

RIVERS LOST RIVERS REGAINED

Rethinking City-River Relations

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CHAPTER 10

THE GANGES AS AN URBAN SINK

Urban Waste and River Flow in Colonial India in the Nineteenth Century

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Our knowledge on this question [mixing of sewage with river waters] is based on general epidemiological considerations and on observations made by many European scientists . . . and by Hankin on the self-purifying powers of the Jumna, as regards India. It must, however, be noted that rivers vary very markedly in their bacterial and chemical contents and in their powers of self-purification. This depends on the soil and the nature of the country and watershed they drain, on their volume, and on the relation to this volume of polluted water (sewage) they receive, on their rate of flow, the nature of their bed and on the climate.

—L. D. SPENCER, OFFICIATING SANITARY COMMISSIONER
WITH THE GOVERNMENT OF INDIA

Rivers in India, especially the Ganges, have been much in the news in recent times on account of their pollution and the difficulties associated with their possible rejuvenation, marking yet another episode in the complex relationship between India's ancient, sacred river and the many cities that dot them.¹ The Ganges offers life to millions,² and its sacred nature continues to draw the faithful to its worship on a routine basis.³ Alongside this, however, there are also concerns about the large quantities of untreated waste that are discharged into the river each day, and the impact the building of canals, dams, and other human artifacts has on the river's flow. Both of these features of the river—its sacred nature in the eyes of the faithful and the continual transformation of its properties in the view of engineers and environmentalists—have been characteristic for over two centuries now. Its history, I suggest, therefore has much

to offer to our current efforts toward maintaining river flows and preventing water pollution.

As the introduction to this volume and the quote above suggest, for much of this modern period—the nineteenth and twentieth centuries—rivers and cities have been thought of in comparative terms. This comparative understanding offers several interesting narrative possibilities regarding European and colonial projects of urban modernity, resource use, and river rejuvenation. As David Arnold has argued, although at one level the sanitary and environmental issues facing Indian cities in the nineteenth century were no different from those that were encountered in the cities of Europe and America, “the understanding of India's cities was overlaid with a colonial perceptual grid that served to distance it from Western precedents. There was repeated insistence that these were ‘tropical’ as well as ‘oriental’ cities, oppressed by climatic, social and sanitary difficulties that were not encountered (or not encountered to the same degree) in the temperate zones.”⁴ The idea of colonial difference, in other words, was stamped at the very moment of origin of sanitary modernity in the colony.⁵ Indeed, difference and imitation, when considered together, implied a distinctive colonial form of modernity, one in which people, nature, materials, techniques, and fiscal resources in India were all arranged differently than in Europe.

Similarities and differences between the metropolitan project and the colonial one are also evident in the interweaving of two different languages and imaginations, anchored in science and engineering on the one hand and faith and ritual on the other. Cities and rivers have coevolved and shaped each other in multiple ways. Their attachment is manifold, linking trade, travel, and worship, but also waste, pollution, and disease. Representations of rivers are thus overlaps of several differently situated projects and outlooks, and in the Indian context one of the more significant overlaps has been between the religious and the natural. Like the meandering branches of the river, these were, and are, sometimes drawn together, and at other times pull apart. Nearly a century ago, Gandhi wrote that in the modern rush, the chief use we had for rivers was to empty gutters into them and to navigate cargo vessels upon them. By contrast, there was little time or inclination “to stroll down these rivers, and in silent meditation listen to the message they murmur to us.”⁶ In a more contemporary account, the anthropologist Kelley Alley points to the distinction made by the people of Banaras between different conceptual couplings such as *pavi-trata/apavitrata* (pure/impure) and *saaf/gandagi* (clean/dirty) and what official terms such as *pollution* or its Hindi equivalent *pradushan* may include or elide.⁷

This essay revisits these overlaps, between the metropolitan and the colonial and between the scientific and the religious, through a focus on the issue of pollution and river flow, as the many uses of the Ganges were sought to be controlled, modified, and rearranged in the nineteenth century. In the process, I seek to move beyond the study of the relationship between a river and "its city" to a conceptualization of a river in flow as it gets entwined with developments in the many cities that dot its banks, specifically the cities of Haridwar, Calcutta, Banaras, and Kanpur. I begin with a brief consideration of the idea of a sacred river, as exemplified in the annual bathing ritual in Haridwar. Then I trace the history of the river in the plains of north India and the emergence of the *modern* problematic of pollution around the turn of the nineteenth century. This is followed by an examination of the debates on the dangers posed by such pollution, through an understanding of the special nature of a tropical river. In the final section, I return to Haridwar to look at the issue of sacred flows, as distinct from contemporary notions of ecological or environmental flows of rivers in India. The conclusion reflects on the ambiguous nature of colonial modernity and the limits placed on the fuller realization of the modern sanitary project.

COLONIAL SETTINGS AND INDIAN RIVERS: THE GANGES AT HARIDWAR

The British in India saw themselves as a departure from their predecessors, the Mughals, due to a specific governmentality of establishing practices that were not exclusively about securing territory but also about improving the conditions of life (or what we might today call the bioproducts) of the native subjects. The old native rulers, they believed, regarded the people simply as producers of wealth from whom the means of paying for the expenses—or extravagances—of the court were to be extracted. By contrast, their idea of government was one that sought to protect the people and promote their well-being; in their regime, they believed, people would no longer be the property of the government but instead the government itself existed to promote their prosperity and well-being.⁸ People alone did not matter in this quest for "improvement"—land, forests, and rivers were all to be reshaped to create new regimes of property and rework relations with nature.⁹ The rivers and streams of England, Ireland, Scotland, and Wales, observed the Collector of South Canara (a district in southern India) in 1868, were all the private property of individuals or companies. The rivers of India, by contrast, belonged to the state—offering, in his view, greater facilities "for uniform treatment,

and direct advantages both to the State and the public."¹⁰ At first there were interventions by way of the making of canals, to provide water for irrigation that would ensure greater productivity and generate more revenue. This was followed by sanitary interventions, concerned with water supply and sewerage works.¹¹ Much of this intervention was guided by a calibration of "natural difference"—regarding the size of rivers, the nature of flows, etc. A simultaneous goal, however, was to imitate that which had already been developed in the advanced countries of Europe: "a diffusion of the knowledge of the latest European improvements in the supply of water and drainage of towns among the existing engineering staff," the best course for which would be "to frame rules that could enable Public Works officers [in India] to visit at public expense engineering works in the United Kingdom."¹² Improvements undertaken by British municipal authorities at home, officials believed, built upon "old traditions." "The real technical work," in India, by contrast, had to be initiated "as something altogether new."¹³

