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– TOXICITY 1: On Ambiguity and Sewage in Mumbai's Urban Sea

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Abstract

In this essay, I focus on the remarkable process through which Mumbai's urban administration has continued to release its sewage, largely untreated, into the Arabian Sea. I show how it does this by rendering sewage both legally and materially ambiguous. I urge an attention to the processes of legal and material ambiguation, through which 'slow violence' is unevenly administered in Mumbai. Building on the work of Jacqueline Best, I argue that ambiguity does not simply leave open improvised forms of technocratic administration; ambiguity also defers *bureaucratic activity in particular domains, while permitting activity in others. Taken together, the municipal administration mobilizes ambiguity so as to evade rendering toxicity an actionable problem of urban living and distributed social vulnerability in the city.*

> 'The Arabian Sea warned Mumbaikars last year. And right on cue, the warning comes yet again. Sending a strong reminder to the city to stop using its waters as an extended dumping ground, the Arabian Sea threw back garbage onto Marine Drive, extending down to Juhu and Gorai beach. The BMC [Brihanmumbai Municipal Corporation] collected over 185,000 kgs of garbage over the weekend, working through the pouring rain and stench.'
> *Conde Nast Traveller*, 'Mumbai gets its annual reminder from the Arabian Sea' (7 August 2019)

Introduction

In recent years, the sea has vividly reminded the residents and administration of Mumbai that it has, for too long, been the repository for the city's wastes. While formal urban planning practices are imagined to end at the coastline (Burte and Krishnankutty, 2006), urban ecologies exceed the terrestrial boundaries of the city (Gandy, 2004; Heynen *et al*., 2006). In different parts of the world, cities draw on 'resources' and direct their waste beyond the city limits so as to continue working. Often, as is now evident in Mumbai, water bodies such as rivers and seas that lie just beyond the city limits are frequently both the sources and sinks that sustain city life (Gandy, 2014; Anand, 2017).

While the spectacular garbage tides refocus attention on the city's systems of solid waste disposal, in this essay I focus on the less remarked, but no less remarkable process through which the city continues to release its sewage, largely untreated, into the Arabian Sea. I build on the work of several scholars of waste (and waste workers) in India who have shown how caste inequalities continue to be reinscribed through municipal sewage networks, despite state policies and the abolition of manual scavenging (see Gidwani and Reddy, 2011; Batra, 2018; Sreenath, 2019; Mirza, 2020).

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Following sewage *after* it is made to flow into drains and treatment plans through these forms of abject labor, in this essay I examine how both effluent water standards *and* the material effects of sewage are made ambiguous by sanitation department engineers in Mumbai so as to allow the city's sewage to leave the city. State processes of legal and material ambiguation of sewage are key sites at which this 'slow violence' is produced and sustained (Nixon, 2011). To the extent that water is treated at all, this is done and the effluent discharged just far enough from the gaze of the city's publics. This short essay contributes to ongoing conversations about urban waste and urban infrastructure by drawing attention to the powers of bureaucratic ambiguation in urban governance. I argue that the case for (reduced or absent) water treatment in Mumbai is generated through bureaucratic practices of *ambiguation* that situate water treatment regimes in material ecologies that lie beyond the gaze of both sociologists and environmental scientists working in the city.

Ambiguity is not only materially produced when the city discreetly releases sewage on the seabed three kilometers from the coastline. In conversation with other pieces in this collection, I show how ambiguation is also produced through legal contestations in the courts (see Bhatia, 2022, this issue; Deekshit and Sumbre, 2022, this issue). Over the last five years, the city administration has been fighting a legal case at the National Green Tribunal and the Supreme Court, insisting that federal water quality standards for its sewage effluent need to be *lowered* for it to meet its legal obligations. In other words, the city is arguing that the law be diluted to accommodate its sewage treatment practices. Taken together, the municipal administration mobilizes ambiguity so as to evade rendering toxicity an actionable problem of urban living and distributed vulnerability in the city.

