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WASTE AND GLOBALISED INEQUALITIES

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Facing Frictions: Waste and Globalised Inequalities

> "In the interplay of ruin and possibility […] lie alternative and more open forms of commitment." Anna Tsing (2004: 267)

Waste is inherent to the global economy of the "permanently polluted world" (Liboiron et al. 2018) in which we are living. This has been suspected for quite some time now, also induced by spectacular public narratives. The global garbage crisis announced in the 1980s and 1990s provided numerous popular accounts of waste-catastrophism – from Neal and Schubel's *Waste Management and the environment: The Mounting Garbage and Trash Crisis* (1987), Gourlay's *World of Waste* (1992), to Griffin's *Garbage Crisis* (1992), among others. An often recurring feature of such accounts has been its tendency to make all people equal in face of humanity's risk of drowning in its own waste. It is a powerful narrative, still brought up every now and then. Just think of recent discussions around plastic pollution in the oceans. However, it is as wrong today as it was 30 years ago.

There is nothing (normatively) equal in the way people are entangled in and affected by the production of waste and processes of wasting. The consequences of waste and pollution are shared unequally, laying the ground for vast injustices. However, because of global production networks, the mobility of certain types of waste, and the continuous material transformations in wasting practices, they are still a matter of global connections – as sociologist Zsuzsa Gille (2007: 27) reminds us – "dealing with wastes has become a more collective and global task".

Much has been written (in academia) about the routes waste takes and the wasting practices that shape these patterns (Hird 2014; Rathje/Murphy 2001; Gregson/Crang 2015). The recent case of "poor quality" and

"contaminated" (Laville 2018) plastic waste materials from UK households finding their way to Malaysia, Vietnam, Poland, Turkey and Brasil after China's 2018 ban of waste imports is a vivid example of the thrust of the global inequalities, on which such deliberate realignments of global waste flows are based. But this is not what the present special issue is primarily concerned with. Rather, we want to draw attention to the fragmentations and conjunctions, the contingencies and consistencies that occur when processes of wasting unfold their distinct dividing powers – in many different places, but with strangely aligned patterns. Trajectories of waste hinge on, relate to, and re/produce global inequalities.

Our introductory piece brings the different contributions to this special issue together. Yet, our text is more than a summary. We make the case for a particular perspective, while focusing on three guiding questions. In which ways is the production of waste matter linked to inequalities? How do processes of wasting enact particular sites of injustice? Additionally, in which forms do those inequalities and injustices appear? We need a refined apparatus – theories, methodologies and stories – to engage with these questions. Drawing on anthropologist Anna Tsing's innovative research (Tsing 2004), we suggest that one needs to *face frictions* through waste to make sense of the particular global connections and related inequalities and injustices. Friction, Tsing argues, enables global connections; likewise, "friction reminds us that heterogeneous and unequal encounters can lead to new arrangements of culture and power" (Tsing 2004: 5). To emphasise the work and stress that is required to establish a global connection, we from now on prefer to refer to the notion of 'globalised'. We thus understand the production of waste as a matter of global connection that is always articulated in specific historical conjunctions which are socially informed, and therefore subject to specific power relations.

Our article thus aims to set the stage for a systematic reflection of globalised inequalities and injustices. We begin by revisiting and evaluating central claims in the burgeoning field of Waste/Discard Studies. Here, we especially focus on how scholars dealt with inequality and injustice. Afterwards, we suggest the notion of facing frictions as a methodological tool with which to study global inequalities and injustices, which is also used to introduce the contributions to this special issue.

1. Waste, discards, and spectres of inequality

Since the turn of the millennium, critical social science research on waste has been growing rapidly, which is captured by the notion of 'Waste' or 'Discard' Studies. Our article does not offer a systematic introduction to the field in general (see Moore 2012; Gregson and Crang 2015; Dines 2018; Reno 2015; Millington and Lawhon 2018; Evans 2011; see also the open-access journal *Worldwide Waste*). However, it nonetheless makes sense to appreciate the substantial work done by the pioneers, that is, anthropologists Mary Douglas (1966) and Michael Thompson (2017 [1979]), and to understand how their early research paved the way for today's scholarship on waste.

Douglas and Thompson championed a social-constructivist approach, according to which waste appeared as a relational entity. Douglas' seminal definition of dirt as matter out of place (1966) pertains to the spatiality of all things wasted, rather than their materiality (Gille 2013), whereas the 'correct' place results from social-spatial orderings. Thompson followed this perspective but, on top of this, developed a social theory of rubbish in which waste is a key category (coined "covert") through which things move to become valuable entities. This theorisation has been an important step towards the formation of Waste/Discard Studies. If we approach the literature on waste through the lens of globalised inequalities, however, we can see that discussions around environmental justice in the 1980s and 1990s enabled today's critical reflections. These discussions can be understood as politically engaged supplements to Douglas' and Thompson's pioneering theoretical work.

1.1 On the impact of environmental justice movements

There is a long history of instances of local resistance against the siting of waste treatment and disposal facilities that has been largely framed (or rather, abridged) under the NIMBY-label (Not In My Back Yard). Such resistances implicitly addressed the spatiality of waste, already highlighted by Douglas, in its confluence with symbolical 'dirtiness' and disorder, and at times also touched upon the bio-physically hazardous characteristics of different kinds of waste. Yet, it was the environmental justice movement in the United States that established a clear relationship between the siting

of such waste infrastructures as well as polluting industries in general, and the disproportionate exposure of Black, Hispanic, Native American, working class and other marginalised communities to toxic and industrially polluted environments (United Church of Christ Commission for Racial Justice 1987; Bullard 2008, 2001). This North American movement and its engaged (academic) knowledge production exposed the entanglement of social inequality and environmental injustice with the politics of waste treatment and disposal. It attended to the "historical socio-spatial processes that produce marginalized populations and that create and unevenly distribute environmental risks" (Moore 2012: 783; Heiman 1996). In doing so, it revealed how environmental racism structures the way US society deals with waste, and how the spatial politics of waste treatment and disposal are governed by white privilege (Pulido 2000, 1996).

The engaged political perspective developed by the environmental justice movement inspired environmental struggles worldwide, including in countries of the Global South, and contributed to what Guha and Martinez-Alier (1997) would later call "Environmentalism of the Poor". However, this truly global reception departed from the pronounced emphasis on the socially unequal and unjust distribution of environmental 'bads' – particularly in light of oppressed and marginalised social groups' exposure to industrial toxic wastes – that initially characterised the environmental justice movement in the United States. Instead, a much stronger focus was put on continued access to and protection of environmental 'goods' and their defense against the enclosure and destruction of commons.

This tension between environmental 'goods' and 'bads' already points towards one central theoretical argument that we have to confront, if we are to look at waste through the lens of globalised inequalities and injustice: waste always unfolds a certain ambiguity. It involves an ambivalent and emergent valence (Corvellec 2019). In an initial but slightly simplified step, we might describe this as the *double character of waste*: it always carries with it potentially 'negative' as well as 'positive' framings. What waste is to become depends on the position and perspective of those connected and connecting to it. Typical vantage points for such an engagement with waste are values, orders and the materiality of waste. The latter perspective is key to the formation of Waste/Discard Studies. As Gregson and Crang (2010: 2017) noted: it was "[e]nvironmental justice's

emphasis on the hazardous nature of various wastes" that really "brought back in the material properties of different forms of waste" after the social-constructivist approaches of Douglas and Thompson. Today, many Waste/Discard Studies scholars embrace a more 'materialist' perspective, although this ranges from historical-materialism to new materialism, with all kinds of intersections from and to post-structuralist approaches on the way. Non-humans are included in the analysis; waste materials and their impact are taken seriously; and waste's indeterminacy has been identified as a fundamental problem one has to deal with. Before we enlarge upon different perspectives on waste-related inequalities, a final note on terminology is needed.

What is the difference between Waste and Discard Studies, and why are there two terms to describe one field? And why do we merge the two – writing Waste/Discard Studies? We do not want to emphasise a strict distinction between waste and discard, but it is worth noting that some scholars see a certain danger in working with a vague and too broad understanding of waste – especially in the globalised context. This is what advocates of Discard Studies argue, a loose team of scholars mostly coming from North America, who also run an academic blog (see discardstudies.com, and the interview with Liboiron in this issue). The argument is unfolded as follows: "Unlike studies that take waste and trash as their primary objects of study, Discard Studies looks at wider systems, structures, and cultures of waste and wasting." (Liboiron 2018) Discard Studies scholars thus embrace a critical perspective, pushing researchers to "question the premises – the assumptions of what seems natural, normal, logical, and inevitable – of waste to investigate the wider systems that allow things to seem natural, normal, logical, and inevitable in the first place." (ibid.) However, many 'Waste Studies', we would argue, do exactly that: they question the nature of waste, and its naturalisation in much of today's public discourses surrounding waste. Thus, we will not throw the notion of waste studies in the bin, largely because of its continued popularity in key contributions, and, crucially, because of the ease of the term 'waste'. Talking about waste helps start a conversation. Everyone knows how to connect with waste (even if that means by pushing it aside as quickly as possible, to free oneself from 'disgusting' things – which translates to caring for one's self; see Hawkins 2005). This is a good backdrop for facing

inequalities: you can connect with people and things. With this in mind we can now move to a brief review of different takes on inequality in recent Waste/Discard Studies.

1.2 Waste and globalised inequalities from three perspectives

Inequality is a major theme in Waste/Discard Studies, even though various scholars theorise it quite differently. In fact, we would argue that spectres of inequality haunt the examination of each and every study on waste related topics, even if some avoid explicitly conceptualising it. For the purpose of this special issue, we propose differentiating between three broad strands of approaching inequalities and waste (instead of offering a systematic analysis of how questions of inequality reverberate in the whole field of Waste/Discard Studies, which is beyond the scope of this introduction): (1) the capitalist accumulation of waste and inequalities; (2) the governance of waste; and (3) the matter of waste. These are just ideal-types; besides, various authors could be affiliated with more than one strand.

The *first strand* of literature takes the coupled production and allocation of waste in the global (capitalist) economy either as a metaphor to describe or as a source to understand globalised inequalities. In its metaphorical use, waste serves as a marker of distributional injustice in the allocation of wealth and pollution. In its analytical deployment, the accumulation and revalorisation of waste and waste-related inequalities is predicated on and explanatory of uneven capitalist development and the logics governing the capitalist pursuit of surplus value. It is hard to deny (even for neo-classical economists) that the global economy is producing a lot of waste (or 'externalities'), and that the environmental burden of this waste is shared unequally – which is illustrated by the notion of "pollution heavens" and its popularity in environmentally inspired studies of the global economy (e.g., Marconi 2012).

A first strategy to transcend such explanations of waste production and allocation based on simple market logics is achieved by recourse to the particular functional and spatial perspectives developed by "global commodity chains" (GCC, e.g Gereffi/Korzeniewicz 1994), "global value chains" (GVC, e.g. Gereffi et. al. 2005) and "global production networks" (GPN, e.g. Henderson et al. 2002) approaches. Such case studies focus

primarily on the "afterlife" and "on-going-ness" (Lepawsky/Mather 2011: 243) of high-value goods, such as the destruction and recycling of e-waste (e.g., Kirby/Lora-Wainwright 2015), ships (Gregson et al. 2010) and cars (Brooks 2012), but include also case studies on garment recycling (Norris 2015). They reveal that the global trajectories of "end-of-life" (Gregson et al. 2010) commodities are much more complex than suggested by the pollution heaven thesis or simple centre-periphery models (Gregson and Crang 2015), and instead have a lot to do with the differential value of wasted goods and materials (Crang et al. 2013). Yet, such approaches tend to focus more on distributional justice as encapsulated in economic inequalities (Piketty 2017) – the distribution power, income and wealth. Moreover, besides their valuable contributions to our understanding of the spatio-temporal trajectories and material transformations enacted by recycling networks, such accounts often tend to focus (implicitly or explicitly) on how the global power of capital permeates into local contexts.

A second strategy deploys an explicitly Marxist approach to highlight the close entanglement of waste and value in the (re)production of waste-related inequalities within the uneven geographies of capitalist accumulation. The work on "global destruction networks" (Herod et al. 2013; McGrath-Champ et al. 2015) conceives the global trajectories of wasted materials as the "political economy of the passage of value/congealed labour from one product to the next in the recycling process" (Herod et al. 2013: 425). For that purpose, these authors introduce the insightful distinction between processes of "devalorization" that describes the 'normal' wear and tear that deprive commodities of their value/congealed labour, and processes of "devaluation" that pertain to the 'wastage' of commodities before they have actually reached their "end-of-life". This differentiation of capitalist processes of wasting provides a number of links to existing analyses of planned obsolescence and is particularly useful in understanding the political economy of formal recycling in the Global North. It is strongly aligned with earlier Marxist accounts that describe capitalist waste as the result of unabsorbed over-accumulation (Baran/Sweezy 1966). Yet, as Samson notes, it also shares with some of these older approaches an inability to account for the particular articulations of waste-related inequalities within post-colonial political economies of recycling: "all of their examples focus simply on how differing labour costs and health

and safety regulations in the global North and global South lead [global destruction networks] to take different forms in these locations" (Samson 2017: 43).

Post-colonial political economies of recycling are often described by reference to the informal character of recycling activities. A number of scholars who engaged with recycling economies in India (Gidwani/Reddy 2011; Gidwani 2015; Reddy 2015) and South Africa (Samson 2015, 2017) have deployed a different Marxist approach, which is inspired by feminist and post-colonial theory and more centred on labour and the reproduction of capitalist social relations, to advance our understanding of the peculiar informality in capitalist entanglements of waste and value. In close interaction with a renewed interest in ongoing processes of primitive accumulation (Federici 2004; Sanyal 2014; De Angelis 2001) and their reframing as accumulation by dispossession (Harvey 2010) from the early 2000s onwards, these contributions have outlined the interrelations between the informality of waste work and the destruction, dispossession and devaluation accompanying uneven capitalist development. Gidwani and Reddy have emphasised that the notion of "waste" itself is deeply entrenched in the early history of capitalism and associated processes of primitive accumulation, thereby "designat[ing] the unenclosed common, the external frontier" (2011: 1626) of future capitalist accumulation (see also Schlitz, in this issue). In present-day urban India, "'waste' has become society's internal and mobile limit […] a fiercely contested frontier of surplus value production" (Gidwani/Reddy 2011: 1625; Reddy 2015; Demaria 2010). This is why Gidwani and Reddy (2011: 1625) consider "waste" to be "the political other of capitalist 'value', repeated with difference as part of capital's spatial histories of surplus accumulation". Similarly, Berg found a direct link between suppressive capitalist relations and the handling of discards. She argues that "everyday garbage practices invisibly but consistently reproduce the social, racial, and environmental inequalities that pervade (and in fact order) capitalist societies more generally." (Berg 2016: 81). Handling waste, it turns out, serves as a stabiliser of structural inequalities, including the pollution of lives and lands. This is where the politics of waste receives attention.

The *second strand* of literature discusses inequality by focusing on the governance of waste. One central take-away message of Waste/Discard

Studies is to consider the way in which the conditions and consequences of waste are shaped differently in different social settings. Governance needs to be put into perspective. Some arguments appear in multiple studies. What is frequently questioned, however, are technological fixes, 'end of pipe' technologies in particular, that is, solutions suggesting that it is possible to get rid of wasted things in the first place – and most probably through capital- and technology-intensive infrastructures, from incinerators to 'high-tech' recycling mechanisms, with the help of rigorous collection schemes. This has been found to be problematic, because in fact only a minority of actors involved in global recycling networks benefit from such schemes. Global economies of recycling call for a more rigorous analysis (Alexander/Reno 2012). Additionally, but equally importantly, technical 'solutions' are not sufficient in terms of preventing huge amounts of (hazardous) waste in the first place (not to speak about the issue that even the most technologically advanced recycling schemes in the Global North barely capture more than 60% of the so-called post-consumption waste) (MacBride 2011). As the environmental justice literature has taught us (Dillon 2014; Taylor 2014), the side-effects of these failures, once again, are hitting marginalised social groups disproportionately.

Several Waste/Discard Studies argue that modern 'solutions' to waste 'problems' tend to stabilise and reintroduce the issues they claim to treat (Gabrys 2011: 150; Gille 2007: 25). From a more general perspective, this insight helps us to grasp the link between social hierarchies and their governance. Scholars draw on a variety of methodological approaches to unravel such all-encompassing power politics surrounding waste and pollution, while pragmatist heuristics (on issue-formation, see Marres 2007) and Foucauldian approaches (on environmentality, see Agrawal 2005) are the most prominent.

How do problems become problems in the first place (defined by whom and what, pushed by whom, to the detriment of whom or what, etc.)? This question is a pivotal one, and it helps us to learn fundamental things about structural inequalities. Along these lines, Hawkins (2005), Corvellec et al. (2013) and Hird et al. (2014) investigate when and how particular waste issues become public issues (or stay private matters). Nicky Gregson and Mike Crang, in turn, emphasise the de-politicising side-effects of the governance of waste in terms of its management, framed by

disposal mentalities and translated into disposal technologies – "principally the established ones of incineration and landfill", although recently more and more "reconfigured as resource recovery" (Gregson and Crang 2010: 1026). Other studies here investigate the relationship between power relations and attitudes towards waste (Leonhard 2013). This is also prominent in research that untangles the histories of concepts of purity – and the way in which societies are structured by excluding certain people and social groups due to their association with matters of cleanliness/contamination (Campkin/Cox 2007; Moisi 2015; see also Iyer, in this issue). Some here also emphasise a link between modernity's consumer culture and the way in which lives/people are 'wasted' (Baumann 2004; Adkins 2018). And, last but not least, ethnographic encounters aid the discussion of such matters from a more intimate perspective. Peter Little, for instance, relates the story of *Toxic Town* (2014), IBM's first US-American manufacturing plant that, decades after its closing and despite a variety of superficial technical measures, continues to be a source of health-related problems for the local inhabitants. Beyond these numerous studies, we would like to highlight one conceptual framework that turns out to be particularly useful in approaching governance.