The pandits (priests) of Haridwar, the site where the Ganges exits from the hills to enter the plains of India, and which was considered an especially holy place for that reason, were not entirely sanguine about these prospects. They expected a speedy termination of the river's sanctity, fearing that nothing would be able to withstand the British power. "Let but the Ganges cease," one brahman is reported to have said, "and nothing would remain to the Hindoos but to embrace the Christian faith."¹⁴ Another believed the imminent demise of the river to be the "determinations of God." The river had but sixty-six more years to continue, and the gathering of sand was a mark that her end was nigh. The "purposes of God" were not to be averted!¹⁵ Perhaps the pandits exaggerated their fears. India did not become Christian, nor did the Ganges lose its sacredness.¹⁶ Indeed, the British were quite reluctant to intervene in matters of faith, especially following the armed revolt of 1857, which had been partially a consequence of hurt religious sentiments.¹⁷ From now on, India was to be governed directly by the British Parliament and the queen was keen to assure her Indian subjects that the religion of the rulers would be kept separate from the affairs of the people: "Firmly relying ourselves on the truth of Christianity, and acknowledging with gratitude the solace of religion, we disclaim alike the right and desire to impose our convictions on any of our subjects. We declare it to be our royal will and pleasure that none be in anywise favoured, none molested or disquieted, by reason of their religious faith or observances, but that all alike shall enjoy the equal and impartial protection of the law."¹⁸ Indians would henceforth be left "free" to conduct their religious affairs in their own

manner, free to treat religion as an "inner" domain where they could express their sovereignty, while recognizing the superiority of the British in an outer, material domain.¹⁹ The great bathing festivals (Kumbh Mela) organized on the Ganges would seem to logically feature in this inner domain.²⁰ However, this was not quite the case, for these festivals, as Kama Maclean points out, were located on the cusp of the inner-outer binary.²¹ While the British were reluctant to interfere directly with the activities undertaken by the pilgrims, they were extremely cautious about sanitation (fearing disease) and policing (fearing rebellious activities of a crowd they understood little). Occasionally attempts were made to prohibit the gatherings, especially in the wake of large-scale outbreaks of diseases such as cholera.²² However, on each such occasion a counterargument was proposed: The large body of the people who flocked to Haridwar could be induced to stay away only by direct proclamation, and by a considerable show of force, and officials believed that "it would be highly inexpedient for many reasons to prevent the assemblage, a gathering which, while it is attended with great risk and danger, is, and had always been, a religious function of great importance to almost every section of the Hindu community."²³

The sanitation of the fair and prevention of disease, wrote a magistrate in 1891, were by far the most important parts of his duty in connection with the assemblage. No effort could thus be spared to keep the town clean, to limit the number of persons who could stay in a particular building, to prevent nuisances, and to disperse the crowds in an orderly manner. Care would also be taken to ensure that no sullage water remained in the city and that the night soil was properly trenched, leaving little waste to flow directly into the Ganges.²⁴ The risk, indeed, was of a different kind—of people drinking water from the same ponds in which thousands had bathed earlier, and consequently falling prey to disease. There had been a suggestion on the occasion of the Kumbh in 1879 that a strong current of water should be directed through the sacred pool of Har Ki Pauri, so that the water might be constantly renewed.²⁵ The magistrate observed: "When it is remembered what numbers bathe at the same time during the fair, and that each of these must drink some of the water, it is unnecessary to say how charged the water must be with human emanations, and how dangerous these under certain circumstances might be if not instantly removed by a strong current."²⁶ It was agreed therefore to request the authorities of the Ganges Canal to make arrangements to send a constant stream of freshwater into the pool, which would quickly remove the impurities. Similar arrangements were also proposed for other sacred tanks. The

cost was great, wrote the magistrate, but were the project not undertaken the outbreak of cholera was certain. In 1892 the Mahavaruni fair was canceled, the only festival ever canceled on sanitary grounds. Quickly following this, in January 1893, the government formed a committee to advise them on how to prevent cholera at festivals in the future. Following the committee's recommendations, the Bhim Ghoda tank was supplied with water by an underground channel in 1903 and within another five years the bottom of the Har Ki Pauri was paved, directing a current to provide a constant flow of water, and an iron railing was erected to provide support for bathers.²⁷ But things were not always this smooth between the authorities engaged in "improvement" and local religious personages whose control over the management of affairs at Haridwar was sharply declining. There were a series of local conflicts in the late 1890s, but one that emerged most prominently in the early decades of the next century concerned the possible impediment to the free flow of the Ganges on account of proposed engineering works, a conflict that I shall return to in the concluding section of this essay.²⁸

THE GANGES, CONTAMINATED AND POLLUTED

Contamination of the river water was, evidently, a relatively minor issue in the hills and the sanitation of Haridwar possibly well managed. It was another matter in the plains, where millions more resided on a permanent basis and where the British were engaged in providing a piped drinking water supply and managing wastewater through flushed underground sewerage networks in the major cities. Among these were Calcutta, the second city of the empire; Banaras, as holy in the Hindu imagination as the city of Haridwar; and Kanpur, an important military station and industrial town, the making of whose waterworks in the late nineteenth century became occasions for outlining the possibilities and limits of colonial urban modernity.²⁹

Beginning sometime in the 1860s, cities in India began to discuss and implement a scheme for a piped supply of water, and relatedly, of drainage. The question was both of relieving the city of its waste (including wastewater) and finding an eventual sink for it. Sometimes authorities worried about only the former—whether the drains were adequately flushed—at other times they expressed concern about the likely health impacts of the wastewater on those who directly relied on the river water for provision of their daily supplies. Calcutta, at the very tail end of the river but the most important of the empire's cities, was the first to consider this matter of urban drainage and river pollution. There was a systematic and willful pollution of the river Hooghly

abreast of the town and above the shipping of the entire port, wrote David B. Smith in his *Report on the Drainage and Conservancy of Calcutta* (1869). Day by day, he observed, the water that thousands of Calcutta's inhabitants drank and that was consumed by every sailor in the port was defiled, "by orders of the Municipality, with I know not how many tons of night-soil."³⁰ The mouths of the main sewers of the city opened up to the banks of the river, some near the main bathing *ghats* (platforms) in the city: "as if the sacred stream was not already poisoned enough by the daily Augean deposit of night-soil, the bathers are furnished a special fountain for themselves!" Worse still, the night-soil was hurled into the Nimtollah Ghat, where "the natives drink it with the greatest appetite, bathe in it every day, to clean both their bodies and souls, and carry it to an immense distance as the greatest imaginable treasure." The comparison was with England, where "lazy river fouling barbarism" was no longer permitted after the passing of the Thames Navigation Act. A similar act, Smith believed, ought to be introduced with regard to the Hooghly too, for to argue otherwise would be to encourage "the thin edge of a vicious principle."³¹ The practice of throwing night soil into the river was eventually stopped in the following decade, but the question of river pollution due to the actions of other cities returned to haunt Calcutta soon. Equally importantly, the idea that the law that prevailed in England must also be enacted in India was subject to much dispute.

