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Chapter 2: Waste Work and the politics of knowledge

Graham Jeffery and Ben Parry

Kashinath, a waste collector describing life sorting waste along the Mithi river: *"The entire swamp is filled with garbage. Now it has reached this height. [Points] It was really very deep earlier. Now, who do you think will benefit?...Tell me. All this garbage that has accumulated here, rising up as hills of waste, after the whole area is filled with garbage, who will gain from this landfill?"* Parasher Baruah's documentary film, *Waste* (2009)



Figure 1: photo: Ben Parry (2012) Rooftops of 13th Compound, Dharavi, Mumbai

Waste: Materials, Evacuations, Absences

Each day Mumbai generates approximately 9,500 tons of waste from domestic households, markets, hotels and restaurants, commercial and construction industry and institutions. Much of this hard waste finds its way to Dharavi and enters one of the largest recycling centres in India, based mainly in the 13th Compound. Estimates vary, but it is thought that the small businesses of the 13th Compound typically process between 60 and 80% of Mumbai's hard domestic waste. Up to 250,000 waste pickers supply 10,000 – 20,000 people employed in grassroots recycling micro-enterprises (Patel *et al.* 2010). Supply chains are complex; materials are traded on their way to Dharavi through an intricate network of itinerant rag pickers, waste traders, sorters, broker-dealers and wholesalers, supplying a workforce who sort and sift through tons of waste per day in cramped, dangerous and unsanitary conditions. Specific to the 'worker colonies' and intricate supply chains of the 13th Compound is the city's dependency on workers' knowledge and skills as 'citizen scientists' and the highly productive recycling practices that prevent the rest of the population from disappearing beneath the volume of their own waste. Dharavi is a hotspot for a reconstruction and reclamation of value from the waste of the affluent city. Scrap trading built upon sophisticated cultures of repair and reclamation extract value from dismissed and discarded trash, through intricate circuits of remanufacturing and enterprise that are generally unacknowledged and unmapped.

The material and social reality of waste is incalculably significant, and what is discarded is often rendered invisible and taboo. An archaeological examination of a deep cross section of any landfill, in any time or place, offers material testimony of the characteristics of a society; evidence which is drawn from what that society discards. Waste permeates every aspect of everyday life, from bodily excretions to food and product packaging, to the longer-term impacts of lifestyles, technologies, systems and processes. The material and immaterial flows of industrialised capitalism, and now cognitive capitalism, constantly produce waste, which takes both physical and informational form. In an informational society, everyday social relations and human experience constantly produce raw materials in the form of discarded and surplus data (Zuboff, 2019). Waste is to be found across all dimensions of temporality and spatiality: from digital waste and e-waste, to wasted landscapes and wasted knowledges. It takes many forms: from unwanted files still stored on defunct servers, from casually discarded street litter to the debris of industrial ruins and redundant spaces left over after development.

The primary ambition here is not to explore the life of objects, the philosophy of things or material flows of consumer objects through the lens of waste, although there is a wealth of art, literature, and media narratives on these topics, and growing global interest in material culture dealing with these ideas (Benjamin, 2002; Barthes, 1972; Appadurai, 1986; McFarlane 2018, 2019). The aim of this chapter is to introduce the reader to the specific context of informal waste management and recovery sectors in India, and to explore how this intersects with the research methods, creative pedagogies and experimental learning approaches of Compound 13 Lab, located adjacent to Mumbai's central informally operated recycling zone.

Dharavi plays a central role in Mumbai's waste management systems. These need to be considered in the wider context of India's complex struggle with waste, contamination and sanitation and how this is structured through class and caste-based hierarchies, in which waste work is the destination of the excluded. Issues of informal waste management (IWM) are explored through discussion of the supply chains and patterns of waste work within the 13th Compound, with a particular focus on the processes of disaggregation and aggregation of discarded objects and the specific ecology of knowledges that underpin waste work. The idea of 'human as waste' (Yates, 2011; Spelman, 2016) builds on an examination of how associations of dirt and disorder, cleanliness and purity mediates

social relations of casteism, as well as expulsion from the productive and valued spaces of capitalism (Bauman 2004, Sassen 2014, Chakrabarty 1992), following the extractive and exclusionary logics of a 'biopolitics of disposability' (Giroux, 2007). Statistics of various kinds are employed throughout this chapter, in part to emphasise the scale of the challenges, but also to reflect on how the unreliability of data on the informal sector, especially in Mumbai, is bound up with the politics of representation, disposability and waste colonialism. This contestable data connects to several themes that run throughout this book, in particular the role of knowledges from below in an informal waste sector that operates largely without specialist equipment or codified knowledge, which despite any institutional investment or state support, sustains some of the highest recycling rates anywhere in the world.

Over the past few decades, across India, as in many other rapidly growing economies of the global South, cities have expanded and the consumer economy has taken hold. Volumes of waste generated have thus increased exponentially. Consumer technologies and domestic appliances, e-waste, plastic toys, tools and kitchen equipment, many manufactured and imported at low cost from China and the Far East and discarded a few years later, have proliferated in the waste chain. Doron and Jeffrey (2018) chart India's complex struggle with managing waste and sanitation; not least because images of public squalor, widespread open defecation and rampant plastic and chemical pollution undermine claims of 'modernization', as well as directly affecting infant mortality, public health and the living conditions of the poor. Alongside this, a long tradition of frugality, repair/mending, and *jugaad* ('frugal innovation') contrasts sharply with the logics of consumerism and social exclusion, which means that material and social inequalities are foregrounded in public debates over waste and disposability.

'Acute poverty and long standing practices of reuse create intricate networks for collection, classification and recycling of waste. Consumer goods in India embark on complex and unexpected journeys involving street-side repair, disaggregation and reaggregation...recycling, restitution and decomposition. An object's life and journey are rarely as predictable as they are in the developed world' (Doron and Jeffrey, 2018, p. 41).

Despite the apparent binary between 'formal' (regulated, registered, audited) and 'informal' (largely cash-dependent, self-organised, small and micro scale) waste management, there are numerous ways in which waste and recycling infrastructures of various types, sizes and scales are intermingled and co-dependent.

"Margins, in this sense, operate at a number of different levels, each servicing the more beautiful and exposed parts of society: markets, waste dumps, cemeteries and carnival were all traditionally linked to urban edges – socially subversive, troubling and essential...Considering the relationship between power centres and margins reveals dependencies that reach both ways. Commodity futures prices for raw and recovered materials affect scrap and recycling activities, which, in turn, feed economies with revalued materials and objects. In such tightly knit relationships, it is hard to distinguish precisely who is dependent upon whom" (Alexander and Reno, 2012, p 21-22).

The IWM sector in India should be understood as not *entirely* informal and marginal, but made up of a matrix of borderline, improvised and mutable practices. It is caught up in a matrix of formal-informal relations: a complex set of factors including price-setting via global markets, policy and regulation, supply and demand, spatial and temporal proximities affect the whole supply chain. Recently, the total ban of single-use plastics enacted by the state of Maharashtra (Deshpande, 2020), making Mumbai the first major city in the world to attempt to completely phase them out, has brought the informal recycling industries into the media spotlight. The potential of the IWM

sector to contribute solutions is largely unacknowledged in public discussions of the problem of waste. Despite this, policy responses to the crises of waste management, marine plastic pollution and the need for recycling, in the absence of any serious investment in alternative systems, continue to be heavily reliant on processes of self-organised work undertaken on the borderline between legality and illegality, largely by those with low incomes, low social status and migrants. Policy documents rarely make any serious attempt to account for the work of the informal sector. Veronesi (2016), Gidwani (2015) and Gill (2019) point out that the IWM sector interfaces with centrally organised 'formal' waste management systems via policy initiatives to do with recycling, circular economy, incineration of waste for energy, or the outsourcing of waste disposal to other countries. IWM is an essential component in Mumbai's urban metabolism (Veronesi, 2016). Middle-class households in Mumbai can expect municipal waste trucks to make street-side collections and take the trash to landfill. Rag pickers can also be seen in neighbourhoods sifting through household rubbish found in bins or from the streets. Broadly speaking, public knowledge of waste management ends at the neighbourhood level.