Gille proposes the notion of "waste regimes" to reveal how waste is governed in different historical phases. In her 2007 book *From the Cult of Waste to the Trash Heap of History,* this is used to develop a nuanced account of how waste was framed in Hungary in the early-, late- and post-socialist eras. In this account, local and transnational influences are brought together (she merges actor-network theory and Marxist approaches; Gille 2010).

Gille's waste regimes are defined by three dimensions: the production, representation, and politics of waste. As a result, regimes can differ substantially, and they are understood to be in constant flux. Studying the three dimensions translates into a research programme that helps grasp governance comprehensively, we would argue. Production then refers to questions such as "what social relations determine waste production and what is the material composition of waste", representation centres on the knowledge surrounding waste and pushes questions such as "which side of key dichotomies waste has been identified with, how and why waste's materiality has been misunderstood, and with what consequences", while the politics of waste is linked with questions like "whether or to what

extent waste issues are a subject of public discourse, what is a taboo, what are the tools of policy, who is mobilized to deal with waste issues, and what nonwaste goals do such political instruments serve" (Gille 2007: 34). In a nutshell, waste regimes affect which handlings of waste are considered feasible (and which modes of governance can be imagined in the first place). This framework can thus be used as a powerful tool.

Consider the following example. The most important taboo that Gille describes has a major impact on inequalities on a global scale: the "taboo of production". While there are plenty of regulations concerning the recycling of waste, she argues that waste production (or more precisely, waste prevention) is hardly touched upon (for the example of electronic waste cf. Lepawsky 2018; see also the review by Laser in this issue). This is particularly problematic, since there is too much attention on household or post-consumer waste, because most of the waste that is produced and discarded occurs during research and design, and in the manufacturing process as well as during transportation (well over 90% of all waste out there apparently comes from industrial practices, and, of course, military waste; MacBride 2011; Krupar 2013).

The *third strand* of literature discusses inequalities from a more 'materialist' perspective, meaning by a renewed attention towards materials and materialities that is championed by Science and Technology Studies (STS) and the so-called new materialisms (Coole/Frost 2010). First and foremost, an interest in materialities in Waste/Discard Studies results from the indeterminacy of waste and pollution (what has been indicated above with the 'double character' of waste). Brian Wynne's *Risk Management and Hazardous Waste* (Wynne 1987) sets the stage for this discussion by highlighting that knowing waste has always to do with taming a unique type of indeterminacy (in risk theories this is described by using the notions of known and unknown unknowns), which goes hand in hand with power relations and inequalities (see also de Carvalho Vallin/Gonçalves Dias, in this issue). As a result, there is hardly any waste/discard study that does not grapple with a particular precondition or consequence of indeterminacy. Thus, to circumvent the impossible task of charting the entire landscape of explicit/implicit approaches on this, we would like to draw attention to an insightful discussion between two waste scholars, Myra Hird and Zsuzsa Gille.

In a 2012 article, Canadian environmental scholar Hird starts from the premise that all knowledge practices can basically be considered as practices in which indeterminate things are rendered determinate – in the form of temporal achievements. With the help of feminist science studies (Barad 2007, in particular) she merges epistemology and ontology, whereby lessons from the study of landfill waste help to underline the argument that we should embrace an "inhuman epistemology", "[t]urning human exceptionalism on its head" (Hird 2012: 463), by acknowledging that non-humans co-determine how things are made knowledgeable. With this, she negotiates inequalities on a theoretical level that promises a fresh perspective. From Gille's perspective, however, "she takes it too far", evoking the following reaction: "rather than calling for and making space for other modes of knowing for emancipatory purposes, she [Myra Hird] argues that we 'simply' need to reorganize and give voice to the inherent nature of matter as always-already indeterminate." (Gille 2013: 3) In her response to this critique, in turn, Hird emphasises the fertility of the particular research endeavour she is pursuing: "My aim", she justifies, "is to detail the myriad agential cuts that make waste a phenomenon (including the various political affiliations that attend these cuts), and advance an ethical approach that forefronts both the known and imprescriptible (political, economic, socio-cultural, environmental, and health) implications of living with waste." (Hird 2013: 31) Nevertheless, Gille has a point when she emphasises the side-effects of such research:

> "Toxic wastes, nuclear wastes, and a host of industrial by-products are actually quite determinate: while they may never be fully known in some theoretical sense, we certainly know *enough* about the dangers some of them or some of their key components pose. The question is not whether they are made determinate but whether they are made determinate enough to warrant regulation. Producers of waste, however, are interested in keeping the exact composition, the exact effects, and the exact amount of these by-products unknown. What are the concrete instances of making the determinate indeterminate in waste politics?" (Gille 2013: 4)

We do not want to take sides in this discussion, as both perspectives offer interesting insights – below we introduce a particular perspective to make use of such tensions. However, and having Gille's critique in mind, we can move to the inner circle of the discard studies-group (see above), who are eager to implement a research programme that critically discusses the polluters' responsibility. We could have discussed this topic under the other two ideal types as well, but we put it here because a reflection on materialities is key to this thinking.

Imaginaries of a waste-free society are called into question by Discard Studies, because such ideas tend to ignore structural inequalities and power relations. In the programmatic piece *The what and why of Discard Studies*, Liboiron (2018) puts it like this:

> "Power, privilege, and injustice can occur if things operate normally. Discard studies has a crucial role in pointing this out in debates, policies, crises, and solutions around waste. These critiques have to surface if we want to do waste *differently*. If discard is necessary for systems to hold together, to subsist and to persist, then differently organized systems are needed that fundamentally alter discarding. We are not talking about eradicating discards altogether. Fundamentally changing discarding means posing the question: how to discard well?"

Discarding well, from a new-materialist kind of view, indicates tackling the infrastructures which drive particularly problematic modes of waste production (for a general introduction to this link see Hird 2017). To understand the revelatory potential of this perspective, it is worth noting how infrastructures are approached in what is now known as "Infrastructure Studies" – a field shaped by STS theorisations. In their seminal work, Susan Leigh Star and colleagues (Star/Ruhleder 1996; Bowker/Star 2000) proposed studying infrastructures relationally. They argued that it depends on your position (which very often implies: if you are a user or maintainer of infrastructures) whether or not you see something as an infrastructure. Asking the question 'when is something an infrastructure' then demands researchers to look for moments in which certain actors and institutions fall from view, doing their work rather quietly or without being called into question. Infrastructures "tend to disappear (except when breaking down)" (Bowker/Star 2000, 34), and so do their inscribed poli-

tics. More recent approaches here focus on "infrastructuring" (Harvey/Jensen/Morita 2017), highlighting the practical effort of, and dynamics in, maintaining infrastructures (see also Gidwani 2015, for view on India's 'infra-economy').

From a Waste/Discard Studies perspective, then, two approaches to infrastructures are helpful. Scholars, first, ask why certain infrastructures and their negative consequences are out of sight (think of the oil and chemistry industries, which are discussed extensively in the so-called Energy Humanities, cf. Szeman and Boyer 2017; see also the interventional research on detecting and problematising pollution: Gabrys 2016; Davies/Mah 2019). Secondly, it is also worth learning about the people and other non-human actors who, often silently and without appreciation, are taking care of the stabilisation of a particular infrastructure, and who also do this by exposing their bodies to harmful surroundings on a long-term basis (Nixon 2011). There is huge potential in learning from the maintainers, cleaners and their entanglements (see also Eitel, in this issue). The potential is captured best by Steven Jackson's notion of "repair thinking" (Jackson 2014) – a perspective that can also be used to rethink the economy as a sphere (Graeber 2012). Either way, inequalities are embroiled in and co-constituted by "infrastructuring" work (particularly with waste). The temporalities and spatial manifestations of infrastructures are to be taken into account in order to recognise their inscribed politics, exclusions and devaluations.

In Discard Studies, new perspectives on wasting are also linked with new scientific practices. Liboiron et al. (2018) draw on Murphy's queer-feminist intervention of "alterlife" (Murphy 2017) to ask "how forms of life and their constituent relations, from the scale of cells to cultures, are enabled, constrained, and extinguished within broader power systems" (Liboiron et al. 2018: 336). This question resonates with the basic ontological and epistemological frictions engendered by feminist STS and new materialism in general. However, to follow up on the saturation of live-constituent interdependencies with power relations, a whole new set of situated methodologies is required. This is what animates the Civic Laboratory for Environmental Action Research (CLEAR) in Newfoundland. Researchers here experiment with new methods of doing research. They try to investigate marine plastic pollution differently: from acknowledging place-based-ness

and its scalar implications for science to new forms of accountability and the valuing of often devalued reproductive work in labs (see the interview with Max Liboiron, in this issue). An example of a 'radical' approach that comes out of this lab is to ask for consent to do research in the designated area (which also includes asking fishermen if one may use their fish). Such (politically) innovative epistemological and methodological approaches highlight the merit of a confluence of critical social science with natural sciences, which is one of the hallmarks of current Waste/Discard Studies.

This short and selective review of the burgeoning field of Waste/Discard Studies shows that inequalities and injustice are addressed from various perspectives. This body of research has elucidated how important it is to grapple with the subtle and not-so-subtle matters of wasting and discarding. What is a bit problematic, however, is that the research tends to disagree on how exactly to grasp the 'global' or 'globalised' nature of the things studied. We now propose to make use of the notion of 'friction' to grasp this global connections, while at the same time attending towards careful cooperation and collaboration across difference.

2. Facing frictions through waste

The forms of inequalities and injustice embroiled in processes of wasting, in the production, handling and valorisation of different forms of waste, can be condensed through what Tsing (2004) describes as "frictions" in global connections: "the grip of worldly encounter" (Tsing 2004: 1), that make global interactions possible and confine them at the same time, break their 'smooth running'. Even more so, the social study of waste and waste-related inequalities appears as a particularly pertinent way to attend to the "persistent but unpredictable effects of global encounters across difference" (Tsing 2004: 3), which are at the heart of Tsing's notion of friction.

Tsing's argument, first and foremost, is an antithesis to the neoliberal euphoria of the 1990s, in which a harmoniously connected globe was imagined – made possible by seemingly peaceful, neutral and almost unstoppable processes of globalisation. Nevertheless, there is no magic in global power. Focusing on friction helps us to decipher the power at work in global connections. However, it is problematic to simply go back,

as it were – for example to reaffirm differentiations such as a fixed understanding of centre vs. periphery. The world is more complex than that.

Methodologically, Tsing here draws on Arjun Appadurai's seminal article *Disjuncture and difference in the global cultural economy* (Appadurai 1990), where the author highlights the impact of fragmentation, complex overlappings, uncertainty and difference, all of which are said to be at the centre of global flows. "Friction" is a tool that wants to make use of this perspective. In her 2004 book, Tsing presents an ethnographic account of the rainforests of Indonesia, a contested place that was transformed in the 1980s and 1990s by capitalist interests (through deregulation, investments, deforestation, mining, but also through crisis and devaluation). This is a study of globalisation from the inside. Much is overlooked, the anthropologist argues, if we ignore the concrete actors and practices on the ground, and how they forge connections across difference.

> "Commodities seem so familiar that we imagine them ready made for us throughout every stage of production and distribution, as they pass from hand to hand until they arrive at the consumer. Yet the closer we look at the commodity chain, the more every step – even transportation – can be seen as an arena of cultural production. Global capitalism is made in the friction in these chains as divergent cultural economies are linked, often awkwardly. Yet the commodity must emerge as if untouched by this friction." (Tsing 2004: 51)

Friction is not a negative term, just as "awkwardly" is a marker for possibility (we will return to this notion below). This is crucial, because it also indicates that criticism is not necessarily the most important goal a study of inequalities has to be interested in. In fact, as discussions around the so-called Sociology of Critique remind us (Boltanski 2011; Latour 2004), sometimes it makes sense to refrain from any critique, and to rather learn from actors – to see how they themselves struggle and cope with particular situations and problems (while we may return to a critique at a later stage of research). What is key here is that scholars can hardly anticipate the consequences of a particular critical statement that stabilise structures that one wanted to destabilise (Boltanski/Chiapello 2007).

Nonetheless, with friction Tsing also critically addresses a second major liberal claim from the 1990s. In 1996, driven by the fear of growing tensions, Samuel Huntington famously put forward the diagnosis of a "clash of civilizations" (Huntington 1996). Tsing, in turn, argues that encounters across difference are not necessarily problematic – in fact, they are what encounters are made of. They can initiate compromises and empower marginalised actors (Tsing 2004: 6). These encounters are full of hope. In a more recent monograph, Tsing (2015) studies life in the ruins of capitalism (by following a valuable mushroom that is mostly harvested by marginalised workers and ironically thrives where nothing else seems to survive anymore), and she makes clear that she now *only* sees hope in the ruins. She finds aspiration in waste. The key question now and then is how and when is cooperation made possible – even though there is no consensus, and without a common ground, beyond narrow conceptions of solidarity (see also Hall 1996; Clifford 2001; Star/Griesemer 1989).

What is particularly problematic in Huntington's reasoning is his take on universal values – the West vs. the Rest. Here, Tsing develops a promising alternative coined "engaged universals". Instead of approaching universal values detached from practical experiences, and rather than abandoning universalism altogether, the focus is laid on practical experiences and unpredictable pathways. "Engaged universals travel across difference and are charged and changed by their travels. Through friction," she argues, "universals become practically effective. Yet they can never fulfil their promises of universality." (Tsing 2004: 8) This perspective, last but not least, is inspired by queer-feminist thinking, by Butler's "restaging" of the universal in the particular (Butler 2000). Universalism has its limits, which is precisely what this is about: pushing the limits; reusing and altering hegemonic notions.

Following Tsing, both equality and justice can be considered as universal claims that become meaningful only through worldly encounters, through friction, which in turn changes their meaning and direction (e.g., the historical situatedness of claims for environmental justice within the civil rights movement in the US and its reverberation in post-colonial contexts, e.g. India). The notion of friction enables us – and hopefully also readers – to make sense of the distinct articulations of waste-related inequalities and injustice reflected in the contributions to this special issue.

Waste enables, excludes and particularises (Tsing 2004: 6) what is revealed through all these contributions, for instance regarding 'formalised' recyclers and their ambiguous position (see Schulz; Hafner/Zirkl).

Social studies of waste do not merely benefit from Tsing's terminology (which has been shown by other waste scholars, too, see Gregson et al. 2016); Waste/Discard Studies also emphasise that it might be of advantage to focus on the supposed 'awkwardness' of encounters across difference. Recent scholarship in the field has shown that this is particularly true with the relationship between value and waste. Very often this relationship is framed in the form of a dichotomy. Where there is no value, there is waste, it is claimed. Greeson, Laser and Pyyhtinen (2019) show, however, that one key lesson from studying wasting practices is that waste does not merely (and magically) emerge, as a side-effect, at an imagined end of a value chain, beyond the market, as it were (Lepawsky/Mather 2011; Gille 2010). Wasting is ubiquitous and always part of valuing practices; values are constantly assembled and disassembled, which is why it is important to understand how waste shapes and transforms structures as well as hierarchies of value. Here, Alexander and Sanchez (2018) draw our attention to indeterminacies. Value-making categories, they argue, while building on research on classification and bureaucratisation, produce waste that resists classification. Hence the introduction of indeterminacy as a third "modality" which the authors associate with a "lack of recognition or incorporation in a given classification system; undetermined futures or directions; and a resistance to totalizing systems" (ibid.: 3). Both perspectives emphasise that waste opens up intermediate spaces of friction, offering different sets of methodologies to approach such spaces.

The 'awkwardness' that one encounters while grappling with the relationship between value and waste calls for a reflection of normative orders; and we suggest engaging with these normativities in a particular fashion: to face the friction through waste. Be it indeterminacy, or the political other of capitalist value, friction helps us to make sense of the ambivalent possibilities enacted through waste – the restoration of order as well as its potential transgression, while always reflecting on the elusive type of connection described as the global. Besides, and crucially, for us (special issue) editors, friction also works as a metaphor to describe and reflect on the collaboration between two modes of thinking that still

misunderstand (and often avoid) each other: a Marxist political economy on the one hand (one may associate it with historical materialism) and science and technology studies on the other hand (which is linked to the so-called new materialisms). In other words, the text in front of you is also a product of friction.

The notion of facing friction helps us find the courage to stay with the trouble, to borrow Haraway's powerful invitation (Haraway 2016), to collaborate despite disagreements and beyond one fixed and common theoretical approach. It helps us to engage with the collective tasks of our times (from climate change, resource allocation, pollution and toxic discourses through to various violent forms of exclusion), while not simultaneously shoving these tasks aside with a narrow framing. The contributions to this special issue also reflect this goal and invite us to learn from a multitude of muddled situations.

3. Contributions to this special issue

This special issue contains five research articles and three special contributions, in the form of a photo essay, a review essay and an interview with Max Liboiron from the Civic Laboratory for Environmental Action Research (CLEAR). They attend to the frictions in normative orders engendered by global connections through the lens of different engaged universals – ranging from state-sponsored drives for modernisation (as in_/formalisation), to ambivalent aspirations for valorisation, representation and recognition, and on to claims for social and environmental justice. The authors address matters of electronic waste, plastic waste, (human) excreta, as well as mixed wastes flowing through landfills and water bodies. While the global character of the connections enacted through the work with waste appears more or less obvious, all the contributions assembled in this issue reveal that frictions through waste are invariably saturated with power relations. They remind us that "encounters across difference can be compromising or empowering" and that "[h]egemony is made as well as unmade with friction" (Tsing 2005: 6).

In *Scrapping 'Irregulars'*, Ivan Schulz attends to global connections at one of the most important sites of the global recycling economy. He focuses

on recent economic policies towards recycling in China and shows how the 'modernisation' of waste collection and recycling is in fact excluding the majority of e-waste recycling actors. Yet, Schulz is careful not to reaffirm stereotypes, which is why he pushes the notion of 'irregulars' instead of aligning to debates about informality.