A modern waterworks and sewerage scheme for Banaras, upstream of Calcutta, had been first proposed by the Municipal Board in 1875 but remained largely on paper as the engineer seconded to it soon died.³² Meanwhile, local community organizations joined in. In 1881 a petition was sent to the viceroy by two residents of Banaras bemoaning the unsanitary condition of the city and the discharge of sewage into the Ganges, rendering it "unwholesome" for both drinking and worship. They pleaded therefore that the government build a large subsoil drain to receive all of the filth of the city and discharge it into the river at a designated spot downstream. The idea was rejected, the municipal board objecting to the sewage flowing directly into the Ganges and unwilling to bear the large expenditure. A few years later, in 1886, the local king took the initiative and the Benares Ganga Prasadini Sabha, an association of local gentry formed at his initiative, decided to raise the necessary funds to make arrangements for redirecting the sewage of Banaras, keeping the bathing *ghats* free from pollution.³³ The matter was soon rendered official with the presentation of an address by the municipal authorities to Prince Albert Victor of Wales in January 1890, where they reversed their original stance:

"Our water will be drawn from the holy river above the city," the address read, going on to add that "we also intend to commence a system of under-ground sewers which will be commanded for flushing purposes by the water pipes, and the sewage will be put into the river somewhere below the city." The aims of the project were thus multiple from the very inception—on the one hand to protect the health of the residents of the city and on the other to secure a religious good by ensuring that the sacred waters of the Ganga at Kashi (the traditional name for Banaras) remained unpolluted.³⁴

From the time that the British had first begun building new centralized waterworks, rivers and tanks as sources of water across the country had stood condemned across the country. This was not bad water but contaminated water, and contaminated as a result of "native habits." The view of "dirty Indian habits" commanded large adherence among official and unofficial British circles, as for instance in Florence Nightingale's observation regarding the "objectionable native habit of bathing and washing in the tanks and using the same water for drinking and erecting privies close to wells."³⁵ Many Indians joined them in deprecating these practices. Above all, Gandhi was to return to this theme often, writing of the holy city of Haridwar, "Whilst I realized the grandeur of the holy Ganga and the holier Himalayas, I saw little to inspire me in what man was doing in this holy place. To my great grief I discovered insanitation both moral and physical. . . . Thoughtless ignorant men and women use for natural functions the sacred banks of the rivers where they are supposed to sit in quiet contemplation and find God. They violate religion, science and laws of sanitation."³⁶ However—and this was critical—while native habits could well suggest long-standing contamination of Indian rivers, these alone could not account for *modern* pollution. That would be caused by the new sewerage works that accompanied the modern waterworks from the last decades of the nineteenth century.³⁷

As had been the case in Europe and America, where population growth and new technologies such as the water closet were beginning to pose distinctively new urban problems (see introduction), so too in India were habits beginning to be considered alongside the potentially harmful impacts of new technologies. The view was put forward most powerfully by G. Hutchenson, the sanitary commissioner of the northwestern provinces.³⁸ Hitherto, he wrote on the occasion of the making of the Banaras sewerage works, the pollution of the rivers of upper India by the flow of crude sewage had been more or less unknown, the discharged amount being too small to have any major effect. The pollution question thus arose only "when it became known that an at-

tempt would be made to dispose of the excreta of such a large town as Benares by the wet method and by discharging the sewage under a general system and without any purification into the Ganges.³⁹ In this he was supported by Surgeon General W. R. Rice, who opined that “to run into a more or less stagnant river millions of gallons of liquid sewage daily, through well-aligned drains,” was by no means “the same thing as allowing it to filter slowly through the soil on the banks.”⁴⁰ The medical view, however, was not entirely unanimous. Surgeon-Major J. Richardson, serving as inspector general of civil hospitals in the northwestern provinces, wrote by contrast that too much was being made of the danger to the riparian population posed by the discharge of sewage into the water of the Ganges. Nor was sufficient information available on how many people relied on the river as a direct source of drinking water, nor were there any data on how many among them fell ill to a greater degree than the population that used water from the wells. Until such time as enough information was available, he would have no hesitation in affirming that there was a “tendency to exaggerate the dangers” arising from the discharge of sewage into the Ganges at Banaras.⁴¹

Communities downstream were not so easily assured. Within ten days of this proposal the sanitary commissioner of Bengal wrote that if the proposed scheme of underground sewers discharging into the Ganges were permitted to be carried out, it would seriously affect the health of the people living in the towns on the banks of the river below Banaras, Calcutta being the most prominent.⁴² The lieutenant governor, the highest civilian official of Bengal, wrote in support that there was little doubt that if the sewerage of a large city such as Banaras, containing a population of nearly two hundred thousand, were allowed to flow into the Ganges, it must pollute the river to an extent that would seriously endanger the health of the populous districts and towns on the banks of the river for many miles.⁴³ The Public Health Society of Calcutta added to the chorus, writing that the practice of ejecting crude sewage into such a major river as the Ganges was open to the greatest possible objection. The superiority of a water carriage system, they wrote, was not in doubt, but in contrast to Europe and the United States, where the practice had been first introduced, the volume of water in Indian rivers was not conducive to direct transfer of untreated waste.⁴⁴ Commissioners inquiring into means of preventing water pollution in England, they further pointed out, had amply demonstrated that the effects produced by passing various waste products into rivers depended largely on the character of these products. Many such products—dyes and certain kinds of chemical waste—were speedily disseminated

and diluted to a degree that deprived them of their deleterious qualities. But crude sewage consisting chiefly of excremental matter was “a waste product of a different character.”⁴⁵