To make this argument, I draw recent scholarship on urban infrastructure in anthropology and geography into conversation with research on toxicity in science and technology studies. Building on the work of historians and anthropologists of environmental toxicity, I dwell in this fraught space in part because, as several scholars have noted, we live in a 'permanently polluted world' where ubiquitous (but not evenly distributed) toxicity is now part of human habitats (Carson, 1994; Baviskar, 2005; Murphy, 2006; Roberts, 2017; Liboiron *et al*., 2018; Lyons, 2018).

Ambiguation is a powerful force in producing the slow violence that is permanent pollution (Nixon, 2011; Liboiron *et al*., 2018), as evidenced across this intervention. For example, in their essay, Deekshit and Sumbre (this issue) show how access to water is denied through the political and legal production of ambiguity in Mumbai, emerging out of the same High Court order that insists that water be made available to all. Also in Mumbai, ambiguity around the material and legal status of the Mithi River, as described by Kamath and Tiwari (2022, this issue), is a necessary condition for the production of ambivalence; what they describe as the alternately weak and strong government of its flows (see also Burte and Kamath, 2017). And in Philadelphia, ambiguity around what precisely *is* safe water is key to both the possibility of data deserts around the lower Schuylkill River (Wiggin, 2022, this issue) and also the reproduction of harm visited by its lead water lines (Bhatia, this issue).

As urban geographers have shown, infrastructural assemblages transform nature to materialize the modern city (Cronon, 1991; Gandy, 2004; Baviskar, 2011). In so doing, they produce social inequalities at different scales, often by displacing precarious populations to the city's margins (Meehan, 2013; Ghertner, 2015; Doshi, 2019). As the crises in Flint, Bhopal, New Orleans and Ramallah have demonstrated, infrastructures do not just distribute life; they also distribute toxic harm and death (Fortun, 2001; Ranganathan, 2016; Anand *et al*., 2018; Stamatopoulou-Robbins, 2019). Rodgers and O'Neill (2012) describe these differentiated distributions of harm as forms of infrastructural violence.

Waste infrastructures are key modes through which toxicity is permitted, produced and circulated in the oceans today (Liboiron, 2016). Built over more than human

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lifetimes, they are key channels for the production of slow violence—environmental crises that quietly gather and distribute toxic harm that accretes in the background of everyday life (Nixon, 2011; Anand *et al*., 2018). To the extent that these infrastructures are designed with laws, rules, safety standards and scientific measurement practices, they are critical technologies both for how cities are materialized and also for how toxic regimes now permeate the planet.

Building on Elizabeth Roberts' (2017) work on toxicity, I draw attention to the ways in which the state produces social and environmental entanglements (or what I call here ambiguation) in its sewage treatment networks to *evade* the responsibilities of water treatment and public health in the city. This is not a new or surprising phenomenon for those familiar with the histories of caste and infrastructure in Indian cities. As Batra (2018) and Sreenath (2019) have shown, one way in which urban administrators evade responsibility is by delegating the necessary labor of sewer maintenance and management to lower and untouchable castes in Indian cities.

My focus here is related, but lies adjacent to these important insights. Drawing on Rodgers and O'Neill's (2012) analysis of the ways in which infrastructural violence might be either active (as part of its intended effects/design) or passive (as a result of certain acts of omission, where materials, peoples or polities might be left out or not considered) (see also Chu, 2014), in this intervention I argue that the infrastructural violence generated by the sewage network is produced both by the entanglements of design *and* also by acts of omission. I argue that in Mumbai the city's sewage infrastructure produces slow violence by blurring the boundaries between its passive and active effects (see Best, 2012). That is to say, Mumbai's sewage network works (both symbolically and materially) in ways that traverse what is actively known and tacitly acknowledged, so as to 'treat' but not really treat sewage as it is pushed out into the sea.

The ambiguity of sewage

Since its earliest days as a city, Mumbai's amphibious margins have been dried and settled, both by massive infrastructural projects of questionable legality and by the labor of marginal residents seeking durable homes at the edge of the terrestrial city (Sharma, 2000; Weinstein, 2014; Doshi and Ranganathan, 2017). The political economy of dessication has been tremendously profitable to the city's municipal government and its real estate development industry, for whom land-making has been key to the making and selling of private property (Appadurai, 2000; Patel and Masselos, 2003; Rao, 2006). As the city has been dried by the political economy of development (see Doshi, 2019), often using garbage from its waste dumps, the city's sewerage infrastructures have been designed to collect and release waste water silently and unobtrusively into the Arabian Sea (Klein, 1986).