The informality characterising recycling networks in much of the world also reverberates in Nicolas Schlitz's analysis of plastic recycling economies in Kolkata, India. In his piece *Recycling Economies and the Use-Value of Waste*, he attends to the fractured nature of global economic connections in a post-colonial context. Schlitz draws on the Marxist notion of 'use-value' to unravel waste work in the political economy of recycling as "work of connection" (Tsing 2005: 7).

In *The 'Abolishing' of Manual Scavenging*, Yvan Iyer exposes persisting caste-related inequalities. Manuel scavengers in India (here, Ahmedabad) face severe discrimination. However, these sanitation workers struggle to address their claims because the government denies their existence. Global-connections reverberate in the implementation of particular sanitation technologies (socially informed by caste-based discriminations) and the legislation that is supposed to 'prohibit' manual scavenging.

In *The Double Burden of Environmental Injustice in a Female Waste Pickers Cooperative in Brazil,* Isabella de Carvalho Vallin and Sylmara Lopes Francelino Gonçalves Dias engage with frictions through the spatial articulations of instances of environmental injustice: the confluence of urban segregation with sexual and racial divisions of labour exacerbates risks associated with housing and the workplace. The authors combine the Brazilian version of environmental justice with a Brazilian adaptation of a French materialist feminist (cf. Falquet 2013) notion of "consubstantiality". This combination of engaged universals helps them to attune to intersectional power relations, while their case study also emphasises how frictions may be the reason for new communities to form.

In their article *Waste De_marginalized*, Robert Hafner and Frank Zirkl discuss key dichotomies of informal waste handling and management practices, and critically assess their pertinence in the Global South and North alike. A comparative study of recycling schemes in Argentina, Brazil and Germany helps them to discuss global connections surrounding social constructions of waste, and develop the notion of 'in_formality' instead.

They emphasise the negative effects of such schemes, most importantly by focusing on socioeconomic effects, to then highlight representational questions of visibility and marginality.

Visibility and representations matter also in Kathrin Eitel's photographic essay *Matter in and out of Place*. She engages with the flows of waste along Cambodia's coasts. In so doing, she recasts the 'life' and 'death' of different materials, redrawing boundaries between 'nature' and 'culture', while introducing us to waste workers who take care of the materials washed up on the beach. This functions as a counter weight to the usual media depictions of dirty rivers (and technocratic calls to 'manage' them).

In an interview with Max Liboiron we learn why power is central to matters of waste. Liboiron is the editor of the academic blog *discard studies*, as well as the manager of CLEAR, an environmental action research lab that centres on marine pollution research. Bringing academia and activism together, while developing interventionist approaches, is one of Liboiron's prime goals. Another example of engaged academic work, focused on the global e-waste issue, is to be found in Josh Lepawsky's new book called *Reassembling Rubbish* (MIT press, 2018), which is reviewed by Stefan Laser in the review essay *Who Carries the Weight of Digital Technologies? What is its Weight Anyway?* Like Liboiron, Lepawsky is a key author in the field of Discard Studies. Laser argues in his review that Lepawsky succeeds in providing a novel entry point to approach electronic waste, which includes fresh insights on this timely matter. A geographer by training, Lepawsky also introduces new forms of data that urges us to refrain from the dominant focus on post-consumer waste. It is "discardscapes", rather than consumption patterns, we ought to centre on, he argues.

We hope the contributions assembled in this special issue encourage a more critical and situated understanding of waste-related inequalities and their global connections – both critical of naturalisations *and* open to disturbances of normative orders and one's own beliefs. Part of this endeavour is more interventionist research on frictions and their consequences.

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Scrapping 'Irregulars': China's Recycling Policies, Development Ethos and Peasants Turned Entrepreneurs

Abstract *Nowadays, 'e-waste', or discarded electrical and electronic equipment (DEEE), is synonymous with environmental degradation and global injustice. In China, the central government has come up with a series of regulations and policies in recent years to deal with the challenge posed by both foreign and domestic DEEE. It justified this programme by invoking the necessity to protect China's environment. This article shows how Beijing's efforts to 'formalise' DEEE collection and recycling concentrate activities in the hands of a limited number of large companies, and cause the exclusion of a myriad of actors and entities, in particular self-made entrepreneurs with roots in the Chinese countryside.*

Keywords *e-waste, recycling, informal sector, exclusion, China*

1. Introduction

Few types of waste epitomise global inequalities better than 'e-waste'. Over the last two decades, activists, researchers and journalists, among others, have been denouncing the dumping of old, used and defunct devices such as television sets, mobile phones and computers from the Global North onto the Global South (see, e.g. Puckett et al. 2002; Brigden et al. 2005; Grossman 2007). Their accounts describe the pollution caused by basic recycling operations in poor regions of Asia and Africa, and stress that people living there pay the price for the affluent lifestyles of others. As a result, 'e-waste' — which will be referred to in this article as discarded electrical and electronic equipment (DEEE), to avoid the presumption that

these products have reached the end of their useful 'life' — has become largely synonymous with environmental degradation and global injustice.

China holds a central place in this narrative. At least up until a few years ago, the country was receiving such large quantities of DEEE from abroad that a team of researchers led by the United Nations University labelled it the "largest e-waste dumping site in the world" (Wang et al. 2013). Officially, a ban on DEEE imports has been in place in China since the early 2000s. Enforcement, however, only begun in earnest during the 2010s, when the Chinese central government shifted to a more restrictive policy on waste imports in general, adopting stricter rules, improving implementation, and tightening controls in this domain, as evidenced by operations Green Fence (*lüli*) and National Sword (*guomen lijian*), among other official measures. This trend culminated in the announcement, in July 2017, of a ban on imports of 24 types of scrap material (MEP 2017)[1], which made international headlines. The ban posed a serious challenge for many foreign recycling companies, including in Western Europe and North America, where business models relied considerably on shipping recyclable waste to China. It also brought out the global scale, division of labour and interdependence that characterise contemporary scrap recycling (Liebman 2018).

At first glance, the Chinese government's increasingly restrictive stance on waste imports can be read as an attempt to put an end to a globalised inequality of which Chinese people are the victims. This is consistent with the official rhetoric in China that denounces 'foreign waste' (*yang laji*) as dirty and dangerous, portrays the Party-state as a champion of 'environmental protection' (*huanbao*), and emphasises its capacity at safeguarding national sovereignty and defending the interests of the Chinese people. A more thorough analysis, however, reveals that there is more at stake than freedom from waste domination — although this is a symbolically powerful message in the context of China's growing clout and assertiveness in the international arena. Restrictions on waste imports are part of a broader revamping of China's waste collection and recycling sector that has been going on for many years — indeed, for more than a decade if we look at DEEE. Together with other recent policy changes, they point to a more general endeavour on the part of the central government that consists in modernising waste collection and recycling in China (see, e.g., Schulz 2015 and 2018).

According to official discourse, this state project of modernisation is meant mainly to reduce the environmental impact of 'e-waste' (*dianzi feiqiwu*), notably by improving pollution control. But what are its other effects, in particular its more questionable ones? In a political ecology approach, what are "the contradictions, the ironies, the winners and losers, and the simultaneously real and represented nature of the world" (Robins 2004: 252) that we can identify as being intrinsic to this project?

In this article, I argue that the drive to modernise leaves little room for the kinds of social actors and economic entities that have been at the forefront of waste collection and recycling in China for the last three to four decades, namely micro and small enterprises, family businesses and self-employed workers (also known in China as 'individual businesses' or *geti gongshanghu*, abbreviated *getihu*)[2] (see also Goldstein 2006 and forthcoming, Lora-Wainwright 2016; Schulz/Steuer 2017). By calling for the end of informality in all things waste-related, it makes it difficult, indeed sometimes impossible, for the latter to continue operating. Seen from this angle, 'formalisation' (*zhengguihua*), as the modernisation of waste collection and recycling is commonly referred to in China, constitutes a fundamentally exclusionary policy, whose impact has been felt sharply by those who live off the trade, transport and transformation of scrap. People of rural origin (peasants turned entrepreneurs, migrant workers, their offspring), who form the bulk of this population, have been hit particularly badly. In other words, the central government's efforts to put an end to environmental degradation in China and elevate the country from its subordinate status in the global industrial pecking order come at a high price, as they deprive millions of people who either own or work for an individual business from their livelihood.

At the same time, formalisation has been slow in the making and remains incomplete to this day. If we look at DEEE collection and recycling, actors and entities labelled 'informal' (*fei zhenggui*) continue to deliver crucial services, which not only the general population, but also 'large companies' (*da qiye*) and state authorities have come to rely on. Likewise, China's new regulatory system for DEEE collection and recycling would not function nearly as well if *getihu* were to disappear completely and with them their organisational modes and business models (see Chen 2006) —

though, ironically, those are precisely what the system has been devised to replace (see Scott 1998).

This article is divided into three sections. The first one provides background information on the historical evolution of waste collection and recycling in contemporary China. Section two focuses on DEEE and analyses the state project of formalisation. A third and final section looks at the impact of formalisation on the ground for the people involved in DEEE collection and recycling, and develops two case studies: one on rural recycling hubs specialised in DEEE dismantling and processing, the other on urban networks specialised in DEEE collection. The data that informs this article has been produced through ethnographic fieldwork that I conducted in Guangdong Province and other parts of China for a total of 18 months between 2014 and 2016.

2. Dealing with waste in contemporary China

In keeping with a classical approach to China's history, the evolution of waste collection and recycling in Chinese cities during the twentieth century can be divided into a Republican (1911-1949), a Maoist (1949-1976), and a reform era (1976-2013[3]) (Goldstein forthcoming). Each of these eras has specific features, or a distinctive waste regime (see Gille 2007: 34). For the purpose of this article, we need to go back only to the Maoist era, and only briefly; what matters most are the changes that took place during the era of economic reforms (*gaige kaifang*).

After the revolution of 1949, China's new Communist government brought waste collection and recycling under state control and made this domain an integral part of the planned economy (Goldstein 2006 and forthcoming). The Communists put the highly diverse network of scrappers, pickers and handicraft workers that had characterised the Republican era (see Dong 2003 on Beijing) under government management and disciplined the resident population. Citizens were encouraged through state propaganda to contribute to what was framed as a nation-wide effort towards efficient resource use by being thrifty, sorting their recyclables, and bringing them to government-run recycling shop. They were also incentivised by the fact that the government bought back recyclables.

Things changed drastically from the late 1970s onwards. At that time China entered an era of market reforms that opened up many sectors of the economy to private enterprises, thereby unleashing productive forces and triggering unprecedented growth. Industrialisation, urbanisation and the advent of mass consumption resulted in an explosion of municipal solid waste throughout China, which led the World Bank to state that "no country has ever experienced as large, or as rapid, an increase in waste generation" (World Bank 2005: 1). In all major Chinese cities, municipal recycling companies were challenged, and eventually all but replaced, by a multitude of highly motivated rural migrants, who became the main characters in Chinese scrap collection and recycling (Li 2002; Ensmenger et al. 2005). In Beijing, the state's recycling net dissolved, mainly due to the combined effect of mushrooming amounts of municipal solid waste and plummeting prices for recyclables. The municipal recycling company began to concentrate exclusively on industrial metals, which require little labour and yield high profits, and to abandon household waste. This created a vacuum, which was quickly filled by people willing to work much harder and for less money than state employees (Goldstein 2006).

China's growing trash heap proved a bonanza for newcomers: it provided a livelihood for many of the people who had left the countryside in hope of finding a better life in a large city. Through exploiting waste, millions of migrants managed to lift themselves out of poverty; a few of them even made a fortune. At the same time, competition was fierce, and migrants' illegal status made them extremely vulnerable. As urbanites possessing only a rural residential permit (*hukou*), they faced discriminatory regulations and repressive state practices (Solinger 1999). Urban sprawl also forced scrapyard communities populated by migrants to regularly move further away from the centre, towards ever more remote city outskirts (Tong/Tao 2016).

With domestic demand for raw materials constantly on the rise, many self-made entrepreneurs with origins in the Chinese countryside started to source scrap from abroad. China became the world's largest scrap importer (Minter 2013; Goldstein 2012). During the first decade of the twenty-first century, scrap and waste accounted for the largest share, in both weight and value, of imports from the United States. Several towns, among which Guiyu in Guangdong Province (see Lora-Wainwright 2016,

2017), Taizhou in Zhejiang Province (see Tong/Wang 2004) and Wen'an in Hebei Province (see Goldstein 2016), morphed into specialised rural recycling hubs that thrived on a mixture of foreign and domestic scrap, and catered for the needs of the Chinese industry. In most cases, these recycling hubs were located in poor rural areas, but close to both the sea and large industrialised regions, which made them ideal spots in terms of labour, land and transportation costs.

With time, the downsides of China's meteoric industrial take-off became increasingly problematic and obvious. Severe environmental degradation, in particular, emerged as a serious cause of concern and a problem requiring prompt intervention (Economy 2010). Waste-related issues (e.g. dumping, landfilling, incineration) increasingly came under the spotlight; recycling was no exception (see, e.g., Wang 2012 and 2016). On a global level, salvaging materials limited pollution and maximised resource utilisation, but on a local level breaking down waste created severe forms of pollution in China (Minter 2013). In the 2000s, rural recycling hubs located along the coast of China, including Guiyu, Taizhou and Wen'an, started receiving much negative publicity as highly contaminated places. The emergence of these pollution scandals can be partly explained by dominant representations of the countryside in China as a backward, dirty and disorganised place (Lai 2016).

In the early years of the twenty-first century, the Chinese state started to reassert its control over the recycling sector. In Beijing, for instance, various district branches of the municipal recycling company made proposals for rebuilding the municipal government's recycling network (Ensmenger et al. 2005). A "new nationalist environmentalism", as Goldstein calls it, informed this push for change. Rural migrants involved in waste collection and recycling became less and less tolerated by officials and civil servants. They were criticised for being 'of lower moral quality' (*suzhi di*) and 'not environmentally friendly' (*bu huanbao*) (Goldstein 2006: 286f., 290), and numerous crackdowns targeted them, especially in the run-up to the 2008 Olympic Games (Goldstein forthcoming).

A similar dynamic can be observed with regard to DEEE collection and recycling. The sector remained virtually unregulated for most of the reform era, until the central government began to intervene in the 2000s by adopting laws and setting up pilot projects (see Schulz/Steuer 2017).

Environmentalism served as the main official justification for these efforts. As we shall see, however, the rationale was much broader. Crucially, the Chinese national policy on DEEE collection and recycling left no room for *getihu*, who had dominated the sector until then. It aimed at driving them out and replacing them with corporations capable of running large, capital-intensive and partly automated plants.

3. The formalisation of DEEE collection and recycling

In official parlance, the revamp of DEEE collection and recycling in China is often referred to as 'formalisation' (*zhengguihua*). Under this banner, experts such as academic researchers, engineers, company representatives, state officials and environmental activists[4] advocate a transformation that can be itemised as follows (Schulz 2016). First, formalisation involves 'systemisation' (*zhiduhua*): the elements that make up the DEEE collection and recycling sector need to be assembled into, to function as, and to be easily recognisable as an organised whole. Second, formalisation requires making sure that DEEE collection and recycling 'conforms to rules' (*hegui*), by which is meant explicit, written rules such as those anchored in regulations, authorisations and certifications. A third essential component is 'standardisation' (*biaozhunhua*), namely the idea that China should strive to attain 'international standards' (*guoji biaozhun*) — which is really another way of saying catch up with 'developed countries' (*fada guojia*). Finally, formalisation involves 'industrialisation' (*chanyehua*) and 'scaling up' (*guimohua*): DEEE collection and recycling should rely on large and specialised establishments that use complex machinery, mechanised processes and disassembly lines, and have the capacity to handle a substantial volume of goods. The adoption of the factory system also means that industrialists, and not workers, plan the working schedule and own the means of production.

In China, the formalisation of DEEE collection and recycling began more than a decade ago and delivered visible results from the late 2000s onwards (Schulz 2015; Schulz/Steuer 2017). A ban on imports of DEEE dates as far back as 2000 but enforcement remained weak until the early 2010s. As regards domestically generated DEEE, experience gathered

during the 2000s through pilot projects and first regulatory efforts led to the adoption in 2009 of a key legal text, the *Regulations regarding the administration of the recovery and disposal of waste electrical and electronic products* (hereafter the Regulations, State Council 2009, effective since 2011). This text states that dismantling and processing must take place in a limited number of large facilities rather than in a multitude of small ones (art. 5 on 'concentration of treatment' or *jizhong chuli*), and that licensed plants are free to supply DEEE from any source (art. 34 on 'multi-channel collection' or *duo qudao huishou*). The Regulations also introduced the principle of extended producer responsibility: producers, i.e. companies selling electrical and electronic equipment, are required to pay a recycling fee on each item they put on the Chinese market; this money is collected by the central government and redistributed in the form of subsidies to a network of licensed recycling plants spanning the whole national territory. In 2015, China had 109 such plants, which together dismantled, and in some cases pre-processed, 75 million items, almost twice as many as in 2013 (CHEARI 2016).

The introduction of the financing mechanism led to a significant increase in volumes but at the same time the new system displayed a number of serious shortcomings. It did not entirely solve the old problem of lack of supply: licensed recycling plants continued to operate much below their full capacity, estimated at 150 million items in 2015 (21st Century Economic Report 2017); and it also created new problems: plants were incentivised to 'feed on subsidies' (*chi butie*) rather than rely on the economic value of recovered materials to generate revenue. In addition, the DEEE recycling fund ran a very large deficit (2.7 billion RMB in 2015, or half of the total sum allocated to licensed recycling plants), which was likely to grow with time (CHEARI 2016, 21st Century Economic Report 2017).

