well designed for future growth. Fourth, he defended his knowledge of the social configuration of the city, rebutting Reid’s criticism of water allowance as misplaced. Latham pointed out that the Cairo Water Company was not the only, or even the most important, source of water for Cairo’s lower classes, as Reid’s comments may have indicated. Everyday Egyptians consumed 1140 cubic meters of water from standpipes and fountains and 700 cubic meters from the Nile and canals. That was already 404,800 gallons per day, or above Reid’s provision of one gallon that was supposed to work for the future lower class. And this was not all because shallow

wells, which would probably supply water for flushing toilets, were very common in mosques and private houses. And so were water cisterns that stored water during high Nile. In short, Reid severely underestimated water usage of Egyptians. It may be that the Egyptian government planned to suppress water carriers selling Nile water and shallow wells in the future, yet for the time being these could not be discounted because they constituted the most important source of water for Cairo's poor. Fifth, Latham crucially pointed out that sanitary habits and patterns of consumption change due to the extension of sanitary infrastructures. "The experience in India," he stated, "is that year by year with the introduction of sanitary works, the demand for water by an Oriental population are continually on the increase, and in the new Water Works of India, I do not know a single town that is not providing at least 20 gallons per head per day for the whole population." Finally, Reid's recommendation to reduce the size of sewers was motivated by the need for economy at the expense of efficiency. Latham defended his provision of rainwater in detail, arguing that Reid's suggestions were not practical if not dangerous. For instance, reducing the size of sewers would not significantly reduce the required power of the pumping machine, because narrower pipes required more velocity and were more prone to stoppage. Thus, against Reid's colonial anthropology, Latham posited a universal vision of engineering that aimed to alleviate social tensions, while not necessarily aiming to resolve them.

At the same time that engineers engaged in techno-social discussions over the scheme, business and imperial competition intensified. French diplomats intervened in the hope of ensuring that French business would not be sidelined from the lucrative contracts to be given by the government in case it adopted a scheme for implementation. The following exchange shows how empires lobbied on behalf of their firms. In 1891, the Marquis de Reverseaux, the French Consul in Cairo, wrote to Alexandre Ribot, French Minister of Foreign Affairs, informing him that Egypt

sought funds to undertake a drainage project in Cairo.²² The Egyptian government sought to obtain the French government's approval to use reserve funds and increase property taxes. Reverseaux cautioned that it was not possible to reject the Egyptian government's demand given the alarming sanitary conditions of Cairo, a subject of a great deal of debate in local, particularly French, newspapers. Tigrane Pasha, the Egyptian Minister of Foreign Affairs, wrote earlier to Reverseaux reminding him that sanitary measures were necessary given that “the European colonies are very largely represented” in Cairo. Ribot responded that the French government had in principle no objection to giving its assent. The question, however, was which company would reap the handsome profits. Ribot had received information that the project could transform part of the Khalig into a wide boulevard of shops and elite houses and cultivate a large sewage farm. The French Minister suggested convening an international commission of experts that included a French engineer for assessing various drainage proposals as a condition for agreeing on the property tax increase and use of reserve funds. The move was meant to ensure a fighting chance for French engineering and French firms at the tender process.

Meanwhile, Erwin Palmer, the Financial Secretary of the Egyptian government, informed the Public Health Department late in 1890 that the project must wait for the approval of Lord Cromer due to its high costs. Referring to the French suggestion of a commission of experts to examine Latham's scheme next to others, Palmer argued that it would be worth it “to have a second authority before we incur such an enormous expenditure.”²³ In his opinion, “we shall have very strong opposition from the native element, even if we succeed in getting the money out of the

²² France, Ministère des Affaires Étrangères, *Documents Diplomatiques. Affaires d'Égypte, 1884-1893* (Paris: Imprimerie Nationale, 1893), Ch. 13 'Assainissement du Caire, 1891-1893'.

²³ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-023470.

caisse [Debt Commission]. I hope, however, that in the end we shall succeed.” As the government formed an international commission of experts, Latham’s project was effectively shelved.

Because urban authorities came under constant attack for failing to prioritize town drainage schemes that would have improved the health of Egyptian cities including Cairo, British observers and supporters often cited French foot-dragging and opposition as the primary obstacle facing modernizing schemes. Commenting on Latham’s botched project, an article argued that French interference through the capitulations and the debt commission constituted nothing short of a crime:

In spite of all of this—in spite of reason, sense and logic—nothing can be done because, alone of all the powers with a share in the control of Egyptian financial affairs, France like a veritable dog-in-the-manger refuses, sullenly and solidly, to sanction the liberation of even an insignificant portion of the enormous reserve fund that has accumulated under English guidance and control...Diplomacy has much to answer for, much to be ashamed of; but never have its annals been sullied by a blacker entry, by the record of a more gratuitous crime against a people's welfare.²⁴

Others like Alfred Cunningham argued that this was merely a ready excuse to “cover official reluctance to move forward in the path of progress.”²⁵ The truth was somewhere in the middle. In the imperial struggle over spheres of influence and markets, France constantly challenged British rule in Egypt until the 1904 agreement, while colonial administrators were successful at pressuring France into approving pet projects that mattered most to the British regime. An expensive urban drainage project was manifestly not among the priorities of the regime in 1890.

²⁴ Pyramid, “The Drainage of Cairo,” *The Provincial Medical Journal* (June 1895), 298-99.

²⁵ Alfred Cunningham, *To-Day in Egypt: Its Administration, People and Politics* (London: Hurst and Blackett, Ltd., 1912), 94-5.

In 1892, the government appointed an international commission composed of three engineers to study drainage proposals for Cairo.²⁶ British Henry Law, French Guérard, and German Holbrecht received and examined twenty-nine projects next to Latham's. Some of these projects were drafted by notable engineers and companies with considerable experience in urban drainage. For instance, Isaac Shone, who patented the "Isaac Shone's Pneumatic Sewerage System" visited Cairo to discuss the matter in person with Scott Moncrieff, under-secretary of the Public Works Ministry. And the French construction company Michau et Fils proposed a system that could be executed on stages as funds became available. John Price of the Public Health Department submitted a project and so did a number of Egyptian engineers including Mahmoud Fahmy of the Tanzim Department and Ismail Youssef.²⁷ None of these projects satisfied the criteria set by the commission, yet while some were generic proposals that did not discuss how the system could be applied to Cairo, others suggested helpful directions.

The international commission of 1892 decided to provide its own blueprint of how a system of drainage could be established in Cairo, and they based it on their preliminary study of the city, the discussion on Latham's project, and some of the draft projects they received. The commission read a note on Latham's project by the French engineer Julien Barois, then General Secretary of the Public Works Ministry. Barois criticized Latham's project as unnecessarily cumbersome and costly. Instead of dividing Cairo into drainage sections, each with its own pump, his suggestion was to lay a network of sewers that functioned by gravity and water flushing, collecting the city's entire sewage towards a certain point from which it would be pushed mechanically towards an

²⁶ "Rapport de la commission internationale de l'assainissement du Caire," *Journal Officiel*, Supplement to No. 51 (16 April 1892).

²⁷ Unfortunately, I was unable to locate any records of projects by Egyptian engineers.

irrigation field. This idea critically hinged on the ability to construct an entire system of sewers where there was enough gradient to obtain a self-cleansing velocity. Latham had thought this was too difficult because it entailed laying pipes at progressively greater depths, which presented difficulties due to Cairo's fluctuating subsoil water and the porous nature of its soil.²⁸ However, the commission entirely approved Barois' opinion and began preparing its own draft project according to his suggestion.

The report of the commission betrayed their ambivalence to provide a single formula for how the scheme would navigate Cairo's trenchant inequalities and their spatial manifestations. The commission designed a combined system that was meant to serve as a blueprint that required further detailed studies on the particulates of Cairo's geography, topography, and demography. The system divided Cairo into four drainage sections, each supplied with a secondary network of sewers and a main collector into which sewage gathered from its respective area and moved towards Ghamra by gravity. From there, pumps would raise sewage towards a farm northeast of the city. As for costs, the commission estimated the project at around £500,000. With regards to the pressing issue of how and if "Arab houses" would be connected to the sewers, the commission was of the opinion that significant variations in the shape and sanitary arrangements of these houses made it impossible to prescribe a single recipe. The commission was not opposed to connecting "Arab" houses to the sewers, yet it insisted on one point as a matter of principle: no house that was not connected to the water company would be allowed to establish sewer connection. Mosques, public latrines, water fountains, and public baths will adapt very well since they can all be easily connected to the water company and to the sewers. The commission

²⁸ Price also expressed his reservation on Barois' suggestion. DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-030152.

cautioned that modifying hygienic arrangements inside houses would be a gradual process. The engineers argued that attempts to cleanse “Arab” quarters immediately required nothing short of rebuilding them anew and “transforming their inhabitants.” Because the costs of connecting houses to the sewers would fall on proprietors, the process was going to be incremental. As such, the commission elided both the question of how infrastructural technologies changed the social landscape and what political pressure was needed to make water more available to the less privileged, whether in public spaces or in the privacy of their homes. In reality, the recommendations of the commission sided with Reid and Price against Latham. Cairo’s inequalities were insurmountable, for now.²⁹

Late in 1892 the Public Works Ministry appointed Barois to study applying the international commission’s blueprint to Cairo, a process that entailed efforts of rescaling and difficulties of negotiating materiality. Barois headed a team that prepared detailed studies, which sparked a painstaking operation of gathering and producing expert knowledge of the city.³⁰ Barois was confronted with the delicate task of tailoring a general blueprint for a specific urban landscape, for which gathering, collating, and producing systematic information of the city was necessary. The Public Works Ministry requested complete information from the gas and water companies on the depth and path of their pipes, as it was necessary to avoid subterranean conflicts. Barois also contacted the Cairo Observatory to request information on rain in normal and exceptional circumstances. The Cairo Water Company helped with calculations of the power of the pumping machine. The French engineer gathered the most recent information regarding street levels, subsoil

²⁹ “Rapport de la commission internationale de l’assainissement du Caire,” *Journal Officiel*, Supplement to No. 51 (16 April 1892).

³⁰ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-030151.

water levels, urban population, and water usage. As we will see in Chapter Five, the most significant outcome of these preparatory studies, which took seven months to complete, was a map and urban survey of Cairo on an unprecedented level of richness, which included 297 plates on a scale of 1:200, 53 on 1:500, and 3 on 1:1000.³¹

The most important challenge for Barois was to establish the network's path underneath Cairo's streets in such a way as to ensure proper gradient for the entire system. Depending on gravity alone meant that the network had to be designed as a plane slicing the city's underground at a measured incline, an underground network that trumped all possible geological and topographical obstacles. The study team worked meticulously to produce studies of the longitudinal profiles of all public streets under consideration. The secondary systems of sewers were established first before the path and gradient of collectors were determined. Making use of rescaled versions of the new map, Barois traced various possible paths triangulating such paths with longitudinal studies and establishing pipelines for flushing the system with water.³² The French engineer also conducted various inconclusive experiments on connecting houses with diverse sanitary arrangements to sewers. Finally, John Price studied the project of establishing public latrines for both sexes and for connecting mosques and public baths to water and sewage systems.³³

However, the colonial administration's desire to drain Cairo on the cheap collided with realities as detailed estimates revealed that the project would cost significantly more than the

³¹ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-037423.

³² Ibid.

³³ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-030152. As we saw in Chapter Two, the proposed location of the sewage farm led to a dispute between the government and residents of the newly developed suburb of Matariya.

international commission projected, leading to its indefinite postponement. The Public Works Ministry had drafted sanitary laws and regulations that proposed to make compulsory the suppression of cesspools at the expense of proprietors and raise taxes on urban properties. Between 1891 and 1894, the Ministry was in the process of submitting these drafts to the European powers to obtain their approval.³⁴ In 1894, the government allocated LE 50,000 for the drainage scheme under preparation.³⁵ However, the administration was shocked by the total cost of the project after all the detailed studies were conducted. Barois estimated the cost to reach LE 1,010,000, which was double that of Latham's proposed scheme. As one article put it, the international commission was apparently "calculating in the air," because once Barois prepared the detailed project he realized that the expenses would be twice as the commission estimated. The article berated the idea of draining Cairo only by gravity as "an insane proposal," that presented technical difficulties and increased the costs of the project as Latham previously argued.³⁶ When Lord Cromer received news of the scheme and learned of its projected cost, he decided to postpone it indefinitely. He explained to the British Foreign Secretary Earl of Kimberley that aside from the unexpectedly high cost, the "very great difficulty" of obtaining the approval of the European powers on new sanitary regulations foreclosed the scheme. More importantly, however, there was another large public works scheme that the administration was considering in 1894. This was none other than the Aswan Dam project. "I am distinctly of the opinion that the reservoir scheme," wrote Cromer, "inasmuch as it affects the whole country, is of far greater importance than the drainage project,

³⁴ Ibid.

³⁵ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-037422.

³⁶ Pyramid, "The Drainage of Cairo."

which only benefits the population of Cairo.”³⁷ The reservoir scheme was in line with the British regime’s foremost priorities in Egypt. Unlike the Aswan Dam, the sewage network was not a lucrative project that would reclaim large swathes of lands, irrigate large estates, or help bring about the contented, conservative rural class that Cromer sought to create as a guarantee for political stability in Egypt. In the final analysis, Cromer’s thoughts on the drainage project in 1894—a year before another cholera epidemic—was that it was an improvement project of limited financial and material benefits. Making the capital healthier did not merit the huge public expenditure when other projects like the Aswan Dam also required funds. Barois’ project was consequently shelved.

A new drainage project from the Cairo Water Company in 1898 signaled the company’s ambition to play a more expansive role in shaping urban life at the cusp of Cairo’s elite residential expansion.³⁸ The company’s then director was William Willcocks, who was also involved in the Aswan reservoir scheme. He proposed a system featuring three separate collectors and pumping stations and two separate sewage farms. The system was designed to function by gravity up to three pumping stations in Boulaq, Old Cairo, and Ghamra (Abbasiya), from where sewage would be pushed towards irrigation farms further south and northeast of Cairo. The scheme deviated from the recommendations of the international commission, as it called for three pumping stations and two farms. And Willcocks initially wanted to adopt a separate system. A commission that examined the project pointed out that while it rained rarely, the city occasionally witnessed strong rain for a number of consecutive days. In the absence of efficient surface drainage, water collected

³⁷ British National Archive [TNA], FO 407/127, No. 10: Lord Cromer to the Earl of Kimberley, June 27, 1894, 11.

³⁸ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-033276 and DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037343.

in low points and depressions created by uneven street levels, especially in old quarters. After Willcocks witnessed one of these events himself in Muski, he made provisions for collecting surface water after strong downpours.³⁹ The scheme was expected to cost LE 660,000.

The Cairo Water Company had near sovereign control over water supply and interest in perpetuating its influence. Thus, there was no expectation of making water more available to Cairo's less privileged classes as a matter of policy and the sewage system project adopted the then readymade solution of constructing 550 public bathrooms for Cairo's majority who were not expected to afford neither water nor sewage connections. The review commission raised the issue that the scheme did not include an appropriate margin for projected population increase—which was the subject of debates among urban authorities, developers, and speculators as we saw in Chapter Two. Relatedly, the commission opposed the proposed location of Ghamra for a pumping station as the area was undergoing residential development and urged Willcocks to rethink how his project would include the rapidly developing quarter of Abbasiya and the northeastern suburbs beyond it. Cairo was changing rapidly and the scheme had to take this into account.⁴⁰ Again, the British administration dropped the scheme citing difficulties of raising property taxes on European residents.

Sewering Cairo

Circumstances in 1906 were finally ripe for supplying Cairo with a sewage system. The urban landscape was changing remarkably. Capital-led urban development during the decade following

³⁹ William Willcocks, *Sixty Years in the East* (W. Blackwood, 1935), 170-71.

⁴⁰ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037343

1897 stretched the limits of Cairo, and the property bubble had pervasive effects on the residential geography of the city. The British regime had come under increasing pressures to provide Cairo with a sewage system that would respond adequately to this development. Moneyed Cairenes in particular lobbied for the drainage system as a necessary component for modern housing that satisfied the requirements of bourgeois privacy. Hygienists, urban reformers, and boosters had been arguing that only an effective sewage system would reduce the city's high death rate and remove barriers on the city's demographic and economic growth and on capital investment in Egypt more broadly. The Anglo-French *entente cordiale* of 1904 freed six million Egyptian pounds at the reserve fund for use by the Egyptian government without French permission, which was required by the regulations of the public debt commission overseeing Egyptian finances. The real and imagined excuse of French obstruction that had prevented the implementation of a sewage system in Cairo during the previous two decades was no longer valid. More importantly, the decision to provide the city with a sewage system came in 1906 at the height of the property bubble when speculation on properties and urban land was rampant. In a way, the project was a subsidy to urban developers and moneyed residents while it also established better hygienic conditions for the city more broadly, thus making a gesture towards an ethos of colonial improvement.

The government's decision to take up Cairo's drainage project in 1906 after numerous failures was tied to a changing urban landscape and a desire to make the city safe for moneyed residents, foreigners, and capital. In March 1906 the Public Works Ministry circulated a memo asking for the government's approval on a new scheme.⁴¹ The memo argued that a drainage project was now more necessary than ever given the rapidly increasing number and height of buildings,

⁴¹ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-034678.

which blocked sunlight, the “great disinfectant,” from the streets. The city’s residents also increased at a great rate, even if population estimates varied widely before the publication of the 1907 census. The memo lamented that while the city was visibly changing, little was being done in terms of its sanitary infrastructure, without which the health of Cairo would see no real improvement. Medical statistics revealed an enduringly high death rate as a reflection of the constant presence of infectious diseases. The memo cautioned that aside from the effects of this hygienic state on Cairenes the city’s conditions would negatively impact the number of foreign migrants and tourists who come to the country to “spend money” (*wa fiha yasrifoun al-dirham*). From all sides the issue needed attention and the Public Works Ministry believed that it had found the best man for the job.

The career of British engineer Charles Carkeet James was in many ways typical of British engineers at a time of imperial expansion.⁴² Born in Truro, England, in 1862, James’ pupillage consisted in assisting on various railway, water, and drainage projects in Cornwall, England. He moved to India where he was involved in Bombay waterworks projects before becoming the assistant executive engineer of the Bombay Municipality in 1891. Afterwards, James was in charge of Bombay’s main drainage scheme and he sat on the 1897 committee that was in charge of devising measures for the suppression of plague within Bombay and surrounding districts. These successful experiences in “oriental cities” made him a strong candidate in the eyes of the Public Works Ministry and it went without saying that drainage of Eastern cities required different experiences and tools than their Western counterparts. And by 1902, James was already a well-

⁴² For studies on British colonial engineering see R. A. Buchanan, “Gentlemen Engineers: The Making of a Profession,” *Victorian Studies* 26, 4 (1983), idem, “The Diaspora of British Engineering,” *Technology and Culture* 27, 3 (1986), and Casper Anderson, *British Engineers and Africa, 1875-1914* (London: Pickering & Chatto, 2011).

known sanitary engineer in India and author of *Oriental Drainage* where he laid out principles of sanitary engineering in Eastern cities to be followed by his 1908 authoritative textbook *Drainage Problems of the East*.⁴³



4.4. Charles Carkeet James (standing, right hand side) with the other members of the Bombay Plague Committee. (Source: The Wellcome Library, London).

As the Egyptian government approved James in 1906, the Public Works Ministry supplied him with two decades worth of studies for aborted schemes, including their archived reports, maps, and correspondences.⁴⁴ The Public Works Ministry also decided to allow James enough time, even up to two years, to study Cairo and previous schemes before he could put forth his proposal. During

⁴³ Archives of the Institution of Civil Engineers, London: membership records of Charles Carkeet James (1862-1942).

⁴⁴ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-034678. Most documents pertaining to Cairo's sewage system schemes are from the archival unit of the Public Works Ministry (Diwan al-Ashghal al-Umumiya) at the Egyptian National Archives. The documents are gathered in the same type of folder with the inscription "Ministry of Public Works. Central Office of Registration and Archives. Subject: Cairo Main Drainage." The rest varies from "Old Project of 1892. International Commission and study of projects," to "requests for information" and "Regulations and Decrees."

this period, the ministry pledged to concentrate its efforts on gathering more precise and updated information, for instance on rainfall, subsoil water levels, and the composition of the soil.

A note by William Garstin, under-secretary of the Public Works Ministry, recounted the uncompromising vetting process that the project's design underwent during the first two years.⁴⁵ James had to submit eleven draft projects to Garstin in order to attain his approval while regularly consulting the director of the Public Health Department. What took eleven preliminary projects was mostly the choice of the location of the main pumping station, the sewage farm, or both. As a matter of principle, the Public Health Department rejected dumping sewage, however purified, in the Nile, even at a location north of Cairo because the river was still the source of potable water for the entire Delta. Garstin personally visited the streets and proposed sites mentioned in the proposals in order to assess the situation on the ground. As Garstin learned from the stiff resistance of Matariya residents back in 1894, sewage farms and pumping stations had to be located as far as possible from inhabited neighborhoods or those being developed.⁴⁶ Not only did residents resent the idea of being close to such sites, but also the value of their properties would undoubtedly depreciate due to unpleasant, yet otherwise harmless, odors. In addition, urban topography and geology were connected in ways that the technological system had to either work around or mobilize for its own benefit. The main pumping station had to be located away from all residential areas. Yet, if placed too far, the main collector, which was planned to function by gravitation, would have to be laid at great depths in order to have sufficient gradient for effective flow. This entailed considerable difficulties and costs, and Garstin especially pointed out the danger of having

⁴⁵ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-033279 and 0075-033280.

⁴⁶ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 037306.

to deal with too much groundwater if the collector was laid at depths exceeding five meters below the surface.

James' eleventh preliminary project finally satisfied Cairo conditions of topography and geology. The engineer had already decided that Khanka, roughly twelve kilometers northeast of the city, was a suitable location for a sewage farm. In order to determine the optimal location of the pumping station, he collected a minute list of land levels covering much of lands northeast of the city. This way he discovered a line of relatively low-lying lands along which the main collector would run. The average depth of the collector across the entire city would be four meters below surface level, reaching seven meters only in a very limited section as the collector approached the main pumping station to be located at a distance from Kafr al-Gamus village. Garstin was pleased by the proposal as the location of the pumping station was away from suburbs and probable residential extensions, and the surrounding countryside was completely open. Other features of the eleventh project were equally satisfactory. James designed the system in such a way as to reduce to a minimum the amount of water needed to cleanse the sewers and Garstin expressed his hope that the Cairo Water Company would in the future lower its rates for water sold to the government, which was at 8 milliemes per cubic meter.

A preliminary report on the main features of the proposed drainage scheme makes explicit the complexities of fitting a general proposal onto a specific natural and social geography.⁴⁷ After a brief description of Cairo's defective sanitary conditions, James delved into a methodical presentation of the scheme, justifying his technical decisions and the overall practicality of the project. The design process utilized a map from 1897 on the scale of 1:10,000 while further studies

⁴⁷ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-033264.

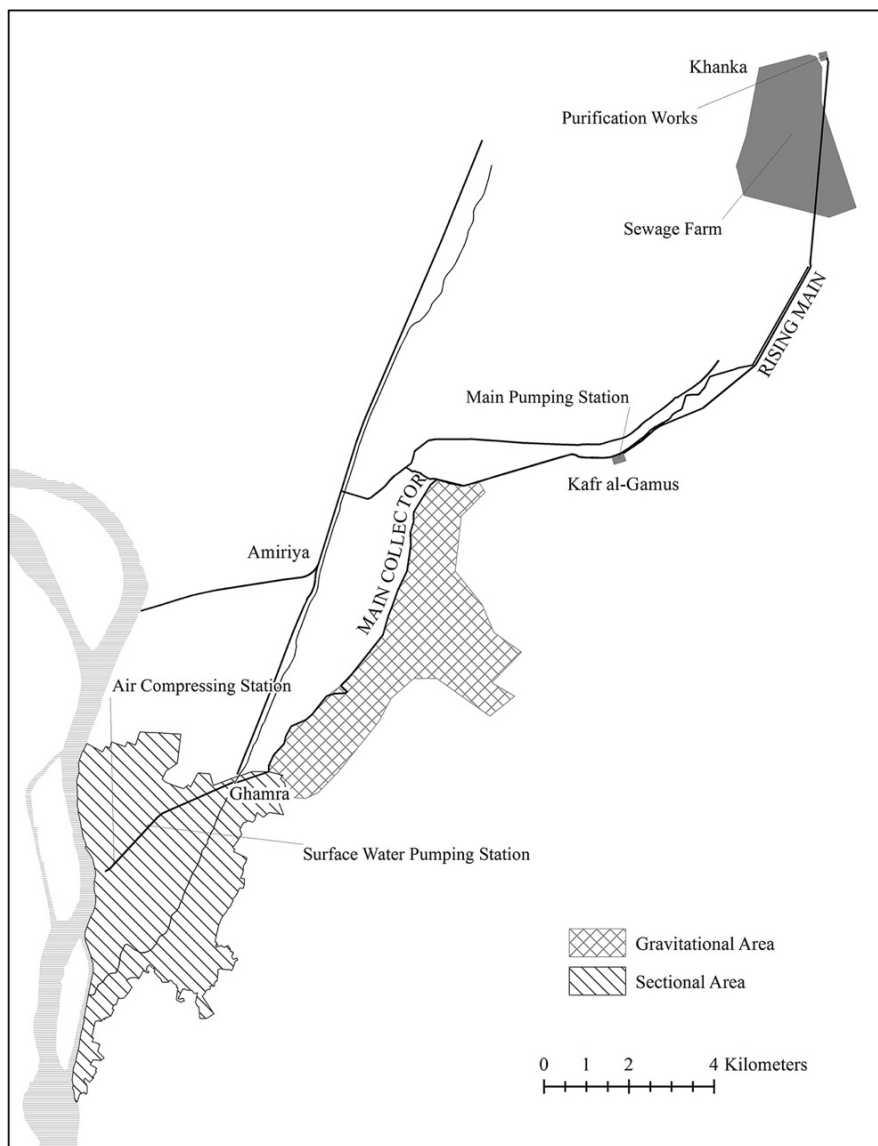
produced a plan of Cairo on the scale of 1:2,000. Due to its scale, James found the 1897 map convenient for drafting the preliminary project as it allowed him to see how the scheme would cover the entire city at a glance. It also allowed him to make modifications and to assess various possibilities of how different sections of the system could be linked to each other. However, during the preparation of the project, the Survey Department triangulated the entire drainage area, which resulted in accurate plans on the scale of 1:2,000. These were more suitable for preparing a detailed scheme as they allowed James to see how specific pipes would navigate specific streets or how a subsidiary system of sewers could be designed to cover a certain neighborhood among other things. Captain G. H. Lyons, Director of the Survey Department, helped James obtain accurate leveling from the Delta Barrage in the north all the way to Cairo. The Survey Department placed 470 benchmarks in the city's main streets and along the proposed path leading to Khanka. James' own staff completed the preliminary work of leveling by placing benchmarks in side streets. In conducting preliminary research, all numbers indicating depth were written in meters counting from the mean Mediterranean Sea level at Alexandria and referred to as 'R.L.' (reduced level).⁴⁸ After surveying over 400 miles (644 kilometers) of city streets, the study team determined that the surface level of much of Cairo ranged between R.L.17.90 and R.L.19.90. The average level along the route of the main collector was R.L.16.50, a feature that contributed to Garstin's approval of the project.⁴⁹

James internalized the lessons of previous drainage scheme, particularly those of Latham and Barois. Because Cairo rested on an irregular plane that lacked any general incline, James

⁴⁸ For instance, R.L.14 is 14 meters above sea in Alexandria.

⁴⁹ Charles Carkeet James, "The Main Drainage of Cairo," *Minutes of Proceeding—Institution of Civil Engineers* 202 (1916), 67.

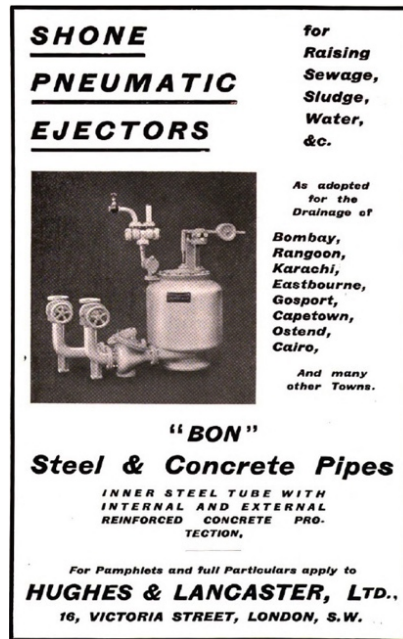
decided early on that the entire city could not be drained by gravity alone, thus siding with Latham against Barois. James divided the city into two main drainage areas, the first totaling 731 hectares to be drained by gravity, while the second, larger area of 2321 hectares would be drained by the “sectional system.” The latter was a system that subdivided large areas into smaller ones, each of which to be provided with an arrangement for pumping sewage and discharging it into a sewer at a higher level that would in turn discharge into the main collector at Ghamra. Similarly to Latham, James subdivided the sectional area into sixty-three smaller areas, each equipped with an ejector.



4.5. Map of the sewage system.

The “Shone” pneumatic pump that the system adopted was manufactured by the English company Hughes & Lancaster and was already well known among sanitary engineers in English and Indian towns. Given economic constraints, James decided that compressed air was the best choice for motive power since it was cheap and clean. And because Shone ejectors were automatic, they required little supervision. The sectional system covered all the city’s low lands from Old Cairo in the south to Shobra and Rod al-Farag in the north and from Qasr al-Nil in the west to Abbasiya in the east. Thus, the sectional area encompassed all of Cairo’s old neighborhoods and the elite and middle class urban developments since the last decades of the nineteenth century. The power station for the compressed air system, which was later called the Maruf Station, was located at the Sahel Bridge and the ejectors were connected to the station via two circuits of air mains running underneath the sectional area.⁵⁰ On the other hand, the northeastern suburbs of Qobba, Zeitoun, Matariya, and the vast new development of Heliopolis comprised the gravitational area to be directly connected to the main collector without any pumping. James designed the system in such a way as to take advantage of the fact that the main collector would already be at relatively greater depths as it moved through and close to these suburbs, making them suitable for a system utilizing the collector’s gradient. A map on the scale of 1:50,000 accompanied the preliminary report, outlining the parameters of the two main drainage areas and delineating the proximate location of the compressed air power station, the main collector, the pumping station, the rising main, and the sewage farm.

⁵⁰ Ministry of Public Works, *Sewerage of Cairo, Report on the Second Section* (Cairo: National Printing Department, 1910), 14.