About half of Mumbai's total sewage (approximately 2.5 billion liters/day) is collected and released through a formal sewage network, or through sewers, culverts and (nominally functioning) treatment plants. The rest of the city's sewage is transmitted (either formally or informally) into the city's small urban streams and rivers, which eventually also empty into the Arabian Sea. Regardless of the means of collection and release, over 80% of the city's sewage is untreated when it enters the sea, according to the former Secretary of the Environment Department of the State Government.[1] In recent years, scientists and fishermen alike have warned that the city's coastal waters are hypoxic, filled with plastics and oils, and that they host pathogenic, multi-drug-resistant bacteria (Quadros *et al*., 2009; Maloo *et al*., 2017). In other words, (the lack of) sewage treatment is producing toxic environments for both humans and the ecologies that live near or in the sea. Yet while in some senses this is a public secret

1 Guest lecture given by Dr B.N. Patil, former Secretary of the Environment Department, NIO CSIR Open Day Event, 26 September 2018.

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(Taussig, 1999), there is little by way of significant infrastructural work to measure, recognize and address the extent of the problem. The sea in Mumbai, like the forgotten river in Philadelphia, is a data desert (Wiggin, this issue).

Scholars of state formation and bureaucratic institutions have shown how states are formed through operations of arbitrariness and ignorance. It is not just practices of knowledge-making that are constitutive of state authority, but also knowing what not to know (Mathews, 2008; Proctor, 2008; McGoey, 2012; Anand, 2017). Such approaches have drawn attention to the ways in which ignorance is socially produced and generative of the power of state and municipal institutions.

My focus here is slightly different. Building on the work of Jacqueline Best (2012), I show how bureaucratic ambiguity is both discursively and materially fostered by the sewerage department in Mumbai. Through research with the World Bank and IMF, Best (2012) shows how producing and managing ambiguity is useful to the work of bureaucratic organizations. I build on Best's work on ambiguity to suggest that produced ambiguity does not simply leave open improvised forms of technocratic administration; ambiguity also *defers* bureaucratic activity in particular domains, while permitting activity in others (see also Deekshit and Sumbre, this issue; Kamath and Tiwari, this issue). As with Mumbai's Mithi River, knowing and not knowing the qualities of sewage is generative of fitful and partial activities by the city's administration. Taken together, by producing ambiguity around what clean water is, and where sewage goes, the municipal authority is able to maintain the status quo of releasing sewage—largely untreated—into the sea and creating zones of pollution and risk that now encircle the city.

Dry weather flows

Sewage infrastructures to transport human waste were laid out in cities around the world in the late nineteenth and early twentieth centuries. Matthew Gandy (2014) has shown how the rapid proliferation of sewers in nineteenth-century Paris emerged with new conceptions of public health, bodily comportment and technological development. Sewers were also needed to deal with the significant amount of water entering and then stagnating in cities through large municipal water infrastructural projects (Klein, 1986). Emerging in the early twentieth century in response to concerns around public health, Mumbai's network was first developed in the colonial city and its nearby neighborhoods, and only extended into its suburbs following their incorporation into the city in the mid-twentieth century. As a result, while the more upper-class regions of the city have large and reliable sewerage infrastructures, vast areas of the city remain unsewered. For instance, residents of Meghwadi in Jogeshwari (a densely populated neighborhood in the north of the city) depend on open *nallahs* (stream-drains) to carry their liquid and solid waste to the rivers that empty into the sea (Anand, 2017). Residents in these areas depend on rivers and streams for their sewage disposal and are often made responsible for their de-silting operations. Carrying gray-black water and smelly for most of the year, the exposed de facto drains reveal an unequal city, divided between those who have no choice but to live near and with these infrastructures, and other, more privileged populations, for whom sewage infrastructures are buried and seldom encountered.