As a state-run system, China's new official system for 'e-waste management' (*dianzi dianqi feiqiwu guanli*) is characterised by considerable bureaucratic complexity (Someno/Miao 2016). No less than eight ministries are officially involved (Wang et al. 2013: 40), which creates red tape and uncertainty. One Chinese businessman I interviewed, who traded scrap on a global scale, told me that he had no intention whatsoever of establishing a DEEE recycling plant in China, and justified his reluctance by saying that: "What the Ministry of Environmental Protection says [*zhiding*] counts as

law; what the Customs says also counts as law; and what the Ministry of Commerce says counts as law too!" Other people I interviewed, who had first-hand experience of the system, criticised it for being opaque and hard to understand and navigate. Proximity to the Chinese state presumably makes it easier for certain enterprises: many of the flagship and largest licensed recycling plants belong to state-owned groups (e.g. Gree, TCL, Changhong), or came into being through public-private partnerships and enjoy support from a provincial or municipal government.

By and large, the Chinese official e-waste management system is a product of top-down governance (Schulz/Steuer 2017). The central government took all important decisions and paid little attention to local realities and regional particularities. Experimentation did take place at the local level during the mid-2000s, and Beijing took into account the outcome of pilot projects while devising China's first nationwide policies on domestic DEEE, but the idea was not at all to build from the ground up. Tellingly, Chinese researchers focused their efforts on studying the policies, regulations and techniques that developed countries such as the US, Japan and Germany had come up with to tackle the issue of DEEE, and on imitating them, or at least finding ways to transpose them into the Chinese context. Very few of them spent any amount of time going to the field, in their own country, to observe existing networks, flows, practices and protagonists. Fei et al. 2016, for instance, remains an exception, which the authors explicitly acknowledge. In an interview, an environmental scientist at the Chinese Academy of Sciences who has conducted this kind of research told me: "I did it only as a side project, a small one at that, because in China you don't get any funds for this." As a result, one could observe a serious lack of knowledge and understanding among Chinese institutional experts regarding what existed before the regulatory system or still exists today in parallel with that system.

One could reasonably argue that the type of DEEE collection and recycling that dominated in China in the 2000s could have been improved, e.g. by making certain practices less environmentally damaging and better protecting workers, and that there would have been benefits in doing so, e.g. leveraging existing knowledge and preserving livelihoods. Yet, the experts who contributed to making China's 'e-waste management' system did not pursue this approach, and perhaps never even seriously envisaged it.

Instead, they assumed that a revolution was the way forward (Schulz 2015, see also Reddy 2015 and Laser 2016 on India). For them, it was obvious that the practices, places and protagonists of yesterday had to make way for those of tomorrow. This owes a lot to the modernist ideology that suffuses the program of formalisation of DEEE collection and recycling — as well as other components of the Chinese government's broader programme of building an 'ecological civilisation' (*shengtai wenming*). On the surface of things, formalisation tackles mainly the problem of pollution caused by DEEE recycling. However, at a deeper level, it aims at solving China's backwardness, real or perceived (see Hubbert 2015).

It is therefore unsurprising that this programme rejects China's *getihu* and what characterises them, namely: petty capitalism, cottage industries, manual labour, object stewardship, lean operations, market mechanisms, ethnic networks and individualised relationships. *Getihu* find it impossible to fulfil official requirements, and therefore to operate lawfully, because China's new 'system' for DEEE collection and recycling has not been designed for them, or with them in mind. Moreover, as far as DEEE dismantling and processing is concerned, the exclusion of *getihu* represents a deliberate strategy on the part of the central government. As a representative of the Ministry of Environmental Protection explained to me: "We are cracking down on small workshops and using economic methods to promote their competitors. The more big recycling plants there are, the harder it will be for workshops to survive." In other words, with regards to at least one subsector, the central government intervened by distorting competition in order to get rid of *getihu*. Likewise, an important aim pursued through the most recent scrap import ban and earlier measures, such as operations Green Fence and National Sword, was to raise sectorial concentration by pushing small players out.

The language of informality plays a crucial role in this context. Proponents of formalisation regularly refer to actors and entities operating outside of the official system as being 'informal' (*fei zhenggui*). Alternatively, they use metaphorical expressions such as 'guerrilla groups' (*youji dui*) and 'irregular army' or 'irregulars' (*fei zhenggui jun*), which reveal their strong antagonism towards the *getihu* involved in DEEE collection and recycling (see also Chaturvedi/Gidwani 2010; Gidwani 2013 on India). Actors and entities deemed informal are described as

'dirty' (*zang*), 'messy' (*luan*), 'scattered' (*san*) and 'hard to manage' (*buhao guanli*). This routine stigmatisation leads many in China to see them as a remnant of a bygone era and a disgrace to the country. In what are arguably extreme cases, some Chinese experts even refused to acknowledge their existence. Two foreign researchers reported, for instance, having been told by Chinese interlocutors that: "China has no informal sector" (personal communications by David Rochat and Stefan Salhofer in 2013 and 2014, respectively). Such a denial may seem absurd given the huge size of China's informal economy — Philipp Huang, for instance, calculated that it employed over 250 million people in 2006 (Huang 2009) — but it makes sense if we read it as an attempt at strengthening a country's reputation.

The exclusion of *getihu* by Chinese state policies runs counter to recommendations found in the scientific literature. Many authors contend that informal actors and entities should, on the contrary, be integrated into China's formal system for e-waste management (see, e.g., Chi et al. 2011; Wang et al. 2012; ILO China 2013; Yang et al. 2008). In my view, this discrepancy can be attributed to the fact that — though well-meaning — scholars' calls for the integration of *getihu* fail to recognise the significant differences, or even incompatibilities, that exist between *getihu* and the higher levels of the state administration. The two are organised in fundamentally different ways: whereas the Chinese state administration adheres to the bureaucratic ideal (hierarchical structure, written rules, standardised procedures, formal training, and so on), *getihu* — to the extent that they can be considered collectively — are more evocative of the adhocratic ideal (organic structure, flexible procedures, and so on). This mismatch stands in the way of the inclusion of *getihu* in the process of formalisation; it also explains the purely abstract nature of the issue of integration thus far.

Due to their operational and organisational modes, *getihu* constitute a challenge for Chinese officials and other experts, especially those in charge of formalisation. Actors and entities such as *getihu* typically interfere with something that lies at the heart of what modern states are meant to do, which is to reorganise societies in ways that make them more legible to apparatuses of governance (Scott 1998). *Getihu*'s mobility and adaptability, for instance, impede modern spatial and economic planning. While doing research in China, I was struck by the conspicuous absence of state programmes targeting *getihu* in non-repressive ways. One legal document

recognises *getihu* as significant players within the waste recycling business (MOC 1985), while another one suggests "consolidating small and medium-sized enterprises and self-employed households […], and making full use of the power of scavengers […] to form stable, efficient, safe and convenient recycling channels" (MOFCOM et al. 2016). However, these two documents constitute isolated instances and have little binding power. Therefore, I would claim that, broadly speaking, Chinese officials and experts have never really tried to address the challenge that *getihu* pose for them. For proponents of formalisation, it was obvious that *getihu* had to adapt to the central government's plans, not the other way around, and that their failure to do so only proved their incompetence.

Finally, the discourse of formalisation conflated *getihu*'s unregistered status, unregulated activity and perceived ungovernability with an infringing of the law. Many Chinese experts used the terms 'informal' (*fei zhenggui*) and 'illegal' (*weifa*/*feifa*) interchangeably and seemed to regard them as synonyms. When mentioning 'illegal activities' (*feifa xingwei*) committed by *getihu*, they mostly referred to DEEE importing or burning, which constitute unambiguous violations of easily identifiable legal provisions, but sometimes also to DEEE dismantling, collection, and even transport, which, to the best of my knowledge, are not forbidden as such, and may or may not infringe Chinese laws depending on the context and circumstances. Likewise, expressions based on the word *hei* ('shady'), such as *heibang* ('gang') and *heishe* ('black market'), surfaced in discussions on a variety of DEEE-related issues. Informality and illegality can be entangled in multiple ways, which explains why they are often associated with one another (WIEGO 2015). Yet, the two concepts do not overlap; their relationship is more complex. Unawareness or carelessness may explain a certain level of confusion between informality and illegality, but the routine conflation of one with the other goes beyond that. In the context of DEEE collection and recycling in China, it seems to me that the indiscriminate use of the vocabulary of illegality to refer to a wide range of actors and entities served to tarnish the reputation of, and to stigmatise, a category deemed undesirable (see also Goldstein 2016; Gidwani 2013).

4. *Getihu*'s reversal of fortune

As stated above, *getihu* accounted for the vast majority of DEEE collectors and recyclers in China up until the late 2000s. From that time onwards, the development of the state project of formalisation gradually reduced their legitimacy, hindered their activities, and compromised their livelihoods. What follows is an illustration of these changes through two case studies that draw primarily on my fieldwork in Guangdong Province. Interestingly, both case studies reveal linkages between so-called formal and informal actors and entities, which suggests that formalisation can only go so far, and that, in order for the new 'system' to be effective, some level of informality needs to be maintained.

4.1 Rural recycling hubs

Guangdong Province, China's laboratory for economic reforms and largest economic powerhouse, hosts several rural recycling hubs, i.e. towns and villages located in the countryside where industry has all but replaced agriculture, and the extraction of economic value from waste material has become the main source of livelihood. As part of my fieldwork, I visited several of these hubs regularly, including the town of Guiyu and the district of Qingcheng, which belong to the prefectural cities of Shantou and Qingyuan respectively.

A pattern emerges when we look at the evolution of these two hubs in recent years. For a long time, village, town and district-level authorities remained lenient towards 'small dismantling and processing workshops' (*xiao chaijie zuofang*). However, their attitude changed drastically in the mid-2010s, when, pressured by city and province-level authorities to clean up their act, they started 'cracking down' (*qudi*) on these workshops. At the same time, state authorities at these different levels collaborated to create or expand dedicated industrial parks in order to concentrate and better control dismantling and processing activities, a strategy referred to as 'enclosed management' (*quanqu guanli*). Officially, small workshops were invited to resettle in these parks, but few of them were willing or able to do so. Eventually, the vast majority had to close down.

Guiyu has been in the spotlight for almost 20 years and has a reputation as a highly polluted place. Since the early 2000s, the town has received

considerable negative publicity, in particular from NGOs and the media, both Chinese and foreign (see, e.g., Puckett et al. 2002). It is, or at least was for a long time, arguably the largest so-called 'informal' DEEE recycling centre in the world; and it seems safe to assume that, were it not for Guiyu, China would never have earned the label of "largest e-waste dumping site in the world" (Wang et al. 2013). Most accounts attribute Guiyu's plight to environmental dumping. However, a glance at neighbouring towns and villages warrants a more nuanced view. Some of them are involved in other industrial activities, in particular manufacturing, and yet also face extreme pollution. Gurao, for instance, long held the title of China's underwear capital. The town is located only nine kilometres away from Guiyu and the environment there presents similar characteristics, i.e. black streams, foul air and uncontrolled dump sites. This indicates that the whole region — like many others in China in the late twentieth and early twenty-first century — embraced the pursuit of growth at all cost, with the blessing of higher-level state authorities and the backing of lower-level ones. Much like elsewhere in China, people in rural recycling hubs resigned themselves to sacrificing the natural environment on the altar of economic development (Economy 2010). Collective concerns about the pollution caused by scrap dismantling and processing emerged as an afterthought (Minter 2013). To be prosperous, Guangdong Province needed great quantities of raw materials to feed its factories; DEEE made for a good source, as it contains valuable metals (copper, gold, silver) and plastics, and, for many years at least, could be obtained relatively easily on global markets.

In the mid-2000s, in response to sustained public attention on Guiyu, the central government stepped in and attempted to revolutionise the recycling hub and redress its thoroughly negative image. As a foreign reporter writes:

> "in 2005 [the National and Development Reform Commission], in concert with six additional high-level Chinese government agencies, announced that Guiyu would receive significant funding to upgrade its facilities in line with China's new emphasis on sustainable development. According to the government's announcement, officials would "accelerate the construction of Guiyu into a national demonstration base for recycling". (Minter 2013: 191)

Such a concerted measure suggests that officials in Beijing initially intended to improve Guiyu and turn it into an exemplary place. The central government even included the town as a 'unit' (*danwei*) — note the bureaucratic terminology — in what was to become China's "first batch of circular economy national pilot projects" (*quanguo di yi pi xunhuan jingji shidian*) for DEEE recycling.

Yet, Beijing's grand plans to transform Guiyu into a fully regulated competence centre for DEEE dismantling and processing did not materialise. For a long time, not much happened. The construction of an industrial park, in particular, was delayed by about nine years. During that time, all the project amounted to was a large signboard and a vast stretch of wasteland. Between the mid-2000s and the mid-2010s, it was very much business as usual in Guiyu (Minter 2013: 190). It seems fair to say that Beijing's initiative ground to a halt not long after it was launched, which arguably owes much to the strong alliance between local officials and 'bosses' (*laoban*).

When I visited Guiyu in January 2016, a serious crackdown on small workshops had just taken place and its impact was obvious: the endless to and fro of trucks carrying goods had all but ceased and thousands of migrant workers had left to look for employment opportunities elsewhere (BAN 2015). Beilin, a village that had morphed into a town district over the years, was particularly badly hit. Of the hundreds of workshops specialising in circuit boards and other electronic components that used to operate there, only a handful remained active. The silence, the empty streets and the closed gates stood in stark contrast to the atmosphere that had prevailed only a couple of years earlier. Elsewhere in Guiyu, a greater proportion of workshops kept running but business was clearly moribund.

At about the same time as the crackdown took place, Guiyu's official 'circular economy industrial park' (*xunhuan jingji chanye yuanqu*) finally became a reality (for an extensive analysis of the park and its impact, see Schulz/Lora-Wainwright 2019). When I explored it in January 2016, construction was nearing completion and several sections were already operational. The park was huge, but largely empty; only very few workshops had resettled there. I interviewed a few owners, and none had anything positive to say about it; all of them voiced their discontent. For them, the park brought mostly drawbacks and few if any benefits.

For one thing, facilities did not suit small workshops' needs and capacities. Among the multi-storied buildings dedicated to dismantling, for instance, only the tallest ones had lifts; the others had none. One dismantler who had settled in a three-storied building explained that he only used the ground floor, although he was paying rent for the remaining floors as well. "I'd have to pay my workers more to have them carry these heavy bags upstairs [for storage] and then back downstairs [for dismantling]. This is hard work, so they'd certainly ask for a rise. I might even have to hire more people, which would cost me a lot of money." This is just one of many examples of the kind of challenge faced by workshop owners in an industrial park that had allegedly been built for them, but without them ever being consulted. Another example is the additional costs linked to the obligation to pay rent and taxes (which can easily amount to 100,000 RMB or 16,000 USD annually, according to my recent interviews in Guiyu). When joining parks, workshops can no longer avoid these costs, which in many cases are high enough to jeopardise their commercial viability. One owner told me: "I'm still in this business now, but I might stop next year. In those conditions, it's just not worth it. I hardly earn anything anymore."

As for benefits, the argument that the park allowed for cleaner DEEE dismantling and processing failed to convince many of my interviewees. One owner of a dismantling workshop, who had unwillingly resettled, commented in a sarcastic tone that "It's good that you've come, because you'll report back to the whole world on how environmentally friendly [*huanbao*] we've all become since we moved here. It was worth it, wasn't it? Look at how environmentally friendly this all is!" Actually, his activities had barely changed and their environmental impact, which was low to begin with, had not improved much.

During my last visit in May 2018, Guiyu's industrial park was full of people, goods and vehicles, and teeming with activity. By contrast, the rest of the town looked empty and felt sluggish. A few years earlier, an estimated 5,000 workshops were operating in Guiyu, but now only a handful remained (all of them workshops specialised in sorting plastics from DEEE). Some owners had managed to move their workshops into the park but most had simply had to close down (see also SCMP 2017). The population of migrant labourers, estimated at more than 100,000 people in Guiyu's heyday, had shrunk dramatically. Many locals faced

the difficult question of what to do next and how to find a new source of livelihood (see Schulz/Lora-Wainwright 2019).

The story in Qingcheng district closely resembles that in Guiyu, even though pollution there only started to make the headlines in the mid-2010s. At that time, most of the operations that had been involved in recycling forbidden types of 'e-waste' imports (e.g. electronics and house appliances) had already transitioned to permitted ones (e.g. electrical cables and motors). Nevertheless, local authorities cracked down on small workshops and left them only a few months to resettle into existing industrial parks. Here again, most of the workshops closed down and very few of them moved. One of the owners I interviewed estimated that his costs would double if he were to join a park. Qingcheng's main industrial parks experienced only marginal growth immediately after the crackdown.

In short, the entry into an industrial park comes at a high price for small workshops. They become subject to new rules that, in the majority of cases, require a major overhaul of their business model. Since small workshops do not receive help of any kind from state authorities, few of them manage such a challenging transition. More broadly, industrial parks introduce, and make mandatory, new forms of spatial, temporal and social organisation, which have very little to do with those that have powered rural recycling hubs thus far. Since they question the very core of economic activity in these places, industrial parks represent nothing short of a revolution. This undoubtedly contributes to explaining why they have met with limited success, at least to begin with.

Industrial parks in rural recycling hubs are arguably more attractive to large firms than to small workshops. A state-owned group named TCL established a presence in Guiyu's park as soon as 2013, before the construction of the rest of park had even begun. It is worth highlighting that, for the first few years at least, there was little overlap between the activities of TCL's DEEE dismantling plant and those of the surrounding small workshops, so the former hardly appeared as a substitute for the latter. The plant dealt exclusively with equipment for which it could receive subsidies, which, until March 2016, included only television sets, washing machines, refrigerators, air conditioners and computers (*siji yinao*) — in practice, TCL, like other licensed companies, secured only television sets, washing machines and refrigerators, and virtually no air conditioners or

computers, as the latter had a high ratio of market price to amount of subsidy. By contrast, small workshops in Guiyu had built their prosperity almost exclusively on electronics (i.e. computers, mobile phones, printers, cameras, servers, routers) and parts or components thereof; they had very little interest in television sets and none at all in home appliances.