4.6. Advertisement for the Shone ejector. (Source: Charles Carkeet James, *Drainage Problems of the East*)

The main collector navigated Cairo’s landscape and extended to where private capital had led the way during the boom period. It began at Ghamra Bridge, where the head chamber received sewage from the entire sectional area pumped along the two main sewers of Abbas and Khalig streets. For thirteen kilometers the pipe made its way along the low-lying lands James and his assistants discovered during the early research process. At the beginning the collector laid at a level of R.L.14.70 while surface level registered R.L.18.40. From Abbas street at Ghamra Bridge the pipe ran underneath new areas to be developed by the Belgian-Syrian businessmen owning the Egyptian Enterprise & Development Company, the Suburban Land Company, and the Koubbeh Garden Company. It crossed underneath the Matariya railway, ran along the Qobba Gardens Avenue, made a sharp turn to the left before making another sharp turn to the right onto the Matariya road—both sharp turns requiring cast iron reinforcements. The two sharp turns were subsequent amendments to the originally proposed route in order to avoid proximity to the

“indifferently built houses” of Taftish al-Qobba.⁵¹ Having run along the Matariya road for about eight kilometers, the main collector crossed agricultural lands, turned right towards Gabal Canal, and crossed underneath the Matariya railway again at Ein Shams station, before it finally discharged at the screening chamber of the main pumping station at Kafr al-Gamus at a level of R.L.9.20, seven meters below the surface. En route, the collector gathered the sewage of the gravitational area including the well-off neighborhoods of Qobba, Zeitoun, Matariya, and Heliopolis. Sewage made this thirteen-kilometer journey completely by gravity, the gradient being the only flushing mechanism. At a later stage, James decided that the collector should be made entirely of concrete instead of glazed bricks as originally proposed, except for few locations where it was reinforced with a special cast iron pipe as it passed under irrigation canals and railroads. He reasoned that concrete was more suitable to Cairo’s fluctuating groundwater. The pipe came with special internal coating in order to make it more resistant to the corrosive effect of sewage gases, and provisions for ventilation were made. Most lands through which the collector was planned to cross belonged to the government, except for several *feddans* that the government expropriated as public utility after reimbursing proprietors.⁵²

At the Kafr al-Gamus pumping station, sewage went through a screening chamber in order to isolate foreign objects before it was pumped into a cast iron rising main of almost one meter in diameter and 11.7 kilometers in length. The main moved northeast from Kafr al-Gamus to Kafr al-Basha along Gabal Canal then north towards Khanka. It crossed agricultural estates (*ezbas*), whose owners were also reimbursed by the government, before it reached the site of the

⁵¹ Ministry of Public Works, *Sewerage of Cairo, First Section, Report and Drawings* (Cairo: National Printing Department, 1909), p 10.

⁵² For the main collector and the rising main the government confiscated nearly 36 *feddans* in total. See the decree of 27 September 1909, published as a supplement to *Journal Officiel* No.120, 27 October 1909.

purification works and sewage farm at Gabal al-Asfar (at R.L.26.00), east of Khanka's lunatic asylum, which was then under construction. At the purification works, sewage passed through liquefying tanks for bacteriological treatment before it irrigated the lands of a large farm.

The decision to include a sewage farm required considerable scientific preparation. At an area of 1,000 *feddans* to be expanded to 3,700, the farm was to become an essential component of the system and it was hoped to defray the costs of annual maintenance. E. C. Bowden Smith, Inspector at Cairo Main Drainage, provided an account of the laborious preliminary research.⁵³ In order to test the soil of the proposed site James sought the help of the Survey Department in sinking 230 holes two meters deep into the ground evenly covering an area of 900 *feddans*. Government laboratories analyzed soil specimens, announcing it to be very suitable for sewage purification and for growing any kind of Egyptian crop. In addition, the soil was absorbent to a sufficient depth and no mineral beds threatened to jeopardize cultivation. At a later stage, authorities sunk even deeper holes reaching down to R.L.12.00, fourteen meters below the surface level, and found that “the farm overlays immense beds of sand.”⁵⁴ Once James confirmed the choice of the location, the newly formed Drainage Department arranged with the Prisons Department to employ the labor of 600 convicts for the purpose of leveling the farm and constructing an onsite camp.⁵⁵ The work of scientific agriculture proceeded, and the Public Works Ministry formed an agricultural commission composed of James, Gerald C. Dudgeon, Director of the Department of Agriculture, and Major de Lotbinière from the Survey Department among others. Dudgeon was formerly the

⁵³ E. C. Bowden Smith, “The Cairo sewage farm at Gebel el Asfar,” *The Agricultural Journal of Egypt* 2, Part I (1912), 23-28.

⁵⁴ *Ibid.*, 27.

⁵⁵ Egypt, Public Works Ministry, “Report on the Drainage Department” in *Report of the Ministry of Public Works for the Year 1911* (Cairo: National Printing Department, 1912).

Inspector of Agriculture for the British West African Colonies and Protectorates, which worked closely with the Imperial Institute in London under the patronage of Lord Elgin in advancing scientific agriculture.⁵⁶ By 1911, 120 *feddans* at Gabal al-Asfar were ready for the experimental work conducted at a large nursery as well as a small experimental garden for vegetables. The results of using sewage to irrigate the experimental garden were “excellent.” It was hoped that as more houses were connected to the network, the sewage farm could yield a net return of LE10.00 to LE15.00 per *feddan* annually.⁵⁷

When excavation for the project became imminent in 1909, anxieties over disturbing Cairo’s sewage infused subsoil surfaced. The idea that Cairo’s subsoil was thoroughly infused with fecal matter, even with the “sewage of many generations,” was common among foreign doctors and observers. Rumors began to surface that excavation would lead to disturbing the city’s putrid, waste-infused strata, which would lead to the spread of disease. Such rumors were particularly widespread in the European press. According to the Special Sanitary Commissioner of the *Lancet*, this was not the first time for Cairo’s residents to connect disease and excavation work. Laying the foundations for the National Bank and other large buildings constructed during the decade of property bubble were believed to have led to the spread of typhoid fever in their immediate neighborhoods. The prospect of laying sewers under Cairo’s streets “has created something approaching a panic.”⁵⁸ In response, James advised the Public Works Ministry to inform the public that laying shallow sewers was adopted as a matter of principle in order to address this

⁵⁶ Joseph Morgan Hodge, *Triumph of the Expert: Agrarian Doctrines of Development and the Legacies of British Colonialism* (Athens: Ohio University Press, 2007), 64-70.

⁵⁷ James, “The Main Drainage of Cairo,” 94.

⁵⁸ [Adolphe Smith], “The Drainage of Cairo (From Our Special Sanitary Commissioner),” *The Lancet*, April 24, 1909, 1209.

potential threat. In all minor streets less than ten meters wide the depth of sewers would not exceed three meters, while in wider streets maximum depth was limited to five meters.⁵⁹ In addition, “all materials excavated on the works will be disinfected as soon as it is brought to the surface, and that which is surplus, removed at once.”⁶⁰ The trenches would be as narrow as possible and overhead cableways would transport freshly excavated soil to fill other trenches. Finally, winter visitors were advised not to fear the consequences of excavation, as the work was planned to stop during the fall and winter months due to high levels of subsoil water, which made laying pipes more difficult.⁶¹

Engineering urban infrastructures is an exercise of adjusting design and rethinking its principles in response to realities and constraints of a particular site. The redesign of Cairo’s system of surface drainage makes explicit some of these dynamics. In his preliminary report, James carefully considered whether the city’s stormwater should be drained separately or by a combined system that gathered rainwater and sewage in the same pipes. As with Willcocks before him, James recognized the challenge of designing an economical and efficient stormwater drainage system in a city where it rained only few times a year, yet strongly enough to flood low-level streets. An effective sewage system would have to put an end to these unsanitary conditions particularly in the narrow and mostly non-macadamized, non-asphalted streets of the native quarters, which became almost impassable after heavy rainfalls.

⁵⁹ Ministry of Public Works, *Sewerage of Cairo, Report on the Second Section*, 11.

⁶⁰ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-033264.

⁶¹ [Adolphe Smith], “The Drainage of Cairo (From Our Special Sanitary Commissioner),” *The Lancet*, April 24, 1909, 1210.



4.7. Pipes at the background of a donkey market in Cairo, circa 1900-1920. (Source: Library of Congress)

Designing Cairo's surface drainage system had to take into consideration the existing, small-scale network of stormwater drains and the nature of street washings. As James thoroughly studied Cairo's underground, he became aware of a small system of stormwater drains that serviced the elite Azbakiya neighborhood, particularly the most exclusive area around the Opera Square. The network dated back to the development of the neighborhood itself under Khedive Ismail, and the Tanzim Department expanded it to include more of the wealthy neighborhood during the boom era, particularly since 1904, a process that accompanied macadamizing, asphaltting, and naming roads of Azbakiya.⁶² The small network worked by gravity except during

⁶² Ministry of Public Works. Sewerage of Cairo, *First Section, Report and Drawings*, 14-16; Public Works Ministry, *Report upon the Administration of Public Works Department in Egypt for 1904* (Cairo: National Printing Department,

the high Nile season, when some pumping was required to lift surface water to its outfall at the Ismailiya canal 400 meters from the Limoun Bridge. James found the surface water cleared by this system to be particularly foul and causing considerable nuisance as it consisted of washings of markets and asphalted streets. However, the drains themselves were in good conditions.

In his preliminary report, James decided on a “compound” system where 1,721 hectares were drained by the separate and 1,331 hectares by the combined system. The project was planned to extend the existing stormwater network to include the few broad streets of the older quarters east of Khalig. James also decided to extend four separate networks for draining surface water from the rest of Cairo, each with its own outfall at different locations of the Nile. James designed the system particularly in order to avoid dumping foul surface water into the river. Under normal weather circumstances stormwater would be led into the main collector either directly or through separate networks via the main sewers of Abbas and Khalig streets. In the event of heavy rainfall a mechanism would lead excess surface water to four Nile outfalls after the first rush of foul water reached the main collector. This way, surface water discharging into the Nile would be sufficiently diluted to pose no hygienic danger. The system was designed to be economical without sacrificing public health.

Yet as the drinking water controversy raged in Cairo between 1905 and 1910, the decision to return to the Nile as the source of intake had consequences for the sewage system project when it was already being implemented. Under renewed pressure not to discharge any contaminated water into the Nile, James had to readjust the design in 1910.⁶³ Work was already under way on

1905), 282-4; Jean-Luc Arnaud. *Le Caire, mise en place d'une ville moderne, 1867-1907: Des intérêts du prince aux sociétés privées* (Aix-en-Provence: Actes Sud, 1998), 247.

⁶³ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-035852 and James, “The Main Drainage of Cairo,” 67-70. See also *al Liwa*, March 30, 1910.

essential features of the scheme such as the main collector and the rising main when due to the new directives of the Public Health Department James had to make provisions to carry all surface water to the sewers. First, James expanded the system to include large swaths of the most rapidly developing parts of the city including Shobra, Abbasiya, and the northeastern suburbs of Qobba, Zeioun, Matariya, and Heliopolis. Second, in place of the separate networks carrying stormwater to the sewers and the Nile, James decided to construct a number of intermediary drains and to connect them to additional ejectors linked to the compressed air system for raising storm water to larger sewers and the main collector. Under the adjusted system, no water would be discharged into the Nile except during rare occurrences of exceptionally abundant rainfall when the amount of surface water was too great for ejectors to receive it. Boulaq would also receive its own ejector under this adjustment while the Public Works Ministry deemed Old Cairo too unworthy for surface drainage provisions.

The design and construction of the drainage system required a new approach to Cairo's streets and to the city as a whole. For long, sanitary engineers have recognized the link between drainage systems and the reorganization of streets. Surface drainage required macadamized or asphalted streets with proper leveling. Particularly the narrow irregular dirt roads of old neighborhoods, which became muddy after rainfalls, were impossible to drain. Thus, the construction of the sewage system had to integrate the reorganization of the streets and alleys of Cairo's poor and crowded quarters. The Tanzim Department informed James that regrading, macadamizing or asphaltting, and paving prominent streets in old quarters must accompany laying sewers underneath them. Reestablishing street levels across large areas of the city and negotiating details of reorganizing narrow crowded streets were no small tasks. They required thinking of the city's roads as an interconnected system, which in turn required systematic information on these

streets and their occupancy. This feature of the drainage scheme led to a considerable, yet unavoidable increase of the overall costs.⁶⁴

Financing the sewage system had been the most prominent hurdle facing the project during the previous two decades, which reflected both the administration's need to negotiate with other European powers and the general disinterest of decision makers in the project and in Cairo more broadly. The 1904 Anglo-French accord freed the Egyptian reserve fund, which had been accumulating for two decades under Cromer's budgetary policies, for use by the Egyptian government without French approval. The reserve fund supplied cash for the project. However, in line with the Egyptian government's earliest thoughts on this subject, financing the scheme had to rely in part on its beneficiaries, Cairo's residents. Real and imagined difficulties stood in the way of gaining the approval of capitulatory powers on raising property taxes in Egypt until 1912 when the Egyptian government finally drafted and negotiated a drainage law. Raising house taxes from eight to ten percent of rent value in all of Cairo provided the government with an extra LE40,000 to LE50,000 per annum. Finally, the sewage farm was expected to yield between LE30,000 to LE50,000 annually after its eventual expansion. In terms of costs, James' preliminary report put the total expenses of the sewage system at LE 1,252,000. Macadamizing and asphaltting roads brought the total expenses up to LE 2 million.⁶⁵ After work began in 1911 and due to the readjustment of the surface drainage scheme, there were numerous recalculations of expenses. The main collector was now projected to cost LE 90,000 instead of LE 39,500 partially due to the use

⁶⁴ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-035852 and 0075-033280.

⁶⁵ By way of providing perspective, it should be borne in mind that the total ordinary expenditure of the Public Works Ministry in 1909 was LE 1,240,000 and that the total ordinary state expenditure of the same year was LE 13,568,000. Ministère des Finances, Direction de la Statistique, *Annuaire Statistique de l'Égypte 1910* (Le Caire: Imprimerie Nationale, 1910), 278-80.

of cast iron reinforcement. The final price tag of the compressed air system came LE 20,000 more. Yet surface water drainage saw the most considerable rise in costs from LE 25,000 to LE 113,300. James' new estimate in 1911 totaled LE 2,343,000.⁶⁶

Urban infrastructures are technological objects that navigate the social order, exerting power and giving it material expressions. However, while engineers, designers, and planners are often explicit about the technical decisions they make, their social and political analysis is often buried under technical details. As with drainage schemes before 1906, James' project had to account for social realities and the future of the city as a social space. Nowhere is the social nature of engineering clearer than in calculations of the velocity of sewage and, more sharply, provisions of water allowance on which the size of sewers was based.

The expected velocity of sewage through the system was calculated based on the gradient of pipes and the expected viscosity of waste, which mattered particularly for "oriental" sewage. James explained that "the determination of the gradients of the sewers is a very important consideration in designing a sewerage scheme for an oriental city, because there is always more extraneous matter in oriental than in occidental sewerage."⁶⁷ In correspondence with fellow engineers at the British Institution of Civil Engineering, James elaborated, providing a quasi-anthropological account of "oriental" habits untouched by European everyday commercial technologies such as soap. He pointed out that "Eastern races" cleansed their cooking-utensils with sand and other objects that mixed with grease before directly finding their way to the pipes and forming an exceedingly viscous sewage that was difficult to cleanse. Based on his Indian

⁶⁶ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-035852.

⁶⁷ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-033264.

experience, Cairo did not differ from other Eastern cities in this respect.⁶⁸ For this reason, the projected velocity of sewers had to be higher than European towns. James pointed out that he would be “courting disaster” if he calculated the gradient based on a desired velocity of 0.60 to 0.75 meter per second as in English cities. Instead, the desired velocity should be fixed at 1.05 meter per second, which is enough to remove stones and other objects commonly found in “oriental” sewage. However, he assigned the slower velocity of 0.93 meter per second to the main collector in order to reduce the gradient thus the depth of required excavation, again to avoid the difficulty of constructing the concrete pipe in the presence of too much subsoil water.

However, the most significant keys to Cairo’s unequal social geography were calculations of water provision and considerations of the geographic coverage of the network in connection to the types of houses populating the city’s landscape. The conclusion that discussions on previous schemes reached was that not everyone in Cairo was set to benefit equally from the system because not everyone had the means to capture such benefits. In the spirit of liberal reform, Latham suggested that a sewage system must improve the conditions of Cairo’s middle and poor classes, both mitigating the effects of social inequalities and offering the material conditions for cultivating the Egyptian middle class into modern bourgeois subjectivity and its necessary spatial and hygienic corollary, namely the private home. As we saw above, Reid and Barois demurred, arguing instead that Cairo’s inequalities were too trenchant. Such inequalities were backed up by colonial realities that left no space for political pressure on behalf of Cairo’s underprivileged classes—there was no parliament or even a municipality to pressure near sovereign foreign companies to make their

⁶⁸ Correspondence on James, “The Main Drainage of Cairo,” 137.

services more affordable. The poor conditions of lower class housing also stood as an additional barrier. For them, urban infrastructures better recognized and conformed to such constraints.

James initially followed the textbook method of estimating the volume of sewage to be carried away by the system based on current and projected water consumption, which in turn influenced the size of pipes, the power of pumping machines and ejectors, and the optimal geographical placement of main features of the system. James met with the director of the Cairo Water Company to obtain information regarding water usage.⁶⁹ In 1906, the company had supplied 18,808,778 cubic meters of water. Most consumption in one day was 87,747 cubic meters, occurring on June 13, while average daily water consumption in January was 55,000 cubic meters. James also learned about the fragmented structure of water provisioning for Cairo's majority who could not afford to connect their houses to the company and who relied instead on standpipes, gratuitous fountains, water cisterns, and carriers selling Nile water of various grades. Finally, the engineer expressed his surprise at discovering that average water consumption of the total population of Cairo was half that consumed in Bombay—undoubtedly owing to the high rates of the Cairo Water Company.⁷⁰ Water consumption was indeed the most direct route to sociological analysis in Cairo.

Instead of depending on average water consumption, as it was the standard procedure in European towns, the British engineer decided that the design had to account for and incorporate the specific class and colonial realities in Cairo. And the house was the link between water allowance and the geographic distribution of class. It was a fit expression of class since it reflected

⁶⁹ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-033264.

⁷⁰ James, "The Main Drainage of Cairo," 65.

the social status of inhabitants with some accuracy, and it translated well spatially onto the city in the form of socially distinct neighborhoods. What clearly decided the matter for James was that the majority of Cairo's houses, particularly outside elite neighborhoods where they were constructed along modern lines, were not connected to the company's water supply. In fact, the sanitary experts of the Public Works Ministry judged the houses of Cairo's poor neighborhoods to be too poorly constructed in their current condition to be connected either to the water company or the sewers. In that case, James reasoned, the design itself had to reflect this spatial and social unevenness. James put on his sociological hat and proceeded to divide Cairo's houses into three classes. On the surface 'class' here referred to types of houses, but it is also clear that it was connected to the material and economic conditions of a social class inhabiting these houses, however under-theorized in James' analysis. According to him, there were three classes of houses in Cairo: class A houses were connected to the water company mains and inhabited by the upper class, class B houses constituted "a good class" of buildings that were not connected to the water company and that were inhabited by the lower class, and class C houses of inferior constructions and "esheshes" (*eshash*) or slums that were inhabited by the city's most deprived and disease ridden residents.

Engineering is social engineering no matter how much it professes faith in a technocratic ethos that is allegedly free from political judgment. This is all the more true with infrastructural projects and other schemes of large magnitude where engineers must design projects with reference to a future that their scheme will help bring about. Engineering is therefore akin to planning in that it is a future oriented activity that seeks to mobilize knowledge for working on present conditions and, reordering and patterning such conditions in light of a desired future.

Design requires meticulous social and cultural labor in order for technological systems to become both durable and malleable enough to succeed and gain traction in the future.

The future of Cairo, or rather the future Cairo, was crucial for James' design and calculations in ways that mirrored, yet also departed from, the ways boosters mobilized the future of the city. A large-scale technological infrastructure had to factor in urban demographic and spatial growth, otherwise the system would become obsolete and inefficient barely by the time it was implemented. For this reason, the city's potential demographic growth and its spatial consequences had to be accounted for. The design accordingly included areas of projected growth such as Shobra, Abbasiya, and the northeastern suburbs, all of which supplied modern housing to Cairo's rising middle class and some wealthy elites. And as we saw above, the Public Works Ministry coordinated with James in order to ensure the placement of main features of the system away from possible areas of urban development.

Urban infrastructures commonly factor future demographic growth into the design, yet the British engineer of Cairo's sewage system did that in a specific way that exposed a sharply hierarchical, colonial vision of society. Relying on the findings of the 1907 census, James fixed the population of Cairo at 644,000 in 1907, projecting it to reach 960,000 in 1932. For the sanitary engineer, this was a solid basis for making his calculations of projected water allowance in 1932, which formed the basis for calculating the maximum amount of sewage based on which the size of specific features of the system including pipes, pumping machines, and ejectors could be determined. The most decisive move was to calculate the total amount of sewage by class in 1932 in order to estimate the full capacity of the system.

The technical decision to calculate projected water allowance not by average urban consumption but by "classes" of houses entailed a vision of engineering and of the social order

whereby the former became the handmaiden of colonial politics by cementing Cairo's inequalities and hierarchies into infrastructures instead of offering alternate visions of society. To a large extent, James' design sided with, and quoted, the "conservative" features of Reid and Barois who viewed private sanitation of Cairo's lower class as impracticable. Only as an afterthought and in response to criticism from the director of the Public Health Department did James introduce some flexibility in the future. For him, the design merely recognized urban contradictions "owing to the cosmopolitan nature of the inhabitants of the better-class quarters, and to the habits of the native and foreign population dwelling in the poorer quarters."⁷¹ The British engineer estimated that out of Cairo's total population in 1907 100,000 were upper class Europeans and Egyptians who inhabited 'Class A' houses and buildings. Cairo's upper class lived in modern houses and apartment buildings that were either already connected to the water company or that could be in the future. In addition, the sanitary arrangements and structural conditions of 'Class A' houses posed no obstacles against connecting them to public sewers. The Public Works Ministry would oblige proprietors to abolish all cesspits as they connected their property to the network. Most of these houses and apartment buildings were spatially concentrated in Cairo's elite neighborhoods including Azbakiya, Ismailiya, and Qasr al-Dubara and new suburbs like Heliopolis to be covered by the sewage system. James estimated current water provision for Cairo's elites at 33 gallons (150 liters) of water per day, which compared favorably to water allowance in major European and American cities. Moneyed Cairenes were not only rich enough to afford ample supply of water but also to defray the costs of connecting their houses to the sewers. James further estimated that this elite demographic would reach 160,000 in 1932, and would be able to maintain the same high

⁷¹ James, "The Main Drainage of Cairo," 63.

standard of living. Given natural population growth, the engineer's figures clearly assumed no or negligible absolute growth of Cairo's elites. The proportion of those on top of the social ladder in 1907 was projected to remain roughly the same a quarter century later.

The question that faced James was how the sewage system would include Cairenes who lived in houses that were currently not connected to the water company thus lacking a stable source of water supply. The question was both technical and social, for it led to an investigation into the water sources of "the lower class" and into the sites of where they commonly relieved and cleaned themselves such as public latrines, baths, and mosques. In addition, James' calculations contained a prescriptive element of the appropriate living standard for the lower class in 1932. James rapidly dismissed 'Class C' houses, or the slums, as negligible. He reasoned that the city's squatters acquired water from the Nile and free standpipes only for potable purposes, and they performed ablutions and bathed either in the open or at mosques. Seeing the effect of the property boom on Cairo, James expected most slums to disappear and to be replaced by urban developments geared towards more comfortable classes.⁷²

'Class B' houses, on the other hand, constituted the majority of dwellings in the city. These houses were of good construction yet they were still not connected to the water company. Judged by the standards of 'Class A' residents, inhabitants of 'Class B' houses constituted Cairo's "lower class," yet they were not as poor as slum dwellers. This diverse sociological category comprised the majority of Egyptians, including inhabitants of the old quarters such as Darb al-Ahmar for instance and a substantial portion of the middle class inhabitants of newer neighborhoods such as Shobra, Abbasiya, and Munira. It also comprised what James called the "South-European races,"

⁷² Ibid., 64.

by which he referred to Greeks, Italians, and Maltese, who mixed with the majority of Egyptians and shared similar standards of living.⁷³ The inhabitants of ‘Class B’ houses acquired water for potable and culinary purposes from the nearest standpipe, consuming an average of 2.2 gallons (10 liters) per head per day. The internal sanitary arrangements of ‘Class B’ houses were rudimentary, consisting of a percolating cesspit placed inside and at the lowest level of the house and connected to a closet without a flush. James estimated that mainly women of the household used these closets while most adult men resorted to the nearest mosque latrines. In 1907, the number of people estimated to use mosque latrines daily was roughly 150,000, consuming an estimated daily average of 4.4 gallons (20 liters). Water used for ablution and general bodily cleanliness was factored into these figures irrespective of their origin.

The project hesitated to allow bourgeois privacy to Cairo’s “lower class,” including the upwardly mobile Egyptian middle class, who sought after such privacy as the material and intimate correlate to what they conceived as moral advancement. In line with the socially conservative features of Reid and Barois, the design emphasized collective places of sanitation including mosques and public bathrooms. The government would take control of mosque latrines from the Ministry of Charitable Endowments in order to convert them into modern public conveniences, installing up to date water-carriage system and connecting them to public sewers. In addition, 400 modern public latrines would be constructed in order to serve the city’s “lower class” population.

Only as an afterthought did the project make provisions for modest growth of the living standards of Cairo’s middle class. In his preliminary report James had nothing to say on the problem of how the system will deal with the existing sanitary conveniences at the houses of the

⁷³ Ibid., 65.

lower class and if they could be connected to the network. W. P. G. Graham, the director of the Public Health Department, wrote a note asking James for more explicit treatment of the subject, which could no longer be avoided.⁷⁴ The latter responded by ensuring the director that the system was meant to absorb all of Cairo's houses, yet the process had to be gradual. 'Class B' houses were currently not yet ready for sewer connections because they were not connected to the water company. If and when proprietors were able to afford more water, they could also connect their houses to the network by means of low capacity gullies. The process of connecting Class B houses to public sewers could take place between 1918 and 1932, only to the extent that proprietors could afford it. Accordingly, James included future provisions of 3.3 gallons (15 liters) in 1932 on all inhabitants of 'Class B' houses. For James, this was a "liberal allowance" given that the "poorer class" bought nearly all the water they use domestically—and water was still the most expensive daily necessity. Low capacity gullies instead of sewage connections were sufficient for the expected low volume of sewage. Proprietors of Class B houses would be required to completely abolish existing percolating cesspits and other deficient domestic sanitary arrangements at their own expenses before connecting their properties to public sewers.

Class hierarchies became material in Cairo's sewers, and while the infrastructure introduced some flexibility, future calculations left no room for doubt that the system privileged the city's upper class.⁷⁵ Water allowance of the upper class projected to reach 160,000 in 1932 was

⁷⁴ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-033280.

⁷⁵ Ghislaine Alleaume's excellent paper on Cairo's sewage system schemes—one of the earliest papers to discuss the city sanitary infrastructure during the colonial period—made a similar point. See Ghislaine Alleaume "Hygiène publique et travaux publics: Les ingénieurs et l'assainissement du Caire (1882-1907)," *Annales Islamologiques* 20 (1984). However, colonial assumptions were buried under even more technical details than Alleaume thought. The network did in fact extend to old neighborhoods as ejectors were placed under major streets, mainly to service mosques and public latrines. Projected water allowance was, in my analysis, the key to excluding Cairo's "lower class." Had Alleaume pushed her analysis further to examine the success and failure of the network during the 1920s, she would

fixed at 33 gallons (150 liters) per head per day. The projected allowance of Cairo’s 780,000 ‘lower class’ depended on and mirrored Cairo’s fragmented water provisioning. James added an allowance for potential house connections to the projected populations using mosque and public latrines daily, who were estimated to reach 215,000 and 565,000 respectively, and he used the same figures for current water consumption at mosques and standpipes. For mosque users, this addition brought their total daily water allowance to 7.7 gallons (35 liters), while the total daily allowance for public latrines users came up to 5.5 gallons (25 liters). Finally, the 20,000 moneyed residents of the then sparsely populated Zeitoun and northeastern suburbs were allowed a daily consumption of 22 gallons (100 liters). Even though these areas were connected to the water company, James lowered the water consumption figures due to “the population of servants who reside on the premise, and are not large consumers of water for personal use.”⁷⁶

	1907		1932	
Upper Class	100,000	33 gallons	160,000	33 gallons
Lower Class Mosque Users	150,000	4.4 gallons	215,000	4.4 gallons + 3.3 gallons from low capacity gullies
Lower Class Public Latrine Users	394,000	2.2 gallons	565,000	2.2 gallons + 3.3 gallons from low capacity gullies
Zeitoun and Suburbs			20,000	22 gallons
	644,000		960,000	

4.8. Water allowance in 1907 and projected allowance in 1932. (Source: Charles Carkeet James, “The Main Drainage of Cairo”)

Urban infrastructures reorganize the landscape in various ways, and while the sewage system was in part a response to Cairo’s transformation during the property boom, it was itself an

have recognized that the way the system failed was connected to the volume of expected sewage and not to the spatial coverage of the network.

⁷⁶ James, “The Main Drainage of Cairo,” 65.

agent of change whereby the government could encourage or discourage certain trends of urban development. As construction went ahead, there were numerous decisions to be made regarding how the system would relate to potential reorganization of specific neighborhoods or even streets whether by the government or private capital. For instance, in 1911 James urged the government to attend to the problem of slums in Boulaq. Having learned of the government's intention to build a boulevard along the Nile bank in Boulaq, his opinion was that a surface drainage scheme would have to encompass all of Boulaq instead of leaving out its poorest areas. Laying sewers and road construction would go hand and in hand, and in the case of Boulaq they would significantly increase land values and change the types of buildings to be constructed in the neighborhood, especially if the government made good on its promises of clearing Boulaq's slums.⁷⁷ With its equally infamous slums, Old Cairo was a different case for James. The neighborhood was away from all lucrative urban developments, and given its reputation as an unhealthy area, he saw including it into the surface drainage system as a waste of money.

There were various critical responses to the project from Egyptian nationalists, sanitary engineers, and public health reformers that focused on a number of aspects including the tender process, financing, lack of municipal oversight, applicability to Cairo, and the glaring disparity of water allowance. One scorching critique came from the Egyptian nationalist press at a moment when nationalist agitation was gaining momentum. The author of 'The sewage system of the Capital' (*Majari al-'Asima*), which appeared in the Arabic newspaper *al-'Alam* in May 1910, critiqued the project based on the lack of expert oversight and the original proposal to discharge

⁷⁷ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-035852.

excess stormwater into the Nile.⁷⁸ Quoting from the reports of Latham and the British Royal Commission on Sewage Disposal, the Egyptian author was clearly well versed in the subject and familiar with sanitary engineering in European and Indian contexts.⁷⁹ First, he reminded the government one more time of the Rod al-Farag well water debacle as a cautionary tale against following the recommendations of an expert before eliciting second opinions and in defiance of popular protests. He wondered why authorities declined to conduct independent examination, which was a standard procedure for undertaking similar projects in large cities like Calcutta, Benares, or even Alexandria. Was that because of James' "superior nationality?" the author asked sarcastically, "or should Egypt be, for good or ill, a school or a laboratory for the experiments of English gentlemen?" Second, the author was against the original proposal of adopting a separate system of surface drainage in Cairo, which entailed discharging excess stormwater into the Nile. It was in response to this and similar critiques that the government decided to modify the project to further minimize Nile discharge. However, the deeper argument of the article was that Cairo should not be seen as an "oriental" city, but rather similar to European cities. What the article challenged was the mobility of knowledge from Indian to Egyptian contexts, and the colonial assumptions undergirding such a move. Universalizing the separate system in all "eastern countries" (*bilad al sharq*) was a mistake. In Egypt, the demand on water was similar to, or even more than, European countries due to weather conditions and religious ablutions. For the author, Cairo was better suited for a combined system with a generous water allowance similar to that of

⁷⁸ *Al-'Alam*, May 30, 1910. The article is unsigned.

⁷⁹ See Arthur Martin, *The Sewage Problem: A Review of the Evidence Collected by the Royal Commission on Sewage Disposal* (London: The Sanitary Publishing Company, 1905).

European cities than for a separate system as that of Indian cities where James exclusively acquired his sanitary engineering experience.