Figure 2: photo: Ben Parry (2019) Single use plastics from airline industry. Compound 13, Dharavi

For the subaltern classes - the majority of Mumbai's citizens - rubbish is also dumped outside the home, on the street or in a nearby citizen-assigned open rubbish dump, much of which will remain uncollected by the Brihanmumbai Municipal Corporation (BMC). What is collected and processed by the informal recycling sector is mostly unquantified, which exacerbates the invisibility and lack of recognition of waste work. Kaveri Gill explains that it is only because informal waste workers regard this waste as economic goods and resources from which they make a living that there is a recycling chain at all. 'The informal waste sector thus plays an important environmental role, shoring up inadequate local authority provision by recovering large quantities of solid waste at zero cost to the public, and reducing the burden of uncollected waste in the process' (Gill, 2010, p.10).

Flows of materials into the 13th Compound intersect at multiple points with Mumbai's municipal waste collection system, as bands of freelance waste pickers sift through what the BMC waste trucks deposit

at the city's key waste dumps at Deonar, Kanjurmarg and Mulund, selling what they can physically gather and carry to small *kabadi* dealers, who sell it on for sorting and processing. Other supply routes operate through self-organised systems of neighbourhood waste collection where individual collectors and itinerant buyers take recyclable waste from street bins, households, and businesses, including from some households in slums. Individual *chawls* or apartment buildings may partially segregate waste via informal agreements with these buyers. Additional systems operate through networks of specialist broker-dealers who trade in large and small used/reconditioned domestic electrical appliances and industrial machinery – such as fans, air conditioning units, washing machines, power tools, pumps and motors. Scavengers and waste pickers roam neighbourhoods for up to twelve hours a day, sifting through rubbish dumped on roadsides and beaches or gathering up domestic waste that has escaped collection. Bearing the stench of picking through this rotting rubbish along with animals and insects often means separating wet from dry waste in search of materials to be aggregated before being taken to dealers who operate a weighing station.

Another key specialism within Dharavi is the recycling and refurbishment of chemical, paint and oil drums – for which there is a ready market in reconditioned containers and packaging for second use.



Figure 3: photo: Ben Parry (2019) Recycling chemical containers, Mahim Junction, Dharavi

Alongside the primary work of sorting, reconditioning and repairing is an ancillary service economy: material washing, weighing, grinding and storage, steel work and fabrication, construction and electrical services, catering and hospitality (food for workers and low cost hotels for businesspeople passing through to trade and seal deals) as well as all the other urban services of a small township – mobile phone cards/repairs, clothing, mechanical services, foodstuffs, domestic supplies, etc. Most of the by-products from the 13th Compound's recycling activities, particularly the run-off from refurbishing chemical and paint containers, fabric dyeing, and washing plastic drop into an improvised sewer system that finds its way into the heavily polluted Mahim creek that runs alongside the compound and into the Mithi River. Given the intensity of activity, it is difficult to trace sources of effluent to individual godowns; the density of the operation generates a kind of solidarity so that it is impossible to trace particular sources of polluting run-offs back to a single source, another 'benefit' (for business owners) of clustering and general lack of regulation or scrutiny. In a similar vein, much burning of plastic uneconomic for recycling is contracted out to be undertaken under cover of

darkness. Although most premises are unlicensed by the Maharashtra Pollution Control Board (MPCB) and exist in a kind of twilight of regulation and legitimacy, they are connected to power and water via intricate relations of sub-letting and sub-contracting.

The rise of e-commerce has also increased the amount of packaging waste, and some go-downs specialise in dealing with food and drink packaging waste, which can be very messy and unsanitary as the food products they formerly contained, often sticky and sugary drinks or sweets, rot away in the intense heat, attracting flies. Unsegregated medical waste can also be found in the Dharavi supply chains it is not uncommon to see used syringes, bags of swabs and other unidentified clinical by-products in the caches of materials being handled with bare hands, no masks and minimal attempt to protect individual workers' health.



Figure 4: Ben Parry (2018) Pelleted plastic dealer, Dharavi 13th Compound

Global petropolitics and plastic flows

The micro-markets of Dharavi, as an intricate web of social and economic relations that sustain the livelihoods of thousands of informal waste workers, operate as a small component of a complex global system of petrochemical production and environmental destruction, vast in scale and reach. It would be oversimplistic to consider the 13th Compound as simply a 'shadow economy' or a parasitical site of scrap recovery. The way in which it operates is centrally bound up with the costs and consequences of the ways in which the global trade in plastics and material goods is (mis)managed and governed. The work of the IWM industry is generally absent from official data about the environmental and social costs of plastic manufacturing, consumption and disposal. There is thus an unfortunate tendency to associate problematic causality with IWM, which makes the sector an easy target for moral panic and scapegoating. The IWM industry's absence from official narratives exacerbates its outsider status, which has consequences for policy and its place in public debates about urban waste management.

Everyday citizen knowledges within the 13th Compound, embedded in the everyday practices and routines of the IWM industry, appear far removed from the global peer-reviewed science discussed at the summits and conferences attended by elite international groups of decision makers, city

leaders, politicians, businesspeople and academics that are driving what may superficially appear to be an international consensus on 'sustainable development' in response to the climate crisis. Deeper analysis reveals multiple contradictions and difficulties. Firstly, there are huge gaps between corporate and governmental rhetorics of sustainability and their actions, particularly in relation to the needs of their poorest and most marginal citizens. Secondly, there may be apparent intergovernmental agreement about the need to address climate change, but major challenges remain in building consensus between stakeholders with radically different agendas in the attempt to move away from 'business as usual' with regard to designed obsolescence, and in the redesign of everyday living systems that would enable a post-carbon future (Irwin, 2018, Kossoff, 2019).

The universalising discourses of 'urban age' ideologies are increasingly ubiquitous across different types of cities in different continents. Neil Brenner argues that they

'remain powerfully operative conceptual tools for analysis, mapping, policy, planning and practice in international organisations such as the United Nations, World Bank, and the World Economic Forum...aggressively promoted by a range of corporate actors and property developers for whom the construction of 'global cities', smart cities, sustainable cities, eco-cities and the like is seen as the optimal pathway for continuing economic growth without disrupting the currently hegemonic formation of neoliberalised, financialized accumulation by dispossession' (Brenner, 2018, p. 571 – 572; see also Brenner and Schmid, 2014)

Instead of accepting such hegemonic narratives at face value, Brenner acknowledges the contributions of postcolonial theory in arguing for an 'engaged pluralist' approach which would question some of the assumptions driving the notion that there can be a common global platform for a transition to sustainability without addressing power dynamics, gross inequalities and difference (Barnes and Sheppard, 2010; Roy, 2014, 2016). Whilst the UN's Sustainable Development Goals might be driven by good intentions, their inclusion in the knowledge flows that accompany the flows of capital, policies and ideologies propounded by powerful institutions and corporate-sponsored urban summitry mean that their radical intent becomes somewhat blunted by the politics of their use and abuse. In this context, big data, used to track, monitor and inform policy, and the techniques and methods of the big science that produces it (Weinberg, 1961) cannot be seen as politically neutral. The 'big data' that underpins popular understandings of the wicked problem of plastic waste, as well as increasingly spilling over into the regulation, governance and monitoring of everyday life through data harvesting and algorithmic platforms, needs to be scrutinised, opened up to criticism, and carefully contextualised.

Peer reviewed research by environmental scientists, intergovernmental agencies, scientific research institutes and independent commissions describes the effects of the global dependency on fossil fuels on the biosphere and the current trajectory of rapid climate change. The following statistics on plastic production and disposal are alarming, but perhaps are so great in magnitude that they have surprisingly little impact on individual consumer habits or practices of care for the environment. Beyond statistics, other ways of knowing and being may help communities and individuals understand their impacts on the natural world. Attention to the sociomaterial assemblages and conditions of everyday life (see Dawson in Chapter 9) and emotional and cultural engagements are important. Values, ethics, habits, practices, and everyday cultures drive engagement with the issue of waste, and as Chapman argues, social knowledge in the form of 'emotionally durable design' (2010, 2013) is perhaps more likely to change behaviours and attitudes. With all these caveats established, we turn to the question of scale and impact of plastic.