When I spoke with a former official of the city's sewerage operations administration, he assured me that approximately 90% of the island city of Mumbai is connected to the sewage network, with approximately 50-60% coverage in its eastern and western suburbs (personal communication, 30 July 2011). The city government's own statistics about sewage coverage (see Table 1) reproduce this understanding, showing that just over half the city's sewage actually makes its way into a waste-water treatment facility (WWTF). The remainder is directed into the sea through rivers and storm-water drains and is registered as 'dry weather flow' (DWF), or the flow of water in storm drains and rivers that should otherwise be dry in non-monsoon months.

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TABLE 1 Sewage accounts and the fabrication of treatment

Row no.		MLD*	%
1	Quantity of water supplied daily by MCGM	3,750	
2	Sewage generated (assuming 27% water losses and sewage generated at 80% of water supply)	2,190	
3	Sewage collected for treatment through sewerage network	1,285	59
4	Sewage that does not find its way to the waste-water treatment facility (WWTF) (row 2 minus row 3)	905	41
5	Dry weather flow (DWF) from the Mithi River	280	
6	DWF from the Dahisar River, Poissar River and Oshiwara River	141	
7	DWF from the JK Chemical *nallah*, Haji Ali *nallah* and other *nallahs*	120	
8	Waste water treated through private STPs (Airport, RCF, BARC)	158	
9	Consent of the state government for treated sewage	2,727	
10	Capacity of planned WWTF for all 7 sewerage zones in 2031	2,982	

*MLD: million liters per day
SOURCE: Data extracted from the Municipal Corporation of Greater Mumbai's Sanitation Improvement Project (2019, unpublished draft)

Like the quantifications of piped water supplies I have described elsewhere, sewage flow quantifications are subject to the arbitrariness of measurement and require a certain amount of improvisation to be created (Anand, 2017; see also Poovey, 1998; Muehlmann, 2012). In Table 1, for instance, the figure for water losses (row 2), as well as the figures for dry weather flow (DWF) (row 5) and private sewage treatment plants (STPs) (row 8), are themselves estimations and not based on any reliable measurements. Instead, these quantifications are generated so as to match the treatment capacities for future waste-water treatment facilities (WWTFs) that are to be built as part of the Mumbai Sewage Disposal Project (MSDP).

Further, while approximately 59% of the city's water enters a treatment facility, the table obfuscates what sewage treatment actually means. To date, all sewage treatment in Mumbai is only primary (i.e. de-gritting and the removal of large sediments and some garbage). The city's treatment plants mostly do not include settling tanks or other infrastructures to remove solid waste from the gray water before it is sent into the sea. In 1995, the World Bank approved a loan for the Bombay Sewage Disposal Project (BSDP; now MSDP) to improve the public health and environment of the city. The project's physical infrastructural plans did not include secondary or tertiary sewage treatment processes that would release 'cleaner' water into the sea. Instead, they included the construction of three sewage outfalls in Colaba, Worli and Bandra to convey untreated effluent into the Arabian Sea (World Bank, 1995: 2).

The sewage outfalls were completed in 2004. In conversation with Mhatre, a retired sewage engineer, I wondered why the sewage upgrade work did not include secondary or tertiary treatment *before* water was released into the sea. According to Mhatre, both he and the physical oceanographers who were contracted by the city agreed with the World Bank consultants that the release of sewage into the sea was itself a kind of treatment: 'They [the consultants] asked us to see sewage not as waste, but as nutrients to other forms of life'. He thought it was 'a sensible approach' because 'the sea is an unlimited sink' (interview, 23 January 2020). Mhatre told me that three kilometers into the sea, the outfall releases sewage through diffusers that spread it on the seabed, and that in these areas you find plenty of crustaceans feeding off the sewage. 'Don't call it waste', he told me later in our conversation, suggesting that the problem of waste begins when we think of it and treat it as being useless.

Indeed, to some degree, as I show elsewhere, Mhatre's provocations and observations were accurate. Secondary or tertiary treatment would be expensive and

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place different kinds of demands on urban land. For Mhatre, releasing sewage into the sea was a more sensible option—especially if they were releasing food for crustaceans, not sewage. Nevertheless, in thinking of the sea as a 'limitless sink', Mhatre also saw waste as something which needs to be flushed away. The sea, he argued, has a limitless capacity for purifying waste. The assumption here is that the dilution of sewage in the sea is a sufficient form of treatment.[2] The ambiguity of this form of 'treatment' is also manifested in the words of the MSDP planning documents:

> *Although not ideal*, the level of *sewage treatment* proposed will bring s*ignificant improvements* over the present situation in which untreated sewage is discharged near the shoreline and to surface water drains and channels within a heavily populated urban area (World Bank, 1995: 5; emphasis added).