Egyptian nationalists also condemned lack of popular oversight and what they viewed as favoritism to British business in distributing lucrative project contracts. Mahjoub Thabit gave a speech at the 1910 Egyptian nationalist congress of Brussels that zeroed in on Cairo's drainage scheme. Thabit was a renowned Sudanese born doctor who was active in the Egyptian nationalist movement and who was later exiled with Saad Zaghloul before he was elected to the Egyptian Parliament after partial independence in 1922.⁸⁰ He regretted the fact that only European powers were consulted before raising property taxes in Cairo. The fact that the city lacked a municipality such as that of Alexandria meant that no popular oversight of the project was possible. In addition, Thabit argued that the project demonstrated British business favoritism, as the British advisors of the Public Works Ministry handed the largest contracts to Hughes & Lancaster, Ltd. Company of London.⁸¹ British business had undoubtedly won the day in Cairo. In 1912, the total value of contracts won by the English firm was LE 787,331 for the Khanka purification works, main collector, surface water drainage, Zeitoun and suburbs, and the compressed air system. The French firm Société des Grands Travaux de Marseille was a distant second with a LE 90,577 contract for the rising main.⁸² Fellow engineers at the British Institution of Civil Engineers openly acknowledged James' "patriotic endeavor" to secure the contract for English firms: "but for his efforts this discussion would have been taking place in Berlin instead of in London." Another

⁸⁰ Arthur Goldschmidt, *Biographical Dictionary of Modern Egypt* (Lynne Rienner Publishers, 2000), 212.

⁸¹ Mahjoub Thabit, "L'hygiène publique en Egypte," *Congrès national égyptien. Œuvres du congrès national égyptien tenu à Bruxelles le 22, 23, 24 Septembre 1910* (St. Catherine Press, 1911).

⁸² Egypt. Public Works Ministry, "Report on the Drainage Department," in *Report of the Ministry of Public Works for the Year 1911*, 478.

engineer who was present at the tender process recalled the “strenuous and somewhat unorthodox efforts by foreign firms, especially German, to obtain the contract.”⁸³

The most damning critique of the project focused on its implicit social vision that calculations of current and future water allowance revealed. Some critics questioned the way James derived his figures. Others charged that the design rested on the assumption that Cairo’s existing social inequalities were to be perpetuated—an unrealistic assumption even compared to other colonial cities. In “The Main Drainage of Cairo,” which was published in 1916, James was as noncommittal on the question of linking houses of the lower class to the system as he was in his preliminary report, mentioning his proposed low capacity gullies for ‘Class B’ houses only once in a table.⁸⁴ In correspondence on the article that was published in the same issue of the *Proceedings of the Institution of Civil Engineers* L. M. Bell noted the absence of provisions for domestic latrines save for upper class houses, which meant that the present unsanitary conditions inside all other houses was going to remain unchanged.⁸⁵ Isaac Shone, the inventor of the Shone ejector that James adopted, also responded in writing to the paper, which evoked memories of his first visit to Cairo in 1884 in order to discuss potential sewage schemes one year after the cholera epidemic. Shone was struck by the disparity of water consumption between classes of population. He understood that the meager water allowance of 2.2 gallons (10 liters) per head per day for most Class B houses would not be sufficient to render ordinary house drains self-cleansing, thus sanitary. Yet in his opinion this was not an obstacle against immediate universalization of house connections. In fact, “an apparatus has been specially designed to deal with dribblets of sewage as

⁸³ Discussion on James, “The Main Drainage of Cairo,” 103.

⁸⁴ James, “The Main Drainage of Cairo,” 66.

⁸⁵ Correspondence on James, “The Main Drainage of Cairo,” 109-110.

evidently must be dealt with in the houses of classes B and C.”⁸⁶ And Shone promised to describe the working of this apparatus further in his upcoming manual on sewage systems.

Other critiques zeroed in on the social assumptions and prescriptions of the project, charging that James offered a conservative design that undermined the potential of the technological system as an agent of social change. For this set of criticisms, James failed to account for growth that would very probably result from the project, which would likely outweigh Cairo’s sharp social and colonial inequalities. For sanitary engineers influenced by ongoing European trends of liberal social reform, the project failed to understand its own mission as a tool for improving and “uplifting” the conditions of the lower classes, or softening sharp class inequalities. Adolphe Smith—the socialist journalist was the special sanitary commissioner of the London *Lancet*—objected to the “pessimistic” impulse of the project. He pointed out that James maintained the same ratio of upper to lower class of 1907 in his projected estimates of 1932 with “mathematical precision.” If this social stasis proved true, then “the best purpose of such a drainage scheme will have miscarried,” since “one of the most fruitful effects of a general drainage scheme is its educational influence on the lower sections of the population.”⁸⁷ As liberal sanitary reformers had been writing for decades, water and drains were meant to have a civilizing influence over lower classes and to relieve social tension. Smith criticized the project for its “hopeless” tone since the project completely missed the pedagogical aspect at the core of ambitious sanitary projects:

“Are your drains in order?” is the inevitable question which, all the world over, the sanitarian, the social reformer, and the Lady Bountiful have on their lips as they penetrate the slums, bringing enlightenment, help, and sympathy to the least fortunate sections of the

⁸⁶ Ibid., 127.

⁸⁷ [Adolphe Smith], “The Drainage of Cairo (From Our Special Sanitary Commissioner),” *The Lancet*, May 8, 1909, 1350. For more on Smith, see note 30 in Chapter One.

community. Thus some even of the poorest classes are taught the importance of sanitation, and from the sanitary point of view are raised to a higher class by their knowledge.⁸⁸

For Smith, the project should have expected more water consumption in 1932 as “knowledge of sanitation increases.”⁸⁹ He realized that James based these estimates on present unequal patterns of water consumption that were sustained by the expensive rates of the Cairo Water Company. However, he viewed the mission of engineering to change realities rather than conform to present constraints.

While understanding the impracticability of domestic cleanliness given small quantities of water, Smith posited the unlikelihood of water consumption remaining so low if the system encouraged less fortunate classes to become private subjects with private conveniences. And for him, the duty of a sanitation project of this magnitude was to do exactly this. Smith argued that James’ provisions of public and mosque latrines made a gesture towards exactly the opposite direction, entrenching collective spaces of hygiene instead of heralding bourgeois privacy. James completely left open the question of when, if ever, the houses of poorer classes would be connected to the sewers. Instead, he solved this problem by making provisions for expanding the use of public and mosque toilets. For Smith, the assumption that the majority would still use collective spaces of sanitation on a daily basis in 1932 was unrealistic because “surely by that time the accommodation in the dwelling houses will have so improved that...there should be a decrease in the number of people making use of the mosque latrines.”⁹⁰ In this sense, James prescribed constructing public latrines and connecting mosques to public sewers in order to indefinitely

⁸⁸ Ibid.

⁸⁹ Ibid., 1351.

⁹⁰ Ibid., 1352.

postpone connecting lower class districts of Cairo to the drainage network. “The public latrine is not to be a convenience,” Smith argued, “but it is to be a means by which it will be possible to postpone the supply of proper closets in private houses.”⁹¹ And even then, the figures were alarming since 400 public latrines of ten closets each were insufficient to accommodate the 565,000 lower class projected to use them daily in 1932. Smith pointed out that the British Common Lodging-houses Act of 1851, which legislated for “social wrecks” such as “the outcast, the vagabond, the tramp, the beggar, the thief, the outlaw,” stipulated a minimum of one closet per twelve inhabitants of lodging houses. Smith reminded James that as sanitary reforms worked for the English lower class there was no reason why they would not work for the Egyptian lower class, especially given that the latter was far more “docile and easy to teach.”⁹² Writing in 1909 before James introduced the idea of low capacity gullies, Smith hoped that the Egyptian government would conduct necessary experiments on how to connect the houses of the poor to the system, referring to a contrivance that could be employed temporarily before the universalization of proper closets inside homes. While Smith’s critique was cast in the language of the civilizing power of sanitation and reform, it was perceptive in understanding how sanitary infrastructures implied distinct social visions.

Against this critique, James might have defended himself as a realist or a pragmatist who made calculations based only on what was practically possible in a city where water was so expensive. He may have even argued that material conditions of the lower classes needed to change and not their “habits” or “knowledge” of sanitation before assuming that Cairo’s class and colonial

⁹¹ Ibid.

⁹² Ibid., p. 1353.

inequalities could be mitigated or reconfigured in the future. However, other criticisms of the project demonstrated the inadequacy of this hypothetical response. H. O. B. Shoubridge, a British sanitary engineer with Indian experience and a fellow member of the Institution of Civil Engineers, responded to James' 1916 paper by drawing on the experience of Indian cities. According to James' figures, average water consumption in 1932 would amount to 11 gallons per head per day. However, the Bombay Presidency considered it inadvisable to introduce an underground network of sewers carrying less than 15 gallons per head per day. The average figure should reach 20 in cases where gradients were flat and flushing was required. Shoubridge noted that in most European large towns, average water consumption was between 30 to 40 gallons. He believed it was unrealistic for a projected city of nearly a million inhabitants that average water consumption would be so low by present standards. While he realized that this was related to the high rates of the water company, he argued that "it was difficult to believe that that cause even would restrict the growing use of water in a city of the size of Cairo."⁹³ In Indian cities, water closets grew in popularity after constructing sewage systems, leading to increased consumption of water. Thus James' proposed figures "hardly appeared to be liberal enough."⁹⁴

Other engineers with Indian experience pointed out that projecting unequal access to service over the future quarter century was so unrealistic that it was more palatable to believe that James designed the scheme to perpetuate present structural inequalities onto the foreseeable future. G. B. Williams recognized that high water rates in Cairo led to diminished consumption, yet he pointed out that flushing would be more economical using unfiltered water, which should be more

⁹³ Correspondence on James, "The Main Drainage of Cairo," 128.

⁹⁴ Ibid.

accessible in Cairo. At any rate, the present 2.2 gallons (10 liters) of water that lower class Cairenes acquired through standpipes was “much too little for a capital city in a hot, dry climate.”⁹⁵ For Williams, the project made no proper arrangements for future growth, and a scheme of this magnitude should not require duplicating features sixteen years after its completion. James’ scheme, “seemed to be based on the supposition that the present sanitary system of Cairo was to be perpetuated.”⁹⁶ According to the design, one sixth of Cairo’s inhabitants living “under European conditions with an ample water supply” and modern private hygienic conveniences should expect to continue to maintain their standards of living in 1932. For the rest, the design made arrangements for continued reliance on public latrines and mosques, as well as slop sinks and percolating cesspits for those at home including many women and children, making no decisive move to recommend or require private connections to houses. Williams presumed that James was already aware that large Indian cities now adopted a different policy. While internal sanitary arrangement required considerably modifications “to adapt it to Oriental conditions,” once a sewage system has been introduced, the policy in Indian cities, especially in Bengal, was to make the most of the system expanding water usage for all urban dwellers. With remarkable foresight, Williams wondered what would happen to the network if in the coming years water supply increased, the costs of water decreased, private closets in houses were transformed along modern lines, and water supply connections doubled or trebled. The system would then become obsolete and in need for expensive expansions and alterations. For Williams, the decision to design the system along its present lines was therefore indefensible.

⁹⁵ Ibid., 134.

⁹⁶ Ibid., 135.

Class and colonial hierarchies were so natural for the colonial engineer's social imaginary, and constitutive of his conception of the city as a social space. Cairo's sanitary infrastructure projected that the same upper to lower class ratio would unproblematically withstand the vagaries of a quarter century, and attempted to cement such hierarchical vision deep into the urban landscape. But as critics including other colonial engineers pointed out, cities of the early 20th century did not always conform to such rigid visions of hierarchy where colonial elites stood at the helm of a world in which a majority of impoverished natives willingly remained in their inferior position.

Corrosion and the Insufficiency of the System

Cairo surpassed the social visions of colonial-era engineers during the two decades following the 1919 revolution and subsequent conditional independence. The system was both a success and a failure. It was a story of success because it encouraged many middle class Cairenes to connect their houses to the network in order to partake in middle class private comfort and hygiene. Many Cairenes paid considerably in order to subscribe to the service of the water company, modify sanitary arrangements inside their houses, and defray the cost of connecting them to public sewers. However, the system was so successful that it failed. The service was so attractive particularly for Cairo's upwardly mobile middle class that by the 1920s, the network had already reached full capacity and began to crumble under the pressure of sewage from those the system consciously declined to fully include. Modern educated *effendis* were poised to assume social and political power in the world spawned by the anticolonial revolution and conditional independence. They filled in the bureaucratic ranks and material and social spaces left vacant by a retreating colonial presence and they largely reaped the benefits. Material, social, and political recalcitrance belied

the colonial vision cemented into the urban infrastructure. During the decolonizing decades of the 1920s and 1930s, Cairo's colonial sewage system became insufficient for the urban middle class, which sought to assert its modernity, its fitness for self-determination and political leadership, and its right to private material comfort and modern living standards. Meanwhile, the implementation of the sewage system and the subsequent improvement of public health in Cairo lifted one of the last barriers against more intensive capital investment into the urban landscape.

Cairo's infrastructures carrying foul and clean water interacted in new ways during the decades following independence. As some of James' critics forewarned, the striking disparities of water consumption in Cairo were not sustainable, and middle class consumption of water increased significantly beyond what James thought possible as the drainage system began to operate. The sewage system increased demand on water, just as some of James' critics expected. During the 1920s and 30s, middle class *effendis* continued to relocate to neighborhoods offering modern housing with private conveniences or altered the sanitary arrangements of their houses in order to connect them to water and sewage infrastructures. Consequently, more Cairenes subscribed to the service of the water company than was thought possible during the colonial era, allowing them to connect their homes to public sewers as well. In 1906, the Cairo Water Company supplied the city with 19 million cubic meters of water. In 1928, the city's supply had jumped to 36 million cubic meters, while in 1936 it had staggered to nearly 47 million cubic meters.⁹⁷ Such a striking rate of increase far surpassed the increase in urban population and it could only mean that Cairenes were now consuming a lot more water than they did during the colonial period. Such figures well surpassed the provisions that James had estimated for 1932.

⁹⁷ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-059295; Egypt, *Almanac for the Year 1933* (Cairo: Government Press, 1933), 304.

The managers of the Cairo Water Company realized that the sewage system could significantly alter patterns of water consumption in the city and that the company was poised to reap the benefits of this transformation. The sewage system turned to be a boon to the business of the near sovereign company as it increased the demand on water. As we saw in the previous chapter, growing demand on water and the company's attempt to augment its already large profits set the stage for a conflict between the company and ratepayers over rates of water and methods of subscription. The company tried everything it could to force the more expensive metered supply on subscribers, a feature that increased its profits but made it liable to lawsuits and government intervention. In the political climate of the 1920s and 1930s Egyptian elites had assumed social power and exercised leverage through the bureaucracy and newly created political institutions including the parliament. This allowed elite and middle class consumers to challenge the company more effectively. The company demanded the introduction of water meters instead of unlimited monthly subscriptions in all houses connected to public sewers, arguing that meters would deter waste since proprietors no longer worried about flooding cesspits at the basement of their houses. In 1938 the Egyptian government employed engineer S. R. Raffety, a member of the British Institution of Civil Engineers, in order to arbitrate between the company and ratepayers. He pointed out that while there may be some truth to the argument against waste, there were other ways to decrease wasteful behavior than forcing a more expensive subscription system onto ratepayers. He charged that the company's argument was self-serving and opportunistic, capitalizing on the increasing demand on water that the sewage system created.⁹⁸ Raffety showed

⁹⁸ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-059295.

how the company's "excessive" profits soared, reaching LE 391,000 in 1936 while they totaled LE 126,000 in 1920.⁹⁹

The introduction of the sewage system accompanied social change that saw the rise of Cairo's middle class and led to increasing water consumption and to the reconfiguration of public spaces, such as streets and neighborhoods, and the private space of the house or apartment. Raffety acknowledged that "it is obvious that not only the introduction of main drainage but also the improvement of housing conditions generally would increase the average quantity of water used per person, which is a feature not peculiar to Cairo."¹⁰⁰ The Egyptian government's *Almanac* of 1933 made the same link between the introduction of urban drainage, changing housing conditions since the property bubble, and increased water consumption:

The increased use of water is due, firstly, to the facilities offered by the drainage system for getting rid of water and other waste products, and, secondly, to the greater prosperity of the country which is to be observed by comparing the class or poor properties, which abounded in the city in 1906, with the modern first class buildings that are now being constructed and fitted with up to date sanitation.¹⁰¹

During the decades following the construction of the sewage system, more and more middle class Cairenes took up housing with private conveniences or rebuilt and restructured their dwellings towards the end of connecting them to the public sewers.

The colonial infrastructure was successful as it improved the health of the city and, more importantly, invited and encouraged proprietors to connect their houses to the network. The number of applications to connect houses to public sewers increased significantly from 1915 to 1932. From the perspective of the government, this continuous increase of applicants meant that

⁹⁹ Ibid.

¹⁰⁰ Ibid.

¹⁰¹ Egypt, *Almanac for the Year 1933*, 304.

Year	Number of Applications
1914	17
1915	181
1916	231
1917	380
1918	335
1919	306
1920	475
1921	621
1922	884
1923	1092
1924	1196
1925	1352
1926	1376
1927	1453
1928	1698
1929	1968
1930	3218
1931	3931
Total applications:	20,714

4.9. Number of applications for connection to public sewers, 1914-1931. (Source: Egypt, *Almanac for the Year 1933*)

“property owners have realized the benefits of connecting their premises to the public sewers and the abolition of the old system of cess-pit drainage.”¹⁰² All applications went through the House Connection Staff, which examined the premises internally and externally and granted no permission before ensuring proper means of ventilation and modern sanitary arrangements. In fact, by the 1920s the Main Drainage Department started to receive complaints from property owners seeking to connect their houses to public sewers, which were not laid under their streets because they were located in areas deemed too poor or too insignificant. In response, the department allotted an annual sum of LE 30,000, that was increased to LE 70,000 in 1929-30, for sewer-laying, particularly in “native quarters, where the inhabitants are suffering from lack of sanitation.”¹⁰³ During the 1920s and 30s the department signed dozens of contracts with smaller firms to extend

¹⁰² Ibid., p 308.

¹⁰³ Egypt, *Almanac for the Year 1929* (Cairo: Government Press, 1929), 246.

secondary sewers under streets, particularly those of old neighborhoods. All work was conducted under the supervision of the department. The length of sewers laid according to each of these small contracts ranged between two to six kilometers.¹⁰⁴ In addition, laying sewers usually accompanied the construction of all new streets. By 1932, the total length of Cairo's streets was 1000 kilometers, 656 kilometers of which had been sewerred, and the department was planning to sewer remaining streets gradually in order to address complaints and to make Cairo "one of the best cities of the civilised world."¹⁰⁵ By the late 1920s, the Main Drainage Department had drafted a House Drainage Law whereby property owners could be compelled to connect their premises to public sewers if they were available within a certain distance, yet the department expected the vast majority of house owners to connect their houses voluntarily. Finally, a sewer gang was made available at all times by the Main Drainage Department to respond to the calls of the public in case of clogging or overflowing. Universalizing house connections to the sewers, which James and government experts saw as unlikely or even impossible in 1910s, was deemed inevitable only a decade later.

The success of the drainage system to attract users, including significant numbers of middle class Egyptians, who now consumed more water, strained the colonial infrastructure leading to failures and malfunctions. Corrosion of the main collector was the technological and material expression of the shortcomings of the engineer's social visions. The system was working beyond its projected capacity as a result of the introduction of high volumes of sewage from Cairo's middle

¹⁰⁴ Wizarat al-Ashghal al-Umumiya [Public Works Ministry], *Al-Taqrir al-Sanawi li Sanat 1925-1926* [Annual Report for the Year 1925-1926] (al-Qahira: al-Matba'a al-Amiriya, 1930), 122; Wizarat al-Ashghal al-Umumiya [Public Works Ministry], *Al-Taqrir al-Sanawi li Sanat 1926-1927* [Annual Report for the Year 1926-1927] (al-Qahira: al-Matba'a al-Amiriya, 1930), 163; Wizarat al-Ashghal al-Umumiya [Public Works Ministry], *Al-Taqrir al-Sanawi li Sanat 1927-1928* [Annual Report for the Year 1927-1928] (al-Qahira: al-Matba'a al-Amiriya, 1931), 168.

¹⁰⁵ Egypt, *Almanac for the Year 1933*, 309.

class, for which there was only a modest space in the original design. To a lesser extent, two other factors contributed towards overstraining the network. First was the unforeseen demographic growth. In 1907, it was estimated that Cairo's population would reach 960,000 in 1932, yet by the 1927 census, Cairo's population was already 1,060,600 and it was estimated to reach 1,195,000 in 1932, or 24.5 percent more inhabitants than the original design anticipated.¹⁰⁶ Second, starting from 1916 the government decided to drain infiltration water through the sewage system as a measure against malaria. The exceptionally high flood of 1916 led to flooding of infiltration water in large areas of Boulaq, Shobra, and Sakakini. The Anti-Malaria Commission was alarmed by the potential threat of disease due to the presence of infiltration water and it asked the Main Drainage Department to drain underground water using the sewage network. The inclusion of infiltration water during high Nile into the system introduced an estimated figure as high as 30,000 cubic meters (or 6.6 million imperial gallons) per day into the sewage network, which was more than half of the total capacity of the entire system.¹⁰⁷ While pumping infiltration water into the sewers lasted only for a brief period, such a high figure must have contributed to the deterioration of the system.

Excessive buildup of sewage gases began to eat into the cement concrete of the main collector only a few years after the system was completed. The phenomenon was first detected through a careful examination of the interior of the main collector in 1918. The Main Drainage Department ruled out internal repair work and enlargement of the collector due to the high volume of sewage and the asphyxiating nature of gases that would render the employment of sewer men

¹⁰⁶ Egypt, *Almanac for the Year 1933*, 304; Richard W. Allen, "Cairo Drainage Scheme," *Journal of the Royal African Society* 28, 112 (1929), 340.

¹⁰⁷ Egypt, *Almanac for the Year 1933*, 305.

inadvisable. And by 1924, the Main Drainage Department found it necessary to consider alterations and extensions of the system. In the newly created Egyptian Parliament (*Majlis al-Shoyokh*), a representative interrogated the Minister of Public Works about potential work on the system. The latter responded by pointing out that various experiments to deal with corrosive sewer gases including hydrogen sulfide had failed and that considerable enlargement of the system was necessary. The representative, Doctor Saad Bey al-Khadem, wondered who was responsible for this malfunction and if the engineer who designed the system had expected such corrosive activity and provided means of protection against it. The Public Works Minister responded that corrosion of the main collector was ultimately “inevitable” since it turned out that the collector was “insufficient for a large city like Cairo.”¹⁰⁸ The ministry was studying all alternatives including constructing another collector and a network of secondary sewers designed to alleviate pressure on the system. However, the minister declined to devolve responsibility for failure on James or anyone in particular.

By 1925, the Public Works Ministry had already decided on three large expansions of the system, which consisted of installation of a new pumping station at Amiriya, construction of a second and larger collector, and construction of a duplicate rising main connecting Amiriya to the old station of Kafr al-Gamous to the Khanka sewage farm.¹⁰⁹ First, the ministry viewed constructing a new pumping station as inevitable for dealing with the increasing volume of sewage that overstrained the old works. The pumping station, which began operating in 1929, was located in the semi-agricultural northern suburb of Amiriya. The works were placed deep into the subsoil

¹⁰⁸ Al-Dawla al-Misriya [Egyptian Government], Majlis al-Shoyokh [Parliament], *Majmouat Madabet Dor al-In'ikad al-Awal, 15 March-10 July, 1924* [Minutes for the first parliamentary cycle, 15 March-10 July, 1924] (Al-Qahira: al-Matba'a al-Amiriya, 1924), 143.

¹⁰⁹ Egypt, *Almanac for the Year 1933*, 305-6.

in order to ensure proper, self-cleansing gradient of the new collector. The pumping machines, which consisted of four sets of pumps and engines, were manufactured and installed by the British firm W. H. Allen & Sons.¹¹⁰

Second, the Main Drainage Department constructed a duplicate main collector of 5.4 kilometers in length, costing a total of LE 190,000. The route of the duplicate collector was chosen according to three criteria. First, in order to allow its being used to divert sewage from the original collector while repair work to fix corrosion was underway. The department constructed two secondary sewers linking the new collector to the old for this purpose. Second, the route would allow draining by gravitation of the rapidly developing northern neighborhood of Shobra, whose middle class population soared during the first three decades of the 20th century. Third, the ministry designed the new collector to run under the two major avenues of al-Amir Farouk and al-Azhar, which were constructed by the Tanzim Department during the latter half of the 1920s as part of broader efforts to alleviate traffic and improve health conditions of the city's old, eastern quarters. By manipulating existing Shone ejectors in order to reverse the direction of flow of some pipes and by constructing a number of secondary sewers, the ministry placed the collector in such a way as to drain the eastern neighborhoods of Cairo by gravity and to discharge its sewage towards Amiriya station instead of the old pumping station. The maximum discharge capacity of the new collector was 258,000 cubic meters per day, a significant increase from the 140,000 cubic meters per day capacity of the old collector. The new works raised the total discharge capacity of the system to 358,000 cubic meters per day, or about two and a half times its original capacity in 1915.

¹¹⁰ Allen, "Cairo Drainage Scheme."

Finally, the Main Drainage Department constructed a new cast iron rising main of 19.5 kilometers in length at the costs of LE 255,000. The pipe began at the Amiriya station, crossed to Gabal Canal, then ran parallel to the old collector and rising main during the rest of its length until the Khanka sewage farm. The new expansions were connected to a new emergency storage reservoir that held up to 60,000 cubic meters of sewage by means of a bye-pass. The total capacity of the new rising main was 100,000 cubic meters per day compared to the 60,000 cubic meters of the old rising main.

Conclusion

Because technological systems are inextricably linked to their social world and to contested visions of the social order, their failure is also simultaneously technical and social. As we saw above, James lumped the vast majority of Egyptians under the category of “the lower class” and accommodated them with a meager water allowance that was projected to remain low in the future. This vision of social hierarchy and stasis undergirding the colonial infrastructure failed to predict let alone dictate the future of Cairo. Urban infrastructures created opportunities for the Egyptian middle class to partake in the material comfort of bourgeois privacy, which resonated on deeper levels with the protracted decolonization of Egypt, understood not only as a struggle for political self-determination, but also as the more diffuse efforts of modern Egyptian elites to capture bureaucratic and economic power. The changing reality of post-independence Cairo ultimately introduced fissures in the colonial infrastructure. The colonial social vision undergirding the sewage system, which put the urban middle class in the socially inferior category of a perpetual lower class that consumed little water and experienced little or no need for private hygiene, was

proven false by the post 1919 social world where Cairo's middle class demanded both political autonomy and bourgeois privacy—as indivisible dimensions of the same modern subjectivity.

The sewage system was part of the regime's response to Cairo's enduring biological crisis and its capital-led expansion. The sanitary infrastructure was an expression of the regime's effort to modernize the city after two decades of neglect that exposed it to critique from the elites and the nascent nationalist movement. And by improving the city's health, the project was also meant to remove barriers on growth and the influx of investment capital. More implicitly, the design and construction of Cairo's sewage system was meant to pull the rug from under the feet of critics of the disjointed administrative framework that managed Cairo. By undertaking such large-scale urban projects, the regime wanted to demonstrate to urban elites and nationalists that no municipality was required for urban improvement and that the present system of managing Cairo through the central government was sufficient despite limitations that government officials themselves were first to acknowledge. As we will see in the final chapter, urban infrastructural schemes were dress rehearsals for ambitious projects of urban development and planning that revealed the regime's desire to take charge of the city's future growth and to set new terms for its relationship with private capital.

CHAPTER FIVE

PLANNING THE CITY: ENGAGING CAPITAL, NEUTRALIZING POLITICS

Introduction

In his *Modern Egypt*, Cromer cautioned British officials against imagining that Egyptians were willing to pay for urban services:

It is, I think, in the direction of increasing the numbers and extending the powers of the Municipalities and Local Commissions that the principal development of local self-government is, in the near future, to be anticipated. Care, however, will have to be taken in dealing with this matter. One of the greatest errors into which Europeans employed in the East are liable to fall is to imagine that Orientals are as much impressed as they are themselves with the necessity of speedily providing roads, drains, lighting, and all the other paraphernalia of civilisation. The present race of Egyptians are, indeed, willing enough to profit by all these things, if they are provided for them from the proceeds of general taxation, but the crucial question is whether they are themselves willing to pay additional taxes in order to attain these objects. They have not, up to the present time, shown much disposition to do so.¹

A decade afterwards, William McLean arrived at a different conclusion regarding the willingness of Egyptians to pay voluntary taxes for improving their towns. McLean was the Engineer in Chief of Municipalities and Commissions of the Interior Ministry from 1913 to 1917, before working for the Alexandria Municipality on a town planning scheme in 1919. Referring to Cromer's admonition, McLean claimed that "a gratifying change in the attitude of the people towards this question appears to have taken place, for since the date of this observation (1907), petitions have been received from the inhabitants of no less than twenty-four towns undertaking to pay voluntary taxes."² In McLean's assessment, Egyptians were not at all opposed to paying voluntary taxes to

¹ The Earl of Cromer, *Modern Egypt* (New York: The Macmillan Company, 1908), Vol. 2, 276.

² William McLean, "Local Government and Town Development in Egypt," *The Town Planning Review* 7, 2 (1917): 90.

improve their towns. This finding was “gratifying” for the British engineer as it meant that his mission in Egypt was significantly easier. McLean oversaw the establishment of municipalities and commissions in dozens of Egyptian towns with the explicit task of overseeing overdue urban improvements, including more regular services, street construction, and urban planning. In his own words, McLean was recruited by Lord Kitchener to help with the work of local self-government, which was considered useful for “creating public interest in the local politics of the “village pump” and so to absorb activities which might otherwise be expanded in less desirable channels.”³ During a troubled period of anticolonial mobilization and increasing political violence, creating local representative institutions to oversee urban management and improvement seemed like a good idea for the administrators of the colonial regime in Egypt. But where did this leave Cairo? As opposed to provincial towns, and in marked contrast with Alexandria, colonial administrators repeatedly refused proposals to establish a Cairo municipality. The city was administered directly by the various ministries and departments of the central government, including the Tanzim and the Public Health departments, during the entire colonial era.

This chapter argues that the colonial regime’s projects of urban improvement and planning sought to respond to the problems of capital-led urbanization and to take charge of the city’s growth while enlisting capital on the regime’s own terms. These projects relied on knowledge and expertise gained during the previous decades and spurred by the regime’s program of infrastructural reorganization. The chapter also shows how the colonial regime sought to sponsor urban improvement as an antidote to the increasingly politicized lack of a Cairo municipality. While critics, including nationalists, argued that a municipality would solve the problem of the

³ The National Archive [hereafter TNA], Foreign Office [hereafter FO] 141/581: From William McLean to Arthur Henderson, dated October 3, 1925.

disjointed bureaucratic framework that managed the city, the regime was wary of the political risks of introducing representative institutions of local self-government in Egypt's leading metropolis and the hotbed of anticolonial mobilization.

This chapter is organized into three sections. The first examines the question of municipality shedding light on proposals to unify the city's fragmented bureaucratic structure and on the regime's reasons for refusing to establish a municipality in Cairo. The second probes systematic knowledge of the city, investigating urban cartography and gaps in official knowledge. The third takes up schemes of housing, urban renewal, and town planning that authorities proposed and partially carried out during the last decade of the colonial era,

Urban Governance and the Question of Municipality

Critiques of the administration of Cairo, which pointed out the inadequacy of services, the city's fragmented bureaucratic structure, and chronic shortage of funding, coalesced around the question of the municipality. At the beginning of the twentieth century, Cairo's lack of a municipal body became increasingly tied up with its unhealthy conditions and its chaotic urban development. Critics of the colonial regime argued that a municipality composed of capable residents could efficiently deliver what the central government could not. The absence of an organ of self-government in the capital stood in sharp contrast to the presence of municipalities and local commissions in other Egyptian towns, including Alexandria, Egypt's second largest and most important port city, where a municipality was established in 1890. However, as experiments of local self-governance, municipal bodies opened up questions far more perilous than the provision of urban services, as they pointed towards the possibility of political representation and contestation of the government through elected bodies. The colonial administration repeatedly

rejected proposals for a Cairo municipality which expressed the regime's desire to avoid such scenarios and to remain unchallenged in the capital. Merchants, property owners, business elites, and foreign residents demanded a Cairo municipality. Nationalists, however, distinguished themselves by demanding a municipality composed of a majority of Egyptians. The city became the site of the formation of a new domain of urban politics.

