# Engineering Heterotopia

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My starting point is the present—certainly a critical and loaded moment for scholars of the modern Middle East. It is incumbent upon us to take a step back and to rethink how to create new concepts, new narratives, new explanatory schemes, new historicities, and new visions of the future. An engagement with science studies, understood broadly, is one possible way to begin such critical rethinking. It is an exercise that could also be mutually illuminating, as scholars of science studies have been debating the global nature of science and technology for the last decade, undoubtedly in reaction to the once European-dominated narrative of the history of science. The field of science studies has moved well beyond "diffusion" and "core-periphery" models toward more eclectic examinations of various processes of epistemic encounters, translations, mediations, and conflicts that shaped societies. These processes also shaped science and technology.[1] Here, I would like to provide a brief outline of one mutual engagement inspired by the injunction to follow scientists, doctors, and engineers and to probe what was at stake in the knowledge they produced and how they "made society."[2]

By following a British engineer involved in an unprecedented urban public works project in colonial Cairo, the contours of a story begin to emerge and it is broadly about the overlapping of capital, politics, and public health. As of the 1910s, it was the most expensive urban public undertaking in Egypt. It was demanding in terms of the organization and accuracy of urban data. It was too monopolistic in nature and too consequential for public health to be left to a private company. It was so spread over the entire city horizontally (and vertically) that it required the cooperation of a large number of experts. I am referring to Cairo's first modern sewage system, which was planned by Charles Carkeet James and constructed between 1907 and 1915. The project cost £E2,343,000 in 1910, an amount nearly as much as the Egyptian government paid to build the Aswan Dam eight years earlier. Engineering Cairo's sewers was not only a matter of constructing a large-scale technological artifact, but also of social engineering, which, in turn, sheds light on how the city became the principal object of government during the early decades of the 20th century.

Between the 1850s and the 1910s, Cairo witnessed profound demographic, economic, infrastructural, and spatial transformations. Frenzied speculation and an inflow of capital during the turn-of-the-century building boom left a permanent mark on Cairo's geography. These transformations were connected to both the introduction of networks of urban transportation as well as demographic shifts that saw an influx of migrants from the countryside, the south, the Sudan, the Levant, and Europe, including Greece and Italy. In designing his project, James had to account for these developments and much more. In fact, the design required the gathering, classification, tabulation, and triangulation of urban information on an unprecedented scale. Never before had data about subsoil, ground water, layout of water and gas pipes, land levels, weather patterns, distribution of population, projected population growth, social stratification, number of

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houses, composition of households, patterns of water consumption, and sanitary habits in Cairo been collected and organized in a systematic manner. All of this information was condensed not only in the report, but also in the sewers themselves. The report contained the city and its residents as a totalized object, at which the engineer/planner looked down, as Michel de Certeau wrote.[3] This metaphorical height was one of the technologies that allowed engineers and administrators to see and to act upon the city's complex reality as a whole for the first time.

The planning and construction of such a technological artifact occasioned many confrontations and negotiations. Medical experts and engineers vied over where to extend their expertise and to what limits. The British colonial administration was faced with having to solve the legal and financial problems caused by the Capitulations. It had to assuage the fears of elite homeowners that the project would not lower the value of their property due to its location and features. The administration also faced severe criticism from the then-growing nationalist movement over the design and financing of the project as well as what was seen as British business favoritism in assigning contracts. The project ran parallel to a new agreement between the government and the concessionary Cairo Water Company over the control of water supply. James himself was either directly or indirectly involved in many of the negotiations that led up to it. However, much of his effort and thought was concentrated on finding the optimal design given all the information he had gathered, all the caveats that the Public Works Ministry made clear, and all the experience he had gained from his previous work in India.

One of the most critical choices that James had to make at the outset concerned the method of calculating the amount of sewage flowing into the network, which in turn was crucial for determining the size of the pipes. In designing the project, the engineer followed the textbook method of calculating the amount of sewage by relying on figures of water consumption. James obtained information about patterns of water consumption across the city's neighborhoods and the conditions of Cairo's houses in order to arrive at an estimate. Ironically, for a city on one of the largest rivers in the world (the Nile), water from the company was sold at exorbitant rates, so that only a fraction of elite Egyptian and European residents could afford an abundant supply. Such inequalities dissuaded James from calculations based on *average* water consumption, which was the standard for European and American cities. In order to estimate the amount of sewage, James had to put on his sociological hat. For him there were three classes of houses in Cairo: Class A was inhabited by the upper class (both elite Europeans and Egyptians) who lived in houses connected to the mains of the Cairo Water Company; Class B houses were inhabited by "a good class" but were neither connected to the water company nor could be connected in the future on account of being so poorly constructed; finally, Class C houses were slums with negligible water consumption. Using figures from the 1907 census, the formula was further simplified into 100,000 upper class residents who used 33 gallons of water per day, and 544,000 lower class residents, the great majority of whom used only 2.2 gallons per day—fifteen times less than the upper class. Further, the system had to account for the prospective increase of the city's population, estimated to reach 960,000 in 1932. James reckoned that 160,000 out of the city's prospective population would still be considered upper class and could still be expected to consume thirty three gallons of water per day, while the lower class (800,000) was allowed an increase of water consumption to 6.1 gallons per day solely