The global annual production of plastic is currently around 322 million metric tonnes (Mt), a figure expected to double by 2035, and which left unchecked, may reach 1.2 billion Mt per year by 2050¹. Other estimates put annual output at around 380 Mt. Many plastic items are used once and thrown away. Since the 1950s, more than 8.3 billion tons of plastic has been produced worldwide and it is estimated that only 9% has been recycled. Of that global total 6.4 billion tons of plastic waste has been generated. Since plastics do not naturally degrade, the majority remains with us in the environment. Up to 60% of all plastics ever produced are buried in landfill or floating in the ocean, often in the form of microplastics (size from 0.1 mm-5mm²). Currently virgin plastic production accounts for 6% of global oil production and represents around 1% of annual carbon emissions, forecast to rise to 15% by 2050 (Jambeck *et al*, 2015).

How waste is written about matters. Circular economy principles are shaping policy and leading the way in recycling plastic, aiming to reduce overall production of virgin plastics. However, the potential benefits of more circular approaches shrink in the face of the continued rate of increase in consumer demand for goods made of virgin plastics. Market prices for recycled plastics closely track the market for virgin plastics, typically trading for around half the price per kg of the corresponding new material. So long as it is economically viable to rely on virgin plastic, recycled products will always be cheaper, unless there is some kind of regulatory intervention to deal with the externalities/costs of plastic waste³, given the implications for climate change and marine pollution of continued rampant hydrocarbon consumption.

Ma and Tran (2018, p. 4) explore the likely futures of waste management in the context of the international investment landscape, offering some startling forecasts:

“Poor waste management is a global reality, with 3 billion people lacking access to basic waste disposal services and 40% of waste placed in dumpsites. Handling waste is likely to become an ever more pressing issue given that we are unlikely to reach peak waste this century. Urbanisation, population and income growth could see waste from cities grow 70% by 2025. Without action, landfills could account for 8 to 10% of human activity-based greenhouse gas emissions by 2025. The cost of inaction would be 5 to 10% more than proper waste management”.

According to Gidwani (2015) a 2013 report from the Indian Central Pollution Control Board confirms a rising trend in the use of plastics. It estimates that in 2012, India consumed 12 million tons of plastics in areas as diverse as ‘packaging films, wrapping materials, shopping and garbage bags, fluid containers, clothing, toys, household and industrial products, and building materials’ (CPCB 2013, Chap. 1, cited in Gidwani, 2015). The same report notes that India generates 5.6 million tons of plastic waste annually, of which up to 60% is recycled, meaning that the country has one of the highest rates of plastic recycling in the world⁴. In 2018, the state of Maharashtra banned all forms of single use plastic, making Mumbai the first large city in the world to do so. In 2019, India banned the import of plastic waste, just one year after China, which at the time accounted for half the world’s global recycling industry in non-industrial waste imports. This caused major changes in the transnational flows of the global market for recyclables, shifting the bulk of global trade in waste materials to smaller countries in South East Asia such as Vietnam, Thailand and Indonesia that were still willing to accept them (Nguyen 2020).

¹ Geyer et al. 2017. ‘Production, use, and fate of all plastics ever made’. *Science Advances*, 3, DOI: 10.1126/sciadv.1700782

² Scientists have recently started investigating the prevalence of nanoplastics and the extent to which they can be re-absorbed into planetary ecologies (<https://www.nature.com/articles/s41565-019-0437-7>)

³ See article on the state of Kerala fixing floor prices for plastic waste -- <https://indianexpress.com/article/india/kerala/kerala-base-prices-fixed-for-recyclable-non-biodegradable-waste-7137081/>

⁴ Barra et al. 2018. Plastics and the circular economy. Scientific and Technical Advisory Panel to the Global Environment Facility. Washington, DC.

One feature of the international market in recyclable material is that by selling waste abroad, more affluent countries can outsource their environmental responsibilities to poorer countries with lower regulatory standards and fewer environmental protections. Figures from 2018/19 show that leading up to these bans, of the EU's total annual waste production of 2.5 billion tonnes, between 36.8 and 41.4 million tonnes of recyclable waste were exported to non-EU countries, with China receiving 5.2 million tonnes and India 4.1 million tonnes respectively⁵. These exports were worth €14 billion in 2018⁶. Whilst the benefits being claimed for the outsourced countries of the Global South is investment and development of waste management infrastructure and improved services, there is little evidence of this within the recycling hubs of the remaining South East Asian countries willing to receive the waste. Liboiron (2018, para. 3) characterises this relationship as 'waste colonialism':⁷

'Waste colonialism, as well as its sister terms garbage imperialism, toxic colonialism, nuclear colonialism, and toxic terrorism, among others, are almost always about the transboundary movement of waste from areas of privilege and affluence to areas with lower economic status and influence, and discussions tend to focus on legislative solutions and channels.'

Currently the average Indian generates 0.01kg per day of plastic waste, compared to the North American average of 0.34kg and the UK's 0.21kg (Jambeck *et al.* 2015). It is important to keep these figures in mind, especially when the mountains of plastic waste in our oceans and along coastlines are largely attributed in media narratives to the countries of the global South. Measurements for inadequately managed plastic waste note India as one of the world's 'worst performing' countries with 85% labelled 'mismanaged' compared to the US or UK rated as 0% mismanaged. This data is part of a global framework that calculates the amount of plastic waste entering our oceans by country, using data including: the mass of solid waste generated per capita annually and 'the percentage of plastic waste that is mismanaged and, therefore, has the potential to enter the ocean as marine debris'. Mismanaged plastic waste was defined by Jambeck *et al.* (2015 n.d) as

"plastic that is either littered or inadequately disposed. Inadequately disposed waste is not formally managed and includes disposal in dumps or open, uncontrolled landfills, where it is not fully contained. Mismanaged waste could eventually enter the ocean via inland waterways, wastewater outflows, and transport by wind or tides."

Jambeck *et al.* noted that there is little reliable data on the amount of plastic debris entering marine environments from land-based sources. One should therefore be cautious in reading too much into the following estimates. Just under 2% of the world's share of plastic entering marine environments is attributed to India, with larger shares going to Vietnam, Malaysia, Thailand, and the Philippines: all countries that remain in receipt of EU and North American waste imports (European Environment Agency, 2019).

The Compound 13 Lab project sets out to question some of the assumptions that underpin this kind of telescopic science, which, because of the ways in which the data is produced and deployed, tends to privilege knowledge that validates and legitimates forms of waste colonialism. How data is obtained, who collects data, how data is deployed strategically, and by whom, matters. Normative 'truths' can be mobilized to generate global narratives of blame and displacement of responsibility

⁵ <https://www.euronews.com/2019/03/12/where-does-the-eu-export-most-waste-outside-the-bloc>

⁶ <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20190304-2>

⁷ Liboiron (2018, para. 2) "The term waste colonialism was first recorded in February 1989 at the United Nations Environmental Programme Basel Convention working group when African nations articulated concerns about the disposal of hazardous wastes by high GDP countries into low GDP countries. That is, high GDP countries like those in Europe and North America were accessing African land for inexpensive disposal of waste. They were using Africa as a sink". <https://discardstudies.com/2018/11/01/waste-colonialism/>

to those countries deemed lacking in infrastructure, or which are deemed not to possess the sensibilities of clean, environmentally conscious citizenship and stewardship. Narratives of 'waste mismanagement' in India do not entirely square with having both the highest rates of plastic recycling and among the lowest rates of plastic waste per head of population.

In Indian cities, waste which is dumped enters a second tier of segregation by rag pickers that scour these dumps for recyclable plastics, metals and other materials from which value can be recovered. In urban settings, there is evidence that much of what can be recycled is recycled, but widely circulated images of waste strewn along coastlines, riverbanks and inland waterways or roadsides fit better with the normative narratives of global environmental science. Like poverty, waste is glossed over and simplified, represented through images and narratives that global media networks generate to 'world' the impacts of environmental crises such as climate change (see Parry, Chapter 4).