The government of the northwestern provinces could hardly be expected to concur. There was nothing new regarding such discharge of the drainage of large towns into the rivers Ganges and Jumna, they responded.⁴⁶ And if the concerns of the Bengal government had to be taken seriously, the imperial government must frame the general principles with respect to waterborne sewerage systems without special regard to Banaras or any other particular town.⁴⁷ In the debate that ensued one issue figured most prominently—the difference between the rivers of India and those of England, linked to which were two other subsidiary issues: the nature of the waste that flowed into the river and the risk posed by such flows of waste streams. A long note was penned by Surgeon General Rice, who doubted very much that the sewage could be rendered innocuous through the self-purificatory powers of Indian rivers.⁴⁸ It was certainly opposed to the laws of England that prohibited the sewage of towns to flow into rivers in their neighborhoods unless it had been rendered innocuous by chemical or other means.⁴⁹ There were two other concerns to be borne in mind, he added: first, in India, many villagers were prone to taking drinking water directly from the river and not from wells as was the case in England. Second, the nature of rivers was also different, for unlike England, where rivers were rapid-running with a very small range between full current and low water, in India the rivers were known to spread out into wide, slow-running streams and in dry weather break up into many backwater and stagnant pools that were practically settling tanks for sewage. Under the circumstances, little reliance could be placed on the possibility of the oxidation of sewage in “rapidly running voluminous streams.” On the other hand, there was little denying the great benefits that would ensue from the building of a modern sewage system, leading Rice to suggest an inquiry into:

- a) The procedure regarding the disposal of town sewage, as authorized by the law of England, with reference to its discharge into inland rivers;
- b) The circumstances under which conditions existing in this connection in India differed from those in England, and the extent to which the question of sewage disposal was affected by this difference;
- c) And, if discharging into the rivers was not advisable, the alternative proposals of treating it with chemical disinfectants, and of utilizing it in manuring sewage farms.

Others protested that this would be too casual an inquiry, and at any rate, considering that there would be several proposals for drainage schemes that involved the flow of sewage into the rivers, only a general principle in this regard would suffice. Indeed, precisely because the rivers of India were so different—their beds being swept clean each monsoon—they countered, the laws of England could not be applied except after a great deal of deliberation and expert opinion. Some others opposed the idea of a general principle altogether, arguing instead for a commonsensical scheme adapted in each case to the circumstances of the city concerned. It would be impossible, they believed, to introduce into India English legislation in regard to the pollution of the rivers unless a lot more was known about the way in which Indian rivers dealt with sewage and other causes of pollution. Eventually, the government of India expressed itself in favor of this view. Based on the available information, they reasoned, it was not a good idea to lay down any general principles as to the discharge of the sewage of riparian towns into Indian rivers. They suggested instead that the Sanitary Board of the North-Western Provinces make suitable inquiries and ascertain “by actual testing and experiment whether the effect upon the water of the rivers is such as to render it dangerous to public health.”⁵⁰

In the debate that ensued, Sanitary Commissioner Hutchenson elaborated on his earlier concerns, writing at length against the idea of conveying sewage into the river.⁵¹ The amount to which a river may undergo pollution without injury or danger to health was an unknown quantity, he argued, and while the question of the proper removal of sewage of towns and cities should be considered in light of the expertise of scientists, there were difficulties with respect to all the known sciences—chemical, bacteriological, physiological, and sanitary. It was therefore no easy matter to practically demonstrate the relation between disease and the pollution of rivers due to sewage. And yet he remained convinced that no sanitarian worth his salt would argue that the absence of palpable evidence implied the absence of pollution. Nor would they accept that the incapability of demonstrating the presence of microorganisms (on account of their diffusion) implied the absence of risk and danger. Under the circumstances, the thing to do was to apply the same logic as had been used in England, where the Parliament had made the pollution of rivers actionable. If the nuisance caused by the pollution of rivers such as the Thames and Clyde was being treated at huge costs, so must care be taken in India regarding rivers such as the Ganges. To cite the large volume of the water in the Ganges as an excuse for extending an “already condemned common and

unscientific method” of sewage disposal was entirely undesirable, especially as the river water both was considered sacred and served as the major source of supply for drinking purposes. The aim of the government, therefore, ought to be to avoid “impurity and hazard” and to establish “purity and safety.”⁵² Contesting these views, as we saw above, was Surgeon-Major Richardson, who remained convinced that while there could be some validity to abstract claims of harms to riparian populations there could be no definitive argument made until such time as actual evidence was forthcoming. It was futile, therefore, to refer to dangers, unless a practical alternative, technically sound and fiscally feasible, could be proposed. By the turn of the century, with Hutchenson transferred and Surgeon Lieutenant Colonel S. J. Thompson taking over as the new sanitary commissioner in place, the tide turned firmly in favor of this view, this time in the context of the drainage and sewerage of the city of Kanpur, upstream of Banaras.

As initially conceived in the 1870s, the scheme in Kanpur had been to provide drainage only for the removal of excess rainfall and refuse water for domestic purposes with the use of two canals, leaving the conservancy of the city to be dealt with through the dry conservancy method.⁵³ Even with respect to this limited scheme, the results were mixed, leading to another being proposed in 1891. There were two key features to the new scheme: (a) the sewers would carry off the rainfall of the city, as well as its sullage and sewage; and (b) the system would terminate in a long intercepting sewer running through the cantonment area and discharging into the river at the downward extremity of the cantonment limits.⁵⁴ Though technically sound, the scheme was expensive, and the municipal board conveyed in no uncertain manner that unless a considerable sum were promised by the government of India, the whole project would require reconsideration. This the imperial government was loath to do, remaining firm in its opinion that local improvement must be achieved with local resources only.⁵⁵ It instead asked for a reframing of the scheme, and to consider whether the sullage alone was best disposed in the river or onto a farm. The views of new sanitary commissioner, as pointed out above, favored discharge into the river. There was no large habitation for some distance from Kanpur, he pointed out, and in any case the persons residing in the riparian villages were more likely to obtain their water from wells than directly from the river itself. Moreover, recent investigations and inquiry had led to much greater value being attached than formerly to the germicidal powers of sunlight and free oxygenation. And if this was so, in his view, the conclusions of the River Pollution Commission in England had only limited application “to

the circumstances of large Indian rivers, teeming with active organic life which feeds on impurities and flowing under an eastern sun."⁵⁶ Indeed, if sewage was as dangerous as his predecessor had made it out to be, there should have been frequent outbreaks of cholera in places downstream. However, cholera, when it happened, had occurred upcountry and against the flow of the stream. The risks, in other words, were far less than in England, though it would still be desirable to conduct a series of chemical and bacteriological tests to determine more conclusively the self-purification power of Indian rivers and to ascertain how quickly the water recovered its original purity.⁵⁷