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on account of the construction of public bathrooms and the connection of more mosques to the water company. James calculated the ratio of the upper to the lower class such that it remained almost exactly the same from 1907 to 1932.[4]

What is most striking about these calculations is how natural the colonial hierarchy was for the engineer's visions of the social order—so natural that it was thought to unproblematically withstand the vagaries of a quarter century to come. Instead of making room for a more egalitarian future, the technological system was a materialized colonial vision that imagined a future colonial Cairo as an ordered, static space. The upper classes were always going to remain the upper classes, and the "natives" were always going to remain "natives," because the colonies were to remain colonies. According to this vision, radical inequalities were timeless social facts rather than the outcome of a particular politics or history.

Yet the engineer's social vision also coincided with colonial anxieties about urban dwellers and the broader question of how to regulate and govern cities. Less than one year after the Dinshwai incident, the writings of colonial administrators and observers expressed anxieties about the rise of modern-educated, urban Egyptians who demand government employment, publish subversive newspapers, form secret societies, and challenge colonial authority. The engineering project unwittingly addressed these social fears. It was an offer of material improvement under the condition of a colonial social order.

In a posthumous text entitled "Of Other Spaces," Michel Foucault spoke about "heterotopias," by which he meant social spaces that functioned differently or even in opposition to all other spaces.[5] For him, some colonial missionary towns were heterotopias of order as they promised to be as well arranged and perfect as the world was actually ill arranged and imperfect. To this extent James' project was a technologically engineered heterotopia that projected a colonial fantasy of order in the midst of rising colonial anxieties about the city.

Foucault later dropped the concept of heterotopia, but he never dropped the centrality of space to technologies of power. Unlike discipline, which works on empty artificial spaces, governmentality is a modern form of power that works on populations understood as biological phenomena bound to a material space. Governmentality functions by regulating the circulation of people, commodities, and diseases in a given space. The modern city was not only the space where this power was often exercised but also the key site of its production and permutation.[6] Following the design of Cairo's sewage system highlights some of the dynamics by which the city, with its concentrated web of biological and social relations, became central to what it meant to govern colonial Egypt. The project brought together engineering sciences, water technologies, and social planning as it produced the city as an object of governance.

Undoubtedly, Cairo's sewage system lowered urban mortality rates. As with any project of such magnitude, there were also some problems, including the fact that the city's population grew much faster than planned. However, the system's most glaring failure was that of the heterotopic colonial fantasy undergirding the design. Walter Benjamin viewed the Paris of Baron Haussmann as a material expression of bourgeois myths. For him, the Paris Commune momentarily expelled these myths.[7] Perhaps in a similar vein we could say that the revolutionary events of 1919 expelled the colonial myth expressed in the engineering project, namely, that

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material improvement could guarantee the permanence of the colonial state and its social order.

NOTES

[1]Kapil Raj, *Relocating Modern Science: Circulation and the Construction of Knowledge in South Asia and Europe, 1650–1900* (New York: Palgrave Macmillan, 2007); 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); Sujit Sivasundaram, Marwa Elshakry, Helen Tilly, Shruti Kapila, and Neil Safier, "Focus: Global Histories of Science," *Isis* 101 (2010): 95–158.

[2]Bruno Latour, *Science in Action: How to Follow Scientists and Engineers through Society* (Cambridge, Mass.: Harvard University Press, 1988); Latour, *Aramis, or The Love of Technology* (Cambridge, Mass.: Harvard University Press, 1996); 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. Wiebe Bijker, Thomas Hughes, and Trevor Pinch (Cambridge, Mass.: MIT Press, 1987), 77–97.

[3]Michel de Certeau, *The Practice of Everyday Life*, trans. Steven Rendall (Berkeley, Calif.: University of California Press, 1984).

[4]*Dar al-Watha'iq al-Qawmiyya* (Egyptian National Archives), *Majlis al-Wuzara* (Council of Ministers), file number: 033264.

[5]Michel Foucault, "Of Other Spaces," *Diacritics* 16 (1986): 22–27.

[6]Michel Foucault, *Security, Territory, Population: Lectures at the Collège de France, 1977–1978*, ed. Michel Senellart, trans. Graham Burchell (New York: Picador, 2009).

[7]Walter Benjamin, *The Arcades Project*, trans. Howard Eiland and Kevin McLaughlin (Cambridge, Mass.: Belknap Press, 1999), 24.

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