Later, after the central government had revised the amount of subsidy for computers and television sets, and made small electronic devices eligible too, TCL's plant in Guiyu became involved with these categories of goods as well. The company quickly realised that it could save money and benefit from the knowledge accumulated by neighbouring workshops over the years by outsourcing part of the dismantling process to them. When asked where the printed circuit boards processed in some of these workshops came from, several employees interviewed in 2015 pointed to TCL's plant across the road. One owner of a workshop specialised in the dismantling of hard disks claimed that he now had a subcontracting agreement with TCL. Outsourcing of this sort shows that interdependencies exist between so-called formal and informal actors and entities (see Chen 2006) even when they are not planned as part of the 'system', and most certainly not allowed by it.

4.2 Urban collection networks

As noted above, in Chinese cities, *getihu* long dominated the collection of objects discarded by households, offices and small businesses, including packaging, furniture, clothes and electrical and electronic equipment. Like a web that extends over the city, they could be found just about anywhere, especially in densely-populated areas. Often referred to as 'junk collectors' (*shou polan*) and 'pedlars' (*xiao shangfan*), they provided valuable services to residents, including buy-back of unwanted possessions, free home pick-up and constant on-call availability. In downtown Guangzhou, where I used to live and work in the mid-2010s, *getihu* represented the most efficient channel for getting rid of DEEE. Large retail chains occasionally organised take-back actions and a few companies had launched specialised online platforms, banking on the trend towards digitalised lifestyles, but opting for *getihu*'s DEEE collection services remained the obvious thing to do for all except the largest companies and state entities. This can be explained by long-standing habits (see above) as well as *getihu*'s competitiveness — itself

the result of hard labour, rigorous cost saving and a diversified strategy for extracting value out of cast-off goods (Li 2002; Schulz/Steuer 2017; Steuer et al. 2017).

Some forms of state action reflect *getihu*'s efficiency in DEEE collection and the difficulty of bypassing them in this field. The fact that China's Regulations allow for 'multi-channel collection', for instance, can be interpreted as an indirect recognition by the central government of the need for licensed DEEE recycling companies to make use of *getihu* networks, at least in a first stage. According to one estimate (Steuer et al. 2015), these companies sourced between 85 and 100 percent of their input from *getihu* in 2015 (see also Chen 2017). It should be noted, however, that Chinese experts viewed this as an anomaly. They predicted that it would disappear following the advent of what they considered to be superior collection schemes based on 'reverse logistics' (*nixiang wuliu*) and 'big data' (*da shuju*), which were expected to install corporations as the main protagonists of DEEE collection (Schulz 2019).

Likewise, in several areas of Guangzhou, state authorities at the lowest administrative level (subdistrict office or *jiedao*) sought to integrate junk collectors into their 'sanitation' (*huanwei*) teams and, by implication, the state apparatus. Conscious of the fact that, to quote a Chinese researcher, "if it weren't for independent rubbish collectors, nothing would get sorted in neighbourhoods", low-level officials drafted a few of these collectors, acknowledged their existence, adopted rules regarding their activity, and vouched for them. They issued them with a certificate, equipped them with uniforms, and housed them in new sheds, hereby signifying that they were legit — and that the others were not. With this measure, local officials aimed at enhancing the collection and sorting of 'domestic waste' (*shenghuo laji*) in the territory under their jurisdiction; improving *getihu*'s lot was beside the point. Thus, here again, formalisation occurred largely at the latter's expense. It did not bring *getihu* any benefits — apart perhaps from some level of assurance that they could continue operating — but it introduced new costs (rent), obligations (report to superiors) and handicaps (loss of operational freedom and flexibility). Furthermore, in Guangzhou at least, the forced integration of a small number of independent collectors remained a localised *ad hoc* measure tolerated but not endorsed by the municipal government.

It should be stressed that these instances of relatively inclusive state action are the exception, not the rule. They contrast with the more general trend that has been affecting independent collection networks in Chinese cities in recent years, namely dispossession and displacement. Whether because of real estate development, urban renewal and 'beautification' (*chengshi meirong*) programmes or public-private partnerships, *getihu* involved in collection have progressively been denied access to DEEE and debarred from using public space. Deprived of any right to the city (Lefebvre 1968, Harvey 2008) and, concomitantly, any right to waste (Chaturvedi/Gidwani 2010), they have been struggling more and more to make a living in a context of constant urban transformation. A particularly telling example is Beijing, where independent collectors have met such hurdles that thousands of them have given up, and either returned to their hometowns or switched to another occupation (Chen 2017; Goldstein forthcoming).

5. Conclusion

What shows through in the above case study on DEEE collection and recycling is a shift in China's development ethos. Whereas the early reform era was characterised by a free-for-all ideology and the promotion of petty capitalism as a means of driving growth, boosting national productivity, and creating wealth, the late reform era — and even more so the post-reform era, with Xi Jinping's coming to power — has been marked by a trend towards increased regulation, centralisation and assertion of state power, which can be seen as the central government's response to the challenges posed by environmental degradation and economic deceleration, as well as to the risk known as the 'middle-income trap'.

For foreign players on global scrap markets, this shift became apparent with the restrictions on imports that the central government put in place from the early 2010s onwards. The wide-ranging ban announced in July 2017, in particular, acted as a wake-up call and made it obvious to everyone abroad that Beijing is trying to move China up the value chain. By that time, however, the wind of change had been blowing within the country for many years already, and Chinese players had felt it in full. *Getihu*, in partic-

ular, found themselves left out from, and excluded by, the state programme of formalisation, a phenomenon I have described in detail above. Routinely labelled 'informal', these actors and entities were stigmatised and treated as pariahs. They had no say in the transformation of DEEE collection and recycling brought about by the central government, and were prevented from playing a role in the new 'system' with which Beijing progressively equipped the country. The new rules of the game valorise and promote an entirely different type of subject, deemed less reminiscent of the country's past and more promising for its future. This translates into a loss of livelihood for the multitude of peasants turned entrepreneurs who had dominated this sector until recently.

The exclusion and dispossession of these people should surprise, for they have been particularly hardworking, resourceful and efficient throughout the reform era. Amidst unfavourable circumstances and in the shadows of the state and corporations, they have established and effectively operated their own networks of material exchanges, which persist to the present day. Through collective effort and highly flexible forms of organisation, these so-called 'irregulars' have devised a system capable of converting huge quantities of DEEE (and other discarded items) into useful raw materials and spare parts – and, admittedly, causing pollution. In doing so, they have come up with relatively appealing solutions for a wide range of customers, including households and enterprises. Such a system contrasts with the formal 'scaling up' strategy. It presents itself as an alternative, the existence and success of which urge us to question the state's dogmatic zeal for generating 'modern', large-scale and capital-intensive solutions for DEEE management.

As it matures, will China's state-led system for DEEE collection and recycling succeed in transforming the sector into an entirely formal one? Nothing could be less certain. Even in 'developed countries', which are held up as models by Chinese experts, formal 'systems' coexist with informal networks. In Europe, for instance, researchers found that, in 2012, only 35% (3.3 million tons) of all DEEE ended up in the officially reported amounts of collection and recycling systems. The other 65% (6.15 million tons) was either recycled under non-compliant conditions in Europe (3.15 million tons), exported (1.5 million tons), scavenged for valuable parts (750,000 tons), or simply thrown into waste bins (750,000 tons) (Huisman et al.

2015). By definition, informal practices and protagonists are off the radar. We know, however, and I have stressed in this article, that they play a crucial role. Often, they even act like oil in the cogs of the formal economy. In China, scrapping 'irregulars' involved in DEEE collection and recycling has proven to be a lengthy and uncertain process thus far, with many unexpected or unwanted effects. Chances are that it will continue along this line. At least, we can expect that this process will not put an end to informality, which has a strong tendency to reappear in new forms.

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1 DEEE is indirectly affected, as it contains plastic types covered by the ban.
2 In Chinese law, the term *getihu* applies to enterprises that have 8 employees or fewer.
3 It has become increasingly obvious in recent years that Xi Jinping's accession to power in 2013 marked the end of the reform era and the beginning of a new one, yet to be named.
4 Following Stehr & Grundman (2011), I use the term 'expert' in a narrow sense as referring to people who not only have expertise on a given topic but also recommend a course of action to others based on technical information.

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Abstract *Heutzutage sind ‚Elektroschrott' bzw. entsorgte Elektro- und Elektronikaltgeräte (DEEE) ein Synonym für Umweltzerstörung und globale Ungerechtigkeit. In China hat die Zentralregierung in den vergangenen Jahren eine Reihe von Vorschriften und Richtlinien erlassen, um der Herausforderung durch ausländische und inländische DEEE zu begegnen. Dieses Programm wird mit dem Hinweis auf die Notwendigkeit des Umweltschutzes in China gerechtfertigt. In diesem Artikel wird gezeigt, wie Pekings Bemühungen, die Sammlung und das Recycling von DEEE zu ‚formalisieren', die Aktivitäten in den Händen einer begrenzten Anzahl großer Unternehmen konzentrieren und den Ausschluss einer Vielzahl von Akteuren und Körperschaften bewirken, insbesondere von ‚self-made' Kleinstunternehmer mit ländlichen Wurzeln.*

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Recycling Economies and the Use-Value of Waste: Scrap Shops in Kolkata, India

Abstract *Informal recycling networks in the Global South have stimulated debates about political economies of recycling in post-colonial contexts. This article retrieves the underrated Marxian notion of use-value to explore how used plastic materials are revalued in the plastic recycling networks of Kolkata, India. Focusing on the role of scrap shops within recycling networks, the relation between informal and formal economic spaces is discussed with reference to Sanyal's (2007) distinction between needs-based and accumulation economies. It is argued that scrap shops perform the crucial role of translating concrete use-value of wasted plastics into new potential social use-value. Thereby, the analysis contributes to understanding the transformation of value between informal and formal economic space in post-colonial political economy of recycling in India.*

Keywords *informal recycling, scrap shops, Kolkata, use-value, global destruction networks, post-colonial political economy*

> "We must be careful also to distinguish between forms of capital that travel in circuits of expanded reproduction and those that strive primarily for simple reproduction or acutely modest accumulation (petty or simple commodity production). And we must acknowledge frequent scenarios where commons (and the communities that sustain them) are relay points in the social life of commodities, and as such may subsidise and supplement capital accumulation." (Gidwani/Baviskar 2011: 143)

1. Introduction

In India, as in many countries of the Global South, economic development throughout the last decades was coupled with an exponential growth as well as compositional change in waste generation (Zhu et al. 2008: 10). Notably, the plastic proportion of the total Municipal Solid Waste (MSW) generation in India has been increasing from 0.7% to 4% between 1971 and 1995 (Mutha et al. 2006: 223). Moreover, the average per capita plastic consumption rose further from 0.8 kg in 1990/91 to 3.2 kg in 2000/01 (Mutha et al. 2006: 223) and increased sharply to around 13 kg in 2014 (WBCSD 2016: 7).

This concomitant feature of economic growth has posed serious challenges to urban local bodies charged with the public responsibility for solid waste management. It laid the groundwork for the formation of vast informal economic networks geared toward the recovery of value from used plastic materials, wherever the local state and private corporations proved incapable of handling and valorising wasted plastics. These informal recycling networks[1] created income opportunities for economically deprived urban populations in times of 'jobless growth' (as the post-reform period in India is often characterised), particularly for marginalised social groups. The waste generated as a result of neoliberal globalisation in urban India advanced to a form of urban commons (cf. Gidwani/Baviskar 2011) and as a result, India has been able to reach exceptionally high plastic recycling rates (compared to most OECD countries) of around 60% (WBCSD 2016: 8).

This article places an empirical focus on scrap shops in Kolkata, in an effort to contribute to the theoretical understanding of the political economy of recycling. My empirical research was geared toward a multi-scalar analysis of plastic recycling networks in Kolkata ranging from *reclaimers*[2] and small scrap shops to recycling workshops and plastic processing industries (see section 5). This research focus is aligned with the burgeoning social science literature on waste (Gille 2007; Gregson/Crang 2010, 2015), and is ascribed in particular to the works concerned with recycling economies (Alexander/Reno 2012; Gill 2012; Gregson/Crang 2015; Samson 2017). As part of this literature, recent contributions within economic geography have described the 'ongoingness' of wasted materials' economic life (Lepawsky/Mather 2011; Gregson et al. 2010; Crang et al.

2013) through *global recycling networks* (GRN) as well as their "very real beginnings and endings" determined by "processes of capitalist accumulation" (Herod et al. 2013: 378) in *global destruction networks* (GDN).

While these approaches have provided a number of analytical avenues for the appraisal of economies of waste and recycling, I contend that the analytical framework provided by the GDN approach falls short of explanations of why, how and under which conditions these recycling economies function in countries within the Global South. Moreover, they miss the implications that spatial and material patterns of wasting have for our understanding of the post-colonial political economy of recycling.

I argue, thus, for a resituating of recycling economies within uneven capitalist development and its prolonged dynamics of primitive accumulation (by dispossession [Harvey 2003] increasingly of urban commons; cf. Gidwani/Baviskar 2011). Such a reconceptualization goes hand in hand with a theoretical reframing of waste and recycling under (post-colonial) capitalism. In this regard, I emphasize the Marxian notion of use-value as an analytical tool to understand the passage of value from waste through the dispersed and fragmented economic geographies created by uneven capitalist development. I consider these fragmented economic geographies in terms of Sanyal's (2007: 209) analysis of urban informal spaces as "needs-based" economies.

The deployment of the notions of 'use-value' and 'needs-based economy' is the result of an empirically grounded search for theoretical concepts that are consistent with the relevance of plastic waste's materiality for the passage of value between informal and formal economic spaces that my research has indicated. In this article I intend to shed light on the question of how and why the interrelation between informal and formal realms of recycling functions economically. I will show this interrelation with regard to the intermediary role of scrap shops in recuperating value from plastic waste in the recycling economies of Kolkata.

In what follows, I will first engage in a theoretical elaboration of waste and recycling that emphasizes the Marxian notion of use-value against the background of uneven capitalist development. I will also critically discuss established works on GDNs within economic geography. Then, I briefly outline my methodological approach. This is followed by an introduction of (informal) plastic recycling economies in Kolkata, and India in general.

The remaining parts of this article take the scrap shop as a vantage point for the empirical analysis of the politico-economic significance of wasted plastics' use-values in the recuperation of value in Kolkata's recycling networks and of the social and economic conditions this is predicated on. These delineations give way to the suggestion that recycling economies in Kolkata ought to be understood in terms of their situatedness within the needs-based economies of post-colonial capitalism (Sanyal 2007).

2. Theorising economies of waste and recycling

Although the burgeoning social science literature on waste has focused much attention on informal recycling activities and the role of reclaimers, Samson (2017: 41) notes that "there is little engagement with literature on value theory or interrogation of *how* reclaimers contribute to the generation of new value" in recycling economies. While the sub-discipline of environmental economic geography (cf. Braun et al. 2018) appears well equipped to address this research gap, it has been silent on the relation of waste and value (with the exception of Franz et al. 2018). Two important exceptions have emerged from other fields of economic geography and were both posed as critics of *global value chain* (GVC, see Gereffi et al. 2005) and *global production network* (GPN, see Henderson et al. 2002) approaches: the works on *global recycling networks* (GRN, see Gregson et al. 2010; Lepawsky/Mather 2011; Crang et al. 2013) and *global destruction networks* (GDN, see Herod et al. 2013, 2014).

The works on GRNs have pointed out that recycling economies pose fundamental challenges to the conceptual frameworks of GVC and GPN approaches. They have argued that the presupposed linearity of value chains (which continue to structure also GPN research, see Crang et al. 2013: 14)—from production to consumption—is at odds with the trajectories of recycling value chains. Instead, they have shown how recycling networks follow multiple trajectories, crosscutting "different product and sectoral chains" (Crang et al. 2013: 14), while being oriented to the supply of eminently heterogeneous 'goods'. The production and capture of value in these recycling networks, therefore, depends upon the ability to assess the quality of complex and heterogeneous materials, and the capabilities to

connect and mediate different production networks, value regimes and regulatory environments. Crang et al. (2013:22), thus, "demonstrate the central importance of materiality to the governance of value capture and extraction". Lepawsky and Mather (2011) align with this principal direction of inquiry but focus more on the practices, actions and processes of wasting and recycling. They emphasize the "'on-going-ness' of economic activity" (2011: 243).

Herod et al. (2014) welcome this GRN critique of the orderly succession of production steps from input to output in GVC and GPN analysis. They however identify a "tendency to ignore the political economy of the passage of value/congealed labour from one product to the next in the recycling process and to focus, instead, on the transformation of commodities' physical form and their discursive transition from 'commodity' to 'waste'" (Herod et al. 2014: 425). To correct this tendency, they introduce the notion of GDNs "as networks of places where products are disassembled and their constituent parts are extracted for processing and re-use." (Herod et al. 2014: 427) They also develop the insightful differentiation of devalorisation and devaluation:

> "When a commodity literally wears out and its constituent elements cannot be used for anything else, then we might think of it as having been devalorised and the value incorporated within it and its constituent parts used up, with none left to be passed on to new products. However, when a commodity is replaced with a newer model and yet it is either still functioning and/or its constituent parts may be reused (either by taking them out and putting them unchanged into another commodity or by processing them and turning them into raw materials for new products), then we might think of it as having been devalued." (Herod et al. 2013: 379)

This differentiation of devalorisation and devaluation provides important insights into the economic processes at work in the global trade in waste and recyclables. Moreover, it also improves our understanding of the political economy of formal recycling, especially in the global North. Recycling schemes mitigate environmental costs of capitalist over-accumulation and "create new spheres of accumulation for capital" (Samson 2017: 41), without jeopardizing demand for new products—a

logic epitomised in disposable items and planned obsolescence (Herod et al. 2013).