Figure 5. Ben Parry (2020) waste bins, Mumbai Central.

Colonialism and geographies of contamination

Gidwani and Reddy's account of the 'spectral' presence of waste in colonial discourses and subsequently in the Nehruvian formation of the early Indian nation-state after Independence provides a genealogy of approaches to the 'problem' of waste in India. They argue that

"it takes little to surmise that the colonial discourse around waste was substantially a shadow theory of value, whose effects were to cast in sharp relief the physical infirmity and cultural inferiority of Indians, thereby clearing the ground for a permanent colonial presence and, equally vital, for "development" as the answer to liberalism's imperial contradictions (2011, p. 1628).

Drawing on John Locke's theory of civil society (1988 [1861]), Gidwani and Reddy explore how the notion of waste fits into 'civilizing' and 'modernizing' discourses: 'to enable passage from the state of "nature" to the state of "civil society"' (2011, p. 1628). The colonial forces sought the enclosure of land and enforcement of property rights as a 'natural' state: 'liberalism's certitudes are constantly secured by the violence of exclusions' (ibid., p. 1630). In this Lockean framework, the state's primary role is to act as an enforcer of property rights, and to map and subjugate non-conforming territories,

framed as wastelands and ungovernable forces, which have to be tamed and controlled. A further association of waste with lack of productivity, lack of efficiency and as an unwanted product of poorly-planned systems can be found in many rhetorics of modernization, not least in contemporary conceptions of low waste/low carbon economies and the idea that waste might be 'designed out' of hyper-efficient socio-technical systems.

McFarlane (2008b) also draws attention to the design of infrastructure for waste management and sanitation, as both a material/technical issue and a discursive one. He traces colonial narratives of 'contamination' and public health and finds resonances of these discourses in contemporary debates about waste, environmental protection and sanitation in Mumbai.

"In the colonies, imaginative geographies of contamination were underwritten by a close association with disgust at the colonial Other, the uncivilized, racialized polluting bodies that were often viewed as less amenable to self-government than their domestic working-class counterparts... Sanitation is a stark illustration of the ways in which infrastructure comes to matter in urban government, and reveals often fraught and contentious processes of socio-material engineering." (McFarlane, 2008b, p. 418)

British colonial rulers were quick to mobilise the politics of class and caste in the service of the 'modernization' and 'improvement' of sanitation infrastructures. For example, Spelman, citing Prashad (2000) points out that the British assigned waste workers to the Delhi sanitation department on the basis of caste, in a potent cross-fertilization of European class politics and a moralizing and subjugating Victorian gaze with indigenous notions of caste and low status. Jobs in waste work were allotted to 'a Dalit group of Balmikis on the grounds that this cohered with what was understood to be the occupation dictated by their caste standing and their relative degree of impurity - even though in their case there was no "living, historical tie with refuse removal" and Indians of the dominant castes knew this' (Spelman, 2016, p.12 citing Prashad, 2000).

Shifting focus back to 2020, the government-driven project of 'cleaning up' the city (linked to the nationwide drive against open defecation, for better sanitation and for a 'Clean Green India' - *Swachh Bharat Abhiyan*⁸) also contains connotations of expulsion, exclusion and class/caste/religion-based politics. This is also fuelled by communal political rhetorics, which tend to associate urban poverty and marginal communities (Muslims, Dalits, migrants) with dirt and decay:

"One of the central concerns of Shiv Sena's⁹ campaign before the 1997 BMC elections was pollution—physical pollution caused by an inadequate infrastructure and the constant influx of new migrants, and cultural pollution caused by 'anti-national' elements, foreign cultures (Western and Muslims) and degenerate works of art emerging from leftist and liberal milieus in Maharashtra (Hansen, 2001). Most of the party's media campaigns called for a transformation of Mumbai to a beautiful and green city free of disease and dirt. The most ambitious part of this transformation of Mumbai was the Slum Rehabilitation Scheme (SRS) envisioned by (Bal) Thackeray to remove the massive slum areas in the city and thus resolve 'the major problem of dirt', as Thackeray put it (Hansen 2001)". (Contractor, 2017, p. 144 – 145)

Dharavi's central role as site for inter-communal violence in the riots of 1992/3, and deep memories of the consequences of this conflict inscribed in the popular consciousness, play into this politics of

⁸ The *Swachh Bharat Abhiyan* (Clean India Mission) is a national campaign launched by the BJP-led government in 2014 with the aim of eliminating open defecation and improving solid waste management. See <https://swachhbharatmission.gov.in/sbmcms/index.htm>

⁹ Shiv Sena translates as 'Shivaji's army', named after Maratha warrior Chhatrapati Shivaji – prominent in Maharashtra politics since its founding in 1966 by cartoonist Bal Thackeray.

reputation and representation (Chatterji and Mehta 2007). Contemporary class and religious dimensions of this debate can also be located in what is described by Gill (2010) as ‘bourgeois environmentalism’, evident in numerous beach clean-up campaigns, neighbourhood beautification drives and their accompanying social media frenzies (Taguchi, 2012). In Mumbai, activist lawyer Afroz Shah successfully mobilized thousands of residents to volunteer time as litter-pickers, urged on by Bollywood ‘influencers’ only too happy to snap selfies in lycra leisurewear whilst posing with a bag of plastic trash¹⁰. Prime Minister Narendra Modi also got in on the ‘plogging’¹¹ act, in one video posted for mass circulation, after which some alleged that plastic debris had been dumped on a private beach purely for the purpose of shooting a ten minute film of him wandering along collecting it up again (ironically, in a single use plastic bag) to make a campaign point (Times of India, 2019).



Figure 6. Graham Jeffery (2019): BMC beach cleaning team, Mahim Beach

Unfortunately, every year during monsoon season the surging tides re-deposit thousands of tonnes of plastic debris back on the Mumbai foreshore – thereby rendering starkly visible the inadequacies of cosmetic clean-ups without attending to the ecological and infrastructural design fundamentals of reducing the amount of material that finds its way to the sea (Chaturvedi, 2018). Despite a legacy of numerous corporate environmental scandals, and plenty of public shaming of polluters and litterers, there has been little attention paid within Indian politics to the more thorny and protracted consequences of uneven development and poorly enforced environmental protection. There is no doubt that countless efforts to ‘raise awareness’ of the problem of waste have taken hold amongst some sections of the middle and working class, fostering a self-consciously virtuous symbolic politics of pre-sorting waste, encouraging recycling and removing single-use plastics. These may be laudable aims, but they reveal a more negative edge when mobilized by politicians to construct moral panics

¹⁰ <https://in.style.yahoo.com/amphml/world-oceans-day-bollywood-celebs-003700130.html>

¹¹ Plogging: picking up plastic trash whilst walking/jogging/running (and posting social media posts about it)

and forms of moral subjection through discourses which associate pollution and contamination with the urban poor.



Figure 7: Ben Parry (2018) Clearing Mahim creek before the monsoon, Dharavi

These discourses are not new. The figure of the downtrodden waste picker, living on the margins of society and exoticized/othered (Alexander and Reno, 2012) is often presented as a counterpoint to the ‘dignified labourer’ employed in a well-regulated, well remunerated production line or office – efficient, tidy, productive, and compliant. This picture of the ‘decent worker’ is set against the image of hordes of disreputable vagrants and outsiders scavenging from the scraps of what ‘respectable society’ leaves behind. Such rhetorics conjure up 19th Century discourses about the deserving and undeserving poor, overlaying a moralising filter upon existing discourses of trash and value – ‘positively freighted moral values of saving resources, providing labour (volunteerism), gifting resources for re-use, which in turn need to be set against the un (Undervalued) people and places typically involved in the restoration of value to worn-out things’ (Alexander and Reno, 2012, p.19).