Three types of institutions of local government existed in Egypt since the last decade of the nineteenth century. The Alexandria Municipality was established in 1890 with the consent of the Egyptian Government and the fourteen capitulatory European powers, and it constituted the most complete form of self-government in the country. With significant caveats, it was locally elected and financially autonomous, and it remained the only municipality with legal personality.⁴ Other important provincial cities where a significant number of foreigners resided formed mixed municipal councils on which Egyptians and foreigners served. Unlike in Alexandria, the formation of mixed municipalities in provincial towns did not require negotiations with the powers. Instead, a system of voluntary taxes applying to all residents supplied funds. The town of Mansura was first to adopt this system in 1896. By 1917, there were mixed municipalities in thirteen provincial towns including, Tanta, Port Said, and Zagazig. Finally, other towns where no substantial foreign communities resided, such as for instance Damietta, formed local commissions on which Egyptians served. These commissions constituted the weakest type of local government in the country, and their limited mandate largely reflected the lack of consular pressure that supported foreigners in other cities. With varying degrees of efficiency and authority, municipalities and

⁴ McLean, "Local Government and Town Development in Egypt" and René Maunier, "La Vie Municipale en Egypte," in *Premier Congrès International et Exposition Comparée des Villes* (Bruxelles: Union internationale des villes, 1913), II, 33-38.

commissions took up issues of road construction and maintenance, distribution of pure water, street lighting, urban drainage, and other amenities and conveniences.⁵

The Alexandria Municipality enjoyed wide prerogatives and was entrusted with the whole range of responsibilities that defined the theories and practices of urban self-government. The *baladiya* had the right to set the budget, to fix and collect taxes, and to administer municipal revenues. And it reserved rights necessary for the management of urban life. The *baladiya* opened, closed, or maintained streets, squares, bridges, parks, and public gardens; it established tariffs for occupancy of public roads and hiring public carriages; it enjoyed the right to develop and subdivide lands and to establish street alignments.⁶ The responsibilities of the *baladiya* comprised all that pertained to the public interest of the city, such as its water supply, lighting, road paving, cleanliness, public markets, cemeteries, abattoirs, sewers, and public baths. Fire service, almshouses, hospitals, primary schools, and charitable urban institutions, such as public fountains, also fell under the responsibilities of the new body. In addition, the administration of public health fell under the responsibility of the municipality, with the important exception of international controls and quarantines, which were under the jurisdiction of the International Board of Maritime Quarantine. Property owners seeking to construct, substantially renovate, or demolish their properties were required by law to obtain approval from the municipal commission in order to ensure conformity with health regulations and public safety.

As contemporary observers versed in comparable institutions in European cities noted, the powers of the Alexandria Municipality were significantly limited in particular aspects. These

⁵ TNA, FO 141/590: "Note sur les municipalités et commissions locales," dated January 31, 1915. See also Michael J. Reimer, "Urban Government and Administration in Egypt, 1805-1914," *Die Welt des Islams* 39, 3 (1999), McLean, "Local Government and Town Development in Egypt," and Maunier, "La Vie Municipale en Egypte."

⁶ Reimer, "Urban Government and Administration in Egypt."

limitations were born out of a compromise between the colonial regime's aversion to the influence of other European powers, especially the French, in Egypt, and the power of consular bodies in Alexandria, as the city was home to more foreigners than any other Egyptian town including Cairo. As the French sociologist René Maunier argued in a paper given at a 1913 conference on comparative cities, the *baladiya* had a limited mandate compared to municipalities of French cities.⁷ The *baladiya* was checked by the International Board of Maritime Quarantine, which was jointly controlled by the fourteen capitulatory European powers. More significantly, the Alexandria Municipality had no role in the administration of justice or in policing—the latter was strictly under the jurisdiction of the central government's Interior Ministry. In matters of taxation, the municipality could only levy taxes agreed upon by the consular bodies of the European powers, but it could not introduce new taxes or modify existing ones that applied to foreign property owners without the consent of the powers. In addition, the Interior Ministry had the authority to review the budget. Finally, the central government administered the city's ports by clearing cotton exports, collecting custom duties, and handling specific imports including that of machinery and foodstuffs.⁸

The composition of the Alexandria Municipality reflected a balance of power between the interests of the city's elites and property owners on the one hand and the colonial regime's unwillingness to completely relinquish authority on the other. By law, the head of the municipality was the governor of Alexandria, who was appointed by the central government. Fourteen out of twenty-eight members of the municipal council were also government appointees. The rest,

⁷ Maunier, "La Vie Municipale en Egypte."

⁸ Reimer, "Urban Government and Administration in Egypt," 296.

however, were elected in such a way as to secure the membership of three representatives of export merchants, three of import merchants, and two of property owners. Conditions of candidacy and restrictions on the franchise ensured that members were drawn from and represented an extremely narrow class of urban elites. In 1895, eligible voters had to be male, twenty-five years old, and paying at least LE 75 of rent annually. Three decades later, the property conditions on the franchise were relaxed by allowing members of the liberal professions to vote and by lowering the bar to a property tax of LE 4 annually. For much of the colonial period, these conditions meant that a plutocracy of merchants, property owners, and moneyed elites of European and Levantine origins took charge of the municipal body, and Michael Reimer estimated that the franchise was limited to one percent of Alexandria's inhabitants.⁹

The sources of revenue for all municipalities and local town commissions in Egypt fell under three categories: first, revenues from property taxes and local dues or profits from slaughterhouses, permits, occupancy of public roads, alignments, and water and light installations, etc., second, grants from the central government, and finally, voluntary taxation.¹⁰ Property taxes constituted the most substantial source of municipal revenues. In addition, the central government provided financial and expert assistance to municipalities, especially with substantial works of infrastructure such as water supply or lighting and with the preparation of town planning schemes. The money that municipalities borrowed from the government for these undertakings was repayable by annual instalments.¹¹ The government particularly assisted the Alexandria

⁹ Ibid., 295. See also TNA, FO 141/590: "Note sur les municipalités et commissions locales," dated January 31, 1915 and Toussaint Caneri, *La ville du Caire, son présent et son avenir: essai sur la création d'une municipalité* (Le Caire: Imprimerie de l'Institut français d'archéologie orientale, 1905).

¹⁰ McLean, "Local Government and Town Development in Egypt," 90.

¹¹ Ibid., 91.

Municipality with funds and expertise on costly projects of sanitary infrastructures. Finally, voluntary taxation was the method by which foreign residents who were willing to pay for urban improvement circumvented their tax exemption under the capitulations. The willingness of Egyptians and foreigners to pay voluntary taxes for the improvement of cities underscored the appeal of municipalities.

Organs of self-government initiated new sites of contestation and new politics in Egypt. Not unlike other municipal bodies or representative institutions for that matter, the Alexandria *baladiya* was an arena of competing business interests and political alliances. During the first years of the Alexandria Municipality, there were debates regarding who should chair meetings. While the governor of Alexandria was the appointed president, it was common for the elected vice-president to chair regular meetings. From 1893 to 1903, the Syrian-Egyptian Shakour Bey, who belonged to a family of urban investors, was the municipality's vice-president and director. When the prime minister, Riaz Pasha, who managed the relation between colonial administrators and the Khedive, ordered the governor to chair all meetings in 1893, the decision led to objections among the European community.¹² The governor had been resentful of the newly elected body that encroached on his powers, while foreign and elite landowning members of the *baladiya* “considered the intervention of a native executive officer in all the details of their business as calculated to impede its efficient transaction.”¹³ In addition, the municipality was the site of the formation of political and economic alliances. At the height of the property bubble when rents and values of urban lands soared, an independent tenants' committee protesting a new rent tax was

¹² TNA, FO 407/120: Mr. A. Hardinge to the Earl of Rosebery, dated July 17, 1893.

¹³ Ibid.

formed in 1904. The committee opposed the universalization of a 2% tax on rents arguing that it was particularly unfair to modest tenants. The *balabiya*, however, shot down the committee's demands as well as early proposals for the construction of economic public housing on municipal lands. The confrontation led to accusations of collusion between members of the municipal council and property owners. The council clearly reflected the interests of its elite members, including landlords and investors in urban development.¹⁴

Contemporary foreign observers agreed that municipalities improved the conditions of Egyptian towns, yet opinions diverged regarding their degree of autonomy compared with similar institutions in England and France. René Maunier was a French colonial sociologist, a professor at the Khedivial School of Law in Cairo, and vice president of the Khedivial Society for Political Economy. Among his various publications were a monograph on the economic function of cities and comparative studies of municipal institutions.¹⁵ He was of the opinion that limitations on Egyptian forms of self-government, including the most powerful municipality of Alexandria, severely limited their scope compared to French municipalities. And he argued that self-governing bodies in Egypt were exceptional sites instead of being the organizing principle of the administration.¹⁶ William McLean compared Egyptian municipalities with English institutions of local self-government. He saw that there were important differences such as the general incapacity of Egyptian local bodies to finance themselves without assistance from the central government and

¹⁴ Hilmi Ahmad Shalabi, *Al-Hokm al-Mahalli wa al-Majalis al-Baladiya fi Misr* [Local Self-Government and Municipal Councils in Egypt] (al-Qahira: 'Alam al-Kutub, 1987), 124-8 and Reimer, "Urban Government and Administration in Egypt," 300.

¹⁵ René Maunier, *L'origine et la fonction économique des villes: étude de morphologie sociale* (Paris: Giard et Briere, 1910).

¹⁶ Maunier, "La Vie Municipale en Egypte."

the relatively low direct taxes compared to those in England. Yet as he studied the municipal question more broadly in 1917 he was struck by how Egyptians favorably reacted to these “liberal institutions” compared to the difficulties they encountered when they were introduced in England and Russia.¹⁷ McLean concluded that enthusiasm for institutions of self-government expressed considerable “civic responsibility” and “public spirit”:

“In the new Commissions public spirit is manifested and demands for improvement and amelioration of the town are made and land is often given or money subscribes or voluntary taxation agreed to in order to hasten these projects, and they are usually carried out with enthusiasm and in a manner which it would be impossible for Government to do alone without the co-operation of the inhabitants themselves.”¹⁸

The question then was what prevented the introduction of a municipality in Cairo? For the entire British colonial period, and indeed up until 1949, the central bureaucracy managed the capital as if it was a province. Since the creation of the Alexandria Municipality, the government received numerous proposals from moneyed inhabitants of dozens of towns, including the capital, to establish comparable institutions.¹⁹ And while it authorized the formation of numerous municipalities and local commissions, Cairo remained a singular exception. The problem of a Cairo municipality was twofold. First, as with many other projects that required taxing foreign residents in Egypt, Cromer cited the system of capitulations as an essential component of what he called the internationalized government of Egypt and as the primary hurdle against a municipality for the capital. The system made it difficult to impose taxes for local purposes, particularly the house tax, as it required the consent of fourteen European powers. Initially, the system provided tax exemptions to foreign residents until 1885 when the powers agreed, yet only in principle, to

¹⁷ McLean, “Local Government and Town Development in Egypt,” 92.

¹⁸ *Ibid.*, 91-92.

¹⁹ *Ibid.*, 90; Shalabi, *Al-Hokm al-Mahalli wa al-Majalis al-Baladiya fi Misr*, 72-81.

equal taxation with Egyptians. However, European governments were still free to contest taxes and their adjustments. For decades, Cromer railed against the capitulations as a “system of privilege” and as a specimen of the internationalized institutions that posed formidable hurdles facing his regime.²⁰ Second, a Cairo municipality would have introduced “internationalism” in the governance of the capital. Cromer was particularly weary of foreign loyalties that exercised influence on his administration. In matters of legislation, he believed that because Egypt was “essentially a cosmopolitan country,” “if any local legislature is created, it must, if it is to be truly representative, be cosmopolitan in character.” The problem, however, was when members of executive or legislative institutions seem to receive instructions from “several Foreign Offices.”²¹ Due to the strong presence of foreign communities, a Cairo municipality would have been necessarily a mixed municipality with a similar, if not wider, mandate than in Alexandria. A mixed municipality in Cairo would have reopened this contentious issue for the British regime, which was willing to tolerate internationalism and relinquish some of its power to local bodies in Alexandria and other provincial towns, but not in the capital. Further, Cromer explicitly argued that Alexandria was an exception, for it “may almost be called an European town.”²² This justified the long and difficult negotiations with the European powers that the British regime endured in order to create the mixed body, which alone of all municipalities approximated the ideal of local self-government in Egypt.

A proposal for establishing a municipality in Cairo made explicit how concerns for health and elite economic interests interwove with demands for municipal autonomy as a guarantee for

²⁰ Cromer, *Modern Egypt*, Vol. 2, Ch. 41 and 52.

²¹ *Ibid.*, 440-41.

²² TNA, FO 407/170: The Earl of Cromer to Sir Edward Grey, dated March 3, 1907.

urban improvement and growth. Writing at the height of the speculative bubble in 1905, Toussaint Caneri, a former official at the Public Works Ministry for twenty-two years, produced a short study on the issue. The Legislative Council had raised the question of a Cairo municipality a year earlier, but the government immediately turned down the idea citing insurmountable difficulties of taxing European residents. Caneri, however, argued that the municipality was a project of “public utility” that should no longer be put off. And he claimed to have discussed the proposal with members of the Legislative Council as well as property and business owners who fully supported the project. He emphasized that his study was an impartial examination of a question that was of critical importance to foreign and Egyptian residents of the city at an important juncture of its history. And he hoped his study would sway the opinion of officials and garner support from the city’s comfortable classes.²³ Caneri’s point of entry was the Alexandria Municipality, for it demonstrated that a similar institution in Cairo was not impossible if the government was willing to enter into negotiations with the European powers.

One of the most critical functions of a municipality that was sorely missing in Cairo was ensuring healthy urban conditions. As we saw in previous chapters, the first decades of British rule were marked by a heightened sense of government failure to respond to urban growth and to insanitary conditions that led to outbreaks of infectious diseases. Caneri pointed out that while Cairo changed much during the past decades, its death rate remained very high, certainly above the 25-30 range that marked healthy urban environments. And he argued that improving the health of Cairo “pertains more to the municipality than the government.”²⁴ While Cairo’s inhabitants paid

²³ Caneri, *La ville du Caire*.

²⁴ *Ibid.*, III

taxes, including the house tax, there were no channels for ensure accountability with matters of public hygiene. Caneri referred to the many projects of urban improvement that remained inactive on the shelves of ministries, and as a former official of the Public Works Ministry, he knew many of the sanitary experts who studied the city's conditions since 1885 and studied their reports. A capable municipality, he argued, could improve sanitary conditions by implementing one of these well-studied yet dormant proposals. For him, the most outstanding tasks that required the formation of a municipality were an urban drainage system, street cleaning, opening new wide streets to ensure better traffic and air circulation, house numbering, road naming, an urban budget, and police regulations that would enable law enforcement in matters of public hygiene.²⁵ And Caneri foresaw no objections from European powers to the formation of a municipality since they were presumably invested in the health of their subjects, who increasingly arrived at the city as tourists and residents.

Caneri hoped that a municipality could better direct, and help deliver, the future that Cairo seemed to be moving towards during the decade of the property bubble. He relied on stock arguments of the city's economic boosters, including urban investors and property owners, who were likely to fill the seats of the new municipality. Citing overinflated demographic figures, the author argued that Cairo's million residents deserved better services. He argued that the city's spatial and demographic growth should be directed by a municipality that was capable of unlocking even more robust growth by carrying out long overdue projects of urban improvement and sanitary infrastructures.²⁶ For instance, a municipality could oversee the project of opening

²⁵ Ibid., 2-3. Caneri also proposed the development of Moqattam as a park and a neighborhood of healthy housing.

²⁶ Ibid., 10.

wide boulevards in old neighborhoods, which would relieve density and improve traffic and public health, thus open these impenetrable zones for capital. The former official was particularly enthusiastic about how opening new arteries could add “additional value to Cairo’s lands.” If the government was incapable of implementing much needed urban reforms for whatever reasons, then a municipality with a strong mandate and the approval of European powers could surely fill in this bureaucratic gap. Relatedly, the author complained of lack of key urban information and of the incoherence of the city’s administration. He claimed that the city needed an exhaustive urban survey in additions to street naming and house numbering in order to ascertain the true value of urban lands, which soared by 1905.²⁷

Caneri argued that Cairo possessed the means to form a financially independent municipality, and he supplemented his proposal with a hypothetical budget, a discussion of possible sources of revenue, and a suggestion on the size and scope of the franchise. He estimated that Cairo needed a budget of at least LE 250,000 compared to Alexandria Municipality’s LE 151,000. The current budget of the Tanzim Department was a mere LE 85,000, which was clearly insufficient except for limited services. As a former employee of the Town and Buildings Service Caneri showed how the Cairo municipality could accumulate robust revenues through several fair and reasonable taxes and returns on houses, slaughterhouse, road occupancy, shipping boats, foodstuffs, and Qasr al Nil Bridge.²⁸ And he suggested that a sewage system could be the source of additional municipal revenues. Cairo’s nearly 60,000 house owners could pay LE 99,000 annually in exchange for connection to public sewers: LE 18,000 from 3,000 houses of the first

²⁷ Ibid., 9.

²⁸ Ibid., 5.

class, LE 20,000 from 4,000 houses of the second class, LE 46,000 from 23,000 houses of the third class, and LE 15,000 from 30,000 houses of the fourth class. For him a service charge was fair because the system would relieve property owners of the high charges they already paid to private companies and night soil men in order to clear cesspools.²⁹

In terms of the composition of the municipal council, Caneri was of the opinion that it must contain both Europeans and Egyptians. Writing at a moment of emergent nationalist mobilization against the colonial regime and challenges to the perceived “European” nature of the Alexandria Municipality, he acknowledged that the legitimacy of the municipal body, which was becoming synonymous with its power to levy taxes, hinged on including natives. But there was still no doubt about the elite nature of the council as Caneri envisioned it. He suggested following the same rules adopted in Alexandria for candidacy and voting, with the sole exception of lowering property requirements to LE 50 of annual rent instead of LE 75. The reduction was significant, yet not enough to radically alter the class composition of the proposed body.

Finally, Caneri acknowledged that the question of a municipality was political. First, he was aware that a municipality could become a space for private interests and competing economic cliques to exert influence over the city, and he suggested more effective monitoring on members in order to mitigate these dangers. Second, writing at the time of the Russian-Japanese war, the Russian constitutional revolution, and increased activities of anarchists and socialists in Egypt and elsewhere, Caneri was cognizant that local self-government was an experiment of political representation.³⁰ He referred obliquely to Russia as a case of “politics that destroys” and

²⁹ Ibid., 6-7.

³⁰ On the rise of radical politics see Ilham Khuri-Makdisi, *The Eastern Mediterranean and the Making of Global Radicalism, 1860-1914* (Berkeley: University of California Press, 2010) and Malak Badrawi, *Political Violence in Egypt, 1910-1924: Secret Societies, Plots and Assassinations* (Richmond, Surrey: Curzon Press, 2000).

maintained that socialists held the wrong position as they sought to dismantle institutions in order to build them anew. For Caneri, Japan, which was under a constitutional regime, suggested a more useful path to political representation and gradual improvement.³¹ While intentionally vague, Caneri hinted that a politics of gradual improvement via locally elected bodies was the best safeguard against revolutionary politics and its aftermath.

The regime responded to these and similar calls for a Cairo municipality by demonstrating that it could carry out projects of sanitation and improvement without risky experiments in representative institutions. Between 1905 and 1915, colonial authorities provided the city with a sewage system and oversaw upgrading the city's water supply. At the same time, they repeatedly ruled out a municipality in Cairo. In 1904, Abd al-Rehim al-Demerdash, a member of the increasingly oppositional General Assembly, a consultative body that lacked authority in budgetary and other critical matters, proposed the formation of a mixed municipality in Cairo.³² Cromer responded that "there is a good deal to be said in favor of this proposal, but the Assembly appears to have been unaware of the fact that, unless municipal taxes are to fall entirely on local subjects, no municipality, possessing any power to impose taxes, can be formed without the consent of the Powers."³³ The imperial administrator was cognizant that institutions of self-government opened up the question of political representation wide open. In his annual report, he presented stock arguments concerning the incapacity of Egyptians to form independent opinions given their lack of political education, and thus the need for European officials or Egyptians who

³¹ Caneri, 16-17.

³² *Mahader Jalasat al-Jam'iya al-'Umumiyya* [Minutes of Proceedings of the General Assembly] (al-Qahira: Matba'at Dar al-Kutub wa al-Watha'iq al-Qawmiya, 2011), Vol.1, 326 and 332.

³³ TNA, FO 407/170: The Earl of Cromer to Sir Edward Grey, dated March 8, 1907.

have “assimilated European ideas” to represent “the interests of the masses.”³⁴ In principle, it was desirable from both the administrative and political point of view that “the townspeople in Egypt should be entrusted with the management of their own affairs.” Yet, Cromer was certain that Egyptians were in reality only concerned with “how they could best get their roads paved and their houses supplied with water or electric light.” Any demand for local self-government as a “stepping stone” for political representation were for the time being “entirely foreign to their thoughts.”³⁵

Yet Cromer’s program of material improvement could not deter the politicization of collective urban life. Using modern idioms for making political claims, Egyptian nationalists demanded representation in exchange for taxation, and denounced the despotism of the allegedly “enlightened” British rule. As we saw in previous chapters, regime critics denounced lack of independent review of projects of infrastructural reorganization in Cairo, and they argued that it was the task of municipalities to ensure adequate examination of such projects before they were implemented based merely on the opinion of few executive officials. Opponents of the regime singled out the “autocracy” (*hokm al-fard*) of the British administration as the cause for the drinking water debacle of 1905-1910.³⁶ In fact, one of the most recurring themes in articles on Cairo in the Arabic press was the absent municipality and the consequent lack of unaccountability in matters of urban governance. Many of these articles blamed the neglect of old neighborhoods on the skewed preferences of urban officials, while many others deplored property taxes in the absence of institutions of local self-government. For instance, an article that appeared in *al-Mu’ayyad* in 1909 urged the General Assembly to speak out against a hike on house tax that was

³⁴ TNA, FO 407/170: The Earl of Cromer to Sir Edward Grey, dated March 3, 1907.

³⁵ Ibid.

³⁶ “Bayan Labudd Minhu” [A Necessary Statement], *al-Jarida*, October 18, 1909.

meant to finance the sewage system scheme. The author argued that until there was a legitimate municipality, the taxes that Cairenes paid ended up “in the hands of an individual or a few of them whose actions are not legible to inhabitants.”³⁷ The Egyptian doctor Mansour Rifaat, who was active in the nationalist movement, wrote an incendiary piece in the short-lived *al-‘Alam* where he highlighted the inefficiency of the Public Health Department in dealing with the health of Cairo, particularly its poorer quarters. He argued that only a municipal council composed of a majority of Egyptians could be trusted to provide adequate services to neglected quarters, and he accused the Alexandria Municipality of heeding the interests of foreign elites alone.³⁸

By the last decade of British colonial rule, Cairo came to occupy a central space for the regime. The regime’s reassessment of models of urban governance articulated the realization that disjointed governance through various departments was no longer adequate to the demands of the thriving metropolis and its newly found centrality. And the regime was already fully invested in the city’s future growth, having devoted much attention to sanitary infrastructures in response to the city’s protracted biological crisis and the demands of urban investors and elites. The regime was also coming under political pressure due to the 1906 Denshwai incident and its aftermath, including the intensification of political violence with the murder of Boutros Ghali by Ibrahim al-Wardani in 1910. Under the relatively more reconciliatory administration of Eldon Gorst—the British Consul General from 1907 to 1911—the Council of Ministers proposed studying the feasibility of a municipality for Cairo late in 1908. In his annual report for 1908, Gorst explained that the “triple control” of the city’s affairs by the Tanzim, the Public Health Department, and the

³⁷ *Al-Mu’ayyad*, Feb 1, 1909.

³⁸ Mansour, Rifaat, “Baladiyat al-‘Asima” [The Municipality of the Capital], *al-‘Alam*, March 15, 1910. See also his lecture in the first national congress in Brussels. Mansour Rifaat, “L’hygiène publique en Égypte,” in *Œuvres du congrès national égyptien tenu à Bruxelles le 22, 23, 24 Septembre 1910* (Brussels: St. Catherine Press, 1911).

Governorate was “conducive neither to economy nor efficiency, and that the municipal work of Cairo would be carried out in a much more satisfactory manner if it were managed by one central body on which the different Departments interested, and also the inhabitants, were represented.”³⁹

The most outstanding aspect of the regime sponsored proposal of Cairo Municipality was that it sought to centralize urban administration while emptying politics out of local self-government. In order to study the question, the Council of Ministers appointed a committee that included members of ministries and departments that then shared the administration of the city.⁴⁰ The committee’s report recommended forming a Public Utilities Commission of sixteen members under a Municipal Service to be placed under the authority of an appointed general director. The municipality would have the power to impose taxes on houses within Cairo’s limits, which could also be negotiated as the city expanded. The sale of all urban lands would be administered by the Ministry of Finance yet added to the municipality’s coffers. The Public Utilities Commission would be entrusted with all the usual urban responsibilities of the Tanzim and have the power to monitor public utility companies including those for water, gas, and tramways. It could review the systems of filtration and distribution of potable water and recommend new ones for adoption by the Cairo Water Company, yet the final judgement on the quality of water would remain under the jurisdiction of the Public Health Department. And it would review applications for private connection to public sewers, and inspect internal house arrangements before authorization. Other notable tasks included control of vacant lots, public carriages, prostitution, markets, cemeteries, slaughterhouses, and dangerous establishments. In terms of composition, eight members would be

³⁹ TNA, FO 407/174: Sir E. Gorst to Sir Edward Grey, dated March 27, 1909.

⁴⁰ TNA, FO 371/622: Report of the committee studying the proposal of a Cairo municipality, dated May 31, 1909.

directly supplied from relevant ministries and departments in addition to the Governor of Cairo. The government would select the other eight members of the Commission from among top property owners in Cairo's eight tax districts (sing. *thumn*).⁴¹ Thus, the committee decided against even the limited franchise for urban elites that was common in other municipalities, but did not foreclose this possibility in an unspecified future. The proposal provided some hope to reform-oriented critics of the British administration but fell far short of the aspirations of nationalists.⁴² It was clear that while the regime searched for centralized dynamics and institutional structures to govern a more demanding Cairo, it sought to avoid the potentially high political costs of creating space for representative politics, which could have been used against it during a period of turmoil.

The question of a municipality for Cairo did not advance much further after 1909. In 1912, the Ministry of Interior circulated a hypothetical budget of the proposed Cairo Municipality compared to Alexandria's budget. In terms of receipts, the most notable difference was that the house tax in Cairo was disproportionately the most important item yielding LE 201,360 out of a LE 302,408 total. Alexandria's revenues (LE 322,000 in total) came from more evenly distributed sources including LE 158,000 from house tax, LE 34,000 from 2% tenants tax, and LE 24,000 from import and export taxes among others.⁴³ These figures came with the qualification that updated figures were sometimes lacking in Cairo, which pointed to gaps in official knowledge of the city that mirrored its fragmented administration.⁴⁴ The government dropped the municipality

⁴¹ For house tax purposes, Cairo was still under the old administrative division of eight districts (*thumn*, literally 'an eighth').

⁴² "Al-Majlis al-Baladi li al-'Asima" [The Capital's Municipal Council], *al-Jarida*, Nov 3, 1909.

⁴³ TNA, FO 141/633/1: "Cairo Municipality."

⁴⁴ TNA, FO 371/622: Report of the committee studying the proposal of a Cairo municipality, dated May 31, 1909.

project indefinitely after 1912, and with the outbreak of World War One and the declaration of Egypt as a protectorate, risky forms of local self-government in Cairo became ever more undesirable for the British regime.

Reforming the Cairo Tanzim Council was by far a safer option. In 1913, the government added “two native notables from the city inhabitants” to the membership of the Tanzim.⁴⁵ As Murdoch Macdonald, the Under-Secretary of state for the Public Works Ministry, explained in a note to the Finance Ministry, the council historically discussed urban engineering matters insofar as they fell under the jurisdiction of the Public Works Ministry. However, from 1913 to 1915 the Tanzim discussed practically all engineering questions affecting the city, and the expanded function of the council was the subject of a debate on mandates and jurisdictions among government officials particularly those of the ministries of Public Works and Finance. Macdonald was in favor of this expansion, and he suggested reforming the constitution of the Tanzim in order to better handle major engineering undertakings in Cairo. Specifically, he suggested including a representative from the Finance Ministry and a member from the Public Health Department in addition to the city’s medical officers currently serving on the council. And he proposed adding a third Egyptian notable to be nominated by the Council of Ministers. As Janet Abu-Lughod acutely noted, this was “at best, an ingenious solution to the problem which the lack of a municipal body had created and perpetuated.” Yet “apolitical management” was not a real substitute.⁴⁶

The reorganization of the Tanzim Department expressed the regime’s desire to create a viable framework for urban administration that could substitute a municipality and oversee a future

⁴⁵ TNA, FO 141/633/1: Note by Murdoch Macdonald, dated May 23, 1915.

⁴⁶ Janet Abu Lughod, *Cairo: 1001 Years of the City Victorious* (Princeton: Princeton University Press, 1971), 149.

program of urban improvement and growth without political risks. In 1915, Macdonald wrote that the council had already done valuable work on the cheap, yet “a great deal has still to be done, more particularly in the native districts.”⁴⁷ As Macdonald saw it, a reorganized Tanzim would be instrumental in project of extending necessary infrastructures including water supply, drainage, and lighting systems to Cairo’s old neighborhoods. These extensions would make possible “laying out the native quarters on more modern lines,” a scheme that has been under consideration for some time, yet remained dormant for lack of funding and administrative organization.⁴⁸ At this juncture, the regime began considering project of urban planning and public intervention into housing, which raised the regime’s program of infrastructural reorganization of the past decade to a new level.

The time was ripe for town planning as a response to Cairo’s housing crisis and its uncoordinated development of the past decades, and such tasks could not possibly wait until the political question of a municipality was resolved. Indeed, the success of these projects of urban improvement and planning could obviate the need for a municipality, and undercut the arguments of government critics including nationalists. By the end of World War One, a new breed of engineers and urban planners including Murdoch Macdonald, C. W. Haswell, and William McLean began prepared preliminary drafts of town planning and housing schemes that relied on the wealth of urban knowledge that the regime produced and systematized during the past decades, which were particularly spurred by its program of infrastructural reorganization.

⁴⁷ TNA, FO 141/633/1: Note by Murdoch Macdonald, dated May 23, 1915.

⁴⁸ Ibid.

Knowing the City

While knowledge of Cairo was essential for everyday governance, it became more necessary the more ambitious the regime's projects were. During the last few decades of the nineteenth century, under both Khedive Ismail and the British occupation, experts produced new kinds of knowledge of Cairo with scientific claims to objectivity and systematicity to replace what they deemed as the impressionistic and deficient accounts of their predecessors. Urban infrastructures sparked even more extensive efforts of knowledge production as they required gathering, collating, and organizing information on the urban landscape. And as the regime rethought its urban policies and began contemplating projects of housing and town planning, information became ever more crucial. The survey, understood as knowledge in concentrated form, was the foremost requirement for projects of urban renewal, expansion, and planning. This section probes mapping as a key site of the production and concentration of knowledge of the city. It also reveals lacunas of knowledge that threatened routine urban administration and posed obstacles to the regime's urban turn of the last decade.