The government of the northwestern provinces was naturally inclined to go along with this opinion, but the question was whether the government of India could "now without risk and without stultifying itself contemplate the discharge of crude sewage although diluted into the Ganges."⁵⁸ The question was both of principle and of public health.⁵⁹ Would it be expedient for government to formally concede the principle involved of passing sewage of however "light" a character into a river of the special character of the Ganges? No *additional* pollution was in question, and the main point then was the expediency of the formal concession to the devolution of this sillage. If sanction was not accorded, the sillage in a less diluted state would still get access to the river at the most dangerous part (above the city and the cantonment). However, it was the normative principle that was more vexing, and to arrive at that it was imperative to consider another related issue: Did a danger to public health arise from permitting the entry of this foul sillage to the river? From a sanitary point of view, it was of no consequence that this procedure was already followed, if there was an element of danger. And regarding this, the sanitary commissioner to the government of India felt that there was certainly a case to be made. At the same time, it was important to retain commonsensical distinctions. It was a well-established sanitary axiom, he opined, that sewage should not be discharged into a river, but that rule "must be interpreted with discretion and due regard to the circumstances in each case." Similarly, while it would be impossible to give a scientific guarantee of harmlessness, or, short of this, a decided opinion, without much further information regarding the actual nature and quantity of the sillage and rubbish, volume of the river, its rate of flow, etc., together with chemical and bacteriological observations at different seasons and at different points of the river's course, still it was possible to accept, on the basis of common sense, and considering that it was not sewage but sillage that was being debated, that the natural agencies of purification could be relied on to avert harm. All that the local government was

proposing for the moment was for drainage works that would only transfer the sillage and the refuse that at present flowed into the river where they were seriously offensive to an outlet where they would be virtually harmless. This the government of India could approve.⁶⁰

The hedging and the qualifications evident in the sanitary commissioner's conclusions were not accidental, for they point to the extreme reluctance on the part of the colonial government to make significant outlays on the project. The consequence was that on all related issues—undertaking the series of experiments recommended by its own officials, providing the necessary expertise, constructing sewage farms—there was a constant deferral, leaving both the waste of the cities and the fate of the Ganges largely unaddressed in the nineteenth century, and indeed into much of the twentieth century.⁶¹ When the question of river flows eventually emerged as a public issue, then, it was not the question of the flow of the river as it bore upon the question of pollution in and around Calcutta, Banaras, or Kanpur, but the extent of the unimpeded flow of the Ganges at Haridwar that was necessary to preserve its sacred character.⁶² As described by James Lochtefeld, beginning sometime in the mid-nineteenth century the British had begun to technologically "manage" the Ganges for myriad purposes, aimed at increasing revenues through better irrigation and facilitating transport. A major project in this regard was the making of the Upper Ganges Canal, which widened and deepened the small branch of the river that ran past the town of Haridwar to serve as the canal's supply channel.⁶³ In the early years of the twentieth century, the government decided to turn this into a more permanent structure, confident that just as the people had appreciated the supplying of pools with water through underground channels, or the making of the headworks of the Lower Ganges Canal at Narora, where the Ganges had been completely controlled since 1878, there would be little hard feeling this time around too. This was not to be. Several voices of protest were raised beginning in June 1914, under the leadership of the Hindu nationalist leader Pandit Madan Mohan Malviya, arguing that this would impede the free flow of the Ganges and thus make it lose its sacred character. Opinions were wide-ranging—the Maharaja of Kasimbazar wanted the Ganges to flow freely from the Himalayas to the sea, whereas others had no objection to the proposed permanent works, since farmers needed the water. Most opinions lay between these two extremes—recognizing the need for some type of construction, yet reluctant to allow for complete control over the flow of the Ganges. Eventually, a compromise solution was arrived at, the government reasoning that in the context of an ongoing war, it would

be imprudent to antagonize “Hindu” opinion.⁶⁴ And as far as native opinion was concerned, though it was largely representative of its elite sections, there was little doubt that asserting control over the Ganges and over the religious festivals associated with it had become a powerful symbolic issue with which to confront the colonial state.

Rivers in colonial India, I have argued, evoked two distinct senses of purity and pollution, one drawing upon sacred texts and ritual performances and the other on the science of sanitation. Official interventions, for the most part, were based on new forms of expertise and the new science of sanitation, which the British believed was unavailable in traditional cultures. Based on this, what developed in nineteenth- and early twentieth-century colonial India was mimicry of the metropolitan culture, with important differences. The Indian city, as both different from and facing similar problems as cities of the West, underwrote much of the colonial intervention in this field. Indian rivers too, as a natural body similar to rivers elsewhere, but with properties that distinguished them from rivers in the temperate zone, were exceptionalized. The character of the Indian people, so remarkably different from the British in their habits and dispositions, further accentuated this sense of difference. Together, these material and subjective differences led officials to believe that only a modern scheme of things, undertaken by British engineers borrowing from the latest European techniques, could put things right. And yet, such modernity itself would be problematic, and on two counts. First, a river such as the Ganges may well have been contaminated through native habits, but pollution, as we understand it today, was not a product of the traditional arrangement of things but of the centralized water and sewerage works that were inaugurated by the colonial regime itself. Second, such new works had also always to meet the test of “practicality,” this being ensured on some occasions by redrawing schemes, on others by making a distinction between sullage and sewage, and at almost all times by citing the need for greater evidence of harm before more resources could be devoted to sanitary matters. This ensured a continual deferral of the schemes under review, such that the Indian city could never parallel the metropolitan urban.

Indians, by contrast, both partook of this modern science and drew upon Hindu notions of purity. In their book, *Sanatan Dharma: An Advanced Text-book of Hindu Religion and Ethics*, published in 1903–1904 by the Theosophical Society, Annie Besant and Bhagwan Das, suggested that the rules of purity also included “a duty of the good citizen to see that the rivers in the neighbor-

hood of cities are not poisoned, nor filth allowed to accumulate to the injury of public health.”⁶⁵ Much the same can be deduced from Gandhi’s statements cited above. Veneration for the Ganges, the traditional leadership of the king, and Western (rather than Hindu) notions of cleanliness and pollution, Arnold writes, were conjoined.⁶⁶ Others have described this as an ambiguous sanitary modernity, where the dependence on colonial bureaucracy for creating infrastructure could coexist with appeals to traditional and religious values.⁶⁷ This essay demonstrates too the significant intersections of differently oriented thoughts and practices in the making of urban waterworks in the colonial period. However, rather than read these as ambiguous responses, I prefer to focus on their overlapping nature, each modifying the other to suit local contexts. Further, this essay suggests that accounts of cities and their rivers benefit by considering local developments and wider geographies simultaneously. Thus on the one hand, while the Ganges was (and is) considered holy all through its journey from the mountains to the sea, it was especially revered at Haridwar and Banaras, which in turn had important bearing on the nature of improvement that could be effected in these cities. On the other hand, I have also demonstrated that what happened in Banaras or Haridwar also had serious implications for people living elsewhere, especially communities downstream. Considered in this manner, localized urban histories of waste and sanitation may be intertwined with histories of dispersed effects, offering a narrative framework that resonates in significant ways in our own times.

jingshen” 川江號子的形成, 內容與文化精神 [The form, content and cultural spirit of the Sichuan haozi], *Fuling shifan daxue xuebao* 涪陵師範學院學報 [Journal of the Fuling Normal University] 19, no. 2 (2003): 58–61.