Wasted lives and the biopolitics of disposability

In conceptualising human waste, one can think of all that is produced by humans, conventionally understood as a by-product of economic activity and as things to be discarded when there is no future left for them. A cradle-to-grave consumer society operates under the cycles of consumer capitalism: incorporating planned obsolescence, driving compulsions for the latest models, keeping up with technological innovation and chasing the trends of fast fashion. Despite a sense of entitlement to material things, there is increasing public awareness of the external costs of consumerism in the form of diverse spoils: exploitation of cheap labour, environmental degradation, toxification of land, air and water, expulsion and displacement of indigenous peoples from lands rich in minerals and fossil fuels, and much more. The production of raw materials, as well as their manufacture and disposal, often entails harsh working conditions and low pay, including child labour. This can be seen in the sweatshops of the textile industry, or in huddles of daily wage workers up before dawn, waiting on corners to be hired for long days of hard manual labour on construction sites, and in particular in the extraction of raw materials from the natural environment such as the cobalt mines in the Republic of Congo, extracting the precious metal that supplies every lithium-ion rechargeable battery on the planet. Those same batteries in smartphones, laptops and the expanding technological gadgetry of the internet of things, once abandoned, eventually find their way to ‘digital dumping grounds’ such as Agbog-bloshie in Ghana: a disaggregation dystopia,

harmful to environment and human health, for the labour intensive dismantling of legal and illegal e-waste. The by-products of these processes are then burned, thus releasing toxic gases into the atmosphere.¹² In India, an estimated 95% of e-waste is recycled through the informal sector, with Mumbai in pole position as the largest generator of e-waste (MAIT-GTZ, 2007).

Gidwani (2011) draws on the example of the huge e-waste markets of Bangalore, fed by an estimated 30% of the booming IT sector's technologies that are thrown away and replaced each year, to demonstrate the physical toll that dealing with an endless flow of toxic materials has on the bodies of those that labour in these industries:

"Toxicology studies (Brigden *et al* 2005) show that e-waste recyclers and dismantlers are at increased risk of developing skin ailments, kidney damage (from mercury), respiratory ailments (through inhalation of cadmium dust) and cancer (through inhalation of beryllium and cadmium dust and fumes). As workers absorb many of these toxins the hazardscape of e-waste is markedly different from that of municipal waste. As a rule, e-waste toxins are interred in the bodies of workers—contributing to chronic illness, long-term morbidity, and delayed outbreak of symptoms. But because the toxins are unlikely to trigger imminent public health catastrophes, concerned authorities have adopted a policy of benign neglect... The bodies of e-waste workers have, quite literally, subsidized the disposal of Bangalore's IT waste since the sector's inception" (Gidwani, 2011, p. 1560)

Such stark examples of the brutal trade of human health in exchange for money reveal connections between labour, commerce, disposability and ecology through the conjoining of products of human waste with wasted human lives (Bauman, 2004). Incorporating the concept of 'the human as waste' into the framework of social reproduction of sustainable life and dignified work begins to make this biopolitics of disposability more visible. In general though, the vital contribution made by informal waste recovery through the self-organised recycling sector remains undervalued and largely hidden, echoing the marginalized and disposable status of the extremely poor workers that sustain it (Gill, 2010).

The negative perception and marginalisation of informal waste work, driven in particular by the social class of those handling waste materials and human sanitation, means that those who work with waste on the margins of the city are seen as disposable (Agarwal, 2019, Chaturvedi and Gidwani, 2010). According to Yates (2011) this follows the logic of human disposability in which 'the body of the labourer is used up or wasted at accelerated rates so as to secure the most profit' (p. 1680). The invisibility and disposability of waste work embedded in multiple dimensions of poverty is two-fold. Firstly, an expulsion of vulnerable local-income workers or the unemployed from the productive spaces of capital through a 'savage sorting' of the labour force (Bauman 2004, Sassen, 2014) and secondly through forms of 'eviscerating urbanism' (Gidwani and Reddy, 2011). This social and economic exclusion takes place at multiple levels, since many people in waste work are economic migrants, displaced from their villages and moving to slums in search of work. Unable to find jobs, many turn to waste work, existing at the bottom of a hierarchy of informal labour. In addition, there are ongoing associations of 'purity' and 'impurity' in the separation of castes where 'untouchables' have historically performed 'unclean' and polluting tasks, including sweeping streets and garbage removal (which continues to this day, despite the concept of untouchability having been outlawed in the Indian constitution). Many factors continue to shape and influence the

¹² Agbog-bloshie is not so much a dumping ground for waste from the West, it is driven more by Ghana's own interactions with global markets and its own computer and mobile phone industry. The majority of its electronic waste comes from within West Africa.

practice of caste (Jodhka 2015, Prashad, 2000), and as handlers of waste, Dalit and scheduled castes, alongside the Muslim minority in India, are frequently characterised by their relationship to cleanliness and pollution in popular narratives of morality and value.



Figure 8: Graham Jeffery (2017) Rag picker collecting plastic on Mahim Beach, Dharavi, Mumbai.

Regimes of exclusion operate at multiple levels, from hierarchies within subaltern communities between established groups and new arrivals, through discriminatory frameworks based on gender and sexuality, through civic and national political discourses stained with communalism, to the international dimension of the competition for status between cities and countries, fed by normative ‘global city’ narratives. The polished urban imaginary of the ‘world class future city’ of which many policymakers speak conflicts sharply with the messy and noisy everyday realities of the informal city; Mehrotra’s ‘kinetic city’ in which the majority of urban dwellers make their living. One prominent media portrayal of Dharavi is of an unproductive, parasitical neighbourhood beset with problems of sanitation and criminality. Imogen Tyler has described this media politics as a form of ‘classificatory struggle’: “Giroux argues that contemporary life is characterized by a ‘biopolitics of disposability’ in which ‘poor minorities of color and class, unable to contribute to the prevailing consumerist ethic, are vanishing into the sinkhole of poverty in desolate and abandoned enclaves of decaying cities [and] neighbourhoods (Giroux, 2007: 309)” (Tyler, 2015, p. 494).

Wasted knowledge and the epistemologies of the South

The work described in this book is, in part, an attempt to recognise and recover the lived knowledges of India’s informal waste workers, as exemplified in the everyday activities of the 13th Compound. The project’s focus on people as infrastructure (Contractor, 2017) and knowledges from below, embodied in social practices and everyday labour, are rendered largely invisible in official narratives, as ‘nonexistent knowledges, deemed as such either because they are not produced

according to accepted or even intelligible methodologies, or because they are produced by absent subjects, subjects deemed incapable of producing valid knowledge due to their subhuman condition or nature' (Santos, 2019, p.2).

The 'wicked problem' of waste is not just material but biopolitical. Not only must the production of waste and its afterlives be addressed, but also the complex biopolitics of its treatment and disposal. The national drive for 'waste to wealth' in the Indian Government's *Swachh Bharat Abhiyan* does not simply ignore IWM: it discursively eradicates much of the waste work carried out by the informal sector. Waste pickers are formally acknowledged in the document (*Waste to Wealth*, 2017) to exist only as scavengers at the dumpsites, thereby, through a form of policymaking violence, undergoing a symbolic and material expulsion from the liveable and legible city¹³. What arrives at landfill for indiscriminate disposal is described in the *Waste to Wealth* 'vision document' as a failure of waste segregation by municipal authorities, disposed of in an unhygienic and unscientific manner (ibid). An admittance of responsibility by the state such as this is a blunt instrument of technocratic thinking, enforcing the territorial recuperation of already existing economies of 'waste to wealth' realised by urban underclasses at extraordinary efficiencies with no state support. Further still, it transforms the spatial economics of Mumbai's informal waste economies, which operate throughout the city – and in the case of Dharavi, right at the urban core - into one of waste-lands on the periphery. This establishes a policy-rhetorical regime under which informal settlements and workspaces are re-designated as of no value, ready to be re-valued and re-made through processes of speculative redevelopment, once those 'whose labors are not counted' have been excluded from political or economic citizenship (Gidwani and Reddy, 2011, p. 1653).