The project planners acknowledge both that treatment through dilution is not sufficient and that the outfalls represent a 'level of treatment' that brings improvement over existing practices. Engineers at the World Bank suggest the use of outfalls not because they are good solutions to sewage treatment, but because they are deemed to be good *enough*.

Part of the reason why outfalls seem to be regarded as an improvement at all is because, unlike previous systems, they release water not near to but at some distance from the coastline, far enough away that the sewage waters will be diluted before they wash ashore. However, these assertions are made without any substantive water quality tests showing this to be the case. It provides a form of treatment in the sense that the city's public is treated to a view of the sea that does not include black patches or the ungainly smell of sewage.

Mhatre touches on this point later in our conversation, alluding to both the purificatory powers of sea water and how the city's residents are sensitive to seeing sewage in their sea. When I asked about drug-resistant bacteria/pollution that were found on city beaches, he replied that this was largely not an issue because 'sea water is bactericidal by itself'. I said I wasn't sure this was the case given the findings published by researchers at the National Institute of Oceanography (NIO) in Mumbai (Maloo *et al*., 2017). There was an uneasy pause, before Mhatre returned to insisting that sea animals thrive in *nutrients* (my emphasis); the main thing was that we should not have black water. 'People living in the city shouldn't see pollution', he said.

Indeed, if the outfalls are effective at treating sewage, it appears that this is because they carry the sewage beyond the gaze of urban publics and into deeper waters where its values and effects are made more ambiguous. Mhatre's words reinscribed the importance of aesthetics in the governance of the city (Ghertner, 2015).

I am especially interested in the ambiguity of sewage and water quality that is produced through sewage treatment projects. The first phase of the Bombay Sewage Disposal Project did not address sewage treatment on land using established treatment technologies. Instead, it built large-scale engineering works to carry untreated sewage into the sea. In doing so, it rationalized governmental interventions that did not clean the muck but permitted its qualities to remain undefined and ambiguous, dispatching it beyond the gaze of people out under the sea. Through practices of material expulsion and by discursively arguing that the sea's powers are limitless, the Sewage Department sought to make questions about sewage quality in the city and in the sea invisible. The

2 Of course, arguments that utilize the limitless powers of water to purify waste are not peculiar to Mumbai. As I detail below, these are the very same discourses that produced the 'big stink' in London, the pollution of Boston Harbor and the death of the Yamuna River in Delhi. As Syantani Chatterjee (personal communication) points out: 'these kinds of arguments were used by British colonial officials to justify dumping garbage on the outskirts of the colonial city, as well as letting *kutchra* [garbage] flow into the city's rivers'.

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material flows and health effects of sewage are literally and figuratively made invisible to the terrestrial city, pushed out beyond its edges, just out of sight.

The ambiguity of standards

The first phase of the BSDP was concluded in 2005. In 2006, the city launched the second phase of the Sewage Disposal Projects, now called Mumbai Sewage Disposal Project II (or MSDP II), funded by the federal Jawaharlal Nehru National Urban Renewal Mission. This phase of sewage infrastructural development focused on general upgrading and the construction of seven new sewage treatment plants. Nevertheless, 14 years after the funds were first set aside for the project, MSDP II is yet to be completed, with only four of the seven new units finished. Why does it take over a decade to build just four sewage treatment plants? There are various reasons for this. Chief among them, however, is that while the city government agrees that some sewage treatment might now be necessary, it has long disagreed as to whether the new sewage treatment infrastructures need to comply with stricter federal water quality standards for the purpose.