46. For a similar case in Wuhan see Robin McNeal, “Constructing Myth in Modern China,” *Journal of Asian Studies* 71, no. 3 (2012): 679–704.

47. Such as the previously mentioned works of Peng Botong or recent collections of articles and sources on local history. See Zhonggong Chongqingshi weiyuan xuanbu 中共重慶市委員宣傳部, ed., *Chongqing duben* 重慶讀本 [Chongqing reader] (Chongqing: Chongqing chubanshe, 2009), hereafter *Chongqing duben*. On Great Yu see Anne Birrell, *Chinese Mythology: An Introduction* (Baltimore: John Hopkins University Press, 1993), 81–83, 146–59. For a full overview with accurate pictures of the sculpture park, see “Pictures of the Sculpture Park on the Three Gorges Square, Shapingba, Chongqing,” accessed 13 Apr. 2014, <http://blog1.poco.cn/myBlogDetail-htx-id-5785337-userid-56387375-pri-n-0.xhtml>.

48. “Pictures of the Three Gorges Square, Shapingba, Chongqing,” accessed 13 Apr. 2014, http://dcbbs.zol.com.cn/61/84_604737.html.

49. See interview with the construction engineer in *Die chinesischen Schuhe: Aus der Vergangenheit flussaufwärts in eine Gegenwart rasloser Veränderung*, dir. Tamara Wyss (Berlin: Good!Movies, 2004).

50. Wang Chuanping 王川平, “Jiedu ‘Chongqing Zhongguo Sanxia Bowuguan’” 解讀“重慶中國三峽博物館” [Decoding “Chongqing Chinese Three Gorges Museum”] in *Chongqing duben*, 544–47.

51. Wang, “Jiedu ‘Chongqing Zhongguo Sanxia Bowuguan,’” 544–47.

52. “Chongqing Sanxia bowuguan 重慶三峽博物館,” *Baidu Online Encyclopedia*, accessed 11 Aug. 2015, <http://baike.baidu.com/view/478839.htm>.

53. “Pictures of the Three Gorges Museum exhibition,” accessed 13 Apr. 2014, <http://www.mafengwo.cn/i/975495.html>.

54. This was substantiated rather tenuously by an excavated wooden boat from the Ba Kingdom era (?–316 BCE).

CHAPTER 10. THE GANGES AS AN URBAN SINK

Epigraph: National Archives of India (hereafter NAI), Home, Municipalities, A, 15–16, June 1901, noting by L. D. Spencer, Officiating Sanitary Commissioner with the Government of India, 19 Apr. 1901.

1. In an interesting development, the government of India has recently renamed its Ministry of Water Resources as the Ministry of Water Resources, River Development and Ganga Rejuvenation. Ganga and Ganges are different names for the same river.

2. The Ganges River basin is the largest river basin in India, covering more than a quarter of the country’s land area, and hosting about 43 percent of its population.

3. On exceptional occasions, such as the days of the Kumbh festival (below), the size of the congregation at holy sites along the rivers numbers in millions.

4. David Arnold, “Pollution, Toxicity and Public Health in Metropolitan India, 1850–1939,” *Journal of Historical Geography* 42 (2013): 128.

5. In its most general sense, the idea of colonial difference contends that there was an inherent moral deficiency of the Oriental such that “a normative proposition of supposedly universal validity did not apply to the East.” See Partha Chatterjee, *The Black Hole of the Empire: History of a Global Practice of Power* (Delhi: Permanent Black, 2013), 34. In this essay I draw upon this idea to look at how the understandings of material life and properties of nature were also inflected by the idea of colonial difference.

6. M. K. Gandhi, “Ganga and Jumna,” *Young India*, 23 Dec. 1926, reproduced as “The Use We Make of Our Rivers,” in Gandhi, *Social Service, Work and Reform*, ed. V. B. Kher (Ahmedabad: Navajivan, 1976), 115–16.

7. Kelly D. Alley, *On the Banks of the Gāṅgā: When Wastewater Meets a Sacred River* (Ann Arbor: University of Michigan Press, 2002).

8. Gol, *Annual Report on the Sanitary Administration of the Punjab, 1868* (Lahore, 1869), 36; see also Bernard Cohn, “Representing Authority in Victorian India,” in Cohn, *An Anthropologist among the Historians and Other Essays* (Delhi: Oxford University Press, 1987); Veena Talwar Oldenburg, *The Making of Colonial Lucknow, 1856–1877* (Delhi: Oxford University Press, 1989).

9. The literature on this subject is too vast, but on rivers in India specifically, see Rohan D’Souza, *Drowned and Damned: Colonial Capitalism and Flood Control in Eastern India* (New Delhi: Oxford University Press, 2006); Christopher Hill, *River of Sorrow: Environment and Social Control in Riparian North India, 1770–1994* (Ann Arbor, MI: Association for Asian Studies, 1997); David Gilmartin, “Modes of Hydraulic Environment: Colonial Irrigation, State Power and Community in the Indus Basin,” in *Nature, Culture, Imperialism: Essays on the Environmental History of South Asia*, ed. David Arnold and Ramchandra Guha (Delhi: Oxford University Press, 1996), 210–36; and John Broich, “Engineering the Empire: British Water Supply Systems and Colonial Societies, 1850–1900,” *Journal of British Studies* 46, no. 2 (2007): 346–65.

10. NAI, Home, Public, A, 47–49, 27 Feb. 1869, *Destruction of Fish*.

11. See Alley, *On the Banks of the Gāṅgā*.

12. NAI, Home, Sanitary, 25–33, July 1876.

13. NAI, Home, Sanitary, no. 52 and 53, Feb. 1888.

14. “Fair at Hurdwar,” *Asiatic Journal*, n.s., 13 (Apr. 1834): 245. On the threat to the sanctity of the river, see also Kama Maclean, *Pilgrimage and Power: The Kumbh Mela in Allahabad 1765–1954* (New York: Oxford University Press, 2008), 131.