Moreover, the pronouncements of Western scientism in demanding that 'waste calls for proper scientific management' may act as potential subterfuge for the violence of epistemicide (Visvanathan 2009a; Santos 2018, Wakeford *et al.* 2019), which excludes and negates already existing knowledges of waste management; even though IWM, in many respects, outperforms the current possibilities of automation and the proposed technological solutions proffered by formal sector encroachment. Nevertheless, the efficiency and efficacy of the IWM sector in an economic sense is sustained in part by the infliction of damage to the health and wellbeing of its workers, even as it sustains them. Part of 'rethinking waste' (Jeffery and Parry, 2018) in the broader context of the informal waste management of Mumbai is to understand the ecology of knowledges that makes possible the transformation of waste into a resource at multiple socio-economic levels, and which keeps Mumbai free from the overflow of waste into the urban flows of upward mobility, already denied to those that service the separation of the hospitable from the inhospitable city. This failure to admit the value of 'knowledge from below' into policymaking or official discourse, and the unaccounted-for, invisible infrastructural labour necessary to sustain life in the margins, exemplifies the struggle not only against social exclusions and the right to the city, but also the struggle for knowledge validation. The diversities of knowledges within the informal waste management sector and across the range of artisanal practices within Dharavi are essential to the livelihoods of over a million people. As a totality then, this economic mass means that Dharavi tends to escape the fate of other slums 'left out of the calculus of civil society' (Amin 2013, p. 486), insofar as it is hailed an economic miracle.

In Dharavi the work of waste exceeds normative discourses of 'circular economy' in range, scope and coverage. The aspirational drivers of circular economy: *repair, reuse, recycle, remake* that advance through ecological and sustainable frameworks for implementation, monitoring and management,

¹³ 'Millions of waste pickers are exposed to hazardous substances while collecting waste in the dumpsites seriously impacting their health and life expectancy. The improper waste management largely contributes to air, land and water contamination.' (*Waste to Wealth*, 2017)

are not 'new' principles that need to be incorporated into an externally imposed 'redesign' of Dharavi's industrial supply chains and systems. They are already there in a highly sophisticated form: embedded and indigenous to communities that transfer intergenerational knowledge between people and things (see Santos, 2018). In a place like Dharavi, the profusion of everyday objects and their social life demonstrate the intersubjectivity of people and things (Appadurai, 1988): everything has a use value; everything sustains life; nothing is idle; nothing is wasted.



Figure 9: Graham Jeffery (2018) Repair shop, Dharavi, Mumbai.

The concept of 'waste' in Dharavi extends far beyond the structural boundaries of formal waste management and the begrudging acknowledgement of the existence and possible relevance of the 'survivalist city' (Amin, 2013) by international urbanists. For example, in the *nagars* of Dharavi, sewing machine repair shops can be found on every street, usually close to an electric motor repair shop servicing the machines of commercial and manufacturing industries, maintaining water pumps, fans and generators. Cultures of mending and repair, customisation and upgrade extend from the private dwelling to the tool-house incorporating domestic appliances, air conditioning units, electrical goods, mobile phones, computers, printers, cameras, clothes, clocks, jewellery, furniture, toys and more, each with their own dedicated parts and repair shop. Via the shifting temporalities of a circular economy of *always in use*, cycles of disaggregation and aggregation, disassembly and assembly persistently sustain complex assemblages of diverse knowledges. Into these material flows of objects and embodied knowledges are momentary aggregations in which different forms of knowledge co-exist (Visvanathan, 2009b). These ways of knowing also represent the learning of skills and knowledge that are embedded in the processes of self-built and self-organised communities that make up the many worlds of Dharavi. These assemblages of *autoconstruction*, shaped through a confluence of shared knowledges and artisanal practices express forms of adaptability, improvisation, dialogue, collaboration, human agency, recycling and experimentation among others (Cruzvillegas, 2009). These intergenerational practices of the labour of social reproduction produce highly generative social relations outside formal training and education (see Chapter 6). Everyone contributes to the building of the home, the community, the neighbourhood and the informal economies that sustain them, thus embodying and representing the struggle - as noncitizens - against exclusion 'from the dominant modes of being and knowing' (Santos, 2018, p. 3) through processes of embodied everyday actions (McFarlane, 2011).

The knowledge assemblage of *autoconstruction* is evident in multiple indigenous industries throughout Dharavi – pottery, leatherwork, metalwork, textile dying and garment construction, each with their own knowledge ecology (SPARC and KRVIA, 2010). In her extensive interviews with Khatiks that process plastic waste at Mundunka village on the outskirts of Delhi, Gill charts how the low-caste Khatiks moved from traditional polluting industries to plastic scrap trade as first-mover pioneers, thereby taking advantage of learning-by-doing as the industry took shape. Intergenerational knowledge transfer is passed down to a younger generation who enter the trade at early age. This forms a ‘sensorium’ of knowledge (Visvanathan, 2014), as a Khatik plastic waste worker explains:

Khatik knowledge of plastic and recycling is unsurpassed – by smelling it, seeing it, and burning it, we can tell what sort of plastic it is. Others have to check with painstaking methods. Because we have imbibed this knowledge from childhood, we can tell just from experience what sort of plastic we are dealing with, what processes maybe used to recycle it. We know 180-200 items by sight. Our *biraderi* has maximum knowledge of this work’ (Gill, 2010, p. 162)

As this demonstrates, polymers are identified via a number of techniques: tapping, bending, snapping, sometimes biting or smelling (Gill, 2010). This is a multisensorial process of looking, listening, touching and observing the plasticity of individual objects (documented in ACORN, Parry and Jeffery, 2018; see also Dawson in Chapter 9). The performativity of haptic knowledge is evidence of an almost encyclopaedic knowledge of consumer objects and the polymers of which they are made, or indeed the combination of different materials in their construction and operation. This enables a standardisation of particular consumer objects that tend towards the same polymers. It is this assemblage of habitual, embodied and haptic knowledge that enables the sorter to segregate at high speed with minimal error. Considerable specialist knowledge operates throughout the waste sector. Typically, the knowledge required to sort and disaggregate plastics at the top end of the market with highest grades of purity takes significant time: As an experienced supplier explains:

The minimum learning involved in this business is two years. If somebody entered this business now, with no prior knowledge, he would definitely make losses for two years – over wrong rates, lack of knowledge of plastic grades and processes and so on... (Gill, 2010, p.153)

The recycling chain combines citizen science and dexterity with an intimate knowledge of the consumer world, even though most of the objects being processed are far out of reach of the purchasing power of the workers involved.



Figure 10: Ben Parry (2020) waste worker disaggregating objects in recycling godown 13th Compound, Dharavi, Mumbai.

Cognitive justice and an ecology of knowledges

Bonaventura de Sousa Santos and Shiv Visvanathan, two of the leading voices on the decolonisation of knowledge, and the emergence of 'epistemologies of the South' in challenging the dominance of Eurocentric thought, help build an understanding of cognitive justice: why it is necessary to recover and validate systems of knowledge that have been systematically silenced and suppressed by capitalism, patriarchy and colonialism. In *The End of the Cognitive Empire* (2018) Santos sets out how the epistemologies of the South are composed of knowledges born in 'struggles of resistance against oppression and against knowledges that legitimate such oppression' (Santos, 2018, p.2). This underlines the brutality of 'cognitive injustice' and the necessary emergence and validation of knowledges that allow those social groups 'to represent the world as their own and in their own terms, for only thus will they be able to change it according to their own aspirations' (Santos, 2018, p. 1; see also Chapter 6).

Visvanathan (2009b) calls for a new epistemology of the South that reclaims an 'emancipative social space that reimagines our margins and silences'. This epistemology seeks emancipation from the universalising discourses of state-science-economic development and the categories of modernity and contemporary history towards the recognition of alternative systems of knowledge. This is what Visvanathan refers to as 'cognitive justice': the right of different forms of knowledges to co-exist.

'It demands recognition of knowledges, not only as methods but as ways of life. This presupposes that knowledge is embedded in ecology of knowledges where each knowledge has its place, its claim to a cosmology, its sense as a form of life. In this sense knowledge is not something to be abstracted from a culture as a life form; it is connected to livelihood, a life cycle, a lifestyle; it determines life chances. (Visvanathan 2009, p. 5).