There are, nevertheless, three interlinked problems in the contributions on GDNs. According to Samson (2017), the first problem concerns the labour process emphasised by Herod et al. (2013, 2014) and their inability to properly account for the supposedly "unproductive labour" (Herod et al. 2014: 439) of informal recycling agents not directly linked to GPNs. The invocation of the term 'unproductive' to designate labour draws on the classical Marxian differentiation of 'useful' labour on the one hand, which is all labour producing some sort of use-value, and 'productive' labour on the other hand, which refers only to that 'useful' labour that also creates surplus value and is characteristic for capitalist production. This differentiation runs the risk of economic reductionism (Gough 1972: 72) as it assigns economic and political relevance to workers more or less exclusively according to their position within the production process. Such a position deprives the masses of informal workers of political and economic agency (particularly if they labour outside classical wage-relations). Instead, Samson (2017: 57) emphasises that "it is crucially important to recognise the role of informal workers in determining the conditions for the de- and re-valuation of waste". For decades, the differentiation of unproductive and productive labour has been subject to considerable critique, particularly by feminist scholars like Federici (2004) who argue that capitalist accumulation is based on the constant exploitation of women's unpaid reproductive labour thereby producing the most important of all commodities for capitalism: labour power. It is no surprise that these feminist critics have also been at the forefront of a renewed engagement with the "continuous character of capital's 'enclosure'" (DeAngelis 2001; Federici 2004; Harvey 2003). This highlights the unabated relevance that the dispossession, exclusion and exploitation of women, nature and the (post-)colonial 'Other' has "as a structural and periodically repeating process that is integral to the *longue durée* of the capitalist world economy" (Gidwani 2015: 590).

The second problem identified by Samson (2017) is related to a general tendency within the GPN literature to focus predominantly on the global nature of big capital (Bair/Werner 2011)—epitomized in the transnational corporation—and a subsequent disregard of "the specific nature of the capitalist economy in postcolonial contexts" (Samson 2017: 39). Herod et

al. (2014: 427) claim that GDNs are "indelibly imbricated with, and an indispensable Other to, GPNs", but they interpret this entanglement of different economies solely in terms of a hierarchy (and thus, implicitly denigrate the supposedly 'unproductive' labour within informal recycling circuits). Samson (2017: 43) observes that "all of their examples focus simply on how differing labour costs and health and safety regulations in the global North and global South lead GDNs to take different forms in these locations". She argues instead that informal recyclers not only "shape conditions for the de- and re-valuation of waste", but "that the choices they make about how to revalue waste reveal important insights into the deep inner-relations between formal and informal, and local and global aspects of the economy in postcolonial contexts" (Samson 2017: 43).

Moreover, and in addition to this critique, I contend that the works on GDNs underestimate the role of material characteristics of waste, processes of wasting and the social metabolism[3] of waste flows in the post-colonial political economy of recycling. The Marxian notion of 'use-value' (often neglected by Marxist economists; cf. Rosdolsky 1977) offers a theoretical avenue to attend to the materiality of waste (e.g. bio-physical properties) and processes of wasting, which can be directly related to the Marxian concept of value as congealed labour, deployed by Herod et al. (2013, 2014). In the remainder of this article, I discuss how this notion of use-value enables me to relate the abstract political economy of capitalist production to the material realities of plastic recycling in India. In this way, it is possible to analyse the entanglements between informal and formal economic spaces, which I consider in terms of Sanyal's (2007) differentiation of needs-based and accumulation economies.

2.1 Capitalist patterns of wasting

In order to understand how the ongoingness of wasted things is connected with the political economy of capitalism, it is vital to take a detailed look at the 'endings' of commodities. That implies analysing the spatial and material patterns of wasting and the social processes embroiled in it. This section investigates such spatial and material patterns of wasting beyond and below the differentiation of devaluation and devalorisation put forward by Herod et al. (2013, 2014).

First, the production of (particularly post-consumption) waste under capitalism follows specific spatial patterns, namely spatial dispersion (Trettin 2002: 4-5), for the sake of value realisation through household consumption. This is why those things that could become waste (e.g. plastic waste) and might evolve into recyclable plastic, first and foremost have to be reclaimed from displacement. They have to be collected, differentiated, gathered and compiled before anything else could be done with them—they have to be recognized. This explains the important status of and enormous expenditure for (separate) waste collection schemes within formal waste management efforts in the global North and South alike.

Second, processes of wasting under capitalism do not produce plastic waste per se, but hybrid forms of waste composed of complex and intricate combinations of different materials (Gille 2007: 29). This is why they have to be appraised as things—potentially use-full things—long before they can become recycling plastic, and partly even before they become plastic waste. The Marxian notion of 'use-value' offers a useful way to analyse the role of wastes' materiality within the political economy of capitalism. Horton (1997: 132) identifies the structural source of waste under industrial capitalism as "the priority of exchange value over use-value"[4]. In this vein, he offers an instructive "proto-concept of capitalist waste" (Horton 1997: 130), drawing on the explication of the commodity form in the opening chapters of Marx's Capital. The single commodity, as Marx elaborates, appears as the elementary form of wealth in capitalist societies. He explains, "as use-values, commodities differ above all in quality, while as exchange-values they can only differ in quantity" (Marx 1990[1867]: 128). Marx emphasises that "the exchange relation of commodities is characterized precisely by its abstraction from their use-values" (1990[1867]: 127).

Consequently, Horton (1997: 130) argues that,

> "[...] it is only under commodity production that useful things are thrown away. The social separation that commodity production introduces between production and consumption provokes the possibility of waste in the historically pure form of the discard of human use-value."

The reason for this is that the "value of a commodity is finally dependent not on its (individual) use but its (social) ability to be sold" (Horton 1997: 129-130), which pertains to its (abstract) social[5] use-value: "Waste under commodity production, therefore, assumes the conceptual form of the discard of abstract [social] use-value" (Horton 1997: 130), which is itself highly dependent on markets and societal conditions. This points to Marx own explication that "use-value itself – as the [social] use-value of a 'commodity' – possesses an historically specific character" (Marx [1881] in Rosdolsky 1977: 76).

While Herod et al. (2013, 2014) are right to claim that there are very real ends to a commodity's life, this differentiation of concrete and social use-value is integral to understand capitalist processes of wasting in general. It implies that the devalorisation of commodities put forward by Herod et al. (2013) does not necessarily wreck things of all their concrete use-value, but largely affects its social use-value moulded by societal conditions across space and time. To quote Moore: "whether or not something is considered trash depends on time and place more than any inherent characteristics of the object itself" (2011: 135). Thus, what is not, and can never really be lost in processes of wasting, is the concrete use-value of a thing (it can only be changed). Also Marx ascertains that such a concrete thing "is a whole composed of many properties; it can therefore be useful in various ways" (1990[1867]: 125).

Gille (2007: 25) has forcefully argued that we also have to consider "negative use value, that can harm nature and human health". Gille (2007: 29) goes on to highlight "the complexity of linkages, both among different scales and among different materials in circulation", which constitutes "waste itself is a hybrid entity, […] simultaneously social and material". To understand how recycling networks function economically, we have to pay attention to the relation of the social and the material embroiled in waste, the difference and margin between concrete use-value and social use-value, and the potential abstraction into quantitative exchange value this involves. The Marxian notion of use-value constitutes a useful conceptual tool to analyse how the material and discursive transformation as well as spatial trajectories of waste are related to the passage of (exchange) value in the political economy of recycling. My empirical analysis of scrap shops in Kolkata illustrates this difference and margin between concrete use-value

and social use-value, and exposes its relevance for the passage of value—particularly in post-colonial contexts, where the contentious expansion of capitalist social relations exhibits its exclusionary and often violent character.

2.2 Informal recycling as need economy within post-colonial capitalism

A focus on on-going processes of primitive accumulation[6] provides a good vantage point to attend to "the specific nature of the capitalist economy in postcolonial contexts" (Samson 2017: 39). Gidwani and Reddy (2011) emphasize that our understanding of 'waste' is deeply entrenched in the early history of capitalist development and associated processes of primitive accumulation and the enclosure of the commons. They show how the concept of waste evolved to "designate the unenclosed common, the external frontier, and the ethical horizon of civil society" (2011: 1626), which ought to be organized properly and used productively. Thus, they consider 'waste' to be "the political other of capitalist 'value', repeated with difference as part of capital's spatial histories of surplus accumulation" (Gidwani/Reddy 2011: 1625).

In present-day urban India, "'waste' has become society's internal and mobile limit […] a fiercely contested frontier of surplus value production" (Gidwani/Reddy 2011: 1625). Moreover, critically drawing on Sanyal's (2007: 208) notion of the "need economy", Gidwani (2015: 2) argues that this makes it necessary to consider informal recycling as an "infra-economy […] that is denied recognition [but] that is conducive for capitalist accumulation".

Sanyal's (2007: 209) elaboration of the "post-colonial economic formation" exposes the historically specific character of use-value in the relations of production implied by informal economies, which are geared towards the satisfaction of needs. Far from being remnants of pre-capitalist petty commodity production, informal economies should be understood as products of uneven capitalist development: "The most important aspect of the informal sector is that its producers are estranged from the means of production as a result of primitive accumulation" (Sanyal 2007: 209). They are also not able to find work in the formal sector.

In order to survive, they have to engage in some kind of productive activity in "the space of the dispossessed, of those who are excluded from the space of capital, a wasteland created by capitalist development" (Sanyal 2007: 193). The inhabitants of this wasteland "engage in a variety of economic activities for their survival" (Sanyal 2007: 194). This involves different forms of labour, from self-employment and family labour to wage labour, "where in most cases the employer himself is a worker who uses hired labor as a supplement" (Sanyal 2007: 214), but the main "purpose of production is consumption for the satisfaction of need" (Sanyal 2007: 212):

> "[T]he need economy is the space of all consumption driven production activities irrespective of their modes of labor, relations of production and organizational forms. These activities are entirely embedded in the circuit of money and exchange. They can generate a surplus for ploughing back and therefore are capable of self-expansion. In contradistinction, the accumulation-economy refers to the space of production activities that are driven by the logic of accumulation and are based on capitalist production relations with strict separation between capital and labor." (Sanyal 2007: 215)

With the help of Sanyal's differentiation between needs-based and accumulation-centred economies, it is possible to think of more than one social use-value in the post-colonial political economy of India, specifically to conceive of the existence of different economic spaces with different social use values. Yet, and in line with Gidwani (2015), I would contend that the need economy is not exactly located "outside" of capitalist accumulation, as Sanyal (2007: 209) argues, but rather describes the manifold corridors through which "workers are thrown out and drawn back into [capital's] embrace" (Gidwani 2015: 590). Recycling economies demarcate one of these corridors and a particularly vibrant one, which also marks the flux of concrete and social use-values in relation with capitalist patterns of wasting. As outlined above, capitalist processes of wasting deprive wasted commodities of their abstract (social, and historically specific) use-value (Horton 1997) within the space of the accumulation economy, which potentially also foregrounds the reversal of the abstraction from concrete use-values entailed in the exchange relation of commodities.

Therefore, it is necessary to consider the use-value of waste, and "the transformation of commodities' physical form and their discursive transition" (the latter is important to asses the social use-value inscribed in things) in order to understand "the passage of value/congealed labour from one product to the next in the recycling process" (Herod et al. 2014: 425). I argue that the economic function of informal recycling economies (as need economies), lies in the recognition of the remaining concrete use-values and subsequent recuperation and rehabilitation of (abstract) social use-values for both need and accumulation economies. In what follows, I will illustrate how recycling agents within the labour-intensive realms of Kolkata's informal recycling networks are translating wasted plastics' concrete use-value into social use-value within both, informal needs-based and accumulation-centred economies.

3. Researching recycling economies in Kolkata

The previous sections have argued for a more comprehensive theoretical perspective on informal recycling economies in the context of post-colonial capitalism, and emphasised the significance of spatial and material patterns of wasting for the ongoingness of economic life. This implies considering wasted (devalorised and devalued) plastic materials in Kolkata as urban commons/end-of-life commodities with multiple remaining use-values. Moreover, this requires framing the collection, sorting and processing of wasted plastics as well as their reinjection into commodity circuits in terms of a "need economy" (Sanyal 2007: 208.). This section introduces the methods and sample of my empirical research to prepare the empirical analysis.

The empirical research was conducted in Kolkata, India, from September 2016 to February 2017 and was designed as a multi-scalar case study of plastic recycling networks. The analysis is mainly based on research interactions with recycling agents directly involved in the plastic recycling process and focuses on thirteen interviews with scrap shop owners. These thirteen interviews are part of a larger qualitative methodical set of 43 semi-structured interviews and ethnographic accounts in the form of 26 waste walks (participatory observations while moving through public

space, with the aim to systematically explore the spatial articulations of waste management systems and recycling networks) and eight participant observations. I worked with two research assistants, Deborshi Chakraborty (PhD candidate at Jadavpur University) and Subhasish Bandypadhyay (post-grad student at Jadavpur University), who supported me in establishing relationships with recycling agents, interpreting during research interactions and translating and transcribing interviews.

4. Setting the scene – situating plastic recycling networks in Kolkata

Kolkata is the capital of West Bengal and one of the three major metropolitan regions in India along with Delhi and Mumbai. Once the prosperous industrial hub of Eastern India, this metropolitan region has experienced extensive divestment following the period of intensified integration into globalized production since liberalisation. Nevertheless, in 2011, Kolkata City generated above 5000 tonnes of municipal solid waste per day (Das/Bhattacharyya 2013: 147-48). The plastic fraction of Kolkata's municipal solid waste has been rising from 1970 to 1995 from 0.64% to 3.22% and reached close to 5% in 2005 (Chattopadhyay et al. 2009: 1450), thus, constituting the second largest recycling fraction after paper. Despite this, the predominant mode of formal waste management by the municipal authorities is disposal (Bagchi/Mitra 2017; Das/Bhattacharyya 2013). As there is only one official and registered (apparently unoperative) plastic recycling plant (Int34) and, compared to other metropolitan areas like Delhi (Chaturvedi/Gidwani 2011) or Bangalore (Reddy 2015), hardly any effort by big capital or NGOs to profit from the formalisation of recycling collection schemes and valorisation of wasted plastics, virtually all plastic recycling in Kolkata is taking place in the so called 'informal sector'.

Kolkata's plastic recycling networks branch out into specific recycling areas that are entangled with the spatial history of the city. Kolkata is bound by the Hoogly River in the West and by vast wetlands in the East. Thus, urban sprawl was long confined to the South, where most of Kolkata's emerging affluent middle and upper class settled, and the North, where significant industrial development took place. Interestingly, big pockets of

the central and northern parts of old Kolkata where taken over by bustling merchandise and labouring classes. This partly explains the peculiarity that one of the oldest recycling hubs of the city is located very centrally, in and around an area called Kolabagan, and right next to some of the oldest and most renowned academic institutions of West Bengal and India.

The eastern Wetlands have only recently become the frontier of urban development. Kolkata's main dumping site 'Dhapa' (Das/Bhattacharyya 2013) has been marking out the eastern frontier like an arrowhead into the wetlands. With the reclamation of the wetlands, Dhapa has also moved eastwards over the course of the 20th century, making way for poor neighbourhoods and small industries, including the plastic recycling hubs of Tangra, Topsia and VIP, which are now surrounded by real estate development (Int34).

Such plastic recycling hubs and their networks are spread throughout urban India and constitute a complex societal coherency. They are shaped by differences and hierarchies related to gender, caste and class as well as communal belonging and religion (Gill 2012; Bagchi/Mitra 2017). Furthermore, they are highly specialized with respect to different waste fractions and their value chains (Gill 2012). Recycling value chains are characterised by a large number of intermediaries on different scales. The profit margins of recycling agents depend on a complex interplay of access to high-quality supply, tacit recycling knowledge, and economies of scale and trade contacts. All of these dimensions are permeated by social difference, resulting in highly unequal terms of trade for the biggest and most marginalized proportion of recycling agents (Gill 2012; Gidwani 2015) in the labour-intensive realms.

5. Wasted plastics' use-value in Kolkata's needs-based recycling economies

Kolkata's recycling networks are composed of a number of different hierarchically integrated recycling agents directly involved in the recovery and recuperation of value from used plastic materials. Their relative position within the plastic recycling value chain is depicted as a structural heuristic in Figure 1. The actors directly involved in plastic recycling include first

of all *reclaimers*, who retrieve recycling-materials in public space and at dumping sites. Then there are mobile *hawkers* (*Kabbadi Walas*, often also referred to as *itinerant waste buyers*), who buy recycling materials directly from households and shops to resell them to scrap shops. They constitute, together with *workers* in scrap shops and recycling workshops, the basic workforce of plastic recycling networks.

The next up-scaled actors are *scrap shops*, which buy, sort and store recycling materials in order to sell them afterwards in bigger quantities of more homogeneous plastic materials to *wholesalers*. As an essential part of the recycling system the scrap shop represents an "engine of arbitrage: the node where 'raw' waste is purchased, segregated, and stored, before being channelled into secondary circuits of value" (Chaturvedi/Gidwani 2011: 132). Scrap shops are of crucial importance for the reversal of capitalist patterns of wasting. Accordingly, the rehabilitation of social use-value from concrete use-value arises during the passage of wasted plastics from scrap shops and wholesalers (who are engaged in intense sorting, thus homogenizing the wasted plastic materials into type-wise plastic input fractions) to cleaners and cutters. Wholesalers (also called *Mahajans* or *apex traders*), who are basically bigger scrap shops, function as gatekeepers for plastic wastes' passage into secondary circuits of value. These are characterised by the comparably technology- and capital-intensive processing of recycling plastic.