Building and area classifications were part and parcel of efforts initiated under the rule of Khedive Ismail to account for the urban environment. As Jean Luc-Arnaud shows, city officials systematically classified the elements that made up the urban landscape in order to analyze their functions and diagnose their problems in ways that diverged from mid-nineteenth century medical topography and ethnographic descriptions.⁴⁹ During the 1870s, public health authorities surveyed cemeteries and issued regulations concerning their location in relation to towns as well as the transport and inhumation of corpses, and in 1883, cholera led the government to survey Cairo's

⁴⁹ Jean-Luc Arnaud, *Le Caire, mise en place d'une ville moderne, 1867-1907: Des intérêts du prince aux sociétés privées* (Aix-en-Provence: Actes Sud, 1998), 195.

slums.⁵⁰ In 1884, the newly established Public Health Department published instructions concerning the location and function of slaughterhouses and butchers.⁵¹ In 1889, the government issued similar regulations concerning insalubrious and dangerous establishments, classifying them into two broad categories according to potential nuisance to their surroundings. The first category comprised slaughterhouses, chemical products manufacturers, matchmakers, brick and glass makers, dung cake depots and makers of natural fertilizers, salted-fish establishments, iron foundries, alcohol, indigo, petrol, and sugar depots and manufacturers, tanneries, gas factories, and quarries. The second comprised public baths, breweries, laundries, charcoal depots, restaurants and public kitchens, distilleries, stables, food markets, public latrines, grain and oil mills, paper manufacturers, meat curers, and soap manufacturers. The regulations listed the requirements for each category for attaining the appropriate permit, and the first class of establishments was required to be placed away from inhabited areas. And as we saw in previous chapters, mosques, ablution courts, water fountains, and public baths, were under the watch of authorities due to their centrality to the city's health.⁵² Not all these regulations were effective. While driven by the city's biological crisis, and particularly cholera epidemics, these efforts demonstrate that authorities actively attempted to account for the constitutive features of the urban landscape. As

⁵⁰ Dar al-Wathaiq al-Qawmiyya [DWQ] (The Egyptian National Archive), Diwan al-Ashghal al-Umumiyya (Public Works Ministry), file number: 4003-037345. *Règlement en Vigueur sur les Cimetières, Inhumations, Exhumations et Transport de Cadavres à l'Étranger* (1877) and *Arrêté Ministériel Concernant la Construction des Habitation pour les Ouvriers* (1883).

⁵¹ DWQ, Diwan al-Ashghal al-Umumiyya (Public Works Ministry), file number: 4003-037345. *Instructions Concernant les Abattoirs et les Boucheries* (1884).

⁵² DWQ, Diwan al-Ashghal al-Umumiyya (Public Works Ministry), file number: 4003-037345. *Decree Project Concerning Inconvenient, Unhealthy and Dangerous Establishments* (1885)

administrators understood, such knowledge was necessary for any attempt to address the health of Cairo.

Urban infrastructures demanded producing and coordinating knowledge of Cairo on a new scale. The design of sewage system schemes required intensive gathering of information about the urban environment. Sanitary engineers solicited a bewildering array of information from government agencies that covered all aspects of the physical landscape including climate, groundwater and Nile levels, land levels, varying composition of the subsoil, location of existing water and gas pipes, and most essentially maps. Compiling, analyzing, and synthesizing such information was necessary for understanding the limits and constraints of the landscape and for examining different scenarios for where to place main features of the system. Engineers solicited demographic information in order to understand the density of different neighborhoods and to design systems that could endure for a given future. And as we saw in the previous chapter, information on water consumption was decisive for the design of these technological systems. Information on the built environment was equally necessary for the design of infrastructures. The number of houses, the rates they paid according to tax classification, and their internal conveniences were of utmost importance to sanitary engineers for assessing the financial viability of projects, for mapping the city socially, and for deciding which houses could be connected. The design of sanitary infrastructures mobilized significant efforts of making and synthesizing knowledge into a manageable framework for the purpose of reshaping the city.

As technological devices that concentrate knowledge, maps were quintessential for the British regime's ambitions to transform Cairo.⁵³ The history of urban cartography is part and parcel

⁵³ For more on cartography see Richard Dennis, *Cities in Modernity: Representations and Productions of Metropolitan Space, 1840-1930* (Cambridge: Cambridge University Press, 2008), 55-60, Partrick Joyce, *The Rule of Freedom: Liberalism and the Modern City* (London: Verso, 2003), Ch. 1, Robert R. Churchill, "Urban Cartography and the

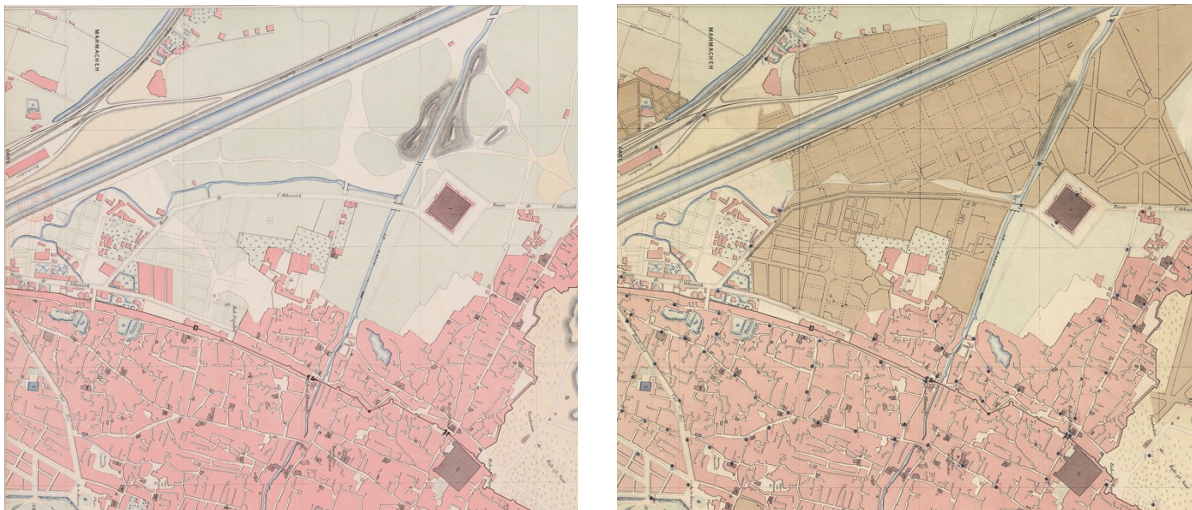
of the need for understanding the structure of the city. In Cairo as elsewhere, scientific cartography underscored the need for detailed spatial knowledge on different, exchangeable scales, allowing both the production an image of the city in its totality and information-packed large-scale maps that allowed studies of neighborhoods and streets. Because they concentrated knowledge in this fashion, maps allowed intervention and mastery of the city on new levels and were therefore central to the work of engineers, sanitary reformers, and city planners. On a more mundane level, plans and maps allowed urban authorities to perform routine tasks such as establishing limits of properties, expropriation, and road construction and alignment. Maps were also important for certain businesses, such as insurance companies, and Cairo's insurance maps expectedly focused on the elite quarter of Azbakiya, the commercial neighborhood of Muski, and their surroundings.⁵⁴

In 1874, Pierre Grand, who founded the Roads Department in 1870, drew a map of Cairo to show, for the first time, the substantial western expansion of the past half-decade under the reign of Khedive Ismail. Drawn on the scale of 1:4000, the map captured the city in considerable detail and it served as the most important reference for urban authorities until 1896 when it was replaced by another map on a comparable scale. Grand's map showed the city's old and new neighborhoods, listed all the mosques and churches, and identified important streets, squares, parks, and buildings including royal palaces, the opera house, and prominent hotels. The map paid much less attention

Mapping of Chicago," *Geographical Review* 94, 1 (2004), and James Akerman and Robert Karrow, eds., *Maps: Finding our Place in the World* (Chicago: The University of Chicago Press, 2007).

⁵⁴ The Cairo Insurance Map of 1905 was typical of insurance company maps that Charles Goad produced for British, American, and other towns. The map provided information on the nature, size, and construction material of buildings, width of streets, and location of depots of alcohol, chemicals, and other flammable material. This and other information such as the proximity of fire service and water sources assisted insurance companies in estimating premiums. Detailed sheets were on the scale of 1:600.

to Boulaq and Old Cairo both of which were poor, isolated quarters.⁵⁵ Because authorities produced no other maps for the next three decades, it is common to encounter updated versions that show subdivision of new areas or renewal of old neighborhoods, by means of superimposed layers on the original map. These updated maps show how Grand's map was utilized for designing new developments during the 1880s and 1890s, or simply for illustrating such developments. While the British administration started mapping important provincial towns during the 1880s, it took fourteen years (from 1882 to 1896) to produce an updated general map of Cairo that still lagged behind the city's growth, a testimony to the relative insignificance of Cairo for colonial policy during the first two decades of the occupation.⁵⁶



5.1. Two copies of Grand Bey's map showing Faggala and Daher. (Sources: The American University in Cairo and The Bibliothèque nationale de France)

The sewage system scheme of 1892 that Julien Barois prepared was the occasion for a survey of Cairo that was unique in its features and unparalleled in its level of details. Preparing a

⁵⁵ Grand Bey, *Plan général de la Ville du Caire: Dressé et publié avec l'autorisation de S.A. Ismail Pacha Khédive d'Egypte*, 1:4000 (Le Caire: Ebner et Cie, 1874).

⁵⁶ Arnaud, *Le Caire*, 211.

scheme that was tailored for Cairo required an updated, large-scale map of the city. This was all the more true since Barois proposed a gravitational scheme that depended on constructing interconnected systems of sewers at measured inclines. To find appropriate inclines and paths of sewers, Barois needed detailed knowledge of streets and buildings, and he entrusted Henri Ravon Bey, the director of the Drawing Office of the Public Works Ministry, with the task of producing a suitable map. Yet with less than a year to finish, evidently insufficient to survey the entire city, Ravon resorted to a very unusual solution. Under his direction and over the years, Ravon's office had produced or possessed many large-scale drawings of single or few neighboring streets covering many parts of the city. These engineering drawings were precise as they were used by the Tanzim for street construction, repair, or alignment and other routine purposes. However, these drawings had varying scales and orientations, largely dictated by the shape of streets and blocks. Ravon and Barois constructed their 1892-93 map by collecting all of these drawings, unifying their scales, styles, and color encoding, filling in where information or drawings were lacking to create an enormous map and urban survey of 353 sheets that covered the entire city. The map comprised 297 sheets on the scale of 1:200, 53 on 1:500, and 3 on 1:1000. Since a general map was still lacking, Ravon created a key map by simply drawing outlines of each sheet on a copy of Grand's map.⁵⁷

The unique characteristics of Barois' map revealed some important aspects of the urban landscape while obscuring others. The most notable feature of the map was the irregularity of the contours of areas covered by each sheet, which commonly captured a few neighboring streets as if they formed an isolated island. The sheets did not form a regular grid uniformly covering the

⁵⁷ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-037423. Arnaud, *Le Caire*, 213-215. Each sheet is about 105 by 145 centimeter.



5.2. Plate from Barois' map and urban survey. (Sources: The Survey Department, Egypt)

city, as large-scale maps commonly did, and it was difficult if not impossible to put together a few sheets of the original map in order to visualize larger areas. However, the map captured numerous aspects of the urban landscape. It showed the limits of buildings in relation to the streets and indicated the names of all streets. It showed all mosques, public baths, public fountains, and buildings administered by the Ministry of Charitable Endowments outlined in the color green. It indicated in blue the location of all sources of water in the city including its wells. The map also indicated the nature of all buildings including warehouses, markets, retail shops, coffee shops, bars, slums as well as industrial buildings and those belonging to gas and water companies. Finally, the map specified land ownership, identifying the name of proprietors on each lot across the entire city. Ravon used the 1:200 scale for old, densely-populated areas and the 1:500 for the sparsely

populated neighborhoods developed under Ismail and the British regime.⁵⁸ The map also showed areas under development such as Faggala and Daher. Suburbs that lay outside the limits of Grand's map such as Matariya were not covered by the survey.

The map was critical for the design process of Barois' sewage system scheme. The survey contained hundreds of reference points that were recorded on a special register and marked street levels covering the entire city. The file that the French engineer submitted to the international commission for their approval on the final project contained evidence of how the study team used the map.⁵⁹ The process involved tracing the original map on new sheets that displayed the proposed position of sewers. For secondary sewers, which the team designed first, the file included 298 maps on the scale of 1:200 and 53 on 1:500 on tracing sheets that displayed the path of the sewers and showed existing gas and water lines, indicating their dimension and depth. Using tracing sheets, the study team was also able to manipulate scale, thus to represent larger areas. The file contained 110 plates of maps on the scale of 1:2000 that were produced using this process. These maps helped Barois examine how neighborhoods and entire sections of the town could be connected to each other and to his proposed network. Using the 1:2000 scale maps, the study team also submitted 110 plates that sliced the depth underneath the streets.⁶⁰ These plates displayed the longitudinal profiles of all streets showing the position and incline of secondary sewers. The team then followed a similar process for the main collectors, submitting various plans to show their location and depth. The survey was instrumental for designing the scheme, which was however

⁵⁸ The 1:1000 scale was used for the Citadel and two other sparsely populated enclaves including Hilmiya, then a quarter of parks and royal palaces.

⁵⁹ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-037423.

⁶⁰ The scale for depth was 1:100.

abandoned due to expenses.⁶¹ The maps, particularly the more manageable ones on 1:2000 scale, became the basis of future cartographic efforts.

In 1896-97, the Drawing Office under Ravon issued two new maps of Cairo. The 1896 map on the scale of 1:4000 largely copied and updated Grand. However, the map did not cover northeastern areas at the frontier of urbanization such as Daher, Waily, and Abbasiya. Based on Grand and the 1:2000 scale maps, Ravon issued another map in 1897 on the scale of 1:10,000 on four sheets. The 1897 map provided, for the first time in decades, a total image of the city, which was on the verge of a construction boom, showing the reserve of sparsely populated, and newly subdivided, areas that formed the basis of the bubble. The map captured the city from Boulaq to Old Cairo and from Abbasiya to the poor quarters that began forming on the western bank of the river in Imbaba and Giza. This map became the Tanzim's reference for years, even after the creation of the Survey Department in 1898. For instance, the Tanzim report for the year 1904 included two maps showing the ongoing naming of roads and their construction material, both of which were copies of Ravon's 1897 map.⁶²

The ongoing property bubble and infrastructural projects highlighted the need for updated spatial knowledge of the city. In 1907, the Survey Department utilized Ravon's 1892-93 plans on the scale of 1:2000 to produce a provisional map on the same scale covering Cairo and its environs for the explicit purpose of utilization by the Drainage Department. As we saw in the previous

⁶¹ Jean-Luc Arnaud should be credited for being the first to study this map and for his work on Cairo's cartography more generally. However, I do not agree with his opinion that Barois' map was a "considerable waste of irrecoverable energy." Arnaud, *Le Caire*, 215. While Arnaud studied the map itself, it seems that he did not consult the file that Barois submitted to the international commission (now at the Egyptian National Archive). Had he studied the file, he would have seen how the map was used for designing the scheme.

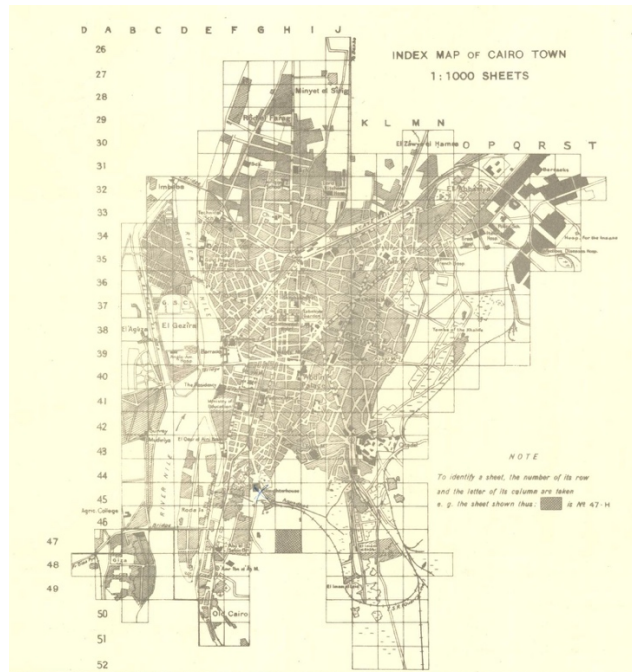
⁶² Ministère des Travaux Publics, *Plan général de la Ville du Caire et des environs*, 1:10,000 (Le Caire: Bureau de Dessin, 1897). *Plan of Cairo Showing Naming of Roads*, 1:18,000, in Public Works Ministry, *Report upon the Administration of the Public Works Department in Egypt for 1904* (Cairo: Government Press, 1905).

chapter, Charles Carkeet James used both of the 1907 provisional map and Ravon's 1897 general map on the 1:10,000 scale for various design purposes. He also consulted the 353-sheet map in order to determine the position of existing water and gas pipes. Also in 1907, the water company asked the Survey Department to forward a copy of these maps, which were in James' possession, as the company did not own comprehensive plans of its own network. As we saw in Chapter Three, the company and the government were investigating complaints against the quality and taste of water, and the company needed the map as a reference for its distribution network.⁶³ Yet by the end of 1907 it was clear to urban authorities that Cairo had rapidly outgrown available spatial knowledge. The Survey Department embarked on a new survey of the city which resulted in a large-scale map that the department drew and published gradually between 1910 and 1913. In Cairo and Alexandria, the department adopted a higher standard of accuracy than that used with provincial towns, since "land is much more valuable."⁶⁴ The result was a 150-sheet map on the scale of 1:1000, which constituted a turning point of urban cartography. As is clear from the index, this map adopted a unified grid system, which facilitated rescaling and combining maps for visualizing larger areas. This feature depended on the Survey Department's recent efforts of gridding all of Egypt since 1901 according to a unified method, or the quadrant system.⁶⁵ The 1910 map of Cairo presented a wealth of information on the city in spatial form. It showed tax, district, and police station boundaries. It displayed tramway and railway lines. It offered information on the type and construction of all buildings including some of its slums. It showed the location of

⁶³ DWQ, Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-007469.

⁶⁴ Ministry of Finance, Egypt, Survey Department, *A Report on the Work of the Survey Department in 1907*, by G. H. Lyons (Cairo: National Printing Department, 1908), 51.

⁶⁵ The department also unified scales, using the following ones: 1:500, 1:1000, 1:2500, 1:5000, 1:10,000, 1:25,000, and 1:50,000. Arnaud, *Le Caire*, 217-18.



5.3. Index map for *Cairo, 1:1000*. (Source: The American University in Cairo)

post offices, sanitary offices, fire hydrants, lamps, wells, public taps, and drinking fountains. Yet while the map covered popular areas that were rapidly developing such as Shobra and Abbasiya, it did not cover new suburbs in the south or the northeast, such as Maadi, Zeitoun, and Heliopolis. Between 1915 and 1921 the Survey Department published another detailed map of Cairo on 47 sheets on the scale of 1:5000. The map captured Cairo’s suburbs and its hinterland all the way to Marg in the northeast and Maadi in the south. Next to the same information of the 1910-1913 map, this survey indicated land levels of all uninhabited areas.

“It is in the town and not in country that “terra incognita” needs to be written on our social maps,” wrote Charles Booth who conducted a pioneering social survey of London in 1891.⁶⁶ His heightened sense of lacunas in official knowledge of the city was widely shared by contemporary

⁶⁶ Quoted in *Charles Booth on the City: Physical Pattern and Social Structure*, edited by Harold W. Pfautz (Chicago: The University of Chicago Press, 1967), 85. See also Christian Topalov, “The City as *terra incognita*: Charles Booth’s Poverty Survey and the People of London, 1886-1891,” *Planning Perspectives* 8 (1993).

urban experts in other cities including Cairo, where they pointed to lack of essential information on Cairo's houses, streets, and "unknown territories" such as slums and squatting settlements. Lack of established street names and house numbers obstructed attempts to survey the city and gather information on its houses and inhabitants, which were necessary for various purposes from preparing tax registers and classifying buildings to settling property titles or even routine road maintenance and construction repairs. The exigencies of governing the unhealthy city, combined with the increasing visibility of the urban poor, highlighted the need to account for slums.

Naming streets and numbering houses were slow processes during the first three decades of colonial rule. Federico Amici, who produced various statistics during the late 1870s and early 1880s, complained that lack of house numbers and fixed names for Cairo's streets and alleys posed challenges to the 1882 census operation.⁶⁷ While authorities proceeded slowly to place official name plates on streets, agencies such as the Post Office Department compiled lists of street names and detailed maps of districts as a reference for its distribution operation.⁶⁸ In 1905, a Public Works Ministry map showing the status of name plates revealed that most streets had plates with the exception of Boulaq, Old Cairo, and northeastern areas from Daher to Abbasiya, where name plates were on order.⁶⁹ The 1910-1913 map displayed the names of all streets, yet these names were not compiled alphabetically or geographically in a separate directory.

⁶⁷ F. Amici Bey, *L'Égypte ancienne et moderne et son dernier recensement* (Alexandrie: V. Penasson, 1884), 71 and Arnaud, *Le Caire*, 201. The census was conducted in the midst of the political turmoil when the country was nearly run by Colonel 'Urabi and the Assembly of Delegates (*Majlis Shura al-Nuwwab*) immediately before the British occupation.

⁶⁸ Jean-Luc Arnaud and Hidi Sami Zaki, *Toponymie du Caire* (Le Caire: CEDEJ, 1994).

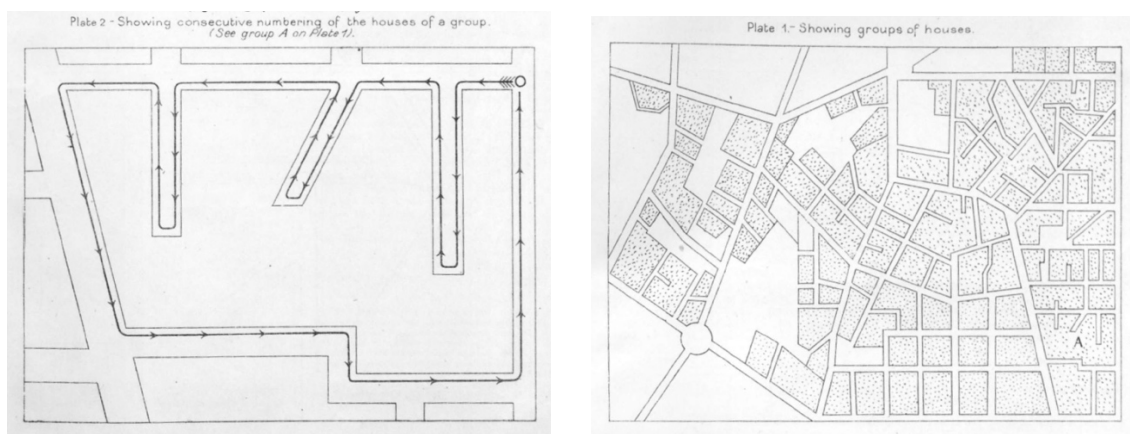
⁶⁹ *Plan of Cairo Showing Naming of Roads* (1905).

House numbering was most crucial for census purposes. C. C. Lewis, the director of the 1907 census operation, complained that lack of fixed house numbers inevitably led to inaccuracies. Given his experience in India, he pointed out that “it is difficult in the East to define a house for census purposes.”⁷⁰ Under his directions, the 1907 census, adopted the practice of using ‘house’ (*bayt*) to correspond to ‘family’ rather than to a numbered construction. Yet in order to counterbalance some potential inaccuracy and assess population density in Cairo and Alexandria, census officials recorded the number of rooms in each inhabited house. Nonetheless, the census operation highlighted the need for more methodical house numbering. J. I. Craig, the director of the 1917 census operation, decided that systematic house numbering should precede census taking. Census officials sought the help of district headmen, or *sheikhs*, in order to assign each house, flat, or shop that was likely to be inhabited on the census night a unique serial number. They assigned as many numbers to large buildings as there were separate families living in them. And they supplied enumerators in Cairo and Alexandria with reproductions of the recent maps on the scale of 1:1000 covering their areas. Dividing Cairo’s districts into *shiyakhas*, or units that fell under the authority of a *sheikh*, each unit was demarcated on the available map. Enumerators were instructed first to walk around the *shiyakha* to which they were assigned and acquaint themselves with its boundaries before testing the suitability of dividing it into smaller blocks and groups of houses. Next step was to draw a scheme of numbering with red ink on the map. Finally, numbering would proceed in the company of *sheikhs*. Census officials adopted the method of consecutive numbering around each block and group of houses rather than across single main streets.⁷¹ Craig

⁷⁰ Egypt, Ministry of Finance, *Te'dad Sukkan al-Qutr al-Misri fi Sanat 1325 Hijriya-1907 Miladiya* [The Census of Egypt in 1325 Hijri-1907 AD] (Cairo: Boulaq Press, 1909), 3.

⁷¹ Egyptian Government, Ministry of Finance, Statistical Department, *The Census of Egypt, Taken in 1917* (Cairo: Government Press, 1920), Vol. 2, Annex II: House Numbering, xxvii-xxxii.

found the presence of *sheikhs* crucial “to secure the goodwill of the native inhabitants,” and supply census takers with information on the number of families occupying buildings, names of streets, and limits of *shiyakhas*.⁷² In the future, however, he proposed better coordination between the census bureau and house tax officials. The central government and the Alexandria Municipality prepared lists of houses in Cairo and Alexandria months in advance in order to serve as guides for the numbering operation.



5.4. Plans showing method of numbering houses. (Source: Egyptian Government, Ministry of Finance, Statistical Department, *The Census of Egypt, Taken in 1917*)

Knowledge was most sparse and confused when it came to Cairo’s slums. Authorities made a series of attempts starting from the 1890s to survey and gain knowledge of slums, their precise location, and their inhabitants. The results of these attempts were occasionally at odds due to lack of coordination among urban authorities as well as the difficulty of the task at hand given the transient nature of the *‘eshash*. When the sewage system scheme by Baldwin Latham was under consideration in 1890, the Public Works Ministry sent to the Interior Ministry asking for a statement detailing the number of houses and *‘eshash* in Cairo and their estimated rent values in

⁷² Ibid., xviii.

order to better assess the financial feasibility of the scheme.⁷³ It turned out that the number of houses in Cairo proper totaled 39,125, out of which 5,634 were *'eshash*. This figure may seem excessively high since slums were concentrated in Boulaq and Old Cairo, both of which were not included in the count. However, it may in fact be accurate if it included the numerous constructions that Cairo's poor built on ruins, abandoned lots, and others administered by the Ministry of Charitable Endowments. It was John Price, the sanitary engineer of the Public Health Department, who supplied this figure based his inspection of slums and old neighborhoods between 1890 and 1892. As we saw in the previous chapter, these figures made the Public Works Ministry skeptical of the feasibility of Latham's project, particularly his suggestion to universalize connection to public sewers.⁷⁴ A few years later, Barois' map and urban survey represented the most sustained attempt to ascertain the geographic location and limits of the city's squatting settlements. In many cases, the map indicated the name of each cluster of *'eshash*, which were mostly named after its owner or owners of the illegally occupied land.

There were grave difficulties of categorization and enumeration when it came to slums. Despite its acknowledged accuracy, the 1897 census only listed the most prominent, and by then the most visible, clusters of *'eshash* while smaller squatted spaces were not given this label. At the same time, other kinds of squatted spaces appeared such as the *'ezba*, a term reserved for previously rural lands that had been swallowed by unplanned urbanization. In Abbasiya, the 1897 census listed 'Ezbet 'Arab al-Mohammadi and 'Ezbet al-Sudaniya (literally the *'ezba* of the Sudanese)—both of which attracted attention during the typhoid fever outbreak of 1889.

⁷³ DWQ. Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-037344.

⁷⁴ DWQ. Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-021820.

Enumerating *'eshash* based on the incomplete information of the census, 2,900 out of the city's 51,150 houses (about 5.7 percent) were makeshift houses.⁷⁵ The figure is enviously far lower than the more precise estimate provided by John Price.

Urban Planning and its Politics

By the last decade of colonial rule urban authorities began contemplating urban projects that sought to forecast the next half-century of urban life. In response to the housing crisis and the uncoordinated development of the past decades, the regime attempted to take charge of the city's growth and to encourage capital investment on its own terms. The need to establish healthy alternatives to slums, to alleviate the congestion of old quarters, to house Cairo's middle class, to create lines of communication among neighborhoods, and to provide a blue print for future city planning were now examined together. For the first time, these issues were seen as facets of the same problem of the spatial and social ordering of a booming city that was being pushed around by forces of demography and capital. These projects paralleled, if not borrowed from, similar ones in Alexandria under the auspices of the municipality. The regime's new approach to governing the metropolis drew on its reservoir of knowledge and its cadre of experts in order to fulfill the tasks of the absent municipality without the associated political risks. During a period of political unrest, urban development and planning were also attempts to undercut contentious politics that called for an autonomous municipality, if not a parliament. The colonial regime sought to invest in material improvement and future growth, from which less comfortable classes were supposed to benefit, as an antidote to contentious politics. During the 1910s and '20s, the Alexandria Municipality and

⁷⁵ Gouvernement Égyptien, *Recensement Général de l'Égypte, 1^{er} Juin 1897—1^{er} Muharrem 1315* (Le Caie: Imprimerie Nationale, 1898).

the central government initiated, examined, and partially implemented projects of urban renewal and town planning. Because the 1919 revolution and subsequent conditional independence reflected slowly on the Public Works Ministry, colonial era projects lingered onto the 1920s.

Opening wide boulevards through Cairo's old, densely-populated quarters had been one of the most outstanding projects that continued to be postponed despite the acknowledged need to improve traffic and air circulation, relieve density, and open these areas for capital. By the middle of the nineteenth century, Clot Bey, Muhammad Ali, and Muski streets were the only streets constructed on top of the old urban fabric, and their construction bore witness to the spatial consequences of mid-century medical theory and its preoccupation with nuisance and the flow of air. During the episode of western expansion under Khedive Ismail, authorities toyed with, yet ultimately abandoned, the idea of "Haussmanizing" older neighborhoods by means of a network of straight boulevards. The project entailed considerable difficulties as it required lengthy negotiations with property owners and religious authorities as well as expenses for expropriation.⁷⁶ Meanwhile, the need to carve wide streets through old quarters continued to surface in official debates. Barois' abandoned sewage system scheme of 1892 called for constructing a number of streets: a boulevard, possibly with a tramline, to replace the Khalig Canal, a boulevard stretching from Clot Bey street and cutting through Faggala in order to facilitate laying the third collector, a road near Muski street to alleviate pressure and ventilate markets, and most ambitiously, a "grand artery" connecting Ataba to Bab al-Futuh.⁷⁷ None of these streets, however, were constructed.

⁷⁶ Mercedes Volait, "Making Cairo Modern (1870-1950): Multiple Models for a 'European-style' Urbanism," in *Urbanism: Imported or Exported? Native Aspirations and Foreign Plans*, eds. Joseph Nasr and Mercedes Volait (London: Wiley-Academy, 2003), 26 and Abu Lughod, *Cairo*, 110-12.