15. “Fair at Hurdwar.”

16. This did not rule out the fact that religious fairs, especially those connected with bathing festivals at the rivers such as the Ganges, Jumna, and Godavari, were important sites for Christian missionary activities, much resented by the native publics.

17. The literature on the revolt of 1857 is quite large. See for instance, Mahmood Farooqui, *Besieged: Voices from Delhi, 1857* (New Delhi: Penguin Viking, 2010); Eric Stokes, *The Peasant Armed: The Indian Revolt of 1857* (New York: Oxford University

Press, 1986) and Rudrangshu Mukherjee, *Awadh in Revolt, 1857–1858: A Study of Popular Resistance* (Delhi: Oxford University Press, 1984).

18. “Proclamation by the Queen in Council to the Princes, Chiefs and the People of India,” 1858.

19. For this distinction between the sovereign inner domain and a colonized outer world see Partha Chatterjee, *The Nation and Its Fragments: Colonial and Postcolonial Histories* (Delhi: Oxford University Press, 1994).

20. Kumbh referred to the exceptionally large bathing festival that took place in cycles of twelve years.

21. Maclean, *Pilgrimage and Power*.

22. There was little information regarding Kumbh fairs previous to 1867, wrote the sanitary commissioner in 1879, but that which remained was nothing if not a record of disease and death. NAI, Home, Public, 67–72, Jan. 1892; G. Hutchenson, *Report on the Sanitary Arrangements of the Hardwar Great Fair, or Kumbh Mela of 1891*; A. B. Patterson, *Memorandum of Hardwar Kumbh, 1891*.

23. NAI, Home, Public, 67–72, Jan. 1892; Hutchenson, *Report*; Patterson, *Memorandum*.

24. NAI, Home, Public, 67–72, Jan. 1892; Hutchenson, *Report*. Sullage referred to wastewater that contained no human excreta or animal waste, thus distinguishing it from sewage.

25. Hari Ki Pauri is the sacred pond in which people bathe.

26. NAI, Home, Public, 67–72, Jan. 1892; Hutchenson, *Report*.

27. James Lochtefeld, *God’s Gateway: Identity and Meaning in a Hindu Pilgrimage Place* (New York: Oxford University Press, 2010).

28. Lochtefeld argues that such conflicts were not confined to Haridwar but were common at Hindu pilgrimage places throughout India. Controlling religious institutions became an important avenue by which to resist colonial power—however symbolic—and to contest the legitimacy of colonial authority, since the government’s pledged noninterference in religious affairs made this one of the few areas in which these rights could be confidently asserted.

29. This essay deals largely with the question of drainage/sewerage and pollution. It is pertinent to point out, however, that the question of religious belief also frequently challenged the technological optimism of colonial authorities with respect to the provision of drinking water. See Sandria Freitag, “State and Community: Symbolic Popular Protest in Banaras’s Public Arena,” in *Culture and Power in Banaras: Community, Performance and Environment, 1800–1980* (Berkeley: University of California Press, 1992), 203–28; Awadhendra Sharan, “From Source to Sink: ‘Official’ and ‘Improved’ Water in Delhi, 1868–1956,” *Indian Economic and Social History Review* 48, no. 3 (2011): 425–62.

30. David B. Smith, *Report on the Drainage and Conservancy of Calcutta* (Calcutta, 1869). Also see Ishita Pande, *Medicine, Race and Liberalism in British Bengal: Symptoms*

of Empire (New York: Routledge, 2010), esp. ch. 6, “Sensing Modernity: Civility, Class and Citizenship in a Sanitary City.”

31. Smith, *Report on the Drainage*, 64.

32. This paragraph largely draws upon Michael S. Dodson, “The Shadows of Modernity in Banaras,” in *Banaras: Urban Forms and Cultural Histories* (New Delhi: Routledge, 2012), 143–69.

33. Dodson, “Shadows of Modernity”; also see David Arnold, “The Ecology and Cosmology of Disease in the Banaras Region,” in Freitag, *Culture and Power in Banaras*, 246–67.

34. Dodson, “Shadows of Modernity.” Dodson prefers to describe these multiple purposes as being ambiguous.

35. Cited in Mridula Ramanna, *Western Medicine and Public Health in Colonial Bombay, 1845–1895* (New Delhi: Orient Longman, 2002), 110.

36. M. K. Gandhi, “Insanitation in Hardvar,” *Young India*, 31 Oct. 1929, reproduced in Gandhi, *Social Service, Work and Reform*, 85–87. Also see “Our Insanitation,” *Young India*, 19 Nov. 1925; “Sanitation in Ahmedabad,” *Young India*, 26 Nov. 1925; “A National Defect,” *Young India*, 25 Apr. 1929; “Insanitary Gaya,” *Young India*, 3 Feb. 1927.

37. Kelly Alley points out that policies regarding the Ganga had first surfaced in the making of the Ganga and Yamuna canals in the late nineteenth century, and this assumption of authority to divert and channel river water later fed into the controls officials developed over other kinds of flows, such as flows of wastewater running through city sewers and drains. See Alley, *On the Banks of the Gaṅgā*, 136.

38. The cities of Haridwar, Banaras, and Kanpur were all located in this province.

39. NAI, Home, Sanitary, 17–25, Apr. 1893, *Sewage and Drainage of Cawnpore*.

40. NAI, Home, Sanitary, 75–76, June 1890, *Discharge of Sewage into the Ganges at Benares*.

41. NAI, Home, Sanitary, 17–25, Apr. 1893, *Sewage and Drainage of Cawnpore*.

42. NAI, Home, Sanitary, 78–79, Feb. 1890. There would be no harm from the discharge of surface drainage into the Ganges, he wrote, but if the river was to be made into a general sewer for towns on its banks, then the risks could be hardly exaggerated.

43. NAI, Home, Sanitary, 78–79, Feb. 1890.

44. NAI, Home, Sanitary, 44–45, Aug. 1890.

45. NAI, Home, Sanitary, 44–45, Aug. 1890.

46. NAI, Home, Sanitary, B, 2–6, July 1878, *Cawnpore Drainage*.

47. NAI, Home, Sanitary, 75–76, June 1890, *Discharge of Sewage into the Ganges at Benares*.

48. NAI, Home, Sanitary, 75–76, June 1890, *Discharge of Sewage into the Ganges at Benares*.

49. The other means referred to the use of sewage on sewage farms but it was doubtful if even the effluent that remained after use on the farm was free of danger.