Antecedent traces of this emancipatory knowledge politics are found in Foucault's 'subjugated knowledges', and by the feminist epistemologies of Donna Haraway. Both have argued for a situated, embodied approach to systems of knowledge and ways of seeing. For Foucault, subjugated knowledges refer to two possible understandings, firstly as 'historical contents' that are buried by the dominant political infrastructures and organisations, as the means to cover up that which would enable us to see the dividing lines between oppressor and the oppressed. And secondly, 'a whole series of knowledges that have been disqualified as nonconceptual knowledges, as insufficiently elaborated knowledges, naïve knowledges, hierarchically inferior knowledges' (1980, p. 84). In a similar framing, Santos refers to the 'abyssal line' that marks the radical division between metropolitan forms of sociability and colonial forms of sociability. The abyssal line separates two worlds of domination, in which the colonial powers enact abyssal exclusions through acts of dehumanisation (categorizing subjects as not fully human) and disappearance (rendering subjects invisible), and the metropolitan world as performing non-abyssal exclusions embedded in capitalist relations of class, social mobility, labour, education and access to capital. Santos argues that the social sciences and critical theories have not acknowledged the existence of the abyssal line. He makes a crucial point about those inhabiting 'this side of the line', who lack the tools to conceptualise a critical component of the colonisation of knowledge:

'Of course, modern science did acknowledge the existence of historical colonialism based on foreign territorial occupation, but it did not recognize colonialism as a form of sociability that is an integral part of capitalist and patriarchal domination, and which, therefore did not end when historical colonialism ended' (2018, p.19).

The question arises then as to how to bring 'knowledge with' modern science into the ecology of knowledges (ibid), echoing the call for 'engaged pluralism' which acknowledges difference and does not silence the subaltern. Telescopic science only sees what it renders as visible; it is a technology of visibilization operated by powerful actors which excludes any matter or material that it does not deem as significant. Santos raises a number of problems that are relevant to the discussion about the citizen science of informal waste management and the threat to livelihoods from the encroachment of technocratic thinking of the formal sector based on so-called 'scientific' waste processing. Firstly, 'how to distinguish scientific knowledge from other kinds of knowledge, and in particular from artisanal knowledges' and secondly 'what relevance to ascribe to non-Western conceptions of science, that is, conceptions of science at odds with those formulated by the epistemologies of the North' (2018, p. 45). This raises questions about learning, seeing and speaking from below, acknowledging the hegemony of the technologies of the practices of visualization, as in Amin's distinction between 'telescopic' and 'metabolic' urbanism (2013). Haraway observes that 'vision is always a question of the power to see – and perhaps of the violence implicit in our visualizing practices' (Haraway, 1988, p.585).



Figure 10: Graham Jeffery (2017) Sorting plastics in the 13th Compound

Chapter 1 set out how Dharavi has become a unique global hot-spot for multidisciplinary research and knowledge production, whose decades of growth and consistency of opportunity can be understood as one among many other productive markets. Dharavi manages to continually absorb ever more research interventions within multiple narratives: of precariousness, alongside sustained struggles such as the ongoing Dharavi Redevelopment Plan, of rising rents, land and property speculation due to the imminent arrival of the Metro Line 3 and its proximities with high value digital/informational economy clusters, and, most recently, the Covid-19 crisis. These multidimensional struggles - as generative markets of cognitive capitalism - are mined for knowledge materials throughout Dharavi and the city's self-built communities. This specific form of urban mining or perhaps *cognitive mining* risks recuperating subaltern socio-economic struggles through yet another form of extractivism. The uninvited scrutiny of the international urbanism industry, the art industry and perhaps even the creative industries, reproduces cognitive capitalism: incorporating the paradigms of the international informational society but ignoring the informational society's costs, consequences and externalities, as part of a technocratic apparatus of power that conceptualises cities 'as engines of the knowledge economy' (Amin 2013 p. 478).

McFarlane (2013) points out that there are also potential forms of policy entrepreneurialism, even *jugaad* (Jeffrey, 2009) in the work of activists, NGOs and advocacy networks, that feed into transnational 'knowledge assemblages', drawing on testimonies and data which value what people do and know as part of their everyday work and life in the city. These advocacy and academic networks also contribute to national and international knowledge markets. This kind of knowledge politics, although not without risk, attempts to valorise the contributions of the informal sector as a potentially transformative solution to the implementation of a more frugal, efficient and healthy circular economy. For example, the collaboratively developed film *Materials of Hope* (ACORN, Parry and Jeffery 2018) set out to document the knowledge, skills and contributions of the community of workers in waste management, and the wider work of C13 Lab in engaging with the everyday cultures and knowledges of waste work within the 13th Compound. The work of the ACORN Foundation, within which Compound 13 Lab is situated, sets out to re-present the people of Dharavi's wasteland as full of human potential and value (See Chapter 6, Chapter 10, and Baruah, 2009). Dharavi's waste workers

“produce an environmental service for the whole population” (Veronesi 2016, p. 17) but at the expense of their own health and wellbeing.

What mechanisms, methods and approaches might help to reframe and rethink the contribution of the urban poor to urban infrastructures? As Parry points out in Chapter 4, this has been a central preoccupation for the participatory projects described in this book, drawing on traditions of socially engaged practice and participatory action research advocated by communities of activists and researchers with a commitment to social justice and ethical knowledge production. How can the experiences, perspectives and knowledges, enmeshed in the everyday life-worlds of those living within the subaltern city find voice and visibility, given that they operate within systems of urban knowledge-politics production that actively silence and marginalise them? The urban poor are silenced and marginalised in multiple ways; through the practices, processes and expulsions of the legislative and planned city; through official policy and science discourses; through economic, social and cultural marginalisation, through lack of access to resources, and finally through the discriminatory politics of gender, caste, class and religion.

Factories of knowledge, cognitive waste and digital waste

Through these conceptualisations, Dharavi can be read as a factory of knowledge. On the one hand, it sustains multitudinous diversities of knowledges, co-constructed and hybridised through the solidarities of autoconstruction of informal communities and economies, and intergenerational knowledges born through struggles of resistance against exclusion and expulsion. And on the other, it feeds academic knowledge of every description, readily intersecting with artistic projects, film and media, journalism and the work of NGOs. Given the intensity of the dynamics between researchers and the researched in a place like Dharavi; of the encounters, entanglements and co-presence of the dominant epistemologies of the North (broadly, Eurocentric, scientific and positivist) with epistemologies of the South (ecology of knowledges, co-constructed) there exists the potential, through practice, to challenge exclusions on both sides of the abyssal line. The question of how these knowledges come to co-exist in Dharavi, performatively, through practice, and theoretically, through how practices are written about, represented and archived, has been a significant part of our critique of research and media representations of poverty and precariousness (see Chapter 4).

The creation of Compound 13 Lab within this complex and contradictory knowledge assemblage can be understood, in part, as an intervention into Western academic thinking about knowledge. It is therefore a site in which to challenge – through practice – the methodological, conceptual and ethical approaches to participatory action research (PAR) as an insistence on the ‘re-appearance of these knowledges from below’ (Foucault, 1980, 85). In their study of Participatory Action Research (PAR), Wakeford and Sanchez-Rodriguez (2018) reframe PAR through the encounters and entanglements of the transdisciplinary researcher with subjugated knowledges, seeking to reverse the Eurocentric bias in methods of producing and generating knowledge. These are for Haraway, methodologies and practices that privilege ‘contestation, deconstruction, passionate construction, webbed connections, and hope for transformation of systems of knowledge and ways of seeing’ (1988, p. 585). PAR, as a mode of ‘knowing with, rather than knowing about’, acts against the erasure of other ways of knowing and offers an ‘epistemological turn’ capable of ‘recognition of the epistemological diversity of the world’ (Santos, 2008). Wakeford and Rodriguez reassemble approaches to PAR through the concepts of cognitive justice (Visvanathan, 2009a), testimonial injustice (Fricker, 2007) and epistemic injustice (Teo, 2008). Haraway also warns there is ‘a serious danger of romanticising and/or appropriating the vision of the less powerful while claiming to see from their positions. To see from below is neither easily learned nor unproblematic’, even if “we” “naturally” inhabit the great underground terrain of subjugated knowledges.” (1988, p.584)