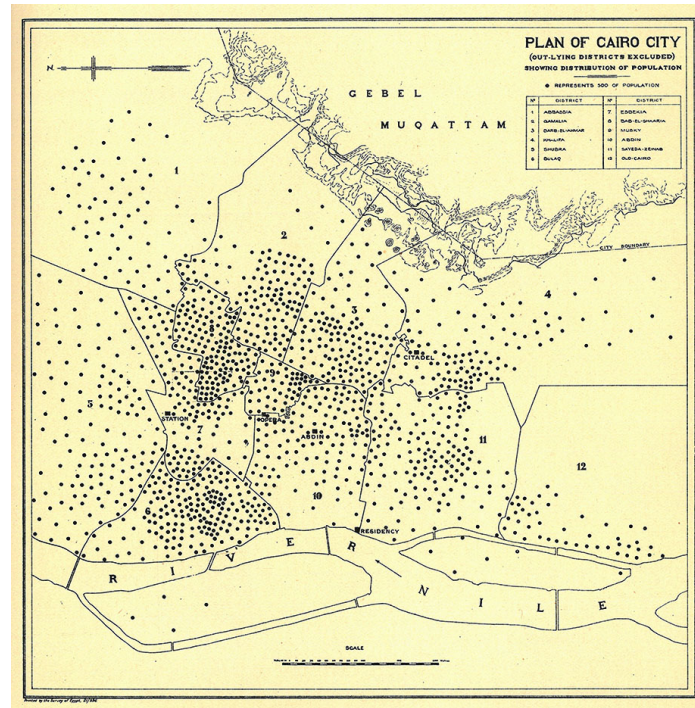
⁷⁷ DWQ. Diwan al-Ashghal al-Umumiya (Public Works Ministry), file number: 4003-030152.

Authorities began to think through the twin problems of urban density and the need for planning in 1911. The Tanzim report conveyed discomfort at the effects of boom era urban developments on congestion and urban connectivity. The department sought to contend with two leading questions in the future: “(1) How to remedy the existing congested conditions of most quarters of the town? (2) How to provide in the future for a rational plotting-out of new building areas?”⁷⁸ In Boulaq and Darb al-Ahmar the percentage of road areas relative to district areas was 11% and 12% respectively, well below the acceptable minimum of 30% that guaranteed healthy environment and effective traffic circulation according to town planning guidelines. C. Haswell, then Controller-General of the Tanzim, estimated that the government needed to expropriate more than two million square meters to achieve this minimum across the city, an enormous task that required between ten to twenty million Egyptian pounds for compensation. Haswell suggested that if the government decided to partially take up this task, it could expropriate not only the area for the new street but also adjacent areas that could be later sold at higher values. “The adoption of such a method,” he added, “would seem to be the only solution for remedying the existing unsanitary and undesirable conditions.” With respect to the second problem, which was undoubtedly a reflection of the construction mania and jerry-building for quick profit that marked the boom, Haswell indicated that regulations were being prepared “with a special view to the plotting out of new building areas.” According to the new regulations, buildings shall be disposed in such a way as not to preclude the laying out of main arteries joining different quarters of the town.⁷⁹

⁷⁸ Egyptian Government, Ministry of Public Works, *Report of the Ministry of Public Works for the Year 1911* (Cairo: Government Press, 1913), 355.

⁷⁹ *Ibid.*, 356.

The housing crisis of the last decade of colonial rule led the government to consider opening up more space for development, albeit under different conditions. In 1918, the Tanzim mapped population density per district using figures on average occupancy per room. The map showed that Bab al-Sha'ariya and Boulaq were most congested with an average occupancy of three persons per room in the worst areas. Haswell again stressed the “urgent necessity” for widening



5.5. Density map of Cairo. (Source: Ministry of Public Works, *Annual Report for 1918-1919*)

roads, making new arteries, and creating garden spaces.⁸⁰ More importantly, the map indirectly visualized one of the most significant barrier for urban growth, namely the enormous chain of rubbish mounds that stretched along the eastern gates of the city, preventing the expansion of congested, eastern neighborhoods.⁸¹ These mounds reached above the level of nearby buildings,

⁸⁰ Ministry of Public Works, Egypt, *Annual Report for 1918-1919* (Cairo: Government Press, 1922), 48.

⁸¹ C. W. Haswell, “Town Planning and Housing in Cairo,” *Garden Cities & Town Planning* 11 (1921), 256.

sometimes to a height of forty-two meters. Called by unusual, menacing names such as Tel al-Borg al-Zefer (The Stinky Tower Mound) and Tel Qat' al-Mar'a (The Cutting of the Woman Mound), these rubbish hills were the designated location for dumping the city's trash, human and animal waste, and construction debris, and they had been a feature of the urban landscape for many decades or even centuries before Ali Mubarak described them in the 1880s.⁸² The Tanzim decided in 1918 to remove parts of these mounds, level the area, and construct roads connecting the Citadel to Abbasiya. These plans were hoped to provide an outlet for eastern areas, thus relieving their congestion. And they would also free up and better connect a reservoir of open lands in the desert of Abbasiya that was suitable for a housing project for the middle class, as Murdoch Macdonald proposed a few years earlier.⁸³ Work required the collaboration of the Public Health Department due to the proximity of cemeteries, and the Arabic Museum screened debris for art and relics. The government sold large quantities of manure that accumulated at these sites, covering the expenses of land levelling.⁸⁴

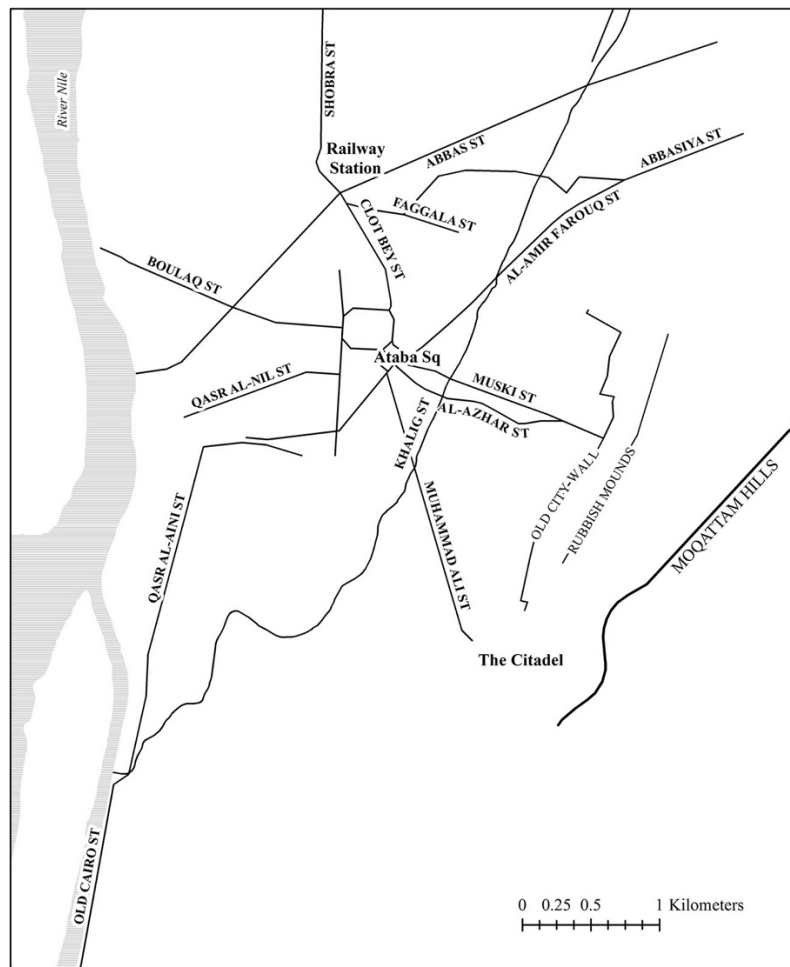
The 1919 revolution and subsequent conditional independence only slowly reflected on urban policies, and authorities continued to consider and implement colonial-era schemes of town improvement and planning for nearly a decade after the revolution. In 1923, the Tanzim finally began taking serious measures to improve traffic circulation and urban connectivity through a mix of road construction and regulations. The most significant of these efforts was the construction of al-Azhar and al-Amir Farouq streets, which finally realized, yet only partially, the government's

⁸² Ali Mubarak, *Al-Khitat al-Tawfiqiyya al-Jadida li Misr al-Qahira* [Tawfiq'a New Plans] (Bulaq, Cairo, 1305 AH), V. 1, 78.

⁸³ Ministry of Public Works, Egypt, *Annual Report for 1918-1919*, 49. For Macdonald's proposal see the Introduction and Ministry of Public Works, Egypt, *Annual Report: 1915-1916* (Cairo: Government Press, 1917), 13.

⁸⁴ Haswell, "Town Planning and Housing in Cairo," 256.

desire to improve old quarters by carving wide arteries into their dense fabric. Al-Azhar, a twenty-meters wide street, connected Ataba to al-Azhar mosque and provided relief to the congested



5.6. Major streets, circa 1920s.

Muski commercial street. Al-Amir Farouq was a thirty-meters wide street connecting Ataba to the newer district of Abbasiya. The street traversed dense neighborhoods including Muski, Bab al Sha’ariya, and Gamaliya before continuing on to Daher. The Tanzim report celebrated these two streets as “two of the most important town improvement schemes carried out in Cairo since Ismail Pasha’s days.”⁸⁵ As the government expected, expropriation for these two streets would be

⁸⁵ TNA, FO 141/633: Cairo Tanzim Department, Annual Report 1923-24, dated August 1, 1924.

laborious and expensive since they were projected to run through densely inhabited areas including the most expensive lands of Ataba and Muski. At an estimated cost of LE 800,000—roughly equal to the Tanzim’s annual budget during these years—these projects required new sources of funding.⁸⁶ The government turned to the Tramway Company. Similar to the case with the Cairo Water Company, the government entered negotiations with the Tramway Company in order to enjoy a share of the company’s enormous profits. Both parties reached an agreement to keep rates high on the condition of profit sharing in order to finance widening and constructing roads.⁸⁷ Other small but notable projects included widening the Khalig street up to thirty-five meters in order to cope with increasing traffic next to the tramway line. A few years later, the Tanzim began compiling lists of properties to be expropriated in order to carve another artery connecting the Citadel to Sayyida Zainab via Ibn Tulun Mosque.⁸⁸ During construction, the Tanzim took great care not to destroy monuments, and it pledged to preserve “the architectural features of the old Arabic town.”⁸⁹ After years of complaining from the lack of a regulatory framework, the Tanzim earnestly considered up to date town-planning and building laws that would prevent construction of buildings with objectionable facades and regulate the laying out of new areas.

Urban authorities raised their ambitions for Egypt’s leading cities with projects of town planning that sought to guide future urban growth for the next half-century. As anticolonial demonstrations raged throughout all of Egypt in 1919, city officials were contemplating

⁸⁶ See Abu Lughod, *Cairo*, 149. See also Wizarat al-Ashghal al-Umumiya [Public Works Ministry], *Al-Taqrir al-Sanawi li Sanat 1925-1926* [Annual Report for the Year 1925-1926] (al-Qahira: al-Matba’a al-Amiriya, 1930), V. 1, 2.

⁸⁷ TNA, FO 141/633: Cairo Tanzim Department, Annual Report 1923-24, dated August 1, 1924.

⁸⁸ DWQ, Majlis al-Wuzara (Council of Ministers), file number: 0075-052664

⁸⁹ TNA, FO 141/633: Cairo Tanzim Department, Annual Report 1923-24, dated August 1, 1924.

comprehensive planning schemes for Cairo and Alexandria after some years of mulling over the idea. The turn to planning reflected the confidence that urban authorities gained in designing and carrying out large-scale infrastructural projects. It also reflected a new creed of urban management whereby comprehensive planning was viewed as an antidote to piecemeal and uncoordinated improvements that were ultimately inefficient. Thus, urban authorities believed that town planning schemes could more adequately address overdue issues of street construction and alignment, traffic improvement, healthy and affordable housing for middle and lower classes, municipal services, and alleviating the density of old quarters by integrating all of these issues into a single framework on scientific and “economic principles.”

In Cairo, Murdock Macdonald and C. Haswell of the Public Works Ministry were behind the city’s town planning scheme of 1921. A year before, “a great deal of information in regard to population, traffic, and the history of the city was got together for use” by the Tanzim Department.⁹⁰ At the same time that the department studied opening al-Azhar and al-Amir Farouq streets, it prepared the following plans to help it identify problems for city planners: traffic plan to show graphically the average density of traffic in the principal thoroughfares of the city; time and distance plan to illustrate the present condition of communication facilities in the city; valuation plan to indicate the value of property in various quarters; plan showing urban growth in the past twenty-five years; plans of road extension projects within the city boundaries; plan showing the classification of the various quarters in the city; various plans connected with the future quartering of the city.⁹¹

⁹⁰ Egyptian Government, Ministry of Public Works, *Annual Report for 1920-1921* (Cairo: Government Press, 1923), 5

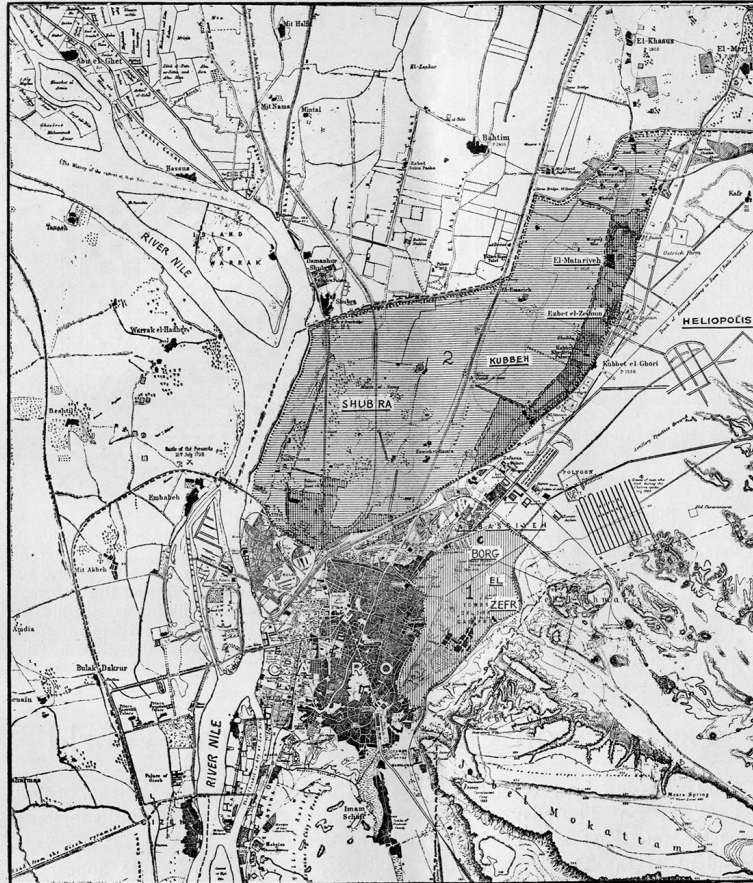
⁹¹ *Ibid.*, p 116.

A rough outline of the town planning scheme demonstrates how the plan built upon and expanded urban authorities' efforts of the past decade. In his "Town Planning and Housing in Cairo," Haswell offered a glimpse of the scheme that his department had been preparing.⁹² The population of Cairo, he stated, had doubled since the mid-nineteenth century, and "the housing problem has assumed serious proportion."⁹³ The department had been studying Cairo's topography for some years in order to determine areas for potential expansion. Significantly, city officials had been calling upon both the government and private capital to provide affordable housing for the middle and lower classes, an indication that authorities had comprehended some of the lessons of the property bubble and the housing crisis. According to Haswell, there were two main areas for future development. The first was the Tall al-Borg al-Zefer area and the second was northern extensions of Shobra, Qobba, Zeitoun, and Matariya. The Borg al-Zefer area was gradually being made available as the government removed some of the rubbish mounds. It was limited by the eastern wall of the city, the Moqattam hills, and Abbasiya from the north, and it contained old Muslim cemeteries and monuments, rubbish hills, the old sand-bed filters of the Cairo Water Company, tramway depots, and a depot of the Cairo Sewage Transport Company. These generally undesirable features made much of the area suitable for anything but lower class housing projects except at Abbasiya, where the government was preparing its own public housing project for the middle class. Thus, Borg al-Zefer was planned to become mainly an extension of eastern neighborhoods and to absorb some of their excess population into healthier forms of housing. With

⁹² Unfortunately, archival material on this scheme did not survive or could not be located.

⁹³ Haswell, "Town Planning and Housing in Cairo," 256.

TOWN-PLANNING AND HOUSING IN CAIRO



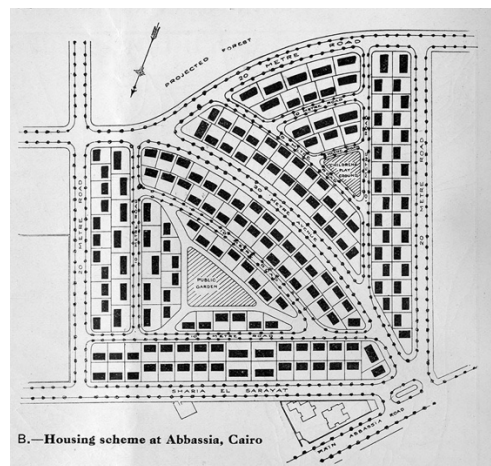
A.—Map of Cairo

5.7. Plan showing two areas for future development, 1921. (Source: C. Haswell, “Town Planning and Housing in Cairo”)

respect to the second area of Shobra and northern suburbs, the Tanzim estimated that it would absorb the growth of the city over the next five decades, offering housing opportunities for various classes. The vast area extended from the Nile at Boulaq and Rod al Farag to Matariya. The department projected the alignments of main arterial roads over the entire area, stipulating a minimum width of twenty-seven meters, twelve of which were reserved for tree-lined footpaths and fifteen for the road proper.

Complementing this draft scheme was the government’s first venture into housing and attempts to incentivize private capital to cater to the lower end of the housing market. The

Abbasiya housing model was meant to be a blueprint for more encompassing housing projects for the middle class. The Tanzim selected Moulid al-Naby ground, which had been reserved for celebrating the popular feast of the prophet's birthday, and the land was at the Abbasiya end of Borg al-Zefer area, close to the French, Italian, and Greek hospitals. The scheme proposed to construct 180 houses and apartment buildings accommodating 250 families on a layout unit of two main clusters that could be multiplied in the future or reproduced in other suitable locations. A plan of the proposed residential area showed that the unit was surrounded by twenty-meter wide roads while internal roads were ten meters wide. The two main clusters of houses were organized around a children's playground and a public park. Proposed buildings occupied no more than half



5.8. Housing scheme at Abbasiya, 1921. (Source: C. Haswell, "Town Planning and Housing in Cairo")

of the lot, ostensibly to make room for gardens, private courtyards, and better air circulation. Yet the government also counted on private capital and especially on large urban development ventures such as the Heliopolis Oasis Company to help overcome the housing crisis. Towards this end, the government proposed to provide incentives to land companies and contractors by facilitating credit and guaranteeing rents or interests on capital for housing projects that catered to middle and lower

classes.⁹⁴ Given the crisis and the government's need for assistance, the powerful Heliopolis Company was able to gain a larger role in developing and planning extensions of its original concession, a trend that continued in the future. In agreement with the government, the company built apartment blocks and houses designed to meet the needs of 600 families of various classes and offered housing at subsidized rates to government employees. Costing LE 600,000, the government guaranteed the project and pledged to provide municipal services including road maintenance, scavenging, drainage, and public lighting on completion of the scheme.⁹⁵ In the final analysis, Haswell understood that these efforts were modest given an estimated shortage of 8,000 houses in the city. However, he was optimistic about the government's ability to guide private capital to adjust to the housing needs of Cairo, especially given the recent decrease in the cost of construction material.⁹⁶

At the same time that the central government considered these plans for Cairo, the Alexandria Municipality offered a spectacular vision of town planning that combined boosterism and urban reform, explicitly underscoring its advantage for governing the city and managing its future growth. The Alexandria Municipality broached the idea of a town planning scheme in 1918 and commissioned William McLean, then Engineer-in-Chief of the municipality, for this task. McLean submitted the preliminary report and studies a year later, and the municipality approved the scheme by the end of 1919. In the preface to the report, A. Granville, Vice-President of the municipality, deplored lack of attention to Egyptian towns in general. There was "no trace of any

⁹⁴ Ibid., 258.

⁹⁵ Ministry of Public Works, Egypt, *Annual Report for 1920-1921*, 116, Ministry of Public Works, Egypt, *Annual Report for 1921-1922* (Cairo: Government Press, 1925), 187, and Haswell, "Town Planning and Housing in Cairo," 258.

⁹⁶ Haswell, "Town Planning and Housing in Cairo," 258.

scheme of town planning, no provision for proper communication, etc., in towns which are rapidly developing and where the type of building is becoming every year more solid in construction and of larger dimensions.”⁹⁷ As a result, chaotic development was the rule. Streets of large towns like Alexandria and Tanta were narrow, unlevelled, unpaved, and without proper alignment or footpaths, and new quarters were developed with no squares or open spaces. Meanwhile, local authorities “crept, or rather hobbled, along with its “Tanzim”,” which presented “a sorry picture of want of town management,” for it invariably acted long after buildings were constructed and areas developed.⁹⁸ The Alexandria Municipality sought to remedy this lack of foresight with a scheme that would act as a guide for the development of the town over the next three to five decades.

McLean (1877-1967) was a civil engineer turned town planner who later drew on his experience to formalize a theory of imperial development. A graduate of the University of Glasgow in 1899, he first worked on infrastructural projects in Glasgow including sewage systems and bridges.⁹⁹ In 1906, he joined the Sudan Civil Service as a municipal engineer for Khartoum. After retaking Sudan from the Mahdists in 1898, Lord Kitchener ordered rebuilding Khartoum as a gesture that suggested the permanence of the new colonial regime, which gained him a reputation of being a supporter of town planning. When McLean arrived in Sudan, his first task was to provide amenities including roads, surface water drainage, sewers, tramways, and water supply to Khartoum’s colonial elites. Later, however, McLean produced a town scheme for Khartoum

⁹⁷ W. H. McLean, *City of Alexandria Town Planning Scheme* (Cairo: Government Press, 1921), 1.

⁹⁸ *Ibid.*

⁹⁹ Robert Home, “British Colonial Town Planning in the Middle East: The Work of W. H. McLean,” *Planning History* 12, 1 (1990).

dividing its space into three distinct fabrics: a zone for a first class of British administrators, another zone for a second class of Egyptian officials and other elites, and a third for Sudanese natives. After Kitchener became the Consul General of Egypt in 1911, McLean was hired as the Engineer in Chief of Municipalities and Commissions of the Interior Ministry in 1913.

McLean's work in Egypt underscores the link between town planning and colonial authorities' attempt to encourage a politics of material improvement that was narrowly and locally defined—a local politics of the “village pump,” in his own words.¹⁰⁰ Between 1913 and 1917, McLean worked on urban development projects in fifty Egyptian towns, publishing “Local Government and Town Development in Egypt” as a systematic synthesis of his work. Creating local politics of the village pump required local institutions composed of people “looking after the welfare of the town in which they dwell,” and a program of town improvement and planning to be overseen by these institutions.¹⁰¹ Naturally, Cairo was conspicuous by its absence from McLean's review of organs of local self-government in Egypt. Indeed, this program of village pump politics was only for the provinces, as colonial authorities were still not ready to experiment with representative institutions in the Cairo, the hotbed of nationalist agitation. McLean reasoned that while local bodies would ensure a sense of “civic responsibility” and “public spirit,” his responsibility as a technical expert was to formalize a program of town planning. The dominant pattern of Egyptian towns was division into “two somewhat ill-defined zones:” a “better-class quarter occupied by the well-to-do classes of Egyptians and Europeans, and an inferior quarter, usually the older part of the town, occupied principally by the working classes and containing the

¹⁰⁰ TNA, FO 141/581: From William McLean to Arthur Henderson, dated October 3, 1925.

¹⁰¹ McLean, “Local Government and Town Development in Egypt,” 97.

bazaars.”¹⁰² The first step was to establish a town service, or a Tanzim, answerable to local government, which would improve alignment of existing streets, open new arteries, and prepare a general plan of the town, making large scale plans for each street separately. The second step was street planning that could decide on what to preserve and that was conscious of the topography of the town. The service should preserve “good examples of a picturesque style of domestic architecture.” It should also improve connections between strategic buildings such as the railway station, large mosques, markets, and public buildings, and create main streets in four directions. McLean was sure that town inhabitants saw the value of this procedure of opening up thoroughfares because it was “beneficial to the town from a public health point of view” and “causing an increase in the value of property in the neighborhood of the improvements.”¹⁰³ Third was to create public parks and squares. Next was to set building regulations before focusing on services such as scavenging and watering, trash disposal, fire brigade, water supply, street lighting, and drainage. As he became the Engineer in Chief of the Alexandria Municipality, McLean had the chance to implement and revise this program in the second largest Egyptian city.

The Alexandria town planning scheme of 1919 revealed the influence that property owners and urban development businessmen of the municipality sought to exercise on the city. McLean began his report with a note that stressed the detriment both to health and property caused by haphazard urban growth. The scheme superimposed a network of major streets on the city and its environs covering the area from Agami to Abu Qir, which would have created an immense reservoir of land for three to five decades of urban growth in which population was estimated to

¹⁰² Ibid., 93.

¹⁰³ Ibid., 94.



5.9. Alexandria town planning scheme, 1919. (Source: William McLean, *City of Alexandria Town Planning Scheme*)

double from 445,000 to one million. The plan contained several small projects for improving connectivity, creating civic and transportation centers, slum clearance and constructing public housing, development of garden city suburbs, creating industrial zones, and preserving archaeological sites. For instance, a fifty-meters wide road would extend from Ibrahimiya further east towards Abu Qir in order to open up territories where the city had been expanding recently. The Cornishe, a seaside promenade, would also be extended to Abu Qir. In the far west, town authorities would develop Agami as a garden city suburb. The scheme included plans to create a large square reserved for public buildings and the municipal theater and another civic center that featured two obelisks that the municipality hoped to bring back from their current locations in Central Park, New York, and Thames Embankment, London. The scheme also featured numerous small projects to relieve congestion in Manshiya, Labban, and Attarin. And there were other projects to improve sanitary conditions including drying up the Hadra lake and creating public parks. Finally, the scheme included a project for a canal connecting the city's two harbors.¹⁰⁴

The scheme gave particular attention to plans to construct sanitary tenements to house slum dwellers and the working class, a problem that both the Alexandria Municipality and the Public

¹⁰⁴ McLean, *City of Alexandria Town Planning Scheme*.

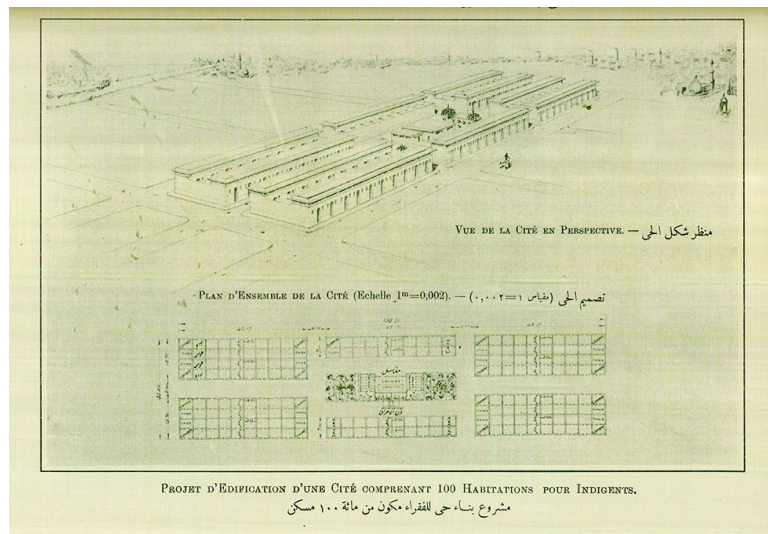
Works Ministry had been investigating for decades.¹⁰⁵ As McLean declared elsewhere, slum clearance and the provision of suitable housing constituted one of the most pressing town planning problems in European and colonial cities.¹⁰⁶ In Alexandria, McLean's scheme included a project of accommodating the "very poor" in tenement housing to replace the *'eshash*. Several slums that were "recognized to be centers of infection in the city" dotted the urban landscape, including 'Eshash al-Qabbari, close to the industrial and harbor area of Mex. The scheme included plans to clear Qabbari and construct a "model colony" with proper layout on nearby government lands in order to rehouse inhabitants. McLean thought that the proximity of healthy and cheap alternatives would facilitate the process of relocation. The proposed site of the housing scheme was a location further inland that was still close to the industrial zone yet more segregated as it was bounded by the Mahmudiya canal and railway lines. A drawing displayed a unit of a hundred houses that occupied a large rectangular block, which could be multiplied as required. Each house in these units comprised a room and a courtyard, and the unit featured "a complete sanitary installation" including a central wash-house and public latrines, in addition to grocery shops and cafes.¹⁰⁷ While space was limited judged by the standards of housing schemes in Britain, as McLean admitted, "the new houses in these slum areas will be many times better than the existing conglomeration of

¹⁰⁵ For Alexandria see Robert Ilbert, "Egypte 1900, Habitat Populaire, Société Coloniale," in *Etat, ville et mouvements sociaux au Maghreb et au Moyen-Orient: actes du colloque C.N.R.S.-E.S.R.C.*, ed. Kenneth Brown (Paris: L'Harmattan, 1989), 270-271 and idem, *Alexandrie, 1830-1930: histoire d'une communauté citadine* (Le Caire: Institut français d'archéologie orientale, 1996). 3 Robert Ilbert, *Alexandrie, 1830-1930: histoire d'une communauté citadine* (Le Caire: Institut français d'archéologie orientale, 1996), 388-89. For Cairo see Ministry of Public Works, Egypt, *Annual Report for 1918-1919*, 49.

¹⁰⁶ W. H. McLean, *Regional and Town Planning in Principle and Practice* (London: The Technical Press, 1930), 57.

¹⁰⁷ McLean, *City of Alexandria Town Planning Scheme*, 6-8.

huts.”¹⁰⁸ However, he was slightly skeptical of the ability of slum dwellers to afford even the “economic” rents of public housing.



5.10. Housing scheme for the poor in Alexandria, 1919. (Source: William McLean, *City of Alexandria Town Planning Scheme*)

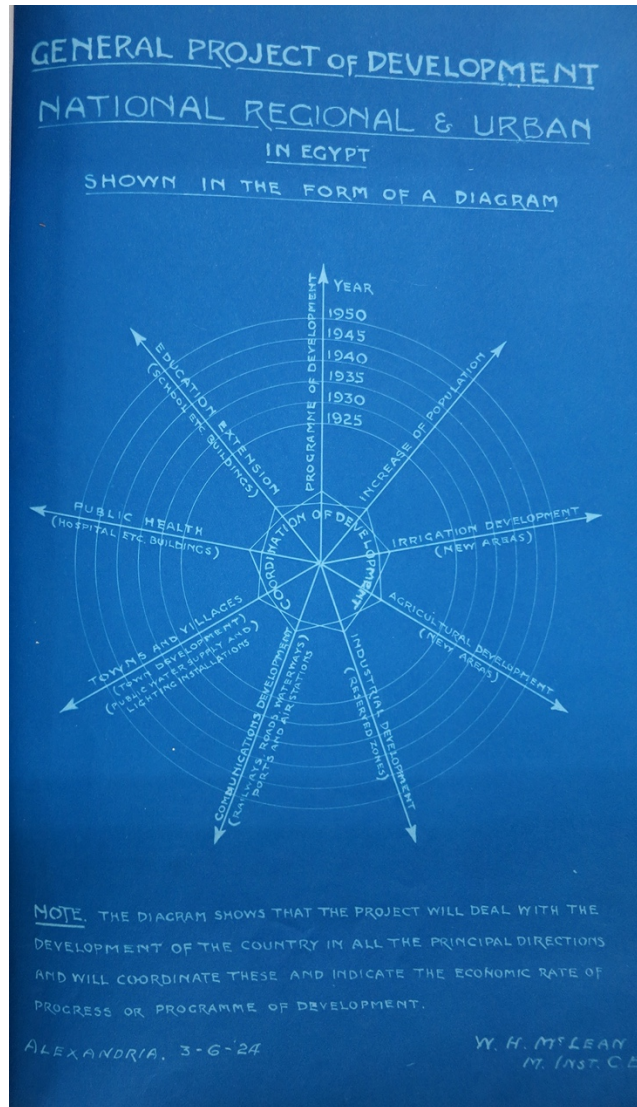
In 1923, McLean reworked his ideas of urban planning, rescaling them to offer a model for national development planning. Working up from the insights and principles of town planning, the British engineer drafted a ‘Note on the Necessity for a General Project of Development, National, Regional, and Urban in Egypt.’¹⁰⁹ He suggested that planning individual towns should be carried out in connection to detailed studies of the entire network of Egyptian towns and villages and to planning the general lines of future development of the country. This shift of scale, he argued, would ensure both rational use and development of resources and the best interest of inhabitants.¹¹⁰ A general project of development such as this would require a survey of the entire country.