50. NAI, Home, Sanitary, 75–76, June 1890, *Discharge of Sewage into the Ganges at Benares*.

51. NAI, Home, Sanitary, 17–25, Apr. 1893, *Sewage and Drainage of Cawnpore*.

52. NAI, Home, Sanitary, 17–25, Apr. 1893, *Sewage and Drainage of Cawnpore*.

53. NAI, Home, Sanitary, B, 2–6, July 1878, *Cawnpore Drainage*.

54. NAI, Home, Municipalities, A, 15–16, June 1901, *Sewerage Scheme for Cawnpore and the Grant of a Loan of Five Lakhs of Rupees to the Cawnpore Municipality*.

55. The extent to which such conditions could be debilitating in the context of sanitary works can be seen in an official noting of the secretary to government, northwest provinces, in the context of proposed works at Agra: “The great and expensive works of sanitary improvement initiated by Sir Auckland Colvin [the previous governor of the province] in the large cities of these provinces have involved the inhabitants in liabilities the liquidation of which must under any circumstances impose a heavy burden upon them, and the provincial resources have now been reduced to such an extent that they can no longer afford such aid in the prosecution of works as was at one time possible.” See NAI, Home, Municipalities, 27–31, Oct. 1896.

56. NAI, Home, Municipalities, A, 8–11, May 1898.

57. The difficulty, as he saw it, was the reluctance of house owners to join to the underground system.

58. NAI, Home, Municipalities, A, 15–16, June 1901, *Sewerage Scheme for Cawnpore*.

59. NAI, Home, Municipalities, A, 15–16, June 1901, *Sewerage Scheme for Cawnpore*.

60. NAI, Home, Municipalities, A, 15–16, June 1901, *Sewerage Scheme for Cawnpore*.

61. The point was acknowledged in a joint note of the sanitary commissioner and the sanitary engineer, who observed in the context of the Banaras sewerage works that “in all recent discussions on the principles of sewage disposal in these provinces, it has been recognized that putting sewage into rivers could only be resorted to as a temporary measure, *made compulsory by the pressure of financial necessity*” (emphasis mine). NAI, Home, Sanitary, 17–25, Apr. 1893.

62. This paragraph draws upon Lochtefeld, *God’s Gateway*.

63. Alley, *On the Banks of the Gaṅgā*, 136.

64. However, not all within the government were satisfied with the eventual compromise, with some officers reasoning that the first bridges built over the rivers had also been considered sacrilegious, and had the government heeded those objections, India would still have been at the stage of using ferries across the rivers.

65. Cited in Leah Renold, “A Hindu Temple of Learning: The Hybridization of Religion and Architecture,” in Dodson, *Banaras*, 170–91, esp. 179.

66. Arnold, “Ecology and Cosmology,” 265.

67. Dodson, “Shadows of Modernity.”

CHAPTER 11. POLLUTED THAMES, DECLINING CITY

1. Accounts of his wanderings in “Night Walks,” in *The Uncommercial Traveller* (London: Chapman and Hall, 1861).

* 2. Gavin Weightman, *The Making of Modern London, 1815–1914* (London: Sidgwick and Jackson, 1983).

3. Pertinent: Peter Brimblecombe, *The Big Smoke: A History of Air Pollution in London since Medieval Times* (New York: Methuen, 1987); Martin Daunt, ed., *The Cambridge History of Urban Britain*, vol. 3, 1840–1950 (Cambridge: Cambridge University Press, 2001).

4. Christopher Hamlin, “Providence and Putrefaction: Victorian Sanitarians and the Natural Theology of Health and Disease,” *Victorian Studies* 28, no. 3 (1985): 382.

5. Charles Dickens, *Our Mutual Friend*, ed. Michael Cotsell (New York: Oxford University Press, 2008); hereafter cited as OMF.

6. “Dust; or, Ugliness Redeemed,” *Household Words*, 13 July 1850. Ackroyd and Gallagher assign the authorship to R. H. Horne, but without reference. Madeline House, ed., *The Letters of Charles Dickens: The Pilgrim Edition*, vol. 3, 1842–1843. (Oxford: Clarendon, 1974), 330–31.

7. “An Act for the Amendment and Better Administration of the Laws relating to the Poor in England and Wales,” 1834, London Metropolitan Archives.

8. Howard W. Fulweiler, “‘A Dismal Swamp’: Darwin, Design, and Evolution in *Our Mutual Friend*,” *Nineteenth-Century Literature* 49, no. 1 (1994): 50–74.

9. Madeline House and Graham Storey, eds., *The Letters of Charles Dickens: The Pilgrim Edition*, vol. 10, 1862–1864 (Oxford: Clarendon, 1965), 164–65.

10. See House, *Letters*, 3:330–31.

11. “Public Health (London) Act,” 1836, CLRO P.D. 51.4, London Metropolitan Archives. Initially the Act excluded London City.

12. Humphrey House, *The Dickens World* (London: Oxford University Press, 1950); Edgar Johnson, *Charles Dickens: His Tragedy and Triumph*, vol. 2 (New York: Simon and Schuster, 1952).

13. Harvey Peter Sucksmith, “The Dust-Heaps in *Our Mutual Friend*,” *Essays in Criticism* 23, no. 2 (1973): 206–12; Nancy Aycock Metz, “The Artistic Reclamation of Waste in *Our Mutual Friend*,” *Nineteenth-Century Fiction* 34, no. 1 (1979): 59–72.

14. Sucksmith, “Dust-Heaps,” 209–10, presents different interpretations of “dust,” including historical expression for “money.”

15. These focus mainly on homoerotic fantasies ascribed to the intensive involvement with excrements and male rivalry. Ellen Handy, “Dust Piles and Damp Pavements: Excrement, Repression, and the Victorian City in Photography and Literature,” in *Victorian Literature and the Victorian Visual Imagination*, ed. Carol T. Christ and John O. Jordan (Berkeley: University of California Press, 1995); Eve Kosofsky Sedgwick, *Between Men: English Literature and Male Homosocial Desire* (New York: Columbia University Press, 1985).

16. Pamela K. Gilbert, *Mapping the Victorian Social Body* (Albany: State University of New York Press, 2004). For a geographer’s perspective see Michelle Elizabeth Allen, *Cleansing the City: Sanitary Geographies in Victorian London* (Athens: Ohio University Press, 2008).