In informational societies, all activities produce surplus waste, not only from what is bought and consumed but also from the output of cognitive labour – texts, documents, artefacts - and the behavioural surplus of interactions through the online world. Much routine knowledge work and technical support is outsourced to call centres and back offices in the global South, which has fuelled the exponential growth of the ICT industry in places like Bangalore and Hyderabad. Many of these jobs are now under threat from automation, machine learning and artificial intelligence, leading an expensive scramble to upskill in programming and digital services for workers in these occupations, to prevent their own looming obsolescence. Call centre work, as one example amongst many of Graeber's 'Bullshit Jobs' (2018) dealing with 'business process outsourcing' is highly regulated and monitored through high pressure, high surveillance regimes of technological supervision (Thite and Russell 2010). Platform capitalism, in the form of companies like Uber, Ola and Swiggy, is introducing new modes of governance of working conditions in transportation and delivery services and occupying informal sector markets by building monopolies of convenience and subsidised pricing (Prabhat et al, 2019; Solon, 2017; Sharma, 2010). E-commerce behemoths like Amazon and Flipkart are gaining market share at the expense of local vendors, a trend exacerbated by the COVID – 19 pandemic, whilst the rise of e-commerce alongside the ongoing drive to 'clean up' public and commercial space exposes hawkers, ferriwallahs, auto-rickshaw drivers, dabbawallahs and the legions of Mumbai's low-paid self-employed workers to new forms of precarity and insecurity (Lazar and Sanchez 2019; Joshi, 2018; Harris, 2018).

Waste work is not immune from this trend. A number of recent experiments have attempted to bring waste work into the purview of the digital: for example *Kabbadiwala Connect*¹⁴ based in Chennai (Hande 2019) which combines digital apps with a database-driven platform and aspires to offer microfinance, supported by a luminous array of international donors. This sort of approach depends on building incentives and trust amongst waste picker communities – what is in it for us, they might ask? Additionally they are required to own and use smart phone technologies with their accompanying digital literacies, which are generally out of reach of most workers at the lower end of the supply chain. Compound 13 Lab, working with NGO ETC Group, is currently conducting a Technology Assessment Platform process¹⁵ with Dharavi residents examining what digital technologies and e-infrastructures they value and are engaged with: the results of this will feed into development work to consider the ways in which digital infrastructures are reshaping the economies and communication methods used by the recyclers. Major plastic manufacturers seek to embed traceability through product lifecycles; but given that sources of plastic waste are so diverse in Dharavi it is not currently remotely feasible to put in place 'closed loop' processes. O'Hare (2019) and Gill (2019) point out that the gaze of the regulatory environment, the introduction of data-driven methods of capture and enclosure, the increasing requirements for licensing and traceability which draw waste workers into more formal arrangements has double-edged consequences: according to Gill, effectively resulting in a 'flow of resources from the informal to the formal economy' (2019, p. 452) which is unlikely to improve livelihoods. On the other hand, the lack of quantification of the volumes and types of waste currently processed through the informal sector, and overall data unreliability means that the contribution of the IWM sector to the city's waste management processes as a whole is generally underestimated and undervalued. These issues are discussed further in the concluding chapter of this book.

Surveillance capitalism, reverse encroachments and regimes of digital governance

Surveillance Capitalism, a term coined by its leading theorist Shoshana Zuboff, describes the foundation of a surveillance economy 'that claims human experience as free raw material for hidden commercial practices of extraction, prediction, and sales..' (2019, p. XX) What is curious about the

¹⁴ www.kabadiwallaconnect.in

¹⁵ <http://assess.technology>

emergence of this new economic order was Google's realisation of the potential to upcycle its own data surplus, to see the 'gold dust in the detritus of its interactions with its users' (Cukier cited in Zuboff, 2018, p.68). This discovery of behavioural surplus followed circular economy principles, feeding behavioural data into machine intelligence to produce markets in future behaviour and new prediction products in an endless cycle of production and recuperation. 'What had been regarded as waste material – "data exhaust" spewed into Google's servers during the combusive action of Search – was quickly reimagined as a critical element in the transformation of Google's search engine into a reflexive process of continuous learning and improvement" (Zuboff, 2019 p. 69). Google and Facebook marketed a dream of the democratisation of knowledge, and of 'making the world more open and connected' (Hoffmann *et al* 2016), but they also data-mined vast quantities of personal information as they colonised the unmapped spaces of the internet in search of free raw material for conversion into behavioural predictions and targeted advertising.

The economic, social and environmental consequences of industrial scale mining of immaterial digital data troves might superficially appear distant from the recycling centres of South Asia. But they are the final destination of the rapidly advancing technological hardware and consumer products that sustain connection and embeddedness in the internet of things for those with the means to subscribe to them, once they are discarded. Beyond earning a living from salvaging value from the physical remnants of an informational society, the capacity of citizens in places like Dharavi to participate in the informational society more generally is entangled in their negotiations with modes of digital governance, digital literacy and digital economy (Datta 2018). Alongside the physical encroachments of large formal infrastructural developments, framed by the state as amenities or civic upgrades – skywalks, the Metro, and so on, can be found forms of digital encroachment. Being drawn into the circles of e-governance, e-citizenship and e-commerce via digital identity programmes like *Aadhaar* (Satpathy, 2017; Chaudhury 2020) or even *Kabadiwalla Connect* mandate a degree of visibility and legibility, which on the one hand can lend 'legitimacy' to business activities, but on the other opens individuals up to what may be unwelcome scrutiny from the state – and which, for those left without the means to access the digital world, leads to new forms of exclusion, punishment and marginalization in the form of the un-digital, un-visible 'data-less' subject.

Conclusion: re-assembling alternative knowledges

The subaltern knowledge economy in places like Dharavi, embedded in deep experiential and social knowledge of livelihood and resistance, is as significant and important as the official knowledge economy. Compound 13 Lab seeks to provide some mechanisms and methods to bring these knowledges into dialogue with the hegemonic forces of multinational capital; as argued here, Dharavi's recycling industry not only a key node in the matrices of multinational capital and global systems of petropolitical flows, but it is also a component and a consequence that big capital, big science and big government generally refuses to see or acknowledge any responsibility for.

The residents of the informal city are caught up in this matrix of 'borderline' social relations – visible/invisible, citizen/non-citizen, official/unofficial, caught in the crossfire of many different paradigms of urban development. Compound 13 Lab seeks make a physical and informational space where these different knowledges can be surfaced, explored and shared, and fed back into wider international circuits of knowledges in ways which are not extractive but, rather, co-produced, given the ethical and social complexities of building dialogues across Santos' 'abyssal line'. Like the physical materials that are disassembled and disaggregated in the 13th Compound, the knowledge materials of Compound 13 Lab require a tolerance of the unreliable and the unexpected. Working in Dharavi, it became evident that the only way to develop and create thorough epistemically-just methodologies was to leave detailed methodological blueprints at the door. Existing methods are

not merely dismantled, they are necessarily deconstructed, and desegregated into component parts for revaluation. The Lab is a very good place to do this. Everywhere things are in pieces, their as yet to-be-discovered value suspended on shelves and under tables in piles awaiting activation. The space of the Lab now determines which parts can be recycled, shredded or (re)used, and which must be discarded and sent to the knowledge landfill of obsolete epistemologies.

As with the waste pickers, who know only too well that all knowledge is embodied, the Lab is there to aggregate and build new pedagogical objects: to construct ecologies of knowledges that combine subaltern knowledge, citizen science, artisanal practices, cultural forms and subjectivities within the diverse bodies of knowledge that make up its constituents. The Lab creates a space of dialogue, shared learning and knowledge making, enabling us to test ideas together through different ways of knowing, across languages and cultures, assembling from fragments of previously unaccounted for knowledges, and learning how to come to know what is *not recognised*, excluded or perhaps simply absent or silent. Confronted with this co-presence of diverse knowledges we join others in asking: How to decolonize knowledge as well as the methodologies by which it is produced (Santos 2018) ?



Figure 11: Ben Parry (2012) rooftops and evening economy along MG Road, Dharavi, Mumbai.

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