The recycling agents in the more capital-intensive realms of plastic recycling value chains are, to a varying extent able to make profits, and (in pursuit of surplus value) to invest into their businesses, while still being (to different degrees) subject to conditions of informality (regarding land titles, legal status and labour relations). *Cleaners and cutters* are intermediate up-scaled actors for the pre-processing of homogeneous plastic recyclables, and they seem to have emerged in the last decade from bigger wholesalers. They are cleaning and cutting the plastic waste to produce flakes, which is a tradable intermediate plastic recycling product (called *cutting*) that later serves as main input into the actual recycling process in *recycling workshops*, where *dana* is produced. *Dana* is plastic granulate and the final product of the recycling process, which is traded by *dana traders* afterwards, or directly sold for further processing to plastic manufacturers.

The final transition from concrete use-value to social use-value within the "accumulation-economy" (Sanyal 2007: 215) appears to be performed in the processing of *cutting* into *dana*. While cleaned and chopped plastic *cutting* still bears the marks of the wasted plastics it was derived from (in terms of colour and texture, and wear and tear), *dana* is already processed (dyed and melted) to an extent that it's qualities only reflect the aggregated properties of a whole tonnage of *cutting* (which was already a mix of particular wasted plastics). This is a form of abstraction also reflected in increasing scientific denotations and related quality grading.

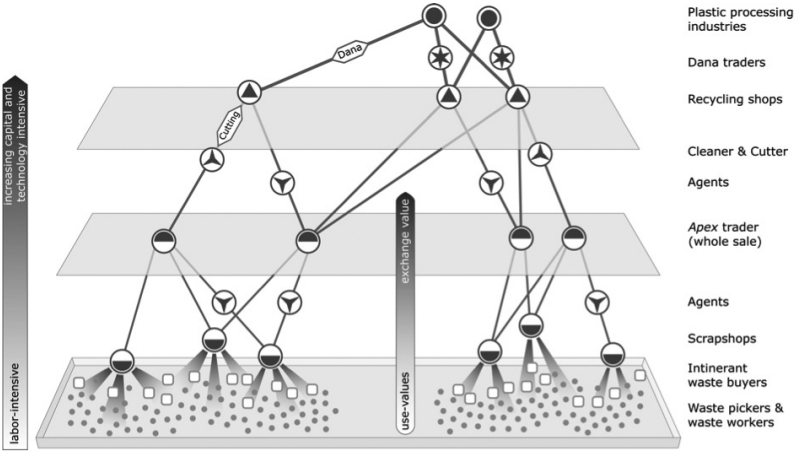

Figure 1: Structural heuristic of plastic recycling networks
Source: own elaboration, prepared by Christoph Reichel

Trettin (2002: 69-86) has argued that the economically most relevant recycling agents in Kolkata are hawkers and neighbourhood-based scrap shops, because they supply enormous quantities of relatively clean and homogenous recyclables sourced directly from households. My interrogation of the 'ongoingness' of the economic life of used plastics in the

recycling networks of Kolkata, therefore, centres on those recycling agents who are spread throughout the city and who do not necessarily collect and compile plastic waste *per se*, but all kinds of potentially useful materials. This includes reclaimers, hawkers, and especially the scrap shops, where useful materials accumulate. These actors in the labour-intensive realms of recycling networks are often differentiated according to their hierarchical position along recycling value chains. This is usually reasoned in the interconnection of value capture and economies of scale (see Figure 1), thus distinguishing, for example, scrap shops and wholesalers due to the higher turnover of the latter. Alternatively, they can be analysed according to the "difference in potential rents to be extracted from particular locations", or territories of collection, as proposed by Bagchi and Mitra (2017: 158). Such an approach already points to the economically crucial aspect of supply and sourcing (see Crang et al. 2013) in recycling networks.

In a slightly related manner, I am going to analyse scrap shops with regard to the spatial, material and discursive trajectories and transformations of wasted plastics implied by capitalist patterns of wasting. That way it is possible to identify three (ecological) economic functions of the labour-intensive realms of recycling networks—epitomized in the role of scrap shops—and foreground the implications of distinct sources of wasted plastics for the recuperation of social use-value through the appraisal of their concrete use-value:

1. The collection and spatial agglomeration of dispersed waste that accrues along different nodes of production, distribution and consumption. This pertains to distinct socio-metabolic points as well as social-institutional frames of access.
2. The appraisal of concrete use-values (predicated on socio-metabolic points of access) and subsequent anticipation of potential social use-values of used material.
3. The segregation and allocation of sufficient amounts of recyclables according to their suitability for further processing and remanufacturing (which pertains to the interconnection of value capture and economies of scale).

These functions indicate how scrap shops in Kolkata facilitate the actual plastic recycling processes, and thus enable the passage of value

from wasted plastics into secondary circuits of value in the accumulation economy. The next sections first offer a detailed analysis of the distinct ways in which three different types of scrap shops attend to capitalist patterns of wasting. Second, the social and economic conditions of recycling economies in Kolkata are analysed in line with the characteristics of Sanyal's (2007) need economy.

5.1 Looking, touching, feeling – scrap shops' translation of plastics' concrete use-values

In what follows, I will first attend in detail to the appraisal of concrete and social use-values in Kolkata's plastic recycling networks. Then I will turn to the reversal of spatial and material patterns of capitalist wasting in the agglomeration of dispersed and hybrid wastes that accrue along different nodes of production, distribution and consumption, in order to differentiate between three types of scrap shops according to their source of wasted plastics. This differentiation serves to illustrate the intermediary role of scrap shops and relevance of wasted plastics' use-value for the passage of value between needs-based and accumulation driven recycling realms.

The presence of concrete use-values in recycling networks reveals itself in mundane practices, namely in the way recycling agents in Kolkata attend to the different wasted items available to them. Concrete use-values are contained in the labour of sorting, dismantling, segregating and compiling, which involves a lot of 'sensing'. They sort according to the physical forms they encounter and differentiate between types and colours of plastics. They meticulously distinguish plastics just by seeing the reflections of light in them (Int6), by crushing and hearing their sound (Int14) and by feeling their texture, or, in case of uncertainty, by tearing (Int6) and breaking (Int30) them, by plunging them in water (Int22) or by burning them (Int13). This practice, the differentiation of types of plastics, is performed through the ordering capacities of a vernacular language of valuation (Martinez-Alier 2008) and the tacit recycling knowledge encoded in it. The discursive order of things in this language is necessarily in conversation with, but never reducible to, the scientific denominations aligned with recycling commodities' exchange value.

Scrap shops translate concrete use-values into social use-values with the help of this language of valuation, which draws on the colour (like

in the case of "*kalo*", which means black, to describe black plastics), the utility (like in the case of the "*delivery*" function of water pipes) or sensible attributes (like in the case of "*hard*" or "*krystal*") of things, or on specific products that shape the perception of these things (like in the case of "*mother*" or "*dairy*" derived from the milk pouches of the dairy company *Mother Dairy*). Yet, the concrete use-values contained in this practice and performed through this language don't appear from nothing but are predicated on capitalist processes of wasting.

Scrap shops in Kolkata do not only process street and household waste but also all kinds of production and commercial wastes. The material and discursive transformations and spatial trajectories of wasted plastics in Kolkata differ according to the respective nodes along conduits of production, distribution and consumption where they accrue. This has implications for the potential recuperation of value by scrap shops.

In the following, I introduce and distinguish three types of scrap shops (see Table 1), differentiated according to their source of recyclables.

1. *Reclaimer-sourced scrap shops* (Int2; Int5; Int7; Int9; Int17; Int25; Int26) attend to the most dispersed and hybrid source of wasted plastics. The recovery of recyclables from mixed municipal solid wastes by reclaimers (c.f. Trettin 2002; Ghosh 2017; Bagchi/Mitra 2017) is a particularly clear example of the reversal of spatial and material patterns of capitalist wasting. Plastics are recovered in an often decomposed or 'dirty' state, which has implications for their concrete use-values and for further processing. Muhammad Aziz[7] (Int5) runs a reclaimer-sourced scrap shop in Kolabagan in Old Kolkata. He inherited this business from his father and grandfather. Reclaimer-sourced scrap shops buy all kinds of scrap materials, compile them and sell them for further segregation to *Mahajans*. These scrap shops are often located in and around recycling hubs (Seabrook/Siddiqui 2011) or low-income neighbourhoods where reclaimers live.

2. *Household-sourced scrap shops* (Int8, Int13, Int22, Int30; c.f. Trettin 2002) also draw on highly dispersed, mostly post-consumption waste, but bypass its trajectories of wasting (often with the help of mobile hawkers) before it enters municipal solid waste streams. Amita Ray (Int8) runs a typical neighbourhood-based scrap shop with her family in the South-East of Kolkata and explains their supply base:

> "We buy waste from different places. The sellers sometimes come down to sell them or as we have our own van, my brother goes to their respective places and collects the material […] from households mainly. We rarely deal with offices, only if they come and ask us to collect. Most of the sellers live in the nearby locality."

The area covered by Farhan Laskar (Int30) and his mobile hawkers is much larger and stretches throughout the vast middle-class neighbourhoods of southern Kolkata, although their suppliers are also households. Farhan Laskar explains that "every kind of material comes here" (Int30), like paper, plastics, glass bottles and metals. By virtue of their source of waste, household-sourced scrap shops receive already pre-sorted and comparably clean recyclables and their variety of reclaimed materials is much greater compared to reclaimer-sourced scrap shops.

3. *Commercially-sourced scrap shops* (Int6, Int14) draw on plastic wasted in the circuits of production and distribution. The small shop of Jabbar Rafiq (Int14), who runs a family business in third generation as well, also located in Kolabagan, stands in stark contrast to reclaimer- and household-sourced scrap shops. He is specialised solely in plastics and his business is built on a privileged source: he purchases relatively unspoiled and homogenous discarded plastic packaging materials in bigger quantities from commercial areas. He also already sorts plastics according to scientific denominations of plastic types. He deals mainly in polypropylene (PP); three different types of low-density polyethylene (LD) differentiated into white, coloured and soft; high-modulus polyethylene (HM); and *dairy* (milk packets). There is a lot of 'sensing' involved in the process. During our interview, he was cutting out the printed parts of plastic packaging foils to separate them from the untainted transparent main parts. He was meticulously differentiating between hard, soft and colour types of plastics and explained how to distinguish plastics just by seeing, crushing and hearing their sound and feeling their texture.

The social-institutional frames of access to wasted plastics, particularly the extent to which a property status is ascribed to them, further elucidates this three-fold differentiation of scrap shops. Commercially-sourced and household-sourced scrap shops generally access waste plastics as a form of

private property, although households sometimes also give away recyclables for free as reward for the collection service or as a gift. In contrast, reclaimer-sourced scrap shops deal with waste plastics that have been obtained by reclaimers as urban commons.

Types of scrap shops	**Spatial patterns and socio-metabolic points of recovery**	**Material properties, compositions and hybridity of source**	**Social-institutional character of supply**
Reclaimer-sourced	Highly dispersed in public space and at MSW disposal sites	All kinds of mixed, often dirty and partly decomposed wastes	Wastes recovered by reclaimers as urban commons
Household-sourced	Highly dispersed, generally derived at place of consumption	All kinds pre-sorted and comparably clean recyclable waste	Waste accessed as private property, exchanged as commodity or received as gift
Commercially-sourced	Less dispersed and derived at different points of production and distribution	Only comparably clean and homogeneous plastics materials	Waste accessed as private property, exchanged as commodity

Table 1: Source-wise differentiation of scrap shops.
Source: own elaboration

The different economic position of scrap shops is always also related to economies of scale (the third of the above-mentioned functions of labor-intensive recycling realms). Nevertheless, this threefold differentiation of scrap shops in Kolkata reveals a general tendency. The reversal of capitalist patterns of wasting and the appraisal of concrete and social use-values of waste plastics by scrap shops intersect in a way that exposes their intermediary

role in the passage of value between informal and formal, between needs-based and accumulation economies. Recyclers in the labour-intensive realms of Kolkata's plastic recycling networks are not only anticipating the social need for recycling *dana* in the accumulation economy. On the contrary, they are always also anticipating the social need for reusable and repairable plastic things in the needs-based economy. However, they do so differently with respect to the specific access-point to capitalist patterns of wasting they can draw on, as exemplified by the household-sourced scrap shop of Farhan Laskar (Int30) and his hawkers. They acquire not only recyclables like paper, plastics, glass bottles and metals, but also collect all kinds of things that could be refurbished, repaired and used again in one way or another. As Farhan Laskar clarifies: "We do not sell them, we take them ourselves. [But,] nothing fixed. If someone comes and asks for them against a good price, we sometimes sell them" (Int30). Like Farhan Laskar and his hawkers, Amita Ray and her family are taking "almost everything" (Int8), including all kinds of useful things that could be repaired, refurbished and passed on against remuneration. Muhammad Aziz (Int5) recounts that "there are things which can be reused" and that reclaimers "get them [and] directly sell them" (Int5) on the market for reusable items (WasteWalk3).

Recycling agents in Kolkata recover value starting from the most direct and concrete way and proceed with the recuperation of value through aggregation and segregation, which makes used plastic materials valuable for accumulation-centred manufacturing again. Kolkata's recyclers are highly skilled translators of different material worlds and they translate differently according to the source of wasted plastics they can draw on and the concrete use-values they obtain from it. The general premise of the appraisal of concrete use-values of plastics remains the same. This clarifies scrap shop's intermediary role in the passage of value from wasted plastics between needs-based economies and the accumulation-centred processing and remanufacturing of recycling *dana*.

The closer wasted plastics accrue to the spheres of capitalist production and circulation of commodities, the easier the re-establishment of social use-value for the accumulation economy, and the higher the value captured by scrap shops. Jabbar Rafiq's (Int14) commercially-sourced scrap shop illustrates the economic relevance of different sources of recyclables.

This is also always related to the homogeneity, quality, colour and contamination-level of waste supply as crucial factors for further processing. While being firmly situated within the need economy (as typical example of an "owner worker" [Sanyal 2007: 238] with one employee in a rented place), his source of recyclables ascribes him a privileged economic position. This is demonstrated by the difference in profit margins. With the sale of their plastic items, reclaimer-sourced scrap traders like Tanveer Sayed (Int2) are making a marginal profit of 0.50 to maximum 2 Rupees (Rs.)[8] per kg. This is less than the profit made by household-sourced scrap shops like the ones run by Farhan Laskar (Int30) and the Family of Amita Ray (Int8), which amounts to an average of 2 to 3 Rs. per kg of plastic material. Jabbar Rafiq (Int14), in contrast, is making an average 5 to 7 Rs. profit per kg of sold plastic. His profit margins are up to five times that of reclaimer-sourced scrap shops and more than double compared to those of household-sourced scrap shops. The resulting capability for "acutely modest accumulation" (Gidwani/Baviskar 2011: 143) gives him hope for social upward mobility, at least in the next generation, as he pledges that his children "will be educated and will do better jobs" in the formal realms of the accumulation economy.

While the analytical distinction of devalorisation and devaluation of Herod et al. (2013) does reverberate in the differential (exchange) value recuperated from used plastics according to their source, this distinction does not serve to explain the passage of value from informal to formal economies of plastic recycling and remanufacturing. It does not explain why, how and under which conditions these recycling economies function in countries of the Global South. I contend that the passage of value in the post-colonial political economy of plastic recycling in Kolkata is predicated first and foremost on scrap shops' reversal of capitalist pattern of wasting through their appraisal of use values *within needs-based economies*.

5.2 Social and economic conditions of the retrieval of wasted plastics in Kolkata

The appraisal of concrete use-value and anticipation of the potential social use-value of used plastic materials by scrap shops (for both reuse within the need-economy and recycling for the accumulation economy) is enabling the achievement of exceptionally high plastic recycling rates

of up to 60% (WBCSD 2016: 8) in India. However, the appreciation of concrete use-values of wasted plastics is economically only feasible at the needs-based informal fringes of capitalist relations of production, as it is particularly labour intensive. It is built on the extreme exploitation of informal labour, and Kolkata's plastic traders and manufacturers are well aware of this fact and of the 'competitive advantage' they gain from it within global recycling networks (Int42; Int37; cf. WBCSD 2016). In this section I discuss how Sanyal's (2007) depiction of the need economy is reflected in the social relations governing labour-intensive realms of recycling economies in Kolkata.

Tanveer Sayed (Int2) runs a "relay point" (Gidwani/Baviskar 2011: 143) in the social (after-)life of commodities: a small scrap shop on a backstreet sidewalk in Old Kolkata, where he is channelling the concrete use-value of wasted materials into potential future social use-values. He came to Kolkata from the countryside (a village, where he still has his household and family) and since the mid-1980s he has been in this profession. Coming from a village, he found work in a scrap shop with the help of friends. Once he understood the business, he opened his own small scrap shop. He remembers: "our business was more or less mundane and constant and the prices were more or less stable" (Int2). However, during the last years, "all the prices of the daily needs are inflating, all the materials of the scrap dealers […] have drastically gone down in price, but the prices of new goods remain the same" (Int2). Against the backdrop of this economic downturn[9] he makes clear that his livelihood is under constant threat. There is now no way to save or invest in his business: "We are poor people, little entrepreneurs, there is no capital for us. Whatever income is there, it's difficult to even run a household with it […], we earn and spend on a daily basis" (Int2).

In line with Sanyal's (2007) description of the need economy, most recycling agents in the labour intensive realms of Kolkata's recycling networks are not oriented toward capital accumulation, but toward consumption for the simple satisfaction of needs. Additionally, the labour relations that are characteristic for capitalist modes of production are not the norm within Kolkata's plastic recycling economies. Tanveer Sayed is (like Int14), a typical example of an "owner worker" (Sanyal 2007: 238) with one employee who basically performs the same kind of work as he

does. The reclaimer-sourced scrap shop of Muhammad Aziz (Int5), on the contrary, reflects (like Int13) typical capitalist labour relations: he employs four workers in two shifts for sorting and packaging tasks, while he manages the shop. He employes no family labour. The scrap shop of Amita Ray (Int8) is again a different case, based solely on family labour (like Int22). Whenever her father is out to work as a driver (in order to meet the children's educational costs), she runs the shop with the help of her mother and younger brother.