MSDP II proposed to improve the quality of sewage released into the city's outfalls through the installation of secondary infrastructure systems. In this way, the plan was to meet the existing central government norms at the time (see 'old standards' in Table 2) of 30 mg/l for biochemical oxygen demand (BOD) and 100 mg/l for total suspended solids (TSS). Nevertheless, a decade after the project was first announced, in 2015, the Ministry of Environment, Forest and Climate Change (MoEFCC) proposed new STP standards (10 mg/l for BOD and 20 mg/l for TSS), so as to be more in line with water quality norms in other parts of the world. Having already conducted the studies and appointed a consultant, the Municipal Corporation of Greater Mumbai (MCGM; also referred to as the Brihanmumbai Municipal Corporation) was unwilling to follow the new and more stringent standards. Instead, the city pressured the MoEFCC to relax its norms (see 'Current MoEFCC standards' in Table 2) because of the financial costs associated with adopting the new ones. The MoEFCC relented and amended the limits to 20 mg/l for BOD and 50 mg/l for TSS. Environmental activists, protesting against the laxer standards, took the MoEFCC and the MCGM to court. The MCGM appealed in court for the more lax standards to be maintained, complaining of the potential cost overruns. After three years, in 2019 the National Green Tribunal ruled that the previously proposed more stringent norms should be upheld (National Green Tribunal, 2019).

The city demanded that lower standards be applied, but not on the grounds of public health or because the sewage was already being sufficiently treated. Instead, the city argued that the stringent water quality standards were expensive and unnecessary and, by gesturing to the sea's infinite ability to digest sewage, that marine outfalls were themselves infrastructures of treatment. Thus, they made legal claims not by insisting that the water was clean or safe when it entered the sea, but by protesting against the higher costs of secondary sewage treatment plans, claiming that the sea 'took care' of the problem through its dynamics and properties. For instance, protesting the higher standards, a senior sewage engineer speaking to different media outlets said:

TABLE 2 Federal standards and the local situation

	Old standards	Current MoEFCC standards	Proposed standards
Biochemical oxygen demand (BOD)	30 mg/l	20 mg/l	10 mg/l
Total suspended solids (TSS)	100 mg/l	50 mg/l	20 mg/l
Fecal coliform (FC)	No limit	1,000/100 ml	100/100 ml

SOURCE: L. Singh (2019)

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> We brought it to the court's notice that the same norms cannot apply to us as we are a coastal city. We have created marine outfalls, which means we have created outfalls deep into the sea. Besides, revising norms would mean high cost escalation and further delay (Deshpande, 2019).
>
> Such standards are meant for a city that discharges water into rivers and lakes. It should not be made mandatory for a city like Mumbai that discharges sewage into the sea (V. Singh, 2019).

In interview after interview, engineers claimed that the effluent standards were unreasonable and not pragmatic for coastal megacities like Mumbai. Nevertheless, in cities around the world, sewer networks consolidating and discharging human waste into bodies of water have long produced problems. The 'big stinks' in London in the nineteenth century or in Boston in the twentieth century or in Mumbai in the twenty-first show how—contrary to imaginaries of circulation and flow—sewage does not dissolve and disappear; not in rivers nor in seas nor in harbors (Girardet, 1996; Dolin, 2004; Kamath and Tiwari, this issue). Instead, and as I show elsewhere, sewage sits, sticks, stinks and continues to inhabit the water bodies into which it is discharged (see Figure 1).

Chemical oceanographers at the NIO also acknowledge that sewage water does not just dilute into nothingness. Taken together, effluents (sometimes called 'nutrients') are known to cause fish kills, dead zones, and a different coastal ecology that is not conducive for pelagic fish. Fishermen throughout Mumbai complain that sewage makes their coastal livelihoods difficult. One fisherman told me that sewage creates a wall in the sea that fish do not cross, in order to explain why the fish catch was down in the region. A 2017 article by Senapati and Gupta reinforced his claim:

FIGURE 1 The sewage line—sewage water bubbles up from the outfalls in Mumbai's urban sea (photo by the author, May 2021)

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> water pollution is a major challenge for fishermen (61% ranked the problem very high) … the polluted coastal water is affecting them seriously in terms of decrease in fish availability (Senapati and Gupta, 2017).

The proliferation of sewage not only produces new chemical ecologies in the anthroposea but also biological ones. The 2017 article by NIO scientists referred to previously found that:

> Although the sewage does get diluted when it mixes with the sea and the creek water, the fecal coliform count is still 100 to 1,000 times higher than permissible limits at all the city beaches … 95% of these populations of *E. Coli* were multiple-antibiotic-resistant (Maloo *et al*., 2017).