¹⁰⁸ McLean, *Regional and Town Planning*, 56.

¹⁰⁹ TNA, FO 141/581: “Note on the Necessity for a General Project of Development, National, Regional, and Urban in Egypt” by William McLean, dated October 10, 1923.

¹¹⁰ McLean, *Regional and Town Planning*, 8-11.

Accompanying the note was a long list of information required from government departments. And an attached diagram showed the main lines of development that the project would coordinate over the next three decades. In 1930, McLean published *Regional and Town Planning* where he



5.11. William McLean's development diagram. (Source: TNA FO 141/581)

offered a full-fledged program of national and imperial development, which showed that the British engineer was in touch with events and debates that led to the formulation of programs of

colonial development and welfare between the 1920s and 1940s.¹¹¹ However, McLean's ideas and schemes did not survive his departure from Egypt in 1926.

Revolutionary politics and its aftershocks stalled the town planning projects for Cairo and Alexandria. After the tenuous settlement of conditional independence of 1922, the presence of British subjects in government departments, who previously guaranteed carrying out the policies of colonial administrators, was one of the most contentious political issue. In November 1919, William Willcocks reflected on the political uprising that began in March of the same year. He explained the events by referring to the discontent of both the peasantry and the urban educated classes. The latter were frustrated by blocked social mobility, as "Britons were imported like a flood into the Government service," filling its upper echelons.¹¹² Willcocks recommended leaving the Public Works Ministry to Egyptians, who "take naturally to engineering," and to halt the appointment of junior Britons. Indeed, the power of British advisors and employees in ministries greatly diminished after 1922, and Egyptian engineers and bureaucrats began filling the upper ranks of the Tanzim and other departments from which they were previously excluded by the colonial regime. In 1925, Mann Alcock wrote that there was an urgent need for a highly organized urban administration that would put into effect broad measures of town planning in Cairo, which was a "heterogeneous grouping of semi-isolated quarters." For Alcock, the capital should lead the

¹¹¹ On the colonial history of development see Michael Havinden and David Meredith, *Colonialism and Development: Britain and Its Tropical Colonies 1850-1960* (London: Routledge, 1996), Frederick Cooper and Randall M. Packard eds., *International Development and the Social Sciences: Essays on the History and Politics of Knowledge* (Berkeley: University of California Press, 1997), Richard Drayton, *Nature's Government: Science, Imperial Britain, and the "Improvement" of the World* (Yale University Press, 2000), Joseph Hodge, *Triumph of the Expert: Agrarian Doctrines of Development and the Legacies of British Colonialism* (Ohio University Press, 2007), and Helen Tilley, *Africa as a Living Laboratory: Empire, Development, and the Problem of Scientific Knowledge, 1870-1950* (University of Chicago Press, 2011).

¹¹² TNA, FO 141/581. Sir William Willcocks of Cairo (in response to a questionnaire by the British Mission of Enquiry in 1919 to examine political events), dated November 25, 1919.

way in matters of urban planning, a “highly specialised work” that required capable staff and “accurate and comprehensive civic survey, involving the accumulation of an extensive mass of varied and detailed knowledge and information.”¹¹³ However, Alcock complained to the British Foreign Office that the Town Planning Service was in disarray since the Tanzim came under Egyptian leadership nearly a year earlier. Like other colonial engineers, Alcock felt the rug being pulled from under their feet. Also in 1925, the British Town Planning Institute praised McLean’s “grandiose” scheme for Alexandria, appropriately adding that its implementation “depends on the settlement of Egyptian politics and the increased prosperity of Egyptian commerce.”¹¹⁴ But the settlement of Egyptian politics was not forthcoming for decades. Authorities shelved existing town planning schemes, while new schemes had to navigate a new arena of political authority and new distributions of social power during the protracted period of decolonization.

Conclusion

In 1924, the Tanzim’s annual report stated with astounding optimism that “far greater town improvement schemes have been projected during the last two years than at any previous period since the great Khedive Ismail.”¹¹⁵ The irony of the placement of this sentence in an official report that was published shortly after the revolutionary events of 1919-1922 does not detract from its general correctness. The reports’ judgment regarding the scale of urban projects that authorities had recently broached was correct. And while revolutionary politics irreversibly interrupted colonial logic, it did not immediately reach into the colonial machinery of government. Colonial

¹¹³ TNA, FO 141/633: Note on the Tanzim Department by A. Mann Alcock, dated January 4, 1925.

¹¹⁴ “Alexandria, Old and New,” *Journal of Garden Cities and Town Planning* 13 (1923), 10.

¹¹⁵ TNA, FO 141/633: Cairo Tanzim Department, Annual Report 1923-24, dated August 1, 1924.

control over ministries and departments gradually receded during the decades following conditional independence. This chapter contextualizes colonial schemes of housing and town planning by arguing that they expressed the regime's efforts to address two problems. First, by offering material improvement, the regime attempted to neutralize the increasingly politicized question of the lack of a Cairo municipality. Second, by assuming responsibility for urban growth the regime sought to address the problems of capital-led urbanization and to establish a new relationship with capital where the regime had the upper hand.

Thomas Russel served as the head of Cairo Police from 1917 to 1946. The British official was able to maintain his key position at the Ministry of Interior due to the post-revolutionary settlement which allowed British authorities to continue to exert influence over matters of internal security in Egypt. In his capacity as the overseer of the security of Egypt's leading metropolis, Russel raised the problem of slums, particularly those of Boulaq, in many of his annual reports. In his 1930 report, he imagined a scenario involving the residents of Boulaq's slums:

As we all know, there is no difficulty in destroying any wretched quarter [*hayy 'haqir*]. It is possible, for instance, to destroy Qulali or the '*eshash* of Sharkas and Turguman in the span of a week, but where will the residents go? It is easy to say that the government has a duty to build dwellings for workers and that in order for these dwellings to be useful they have to be affordable and suitable for the condition of workers and that the rent should be no more than few piasters per week. However, establishing housing at economic rents is a task that cannot be currently achieved. Yet, the problem of wretched quarters has many dimensions and should be solved immediately. Let's imagine the residents of these wretched quarters as they pour into the city, panic-stricken as if infected by cholera [*kaman massahom al-hawa' al-asfar*, lit. as if touched by yellow air], or in the form of an angry mob [*ghawgha' ghadeba*]. Such a scene is not pleasant to behold.¹¹⁶

The statement of the Chief of Cairo Police, who had first-hand experience with the angry "mob" of the 1919 revolution, is only a sample of to the metamorphosis of slum dwellers from a biological

¹¹⁶ Kingdom of Egypt, Ministry of Interior, Cairo City Police, *Al-Taqrir al-Sanawi li Sanat 1930* [Annual Report for the year 1930] (al-Qahira: al-Matba'a al-Amiriya, 1931), XVIII.

threat into an additional social and political menace. And Russel's sentiment was shared by many officials, elites, and the Egyptian middle class. The jagged contradictions of the urban landscape, that the colonial experience largely perpetuated and entrenched, continued to shape the city and its politics, ushering in a new era with the Cairo fire and riots of 1952.¹¹⁷

¹¹⁷ On the Cairo Fire see Nancy Reynolds, *A City Consumed: Urban Commerce, the Cairo Fire, and the Politics of Decolonization in Egypt* (Stanford University Press, 2012) and Yasser El Sheshtawy, "Urban Rupture: A Fire, Two Hotels, and the Transformation of Cairo," in *Violence and the City in the Modern Middle East*, edited by Nelida Fuccaro (Stanford: Stanford University Press, 2016).

CONCLUSION

The leading narrative on British colonial Cairo treats the colonial era as a homogeneous expression of official retrenchment and capital-led urban development. This dissertation takes a different line on the period, arguing that a distinct transformation took place whereby urban space became the object of technological and social intervention and a realm of contestation and politics. It further argues that biological and social pressures facilitated this transition, which forced the British regime during the latter two decades of the occupation to devise a new approach to the Egyptian capital. After two decades of halted urban development due to financial stringency and the regime's agrarian focus, the colonial administration began to intervene in urban space through an ambitious program of infrastructural building and improvement. This dissertation provides an account of Cairo's growth in parallel to the expansion of its infrastructures, connecting what took place above ground to what took place underneath it. And it draws lessons from this relationship.

Engineering Metropolis is divided into two parts. The first highlights the main forces that brought about this transition. Chapter One follows the biological story showing how successive cholera epidemics forced colonial authorities to bring Cairo to the center of colonial policy. Contagion wrought three interconnected developments in how health and urban space were understood in relation to each other. First, it spurred efforts to account for Cairo's sanitary infrastructures and map it systematically. Numerous commissions composed of sanitary and engineering experts met in order to investigate the underlying causes of Cairo unhealthy conditions and to propose solutions. These commissions studied urban services, streets, houses, mosques, baths, water fountains, markets, vacant lots, cemeteries, and other important features of the urban environment. An image of a bifurcated sanitary geography emerged whereby a minority of

moneyed Cairenes were able to afford private sanitation while the majority depended on collective institutions such as mosques, public baths and latrines, and water fountains. Second, epidemics exposed the colonial regime to much criticism from foreign communities, urban elites, and the anticolonial movement. Eventually, even the government's own experts acknowledged the need for improving the health of the city by investing in its sanitary infrastructures instead of merely responding to crises. Finally, contagion wrought epistemological displacements in how health and cleanliness were conceived by various social classes. Most importantly, the upwardly mobile Egyptian middle class refashioned its commitment to inherited medical traditions and demanded private sanitation as a necessary condition for a new subjectivity.

Chapter Two introduces the other force that facilitated Cairo's becoming an object of governance, namely financial investment in the urban landscape, particularly in housing. The chapter traces how both the poor and developers pushed the urban landscape in various contradictory directions, exposing the dynamics and consequences of the city's becoming a theater for capital accumulation. By reconstructing the history of the colonial city through the lens of housing, a category that is both spatial and social, this chapter uncovers three features of Cairo's capital-led growth. First, elite neighborhoods offering new forms of housing with amenities and private conveniences provided an answer to the city's unhealthy conditions, yet only to the few who could afford it. Second, capital-led urban growth spurred a period of speculative investment into urban development and construction leading to a property bubble followed by a financial crisis in 1907. The bubble and its aftershocks led to the redistribution of urban population and to a new socio-spatial configuration. Finally, against the predictions of boosters and custodians of the colonial regime, Cairo was also a space of impoverishment and displacement. The bubble led to a housing crisis that urban authorities were forced to acknowledge by the last decade of colonial

rule. Overall, the chapter shows how finance transformed the urban landscape in ways that both satisfied and alarmed colonial administrators.

The second part investigates the regime's program of infrastructural building and organization as well as projects of housing and town planning that betrayed a different approach to the city. Chapter Three examines attempts by the colonial regime to modernize and scientifically control Cairo's water supply, focusing primarily on a failed scheme to draw drinking water from deep tube wells instead of the Nile. The scheme was meant to provide pure drinking water, thus avert the recurrence of waterborne epidemic diseases that ravaged the city during the first two decades of the occupation. However, instead of solving the problem, the new water supply became the focus of a sociotechnical controversy when ordinary Cairenes objected to the taste and qualities of the new supply. The chapter also sheds light on the critical role of the concessionary Cairo Water Company in governing the biological life of the city. The company was a particularly glaring example of private ventures that exercised a form a sovereignty on urban life, creating and maintaining structural inequalities of service provision.

Chapter Four traces the schemes, designs, construction, reception, and afterlife of Cairo's sewage network during the colonial and postcolonial eras. It takes as its starting point the idea that engineering a technological system implies social engineering down to the most technical details and that social relations of power are embodied into infrastructures and enacted by their flows. Failed sewage system schemes between 1885 and 1898 embodied two different visions of engineering. The first was a liberal universalist vision that saw engineering as a vehicle of social change geared towards improving the conditions of the lower classes. The second, however, was an anthropological colonialist vision that saw engineering as the handmaiden of a politics that sought to cement colonial and class inequalities into the urban environment. Further, the chapter

shows how Cairo's first sewage system sided with the second vision, sharply dividing the city into a minority of upper class elites who enjoyed water and sanitation privately and a majority of lower class, and mostly Egyptian, residents who were largely denied bourgeois privacy and who were projected to continue to depend on collective institutions of sanitation for the next decades. Finally, the chapter shows how the colonial network failed to function as projected during the postcolonial era, which witnessed the rising social power of the Egyptian middle class as well as their expanding private use of water. The infrastructure was unable to dictate its colonial social vision on the social life of post-independence Cairo.

The final chapter traces the rise of new urban politics in Egypt by examining debates on a proposed Cairo municipality, linking such debates to the regime's postwar efforts of urban planning and housing provision. The chapter argues that town planning and housing schemes represented the culmination and scaling up of the regime's program of infrastructural reorganization. They also expressed the regime's efforts to respond to the excesses of capital-led urban growth by taking charge of the city's development while enlisting capital on the regime's own terms. Finally, these schemes sought to offer urban material improvement as an antidote to contentious politics, which particularly gripped the Egyptian capital during the final decade of the occupation before it culminated in the revolutionary events of 1919 leading to conditional independence in 1922.

Engineering Metropolis problematizes the dual city model that has been dominant in the study of Middle Eastern and colonial cities. Instead of dismissing the model altogether, this work circumscribes and contextualizes it, showing how it was used or mobilized as well as its limitations in a changing metropolis. The perception of a dual city was significant for turn of the century residents and observers and it served as the basis for a number of arguments put forth by engineers

of technological systems and by critics of the colonial regime. To put it schematically, this dissertation shows that while colonial sanitary infrastructures created and reinforced sharp spatial and social divisions, other forces including the urban development industry, social mobility of the middle class, and revolutionary politics worked against these sharp divisions pushing towards a more stratified and variegated urban space. As we saw in the third chapter, the exorbitant water rates of the Cairo Water Company, which was established in 1869, created a sharp division between geographically concentrated elites with abundant access to water in their private homes and the rest of Cairenes who depended on collective and time-honored institutions of water service and sanitation. Such high rates later functioned as a barrier that denied water to the nascent Egyptian middle class that formed during the four decades of colonial rule. And as we saw in the fourth chapter, the design of the sewage network reinforced the same bifurcated landscape, whose fixity was thought to be guaranteed by the stability of the colonial regime itself. On the other hand, dynamics of social mobility and urban change worked against sharp dualities. As we saw in the second chapter, the property bubble opened up the urban landscape and created diverse spaces for more comfortable Egyptians and non-Egyptians including Europeans of modest means. Such spaces that were inhabited by a more diverse class complicated dualistic social visions. Furthermore, the Egyptian middle class adopted new conceptions of health and cleanliness, and it demanded access to urban services and private sanitation as material conditions for a new subjectivity. As we saw in the third and fourth chapters, the rise of the social power of this class during the two decades following conditional independence in 1922 translated into increasing access to private services. If the dual city epitomized a colonial imaginary of hierarchy and order embodied in urban infrastructures, then business interests and social mobility represented countervailing forces and dynamics that stratified the urban landscape more finely.

Engineering Metropolis heeds the voice and agency of Cairenes while being aware of the challenge of narrating the history of the colonized, and of the epistemological and methodological presuppositions of different modes of narrative. The challenge is paradoxically how to populate an account of colonial Cairo with ordinary people and dispossessed classes, who constituted a majority of urban residents, while colonial archives—both in London and Cairo—are mostly inhabited by colonial categories, bureaucrats, experts, and economic elites. *Engineer Metropolis* searches for the voices of those who have been silenced by power and for moments of contradiction, opposition, and negativity in ways that are attuned to the narrative itself instead of adopting a unified strategy of approaching historical texts and archives, be it the social historian's reliance on quantitative methodologies or the postcolonial reading of the colonial archive against its organizing logic. Thus, the second chapter shed light on the city's squatters and slum dwellers, revealed their logic for settling in some areas rather than others, presented them as shapers of the urban landscape, and dwelled on the forces that continued to dispossess them in the name of health and progress. And the third chapter traced how ordinary Cairenes, who drew on local epistemologies and embodied knowledge, objected to the taste and qualities of a new water supply. The chapter demonstrated how the widespread rejection of the new water supply dealt a blow to colonial scientific self-assurance, evoked irresolvable colonial tensions, and forced colonial officials to rethink their assumptions regarding what ordinary people knew and were capable of knowing. Finally, the fourth chapter traced the history of a technological system against the backdrop of social transformation, arguing that the social vision embodied in the colonial infrastructure failed to dictate the life of Cairo. While the design of the drainage system adopted a vision of social hierarchy and stasis, suppressing the politically dangerous and upwardly mobile middle class by lumping it with the "lower class," the 1919 revolution and the following decades

of decolonization empowered this class. The revolution and the social transformation it unleashed belied the colonial sociology of imperial engineers. The inability of the system to absorb increased water usage was the material expression of the failure of the colonial project to engineer society.

BIBLIOGRAPHY

Archives

Dar al-Wathaiq al-Qawmiya [The Egyptian National Archives] (Cairo, Egypt)

Council of Ministers (Majlis al-Nuzzar wa al-Wuzara)

Ministry of Public Works (Diwan al-Ashghal al-Umumiyya)

Ministry of Interior (Nizarat al-Dakhiliyya)

Ministry of Public Health (Diwan al-Sihha al-Umumiyya)

Cairo Water Services (Merfaq Miyah al-Qahira)

The National Archives of the United Kingdom (London)

Foreign Office (FO)

Domestic Records of the Public Records Office (PRO)

Archives of the Institution of Civil Engineers (London)

Records of the Greater Cairo Sanitary Drainage Company (Cairo)

Cartographic Sources

Grand Bey. *Plan Général de la Ville du Caire: Dressé et Publié avec l'Autorisation de S.A. Ismail Pacha Khédive d'Egypte*, 1:4000. Le Caire: Ebner et Cie, 1874.

Untitled Plan and Survey of Cairo [By Ravon Bey, Director of the Drawing Office of the Public Works Ministry. Signed by Julien Barois, General Secretary of the Public Works Ministry], 1:1000, 1:500, 1:200, 353 sheets (1892-94).

Ministère des Travaux Publics. *Plan Général de la Ville du Caire et des Environs*, 1:10,000. Le Caire: Bureau de Dessin, 1897.

Plan of Cairo Shewing Naming of Roads, 1:18,000. In Public Works Ministry. *Report upon the Administration of the Public Works Department in Egypt for 1904*. Cairo: National Printing Department, 1905.

Goad, Charles E. *Insurance Plan of Cairo*, 1:2400 and 1:600. London: Charles E. Goad, 1905.

Ministry of Finance. *Cairo City*, 1:1000. Cairo: Survey Department, 1909-1913.

Ministry of Finance. *Cairo*, 1:5000. Cairo: Survey Department, 1915-1921.

Ministry of Finance. *General Map of Cairo*, 1:15,000. Cairo: Survey of Egypt, 1920.

Official Reports and Documents

Censuses

Gouvernement Égyptien. *Recensement Général de l'Égypte, 1^{er} Juin 1897—1^{er} Muharrem 1315*. Le Caie: Imprimerie Nationale, 1898.

Egypt, Ministry of Finance. *Te'dad Sukkan al-Qutr al-Misri fi Sanat 1325 Hijriya-1907 Miladiya* [The Census of Egypt in 1325 Hijri-1907 AD]. Cairo: Boulaq Press, 1909.

Egyptian Government, Ministry of Finance, Statistical Department. *The Census of Egypt, Taken in 1917*. Cairo: Government Press, 1920.

Ministry of Finance

Ministry of Finance, Egypt, Survey Department. *A Report on the Work of the Survey Department in 1907, by G. H. Lyons*. Cairo: National Printing Department, 1908.

Recueil général de contrats. Le Caire: Imprimerie Nationale, 1908.

Ministère des Finances, Direction de la Statistique. *Annuaire statistique de l'Égypte 1910*. Le Caire: Imprimerie Nationale, 1910.

Ministère des Finances, Direction de la Statistique. *Annuaire statistique de l'Égypte 1914*. Le Caire: Imprimerie Nationale, 1914.

Ministère des Finances, Direction de la Statistique. *Annuaire statistique de l'Égypte 1921-22*. Le Caire: Imprimerie Nationale, 1923.

Almanac for the Year 1929. Cairo: Government Press, 1929.

Almanac for the Year 1933. Cairo: Government Press, 1933.

Ministry of Interior, Department of Public Health and Sanitary Services

Ministry of Interior, Sanitary Department. *Report on the Epidemic of Cholera in Egypt During the Years 1895 & 1896*. Cairo: National Printing Office, 1897.

Ministry of Interior, Department of Public Health. *Annual Report for 1909*. Cairo: National Printing Department, 1910.

Egypt, Ministry of Interior, Department of Public Health. *Instructions on Procedure in Outbreaks of Cholera*. Cairo: Government Press, 1918.

Egypt, Department of Public Health. *Reports and Notes of the Public Health Laboratory*, No. 1. Cairo: Government Press, 1918.

Egypt, Department of Public Health. *Reports and Notes of the Public Health Laboratory: Egyptian Water Supply*, No. 3. Cairo: Government Press, 1920.

Ministry of Public Works

Direction Générale du Tanzim. *Compte rendu de l'exercice 1886*. Le Caire: Imprimerie Nationale, 1887.

Résumé du Rapport de M. Baldwin Latham sur la Drainage du Caire. Le Caire: Imprimerie Nationale, 1890.

Report upon the Administration of Public Works Department in Egypt for 1904. Cairo: National Printing Department, 1905.

Sewerage of Cairo, First Section, Report and Drawings. Cairo: National Printing Department, 1909.

Sewerage of Cairo, Report on the Second Section. Cairo: National Printing Department, 1910.

Report of the Ministry of Public Works for the Year 1911. Cairo: National Printing Department, 1913.

Report of the Under Secretary of State on the Ministry of Public Works during 1914-1915. Cairo: Government Press, 1916.

Annual Report, 1915-1916. Cairo: Government Press, 1917.

Annual Report for 1916-1917. Cairo: Government Press, 1921.

Annual Report for 1918-1919. Cairo: Government Press, 1922.

Annual Report for 1920-1921. Cairo: Government Press, 1923.

Annual Report for 1921-1922. Cairo: Government Press, 1925.

Al-Taqrir al-Sanawi li Sanat 1925-1926 [Annual Report for the Year 1925-1926]. Al-Qahira: al-Matba'a al-Amiriya, 1930.

Al-Taqrir al-Sanawi li Sanat 1926-1927 [Annual Report for the Year 1926-1927]. Al-Qahira: al-Matba'a al-Amiriya, 1930.

Al-Taqrir al-Sanawi li Sanat 1927-1928 [Annual Report for the Year 1927-1928]. Al-Qahira: al-Matba'a al-Amiriya, 1931.

Other Reports and Documents

Ministry of Public Instruction. *Records of the Egyptian Government, School of Medicine*. Cairo: National Printing Department, 1901.

Egyptian State Railways. *Winter in Egypt: Illustrated Guide of the Egyptian State Railways*. Cairo: National Printing Department, [1905].

Majlis al-Shoyokh [Parliament]. *Majmouat Madabet Dor al-In'iqad al-Awal, 15 March-10 July, 1924* [Minutes for the first parliamentary cycle, 15 March-10 July, 1924]. Al-Qahira: al-Matba'a al-Amiriya, 1924.

Mahader Jalasat al-Jam'iya al-'Umumiyya (1885-1912) [Minutes of Proceedings of the General Assembly]. Al-Qahira: Matba'at Dar al-Kutub wa al-Watha'iq al-Qawmiya, 2011.

Kingdom of Egypt, Ministry of Interior, Cairo City Police. *Al-Taqrir al-Sanawi li Sanat 1930* [Annual Report for the year 1930]. Al-Qahira: al-Matba'a al-Amiriya, 1931.

Newspapers and Periodicals

The Agricultural Journal of Egypt

Al-Ahram

Al-'Alam

The British Medical Journal

Bulletin de l'Institut Égyptien

The Cairo Scientific Journal

L'Égypte Contemporaine

The Egyptian Gazette

Al-Fawayed al-Sihhiyya

Al-Hilal

Al-Jarida

Journal Officiel

The Lancet

Al-Liwa'

Al-Majalla al-Sihhiyya

Al-Majalla al-Tibiyya al-Misriya

Al-Mu'ayyad

Al-Muqtataf

Progrès

The Provincial Medical Journal

Al-Qahira

Revue d'Égypte

The Sanitarian

Al-Shifa'

Al-Sihha

Tabib al-'A'ila

Al-Tibb al-Hadith

The Wall Street Journal

Published Contemporary Sources

Amici, F. *L'Égypte ancienne et moderne et son dernier recensement*. Alexandrie: V. Penasson, 1884.

Arminjon, Pierre. "La crise financière égyptienne actuelle." *Revue des deux mondes* 41 (1907): 198-221.

- Artin, Yacoub. *Essai sur les causes du renchérissement de la vie matérielle au Caire dans le courant du XIXe siècle (1800 à 1907)*. Le Caire: Imprimerie de l'Institut français d'archéologie orientale, 1907.
- Al-Baghdadi, Abd al-Latif. *Rihlat Abd al-Latif al-Baghdadi fi Misr*. Al-Qahira: al-Hay'a al-'Ama al-Misriya li al-Kitab, 1998.
- Bitter, H. *Observations hygiéniques sur l'approvisionnement en eau de la nappe souterraine - projeté pour la Ville de Tantah par M. l'Ingénieur K. Abel*. Le Caire: Typ. Lithographie A. Costagliola, 1897.
- . "Le choléra et la peste en Égypte." In *Comptes Rendus de Premier Congrès Égyptien de Médecine tenu au Caire du 19 au 23 Décembre 1902*, 213-242. Le Caire: Imprimerie Nationale: 1904.
- Bitter, H. and Henry Blagden. *Filtration Experiments at Alexandria, Egypt: Report on the Efficiency of the "Jewell" Filter*. New York: New York Continental Jewell Filtration Co., 1903.
- Boissieu, Pierre de. *Coup d'œil sur le développement de l'Égypte au cours des dernières années*. Paris: Bonvalot-Jouve, 1906.
- Boulad, Emile. *Les Tramways du Caire*. Cairo: Paul Barbey Press, 1919.
- Caneri, Toussaint. *La ville du Caire, son présent et son avenir: essai sur la création d'une municipalité*. Le Caire: Imprimerie de l'Institut français d'archéologie orientale, 1905.
- Congrès National Égyptien. *Œuvres du congrès national égyptien tenu à Bruxelles le 22, 23, 24 Septembre 1910*. Brussels: St. Catherine Press, 1911.
- Corthell, Elmer. "A Recent Trip to Italy, Egypt, Southern France and Spain. Interesting Facts and Personal Experiences." *Professional Memoirs: Corps of Engineers, United States Army, and Engineer Department at Large VII*, 33 (1915): 253-306
- Cottarel, François. *Bahth Tarshih Miah al-Nil al-Mo'ada li al-Shorb*. Al-Qahira: Matba'at Paul Perrier, 1910.
- Cromer, The Earl of. *Modern Egypt*. New York: The Macmillan Company, 1908.
- Cunningham, Alfred. *To-Day in Egypt: Its Administration, People and Politics*. London: Hurst and Blackett, Ltd., 1912.
- Eid, Alfred. *La Fortune immobilière de l'Égypte et sa dette hypothécaire*. Paris: F. Alcan, 1907.
- France, Ministère des Affaires Étrangères. *Documents Diplomatiques. Affaires d'Égypte, 1884-1893*. Paris: Imprimerie Nationale, 1893.

- Folwell, Prescott. *Sewerage: The Construction, Design, and Maintenance of Sewerage System*. New York: John Wiley and Sons, 1910.
- Foucart, George. "Le Caire et la speculation." *La nouvelle revue* 47 (1907): 487-504.
- Government of Great Britain. *Commercial. No. 34 (1883). Correspondences respecting the cholera epidemic in Egypt: 1883*. London: Harrison and Sons, 1883.
- . *Commercial. No. 39 (1883) Correspondences respecting the cholera epidemic in Egypt: 1883*. London: Harrison and Sons, 1883.
- Haswell, C. W. "Town Planning and Housing in Cairo." *Garden Cities & Town Planning* 11 (1921): 256-258.
- Ismail, Abd al Rahman. *Tibb al-Rekka*. Al-Qahira: al-Matba'a al-Bahiya, 1892.
- . *Al-Taqwimat al-Sihhiya 'Ala al-'Awa'id al-Misriya*. Al-Qahira: Matba'at Bulaq, 1895.
- James, Charles Carkeet. "The Main Drainage of Cairo." *Minutes of Proceeding of the Institution of Civil Engineers* 202 (1916): 57-139.
- . *Drainage Problems of the East*. Bombay: Bennette, Coleman & Company Limited, 1917.
- Kemp, W. G. *Egyptian Illustration: A Pictorial, Psychologic, Personal, Pithy and Political Miscellany*. Cairo: G.G. Zaccharia & Co., 1908.
- Legrand, F. *Les fluctuations de prix et les crises de 1907 et 1908 en Egypte*. Nancy: Imprimerie Typo-litho J. Coube, 1909.
- Lucas, Alfred. *The Chemistry of River Nile*. Cairo: National Printing Department, 1908.
- McLean, William. "Local Government and Town Development in Egypt." *The Town Planning Review* 7, 2 (1917): 83-97.
- . *City of Alexandria Town Planning Scheme*. Cairo: Government Press, 1921.
- . *Regional and Town Planning in Principle and Practice*. London: The Technical Press, 1930.
- Mahmoud, Hassan Pasha. *Waba' al-Haida fi Sanat 1883*. Al-Qahira: Al-Matba'a al-'Amera al-Sharafiya, 1884.
- al-Maqrizi. *Al-Mawaiz wa al-I'tibar bi dhikr al-Khitat wa al-Athar*. Al-Qahira: Madbouli, 1998.
- Martin, Arthur. *The Sewage Problem: A Review of the Evidence Collected by the Royal*

- Commission on Sewage Disposal*. London: The Sanitary Publishing Company, 1905.
- Martin, Germain. *Les bazars du Caire et les petits métiers arabes*. Cairo: Cairo University, 1910.
- Maunier, René. *L'Origine et la fonction économique des villes: étude de morphologie sociale*. Paris: Giard et Briere, 1910.
- . “La Vie Municipale en Egypte.” In *Premier Congrès International et Exposition Comparée des Villes*, 33-38. Bruxelles: Union internationale des villes, 1913.
- Al-Muwaylihi, Muhammad. *Hadith Isa Ibn Hisham*. Cairo: Hindawy Publishing, 2013 [1907].
- Mubarak, Ali. *Al-Khitat al-Tawfiqiyya al-Jadida li Misr al-Qahira*. Cairo: Boulaq Press 1888.
- Noyes, Alexander. “A Year After the Panic of 1907.” *The Quarterly Journal of Economics* 23, 2 (1909): 185-212.
- Poffandi, Stefano. *Indicateur égyptien administratif et commercial*. Alexandria: Imprimerie Générale A. Maurès, 1904.
- Richmond, Ernest. “Building Methods in Egypt.” *Journal of the Royal Institute of British Architects* 18 (1911): 535-550.
- Richmond, Henry Droop. “Contributions to the Chemistry of River Waters: The River Nile.” *The Journal of Analytical and Applied Chemistry* 7 (1893): 209-223
- Saadeh Bey. “Motor Progress in the Land of the Pyramids.” *The Horseless Age*, August 21, 1907.
- Sandwith, Fleming Mant. *Egypt as a Winter Resort*. London: Kegan Paul, Trench & Co., 1889.
- . *The Medical Diseases of Egypt*. London: Henry Kimpton, 1905.
- Scott, James Harry. *The Law Affecting Foreigners in Egypt. As the Result of the Capitulations, with an Account of their Origin and Development*. Edinburgh: William Green and Sons, 1907.
- Vallet, Jean. *Contribution à l'étude de la condition des ouvriers de la grande industrie au Caire*. Valence: Imprimerie Valentinoise, 1911.
- Weston, Edmund. “The American System of Filtration at Mansourah, Egypt.” *The Engineering Record* 53, 6 (1906): 146-8.
- . “The American System of Filtration Plant at Damietta, Egypt.” *The Engineering Record* 55, 18 (1907): 536-9.