The sea here appears as a soup of human emissions; emissions of bacteria that no longer respond to the antibiotics overused by humans. Drug-resistant bacteria now inhabit Mumbai's anthroposea together with suspended solids, heavy metals and nitrates, producing water qualities that the state pollution board blithely characterizes as 'bad to very bad' in its water quality surveys.

Conclusion

In this essay, I have demonstrated the ways in which urban toxicities are produced through state practices of ambiguation. I have shown, for instance, that while the municipal administration recognizes that sewage needs to be more thoroughly treated, at the same time it defers acting on this knowledge by building partial and incomplete sewage treatment plants, contesting federal water quality standards, and even suggesting that sewage be read not as waste at all, but as a resource. Cutting across both active and tacit recognitions of sewage, the state treats sewage as an urban and environmental problem, yet fails to implement a comprehensive response.

That these practices of ambiguation emerge through the matter of sewage dispersal is not incidental. In cities, sewage infrastructure is both necessary and 'unmentionable' (George, 2014). These infrastructures do and are 'dirty work'. Retired engineer Mhatre is keenly aware of this. When I asked him, for instance, why sewage infrastructural projects take so much longer (over a decade) to execute relative to other infrastructural projects in the city, he responded by saying: '[When all's] said and done, it is dirty work. Sewage is not glamorous work … Somehow it goes into the background for all the leaders'.

At the same time, it is necessary work. He gave an example of how water shut-offs are sometimes organized for days at a time, but sewage infrastructure cannot ever be shut. 'I can't say to you "don't use your toilet".' 'Whatever work we do is in the background. We are not heroes', he said.[3] Mhatre was determined to re-signify sewage not as sewage at all, but as a resource.[4] Nevertheless, his observation points to an important relation between backgrounding tacit and active knowledge, with which I wish to conclude.

Mhatre's observation that sewage work 'goes into the background' is reminiscent of Susan Leigh Star's (1999) provocation that infrastructure is backgrounded and invisible unless it breaks down.[5] Like Star, Mhatre describes backgrounding as an

3 Indeed, Mhatre (and other engineers in the city as well) would describe the sanitation engineer's post as a punishment post; one that honest engineers would often be deputed to for not carrying out the will of the city's elected officials.

4 In a certain way, the sewage engineer's position is not unlike that of the lower caste workers who constitute the great proportion of sewage and waste workers in the city. Both are rendered abject through this work, and both insist on seeing the refuse as something to make life out of (Lalitha Kamath, personal communication).

5 This claim has been questioned by McFarlane and Rutherford (2008), who suggest that if infrastructure has been rendered invisible, it is more frequently that of more hegemonic groups. Further, as Larkin (2013) and Anand *et al*. (2018) point out, some infrastructures, such as highways and roads, are built to be highly visible.

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active process. Sewage infrastructure needs to be just sufficient enough to remain in the background. It needs to work like the outfall, carrying sewage far enough into the sea so as to become unnoticeable to the city's landlocked residents. To do this, enough active knowledge is needed (in the form of designing the sewage outfall) so as to push sewage into the domain of tacit knowledge (floating invisibly in the sea). And while tacit knowledge may always be stirred (by the regular appearance of fish kills or garbage tides, for example), when it is, it does not produce a response, because it is not something previously unknown. Few of Mumbai's residents are surprised to learn that the urban seas are polluted; the knowledge was always buried yet known. Understandings of pollution are *made* ambiguous and tacit and are consequently difficult to act on once the 'public secret' is revealed (Taussig, 1999).

Practices of ambiguation render opaque the infrastructural processes through which the city administration evades responsibility for the environmental harm and slow violence it produces through its *refusal* to treat waste to meet federal water quality standards. I have shown how this evasion of responsibility is generated through the related processes of producing both legal and material ambiguity, permitting sewage to silently creep into and remake the urban sea. By mobilizing the sea as having limitless regenerative capacities on the one hand, and ignoring water quality data demonstrating the effects of sewage in the sea on the other, the city participates in the production of slow violence, a slow violence that accretes and is episodically visible today in the form of an urban sea composed of toxicity.

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