Watson, Hugh Sextus. *Sewerage Systems, Their Design and Construction*. McGraw-Hill Book Company, 1911.

Wright, Arnold and H. A. Cartwright, eds. *Twentieth Century Impressions of Egypt: Its History, People, Commerce, Industry and Resources*. London: Lloyd's Greater Britain Publishing Company Ltd., 1909.

Secondary Sources

Aalbers, Manuel and Brett Christophers. "Centering Housing in Political Economy." *Housing, Theory, and Society* 31 (2014): 373-394.

Abu-Lughod, Janet. "Tale of Two Cities: The Origins of Modern Cairo." *Comparative Studies in Society and History* 7, 4 (1965): 429-57.

———. *Cairo: 1001 Years of the City Victorious*. Princeton: Princeton University Press, 1971.

Alder, Ken. *Engineering the Revolution: Arms and Enlightenment in France, 1763-1815*. Chicago: University of Chicago Press, 1997.

Ackerknecht, Erwin. "Anticontagionism between 1821 and 1867." *Bulletin of the History of Medicine* 22 (1948): 532-93.

Adas, Michael. *Machines as the Measure of Men: Science, Technology, and Ideologies of Western Dominance*. Ithaca: Cornell University Press, 1990.

Akerman, James and Robert Karrow, eds. *Maps: Finding our Place in the World*. Chicago: The University of Chicago Press, 2007.

Alleaume, Ghislaine. "Hygiène publique et travaux publics: Les ingénieurs et l'assainissement du Caire (1882-1907)." *Annales Islamologiques* 20 (1984): 151-82.

Allen, Richard W. "Cairo Drainage Scheme." *Journal of the Royal African Society* 28, 112 (1929): 340-346.

Allen, Roger. *A Period of Time: A Study and Translation of Ḥadīth 'Īsā ibn Hishām by Muḥammad al-Muwayliḥī*. Reading: Ithaca Press, 1992.

Anand, Nikhil. "Pressure: The PoliTechnics of Water Supply in Mumbai." *Cultural Anthropology* 26, 4 (2011): 542-64.

Anderson, Casper. *British Engineers and Africa, 1875-1914*. London: Pickering & Chatto, 2011.

Arnaud, Jean-Luc. *Le Caire, mise en place d'une ville moderne, 1867-1907: Des intérêts du prince aux sociétés privées*. Aix-en-Provence: Actes Sud, 1998.

- Arnaud, Jean-Luc and Hidi Sami Zaki. *Toponymie du Caire*. Le Caire: CEDEJ, 1994.
- Arnold, David. "Europe, Technology, and Colonialism in the 20th century." *History and Technology* 21, 1 (2005): 85-106.
- Azadian, A. *Les Eaux d'Égypte*. Le Caire: Imprimerie Nationale, 1930.
- Badrawi, Malak. *Political Violence in Egypt, 1910-1924: Secret Societies, Plots and Assassinations*. Richmond, Surry: Curzon Press, 2000.
- Baer, Gabriel. *A History of Land Ownership in Modern Egypt*. London: Oxford University Press, 1962.
- Bahgat, Nabil. *Badi' Khairy: al-A'mal al-Shi'riya al-Kamila*. Al-Qahira: Dar Mirit, 2010.
- Baker, M. N. *The Quest for Pure Water: The History of Water Purification from the Earliest Records to the Twentieth Century*. New York: The American Water Works Association, 1948.
- Bakker, Karen. *Privatizing Water: Governance Failure and the World's Urban Water Crisis*. Ithaca: Cornell University Press, 2010.
- Baldwin, Peter. *Contagion and the State in Europe, 1830-1930*. Cambridge University Press, 1999.
- Barak, On. *On Time: Technology and Temporality in Modern Egypt*. Berkeley: University of California Press, 2013.
- Barakat, 'Ali. *Tatawur al-Milkiya al-Zira'iya fi Misr wa Atharahu 'Ala al-'Haraka al-Siyasiya, 1813-1914* [The Development of Landed Property in Egypt and its Effect on Politics, 1813-1914]. Al-Qahira: Dar al-Thaqafa al-Jadida, 1977.
- Barry, Andrew. *Material Politics: Disputes Along the Pipeline*. West Sussex: Wiley-Blackwell, 2013.
- Beinin, Joel and Zachary Lockman. *Workers on the Nile: Nationalism, Communism, Islam, and the Egyptian Working Class, 1882-1954*. Princeton: Princeton University Press, 1988.
- Berque, Jacques. *Egypt: Imperialism and Revolution*, translated by Jean Stewart. London: Faber & Faber, 1972.
- Bijker, Wiebe. "Dikes and Dams, Thick with Politics." *Isis* 98 (2007): 109-123.
- Bijker, Wiebe, Thomas Hughes, and Trevor Pinch, eds. *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*. Cambridge, Mass.: MIT Press, 1987.

- Bijker, Wiebe E., and John Law, eds. *Shaping Technology / Building Society: Studies in Sociotechnical Change*. Cambridge, Mass.: The MIT Press, 1994.
- Björkman, Lisa. "Becoming a Slum: From Municipal Colony to Illegal Settlement in Liberalization-Era Mumbai." *International Journal of Urban and Regional Research* 38 (2014): 36-59.
- . *Pipe Politics, Contested Waters: Embedded Infrastructures of Millennial Mumbai*. Durham: Duke University Press, 2015.
- Blackmar, Elizabeth. *Manhattan For Rent, 1785-1850*. Ithaca: Cornell University Press, 1989.
- . "Accountability for Public Health: Regulating the Housing Market in Nineteenth-Century New York City," in *Hives of Sickness: Public Health and Epidemics in New York City*, edited by David Rosner, 42-64. New Brunswick: Rutgers University Press, 1995.
- Briggs, Asa. "Cholera and Society in the Nineteenth Century." *Past and Present* 19 (1961): 76-96
- Brown, Nathan J. "The Precarious Life and Slow Death of the Mixed Courts of Egypt." *International Journal of Middle East Studies* 25, 1 (1993): 33–52.
- Bruner, Robert and Sear Carr. *The Panic of 1907: Lessons Learned from the Market's Perfect Storm*. Hoboken, New Jersey: John Wiley and Sons, 2007.
- Buchanan, R. A. "Gentlemen Engineers: The Making of a Profession." *Victorian Studies* 26, 4 (1983): 407-425.
- . "The Diaspora of British Engineering." *Technology and Culture* 27, 3 (1986): 501-524.
- Callon, Michael. "Society in the Making: The Study of Technology as a Tool for Sociological Analysis." In *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, edited by Wiebe Bijker, Thomas Hughes, and Trevor Pinch, 83-103. Cambridge, Mass.: The MIT Press, 1987.
- Çelik, Zeynep. *Empire, Architecture, and the City: French-Ottoman Encounters, 1830-1914*. Seattle: University of Washington Press, 2008.
- Chalcraft, John. *The Striking Cabbies of Cairo and Other Stories: Crafts and Guilds in Egypt, 1863-1914*. Albany: State University of New York Press, 2005.
- Chatterjee, Partha. *The Black Hole of Empire: History of a Global Practice of Power*. Princeton: Princeton University Press, 2012.
- Churchill, Robert R. "Urban Cartography and the Mapping of Chicago," *Geographical Review* 94, 1 (2004): 1–22

- Clerget, Marcel. *Le Caire: Etude de géographie urbaine et d'histoire économique*. Cairo: E. & R. Schindler Press, 1934.
- Cohn, Bernard. *Colonialism and Its Forms of Knowledge: The British in India*. Princeton: Princeton University Press, 1996.
- Cole, Juan I. *Colonialism and Revolution in the Middle East: Social and Cultural Origins of Egypt's 'Urabi Movement*. Princeton: Princeton University Press, 1993.
- Coleman, William. "Koch's comma bacillus: the first years." *Bulletin of the History of Medicine* 61 (1987): 315-42.
- Collins, H. M. and Richard Evans. "The Third Wave of Science Studies: Studies in Expertise and Experience." *Social Studies of Science* 32, 2 (2002): 235-96.
- Cooper, Frederick, and Ann Laura Stoler, eds. *Tensions of Empire: Colonial Cultures in a Bourgeois World*. Berkeley: University of California Press, 1997.
- Cooper, Frederick, and Randall M. Packard, eds. *International Development and the Social Sciences: Essays on the History and Politics of Knowledge*. Berkeley: University of California Press, 1997.
- Cooper, Timothy. "Peter Lund Simmonds and the Political Ecology of Waste Utilization in Victorian Britain." *Technology and Culture* 52, 1 (2011): 21-44.
- Corbin, Alain. *The Foul and the Fragrant: Odor and the French Social Imagination*. Cambridge: Harvard University Press, 1988.
- Cronon, William. *Nature's Metropolis: Chicago and the Great West*. New York: W. W. Norton & Company, 1991.
- Crouchley, A. E. *The Investment of Foreign Capital in Egyptian Companies and Public Debt*. Cairo: Government Press, 1936.
- Darwish, Hasan. *Badi' Khairy: al-Azgal al-Badi'a wa al-Alhan al-Raihaniya, Dirasa Fanniya Siyasiya Ijtima'iya*. Al-Qahira: al-Majlis al-A'la li al-Thaqafa, 2001.
- Davis, Mike. *Late Victorian Holocausts: El Nino Famines and the Making of the Third World*. London: Verso, 2002.
- Dennis, Richard. *Cities in Modernity: Representations and Productions of Metropolitan Space, 1840-1930*. Cambridge: Cambridge University Press, 2008.

- Drayton, Richard. "Science, Medicine and the British Empire." In *The Oxford History of the British Empire* Vol. 5, edited by Robin W. Winks, 264-276. Oxford: Oxford University Press, 1999.
- . *Nature's Government: Science, Imperial Britain, and the "Improvement" of the World*. New Haven: Yale University Press, 2000.
- Elshakry, Marwa. *Reading Darwin in Arabic, 1860-1950*. Chicago: The University of Chicago Press, 2013.
- Esmeir, Samera. *Juridical Humanity: A Colonial History*. Stanford: Stanford University Press, 2012.
- Evans, Richard. *Death in Hamburg: Society and Politics in the Cholera Years*. Oxford University Press, 1987.
- Fahmy, Khaled. "An Olfactory Tale of Two Cities." In *Historians in Cairo: Essays in Honor of George Scanlon*, edited by Jill Edwards, 155-87. Cairo: The American University in Cairo Press, 2002.
- . "Modernizing Cairo: A Revisionist Narrative." In *Making Cairo Medieval*, edited by Nezar Alsayyad, Irene Bierman and Nasser Rabbat, 173-99. Lexington Press, 2005.
- Fahmy, Ziad. *Ordinary Egyptians: Creating the Modern Nation Through Popular Culture*. Stanford: Stanford University Press, 2011.
- Fathy, Hassan. *Architecture for the Poor: An Experiment in Rural Egypt*. Chicago: The University of Chicago Press, 1973 [1969].
- Fishman, Robert. *Bourgeois Utopias: The Rise and Fall of Suburbia*. New York: Basic Books, 1987.
- Forrest, R. and P. Williams. "The Commodification of Housing: Emerging Issues and Contradictions." *Environment and Planning* 16 (1984): 1163-1180.
- Foucault, Michel. "The Politics of Health in the Eighteenth Century." In *Power: Essential Works of Foucault, 1954-1984*, edited by James D. Faubion, 90-105. New York: The New Press, 2001.
- . "Space, Knowledge, and Power." In *Power: Essential Works of Foucault, 1954-1984*, edited by James D. Faubion, 349-364. New York: The New Press, 2001.
- Gallagher, Nancy. *Egypt's Other Wars: Epidemics and the Politics of Public Health*. Syracuse: Syracuse University Press, 1990.
- Gandy, Matthew. "Learning from Lagos." *New Left Review* 33 (2005): 37-53.

- . *The Fabric of Space: Water, Modernity, and the Urban Imagination*. Cambridge: MIT Press, 2014.
- Gilberg, Mark. “Alfred Lucas: Egypt’s Sherlock Holmes.” *Journal of the American Institute for Conservation* 36, 1 (1997): 31-48.
- Gilmartin, David. “Imperial Rivers: Irrigation and Visions of British Empire.” In *Decentering Empire: Britain, India and the Transcolonial World*, edited by Dane Kennedy and Durba Ghosh, 76-103. Delhi: Orient Longman, 2006.
- Goldschmidt, Arthur. *Biographical Dictionary of Modern Egypt*. Lynne Rienner Publishers, 2000.
- Goldschmidt, Arthur, Amy Johnson, and Barak Salmoni, eds. *Re-envisioning Egypt, 1919-1952*. Cairo: American University in Cairo Press, 2005.
- Goubert, Jean-Pierre. *The Conquest of Water: The Advent of Health in the Industrial Age*. Princeton: Princeton University Press, 1989.
- Graham, Stephen and Simon Marvin. *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition*. London: Routledge, 2002.
- Hamlin, Christopher. *A Science of Impurity: Water Analysis in Nineteenth Century Britain*. Berkeley: University of California Press, 1990.
- . *Public Health and Social Justice in the Age of Chadwick: Britain, 1800-1854*. Cambridge: Cambridge University Press, 1998.
- Hanley, Will. *Identifying with Nationality: Europeans, Ottomans, and Egyptians in Alexandria*. New York: Columbia University Press, 2017.
- Hanssen, Jens. *Fin de Siècle Beirut: The Making of an Ottoman Provincial Capital*. Oxford: Clarendon Press, 2005.
- Harvey, David. *Rebel Cities: From the Right to the City to Urban Revolution*. London: Verso, 2012.
- Havinden, Michael and David Meredith. *Colonialism and Development: Britain and Its Tropical Colonies 1850-1960*. London: Routledge, 1996.
- Hazlett, Maril. “‘Woman Vs. Man Vs. Bugs’: Gender and Popular Ecology in Early Reactions to Silent Spring.” *Environmental History* 9, 4 (2004): 701–729.
- Headrick, Daniel. *The Tentacles of Progress: Technology Transfer in the Age of Imperialism, 1850-1940*. Oxford: Oxford University Press, 1988.

- Highsmith, Andrew. *Demolition Means Progress: Flint, Michigan, and the Fate of the American Metropolis*. Chicago: University of Chicago Press, 2015.
- Hobson, J. A. *Imperialism: A Study*. London: James Nisbet & Co., 1902.
- Hodge, Joseph Morgan. *Triumph of the Expert: Agrarian Doctrines of Development and the Legacies of British Colonialism*. Athens: Ohio University Press, 2007.
- Home, Robert K. "British Colonial Town Planning in the Middle East: The Work of W. H. McLean." *Planning History* 12, 1 (1990): 4-9.
- . *Of Planting and Planning: The Making of British Colonial Cities*. Oxford: Taylor & Francis, 1997.
- Howard-Jones, Norman. *The Scientific Background of the International Sanitary Conferences, 1851-1938*. Geneva: World Health Organization, 1975.
- Huber, Valeska. "The Unification of the Globe by Disease? The International Sanitary Conferences on Cholera, 1851-1894." *The Historical Journal* 49, 2 (2006): 453-76.
- . *Channelling Mobilities: Migration and Globalisation in the Suez Canal Region and Beyond, 1869-1914*. Cambridge University Press, 2013.
- Hughes, Thomas P. *Networks of Power: Electrification in Western Society, 1880-1930*. Baltimore: Johns Hopkins University Press, 1993.
- Ilbert, Robert. *Héliopolis, le Caire, 1905-1922: genèse d'une ville*. Paris: Centre Nationale de la Recherche Scientifique, 1981.
- . "Egypte 1900, Habitat Populaire, Société Coloniale." in *Etat, ville et mouvements sociaux au Maghreb et au Moyen-Orient: actes du colloque C.N.R.S.-E.S.R.C.*, edited by Kenneth Brown, 266-282. Paris: L'Harmattan, 1989.
- . *Alexandrie, 1830-1930: histoire d'une communauté citadine*. Le Caire: Institut français d'archéologie orientale, 1996.
- Jacob, Wilson Chacko. *Working Out Egypt: Effendi Masculinity and Subject Formation in Colonial Modernity, 1870-1940*. Durham: Duke University Press, 2010.
- Joyce, Patrick. *The Rule of Freedom: Liberalism and the Modern City*. London: Verso, 2003.
- Kaika, Maria and Erik Swyngedouw. "Fetishizing the Modern City: The Phantasmagoria of Urban Technological Networks." *International Journal of Urban and Regional Research* 24, 1 (2000): 120-138.

- Khuri-Makdisi, Ilham. *The Eastern Mediterranean and the Making of Global Radicalism, 1860-1914*. Berkeley: University of California Press, 2010.
- Kilani, Muhammad Sayyid. *Teram al-Qahira*. Al-Qahira: al-Hai'a al-'Ama li Qusur al-Thaqafa, 2010 [1968].
- Kleinman, Daniel Lee, ed. *Science, Technology, and Democracy*. Albany: SUNY Press, 2000.
- Koven, Seth. *Slumming: Sexual and Social Politics in Victorian London*. Princeton: Princeton University Press, 2006.
- Kramer, Gurdun. *The Jews in Modern Egypt, 1914-1952*. London: I. B. Tauris, 1989.
- Kuhnke, LaVerne. *Lives at Risk: Public Health in Nineteenth-Century Egypt*. Berkeley: University of California Press, 1990.
- Latour, Bruno. *We Have Never Been Modern*. Cambridge: Harvard University Press, 1993.
- . *Science in Action: How to Follow Scientists and Engineers Through Society*. Cambridge: Harvard University Press, 1987.
- . *The Pasteurization of France*. Cambridge: Harvard University Press, 1993.
- . *Aramis, or, The Love of Technology*. Cambridge: Harvard University Press, 1996.
- Legg, Stephen. *Spaces of Colonialism: Delhi's Urban Governmentalities*. Oxford: Blackwell Publishing, 2007.
- Lenin, Vladimir. *Imperialism: The Highest Stage of Capitalism—A Popular Outline*. London: Penguin Books, 2010 [1916].
- Low, Michael Christopher. "Ottoman Infrastructures of the Saudi Hydro-State: The Technopolitics of Pilgrimage and Potable Water in the Hajj." *Comparative Studies in Society and History* 57, 4 (2015): 942-974.
- Lutfi, Huda. "Coptic Festivals of the Nile: Aberrations of the Past?" In *The Mamluks in Egyptian Politics and Society*, edited by Thomas Phillip and Ulrich Haarmaan, 254-82. Cambridge: Cambridge University Press, 1998).
- MacLeod, Roy. "Introduction to Nature and Empire: Science and the Colonial Enterprise." *Osiris* 15, 1 (2000): 1-13.
- McGrew, Roderick. "The First Cholera Epidemic and Social History." *Bulletin of the History of Medicine* 34 (1960): 61-73.

- Melosi, Martin. *The Sanitary City: Urban Infrastructure in America from Colonial Times to the Present*. Baltimore: Johns Hopkins University Press, 1999.
- Mikhail, Alan. *Nature and Empire in Ottoman Egypt: An Environmental History*. Cambridge: Cambridge University Press, 2011.
- Millward, Robert. "Emergence of Gas and Water Monopolies in Nineteenth-century Britain: Contested Markets and Public Control." In *New Perspectives on the Late Victorian Economy*, edited by James Foreman-Peck, 96-124. Cambridge: Cambridge University Press, 1991.
- . "The Political Economy of Urban Utilities." In *The Cambridge Urban History of Britain*, edited by Matrin Dauton, 315-49. Cambridge: Cambridge University Press, 2000.
- Mitchell, Timothy. *Rule of Experts: Egypt, Techno-Politics, Modernity*. Berkeley: University of California Press, 2002.
- Mitman, Gregg, Michelle Murphy, and Christopher Sellers. "Introduction: A Cloud over History." *Osiris* 19 (2004): 1–17.
- Moon, Suzanne. "Place, voice, interdisciplinarity: Understanding technology in the colony and postcolony." *History and Technology* 26, 3 (2010): 189-201.
- Morris, Aldon. *The Scholar Denied: W. E. B. Du Bois and the Birth of Modern Sociology*. California: University of California Press, 2017.
- Morgan, Emily Kathryn. "'True Types of the London Poor': Adolphe Smith and John Thompson's *Street Life in London*." PhD diss., The University of Arizona, 2012.
- Mukerji, Chandra. *Impossible Engineering: Technology and Territoriality on the Canal Du Midi*. Princeton: Princeton University Press, 2009.
- Nash, Linda. *Inescapable Ecologies: A History of Environment, Disease and Knowledge*. Berkeley: University of California Press, 2006.
- Nye, David E. *Electrifying America: Social Meanings of a New Technology, 1880-1940*. Cambridge, Mass.; London: The MIT Press, 1992.
- Ogawa, Mariko. "Uneasy Bedfellows: Science and Politics in the Refutation of Koch's Bacterial Theory of Cholera." *Bulletin of the History of Medicine* 74, 4 (2000), pp. 671-707.
- Otter, Chris. *The Victorian Eye: A Political History of Light and Vision in Britain, 1800-1910*. Chicago: University of Chicago Press, 2008.
- Owen, Roger. *The Middle East in the World Economy 1800-1914*. London: I. B. Tauris, 2002.

- . *Cotton and the Egyptian Economy*. Oxford: Clarendon Press, 1969.
- . “The Cairo building industry and the building boom of 1897 to 1907.” In *Colloque internationale sur l’histoire du Caire*. Cairo, Egypt: Ministry of Culture of the Arab Republic of Egypt, 1972.
- Pattillo, Mary. “Housing: Commodity versus Right.” *Annual Review of Sociology* 39 (2013): 509-531.
- Pelling, Margaret. *Cholera, Fever, and English Medicine, 1825–1865*. Oxford: Oxford University Press, 1978.
- Pfautz, Harold W., ed. *Charles Booth on the City: Physical Pattern and Social Structure*. Chicago: The University of Chicago Press, 1967.
- Phillips, Christopher J. “The taste machine: Sense, subjectivity, and statistics in the California wine world.” *Social Studies of Science* 46, 3 (2016): 461-81.
- Powell, Eve Troutt. *A Different Shade of Colonialism: Egypt, Great Britain and the Mastery of the Sudan*. Berkeley: University of California Press, 2003.
- Prakash, Gyan. *Mumbai Fables*. Princeton: Princeton University Press, 2011.
- Raafat, Samir. *The Egyptian Bourse*. Cairo: Zaitouna Press, 2010.
- al-Rafi’i, ‘abd al-Rahman. *Mohammad Farid: Ramz al-Ikhlās wa al-Tad’hiya* [Mohammad Farid: A Symbol of Loyalty and Sacrifice]. Al-Qahira: Dar al-Ma’arif, 1984 [1941].
- Raj, Kapil. *Relocating Modern Science: Circulation and the Construction of Knowledge in South Asia and Europe, 1650–1900*. New York: Palgrave Macmillan, 2007.
- Raymond, André. *Cairo*, translated by Willard Wood. Cambridge: Harvard University Press, 2000.
- Reid, Donald. *Paris Sewers and Sewermen: Realities and Representations*. Harvard University Press, 1991.
- Reimer, Michael J. “Urban Government and Administration in Egypt, 1805-1914.” *Die Welt des Islams* 39, 3 (1999): 289-318.
- Reynolds, Nancy. *A City Consumed: Urban Commerce, the Cairo Fire, and the Politics of Decolonization in Egypt*. Stanford University Press, 2012.
- Richards, Alan. *Egypt’s Agricultural Development, 1800-1980: Technical and Social Change*. Boulder, CO: Westview Press, 1982.

- Rosen, George. *A History of Public Health*. Baltimore: Johns Hopkins University Press, [1958] 1993.
- Rosenberg, Charles. *The Cholera Years: The United States in 1832, 1849 and 1866*. Chicago: The University of Chicago Press, 1962.
- Roy, Ananya. "Slumdog Cities: Rethinking Subaltern Urbanism." *International Journal of Urban and Regional Research* 35 (2011): 223-38.
- Ryzova, Lucie. *The Age of the Efendiyya: Passages to Modernity in National-Colonial Egypt*. Oxford: Oxford University Press, 2014.
- Said, Edward. *Orientalism*. New York: Vintage Books, 1994.
- Schaffer, Simon, Lissa Roberts, Kapil Raj, and James Delbourgo, eds. *The Brokered World: Go-Betweens and Global Intelligence, 1770-1820*. Sagamore Beach, Mass.: Science History Publications, 2009.
- Schiebinger, Londa. "Introduction to Focus: Colonial Science." *Isis* 96, 1 (2005): 52-55.
- Schölch, Alexander. *Egypt for the Egyptians! The Socio - political Crisis in Egypt, 1878-1882*. London: Ithaca Press, 1981.
- Schwartz, Pedro. "John Stuart Mill and Laissez Faire: London Water." *Economica* 33 (1966): 71-83.
- El Shakry, Omnia. *The Great Social Laboratory: Subjects of Knowledge in Colonial and Postcolonial Egypt*. Stanford: Stanford University Press, 2007.
- . "Cairo as a Capital of a Socialist Revolution?" In *Cairo Cosmopolitan: Politics, Culture, and Urban Space in the New Globalized Middle East*, edited by Diane Singerman and Paul Amar, 73-98. Cairo: The American University in Cairo Press, 2006.
- Shalabi, Hilmi Ahmad. *Al-Hokm al-Mahalli wa al-Majalis al-Baladiya fi Misr* [Local Self-Government and Municipal Councils in Egypt]. Al-Qahira: 'Alam al-Kutub, 1987.
- Shapin, Steven. "Following Scientists Around." *Social Studies of Science* 18, 3 (1988): 533–550
- . *Never Pure: Historical Studies of Science as If It Was Produced by People with Bodies, Situated in Time, Space, Culture, and Society, and Struggling for Credibility and Authority*. Baltimore: Johns Hopkins University Press, 2010.
- . *Changing Tastes: How Things Tasted in the Early Modern Period and How They Taste Now*. Uppsala: Uppsala Universitat, 2011.
- . "The Sciences of Subjectivity." *Social Studies of Science* 42, 2 (2012): 170-84.

- . “A taste of science: Making the subjective objective in the California wine world.” *Social Studies of Science* 46, 3 (2016): 436-60.
- Shapin, Steven and Simon Schaffer. *Leviathan and the Air-pump: Hobbes, Boyle, and the Experimental Life*. Princeton: Princeton University Press, 1989.
- El Sheshtawy, Yasser. “Urban Rupture: A Fire, Two Hotels, and the Transformation of Cairo.” In *Violence and the City in the Modern Middle East*, edited by Nelida Fuccaro, 211-230. Stanford: Stanford University Press, 2016.
- Shousha, Aly Tawfik. “Cholera Epidemic in Egypt (1947): A Preliminary Report.” *Bulletin of World Health Organization* 1, 2 (1948): 353-81.
- Simmons, Dana. “Waste Not, Want Not: Excrement and Economy in Nineteenth-Century France.” *Representations* 96, 1 (2006): 73-98.
- Smith, Crosbie and M. Norton Wise. *Energy and Empire: A Biographical Study of Lord Kelvin*. Cambridge; New York: Cambridge University Press, 1989.
- Soll, David. *Empire of Water: An Environmental and Political History of the New York City Water Supply*. Ithaca: Cornell University Press, 2013.
- Stoler, Anne Laura. *Along the Archival Grain: Epistemic Anxieties and Colonial Common Sense*. Princeton: Princeton University Press, 2010.
- Taylor, Vanessa and Frank Trentmann. “Liquid Politics: Water and the Politics of Everyday Live in the Modern City.” *Past and Present* 211, 1 (2011): 199-241.
- Tilley, Helen. *Africa as a Living Laboratory: Empire, Development, and the Problem of Scientific Knowledge, 1870-1950*. Chicago: University of Chicago Press, 2011.
- Topalov, Christian. “The City as *terra incognita*: Charles Booth’s Poverty Survey and the People of London, 1886-1891.” *Planning Perspectives* 8 (1993): 395-425.
- al-Toukhy, Nabil. *Tawa’if al-‘Hiraf fi Misr*. Al-Qahira: al-Hai’a al-Misriya al-‘Ama li al-Kitab, 2009.
- Tresch, John. *The Romantic Machine: Utopian Science and Technology After Napoleon*. University of Chicago Press, 2012.
- Tunçer, Ali. *Sovereign Debt and International Financial Control: The Middle East and the Balkans, 1870–1914*. London: Palgrave Macmillan, 2015.
- Tvedt, Terje. *The River Nile in the Age of the British: Political Ecology and the Quest for Economic Power*. London: I. B. Tauris, 2004.

- Vasudevan, Alexander. "The Makeshift City: Towards a Global Geography of Squatting." *Progress in Human Geography* 39 (2015): 338-359.
- Vitalis, Robert. *When Capitalists Collide: Business Conflict and the End of Empire in Egypt*. University of California Press, 1995.
- . *White World Order, Black Power Politics: The Birth of American International Relations*. Ithaca: Cornell University Press, 2015.
- Volait, Mercedes. *Architectes et architectures de l'Égypte moderne (1830-1950): genèse et essor d'une expertise locale*. Paris: Maisonneuve & Larose, 2005.
- . "Making Cairo Modern (1870-1950): Multiple Models for a 'European-style' Urbanism." In *Urbanism: Imported or Exported? Native Aspirations and Foreign Plans*, edited by Joseph Nasr and Mercedes Volait, 17-50. London: Wiley-Academy, 2003.
- Watts, Sheldon. "From Rapid Change to Stasis: Official Responses to Cholera in British-Ruled India and Egypt: 1860 to c. 1921." *Journal of World History* 12, 2 (2001): 321-374.
- White, Luise. "Sex, Soap, and Colonial Studies." *Journal of British Studies* 38 (1999): 478-486.
- . *Speaking with Vampire: Rumors and History in Colonial Africa*. Berkeley: University of California Press, 2000.
- Willcocks, William. *Sixty Years in the East*. Edinburgh and London: William Blackwood and Sons, 1935.
- Wise, M. Norton and Crosbie Smith. "Work and Waste: Political Economy and Natural Philosophy in Nineteenth Century Britain (I-III)." *History of Science* 27-8 (1989-1990): 263-301, 391-449, 221-261.
- Wright, Gwendolyn. *The Politics of Design in French Colonial Urbanism*. Chicago: University of Chicago Press, 1991.