The need economy, which Sanyal (2007) conceptualises to characterise urban informal economies like Kolkata's plastic recycling networks, is the result of primitive accumulation. It constitutes a "wasteland" that is the "the space of the dispossessed" (Sanyal 2007: 194) and excluded. As such, it is predicated on contested, contradictory and often violent histories of rural-(peri)-urban relations and migrations. Like in a classical neoliberal example of the expropriation of subsistence farmers and fishers around Kolkata for state-sponsored land speculations in the name of an urban development project called *Rajarhat New Town Project*: "Most of [the fishers and farmers] now collect, sort and sell garbage for their living" (Seppälä 2014: 95). However, these rural-(peri)-urban relations include also commuting stories, occupational mobility and diversification of income for better livelihood options (Int8; Int22; Int30; cf. Trettin 2002).

Processes of primitive accumulation by dispossession are bound up with and always draw upon existing power relations (DeAngelis 2001; Federici 2004) especially social categorizations along gender, caste and religion in the case of Kolkata, and India in general. In line with previous studies (Trettin 2002; Bagchi/Mitra 2017), my research shows that, while more than half of all reclaimers are women, the share of female workers in scrap shops is already much lower (and confined to sorting activities), and only very few women are found to run scrap shops (and there are virtually no female hawkers and no women among up-chain actors of the recycling value chain). Only two of the scrap shops included in my sample were run by women (Int25, Int8), and one of them, Amita Ray (Int8), did so only in the absence of her father. Amita adds another crucial layer to the interwoven power relations that structure the political economy of plastic recycling in Kolkata when she explains: "Actually, most of the buyers

are Beharis and Muslims. […] Very few Bengalis like us are associated with this trade" (Int8). Waste and recycling works are done mainly by low-status Muslim (Seabrook/Siddiqui 2011) and low-caste, *Dalit* groups (Bagchi/Mitra 2017; see also Iyer in this issue) who are often considered as "intruding" migrant populations by the dominant social groups in Kolkata, even if they migrated from neighbouring states or rural Bengal generations ago. The low status ascribed by dominant social groups to everything and everybody related to waste and recycling is also reflected in the political negation of recycling economies in Kolkata. This negation by state authorities, government institution and parts of the civil society—for whom local plastic recycling economies either do not exist (Int43) or are to be held responsible for urban pollution (Int31)—has considerable implications for the social, political and economic vulnerability of recyclers (particularly in public space) and the devaluation of recycling labour, as it affirms its societal stigmatization. Amita Ray (Int8) also speaks about the close-knit relationship between sources of recyclable materials and the longstanding stigmatisation of waste and dirt related works. She points out that "all the works are done by the family members only" and that they "do not deal with the waste pickers […]. The neighbours object to dealing with the waste pickers as they collect things from unhygienic places" (Int8). She affirms that "*kabbadi walas* [mobile hawkers] collect many things from dustbins, which we do not allow them to sell here" (Int8).

Labour-intensive realms of recycling networks in Kolkata reflect how social power relations (particularly along social categories of gender, religion and caste), the stigmatisation of recycling labour and its political negation are entangled with the economic deprivation implied by prolonged processes of primitive accumulation by dispossession. They coincide with the economic inequalities produced by the hierarchical division of labour and economics of scale that structure recycling networks, and are aggravated by the divergent access to differently wasted plastic materials. The result of this is the extreme devaluation of all works related to the collection, sorting, agglomeration, segregation, compiling and purification of waste materials (see also Vallin/Dias in this issue). This has to be taken into account in order to understand the "passage of value/congealed labour" (Herod et al. 2014: 425) in the post-colonial political economy

of recycling. The devaluation of recycling labour conditions, enables and confines the appraisal of wasted plastics' concrete and social use-value, and the interactions between need and accumulation economies configured by it.

6. Conclusion

In this article, I have focused on scrap shops' intermediary role in the retrieval of wasted plastics' use-value through informal recycling economies in Kolkata, India. Based on a critical engagement with recent economic geography scholarship on GDNs (Herod et al. 2013), I have argued with Samson (2017) for a theoretical reframing of the political economy of recycling in post-colonial context. Ensuing from a multi-scalar empirical analysis of plastic recycling networks in Kolkata, I have deployed the Marxian notion of use-value as an analytical tool to account for the relevance of spatial and material patterns of wasting in the recuperation of value by scrap shops in the labour-intensive realms of needs-based (Sanyal 2007) recycling economies. This approach foregrounds the interrelations and entanglements of informal and formal and of needs-based and accumulation-centred spaces in the post-colonial political economy of recycling.

I have analysed scrap shops' intermediary role in the retrieval of wasted plastics' use-value with respect to their supply. The source-wise differentiation of scrap shops in Kolkata elucidates how economies of recycling begin with the reversal of capitalism's spatial and material patterns of waste production. They aggregate dispersed hybrid discarded materials, acquired either as waste-commodity (within the confines of private property) or obtained as urban commons (by reclaimers). They distinguish and disassemble the constituent parts of their purchase according to concrete material characteristics that indicate physical and chemical properties, sensible texture, form and colour, that is, the concrete use-value of wasted things. This is a process that involves a lot of looking, touching and feeling, as well as a lot of knowledge about relative exchange values (premised on potential social use value) of recyclables. However, in this process, they also measure out the re-use-value of things against

their potential exchange value in recycling value chains (c.f. Samson 2017). They take the reusable items for themselves, or re-sell them at second-hand markets. In the case of all three types of scrap shops, the material properties of wasted plastics are the only reliable indicator to assess their potential value, to be either fed as resource inputs into the "secondary circuits of value" (Chaturvedi/Gidwani 2011: 132) in the accumulation economy, or to be kept or sold for direct reuse or repair in the need economy. However, they are translating the material properties of wasted plastics differently according to the waste-source they can draw on and the concrete use-values they obtain from it, thereby extending the "useful life" (Reddy 2015: 168) of things. This differential capability to translate concrete use-values into social use-values designates their abstract economic function as "relay points" (Gidwani/Baviskar 2011: 143) in the interactions between informal and formal, between needs-based and accumulation economies. It elucidates how they "subsidise and supplement capital accumulation" (Gidwani/Baviskar 2011: 143).

This appraisal of use-values of wasted plastics is only economically feasible within the informal sub-economies of India's post-colonial capitalist formation (Sanyal 2007). It is based on the extreme exploitation of devalued labour at the fringes of capitalist accumulation and deeply entrenched in on-going processes of primitive accumulation by dispossession. In Kolkata, these processes are particularly clear along power relations related to social categorizations of caste, gender and religion that translate into the social stigmatisation of work with waste and its political negation by government institutions, state authorities and the general public. The entanglement of recycling economies within the interlocking power relations that structure needs-based economies in India results in the stark devaluation of recycling labour. Ironically, it is exactly this useful labour of collecting, sorting, aggregating and compiling—the metabolizing labour "inside India's infra-economy" (Gidwani 2015)—that is absolutely central for the reversal of capitalism's spatial and material patterns of wasting, and thus, the indispensible premise of any recycling economy. This has implications for the Marxian understanding of value (as congealed labour) put forward by Herod et al. (2013, 2014), because the recuperation of exchange value is not organised solely within the confines of capitalist production but

mediated through diverse societal relations that might be partly aligned to, but in any case exceed capitalist social relations. Thus, from a value standpoint, the congealed labour of waste plastics has been (to varying degrees) already lost *within* capitalist primary circuits of accumulation (be it through devaluation or devalorisation) and is only reincarnated in an accumulation-by-dispossession like manner.

The transfer of value from waste between informal and formal economic spaces of recycling discussed in this article could provide new impetus for the engagement with "socio-economic inequalities and environmental change" (Franz et al. 2018: 201) within environmental economic geography (cf. Braun et al. 2018). The Marxian notion of use-value, particularly the differentiation between concrete and social (or abstract) use-value, might also provide a missing link to the recent, and extremely productive, engagement with the materiality of waste and recyclables from the perspective of new materialism, which is drawing on actor network theory (cf. Gille 2010), and science and technology studies (cf. Lepawsky/Mather 2011). Moreover, it might offer fertile ground for further engagement with the research agenda set by the explicitly political Marxist readings of recycler's "abstract and concrete labour in the age of informality" (Gidwani 2018) and their agency (Samson 2017) within the uneven geographies of post-colonial capitalism.

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1 I am using 'recycling networks' interchangeably with 'recycling economies'. Yet, the former is pertaining more to geographically situated spatial relations, while the latter is highlighting economic relations.

2 The term 'reclaimers' is less prone to reproduce the stigmatization of waste work, compared to 'waste pickers', see Samson (2017).
3 The notion of social metabolism is used here to denote waste flows in terms of the co-constitution of politico-economic processes and "biophysical processes that result as resources are assembled and transformed, and waste is produced" (Demaria/Schindler 2016: 3).
4 This is much in line with Herod et al.'s (2013) differentiation of devaluation and devalorization, but located on a different level of abstraction.
5 The notions ‚social use-value' and ‚abstract use-value' are both used in the Marxist literature. While their distinction makes sense in specific cases, I use 'social use-value' for reasons of comprehensibility.
6 The term "primitive accumulation" is used instead of "original accumulation" in this article for reasons of conformity with the quoted literature (from post-colonial perspective).
7 All names of interviewees are synonyms.
8 During the research period, 1 € has been exchanged for approximately 73 Rs.
9 The local prices of recyclables are directly related to the prices of fresh plastic (Int37; Int42), and thus, bound up with the global oil price. Virtually all of my informants were aware about this connection, but an overwhelming majority of them attribute their economic hardship since 2015 to the economic policies of the BJP-lead government of Narendra Modi.

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List of Interviews

Int2: small-size scrap shop; interview conducted in Old Kolkata on Nov. 19, 2016.
Int5: middle-size scrap shop; interview conducted in Old Kolkata on Nov. 25, 2016.
Int6: middle-size scrap shop; interview conducted in North Kolkata on Dec. 3, 2016.
Int7: small-size scrap shop; interview conducted in East Kolkata on Dec. 4, 2016.
Int8: small-size scrap shop; interview conducted in East Kolkata on Dec. 4, 2016.
Int9: middle-size scrap shop; interview conducted in East Kolkata on Dec. 4, 2016.
Int13: middle-size scrap shop; interview conducted in Old Kolkata on Dec. 10, 2016.
Int14: small-size scrap shop; interview conducted in Old Kolkata on Dec. 10, 2016.
Int17: big-size scrap shop; conducted in East Kolkata on Dec. 15, 2016.
Int22: middle-size scrap shop; interview conducted in East Kolkata on Jan. 19, 2017.
Int25: middle-size scrap shop; interview conducted in East Kolkata on Jan. 24, 2017.
Int26: big-size scrap shop; conducted in East Kolkata on Jan. 24, 2017.
Int30: small-size scrap shop; conducted in South Kolkata on Jan. 26, 2017.
Int31: Kolkata Municipal Corporation; interview conducted on Jan. 30, 2017.
Int34: NGO representative; interview conducted in East Kolkata on Feb. 6, 2017.
Int37: Central Institute of Plastics Engineering & Technology; interview in Haldia on Feb. 8, 2017.
Int42: plastic manufacturer; interview conducted in Old Kolkata on Feb. 14, 2017.
Int43: West Bengal Pollution Control Board; interview conducted on Feb. 17, 2017.
WasteWalk3: WasteWalk conducted in Old Kolkata on Nov. 2, 2016.

Abstract *Informelle Recyclingnetzwerke im Globalen Süden haben Diskussionen über die politische Ökonomien des Recyclings im postkolonialen Kontext angeregt. Dieser Artikel greift auf den unterbewerteten marxschen Begriff des Gebrauchswertes zurück, um zu untersuchen, wie gebrauchte Plastikmaterialien in den Plastikrecyclingnetzen von Kalkutta, Indien, aufgewertet werden. Mit Blick auf die Rolle von Recyclinghändlern innerhalb von Recyclingnetzwerken wird der Zusammenhang zwischen informellen und formellen Ökonomien unter Bezugnahme auf Sanyals (2007) Unterscheidung zwischen bedarfsorientierter und akkumulationsbasierter Ökonomie erörtert. Es wird argumentiert, dass Recyclinghändler eine entscheidende Rolle dabei spielen, den konkreten Gebrauchswert von Kunststoffabfällen in neue potenzielle soziale Gebrauchswerte, und damit Tauschwerte zu übersetzen. Dadurch trägt die Analyse dazu bei, die Transformation von Wert zwischen informellen und formellen ökonomischen Räumen in der postkolonialen politischen Ökonomie des Recyclings in Indien zu verstehen.*

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The 'Abolishing' of Manual Scavenging: Negotiations with Caste and Occupation in Ahmedabad

Abstract *Despite laws prohibiting the occupation of manual scavenging, it is widely prevalent in India. While it is recognised as a hazardous and undignified occupation that involves the manual handling of excreta, it is also recognised as a form of caste-based discrimination that is performed by the lowest Dalit castes in India. In Ahmedabad, manual scavenging and sanitation work is performed by the Bhangis who lack access to alternative occupations and bear the brunt of untouchability. While sanitation workers, activists, NGOs and trade unions attempt to uncover the prevalence of manual scavenging in Ahmedabad, government bodies continue to deny the existence of manual scavenging and caste based discrimination as such. In this paper, I look at the ways in which the occupation of manual scavenging is articulated, contested and negotiated by the aforementioned actors in Ahmedabad.*

Keywords *manual scavenging, caste-based discrimination, technological solutions, rehabilitation schemes, graded hierarchy of caste*

1. Introduction

Manual scavenging has been recognised internationally as a violation of basic human rights of health and dignity (Human Rights Watch 2014). However, despite laws that prohibit manual scavenging and declare the enforcement of the occupation of manual scavenging as a punishable offence (Government of India 2013), manual scavenging is widely prevalent in India (Shaikh 2018). In "The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013", a manual scavenger is defined as,

> "a person engaged or employed, at the commencement of this act or at any time thereafter, by an individual or local authority or an agency or a contractor, for manually cleaning, carrying, disposing of, or otherwise handling in any manner, human excreta in an insanitary latrine or in open drain or pit into which the human excreta from the insanitary latrines is disposed of, or on a railway track or in such other spaces or premises, as the Central Government or a State Government may notify, before the excreta fully decomposes in such a manner as may be prescribed" (Government of India 2013, Clause 2[g]: 3).

"Manual scavenging", the Act clarifies, "shall be construed accordingly" (Government of India 2013, Clause 2[g]: 3). In this paper, I look at the ways in which the occupation of manual scavenging is contested and negotiated by municipal bodies, sanitation workers, Dalit[1] activists, NGOs, and trade unions in Ahmedabad, in the state of Gujarat.

The paper is organised into two sections. In the first section, I look at the solutions recommended for the "eradication" and "abolishing"[2] of manual scavenging, and attempt to problematise the idea of manual scavenging as a sanitation issue and/or an issue of caste-based discrimination[3]. I argue that, in Ahmedabad, technological solutions and rehabilitation schemes have been unable to effect a transformative change towards dismantling the close correlation between caste identity and sanitation occupations in the case of the Bhangis[4], who lack access to alternative occupations. In the second section, I argue that, owing to the vulnerable socio-economic position of the Bhangis and the denial of manual scavenging and untouchability by the state government, it has not been yet possible for activists, NGOs, CBOs (Community Based Organization)[5] and trade unions to articulate caste-based discrimination and labour rights simultaneously in the case of manual scavenging. Lastly, I argue that the issue of manual scavenging continues to be isolated from the larger Dalit movement in Ahmedabad, owing to the caste position of the Bhangis even amongst the Dalits. I conclude by reflecting on the relationship between neoliberalism and sanitation work in India.

This paper is primarily based on a series of interviews that I conducted in Ahmedabad between August and December 2016 for my M.Phil dissertation. My initial research question was an attempt to understand the relationship between the demand for the rights of permanency for sanitation

workers in the Ahmedabad Municipal Corporation and demands for the "eradication" of manual scavenging[6] (Dhar 2016). I followed a snow-ball sampling method and conducted 22 interviews with various individuals, ranging from sanitation workers to activists and government officials. The most important assumption of this paper, i.e. the close correlation between caste identity and sanitation-based occupations, is partly based on Paul D'Souza's PhD dissertation (D'Souza 2005) on the scavenging castes in Ahmedabad. Unlike his study, my own method for studying the representation of and contestations to manual scavenging in Ahmedabad did not involve a quantitative survey. Rather, I followed leads by respondents regarding other potential respondents in an attempt to understand the networks of alliance and conflict between the various actors contesting and negotiating the persistence of manual scavenging in Ahmedabad. Ultimately, my research presents the many difficulties and contradictions that are encountered by sanitation workers, activists, NGOs and trade unions in the struggle against manual scavenging in Ahmedabad[7].

2. Solving manual scavenging: between technological renovation and rehabilitation schemes

"The Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act" of 1993 is the first ever legislation that prohibited the practice of manual scavenging and deemed it a punishable offence. However, there are two problems with this legislation. Firstly, by making the prohibition of dry latrines a central factor in the abolition of manual scavenging, it did not take into into consideration a wider range of occupations which involve the unsafe and undignified handling of excreta, such as manual scavenging in sewers. In contrast, the 2013 Act includes a wider variety of occupations under the definition of manual scavenging, thereby making it possible to contest a wider range of manual scavenging practices[8]. This is significant, since it argues against simplistic correlations that might be made between the destruction of dry latrines and the abolishing of manual scavenging (Janvikas 2012: 6). Secondly, the 1993 Act does not include the relationship between the occupation of manual scavenging and caste identity. Since the 2013 Act connects the occupation of

manual scavenging to caste-based discrimination (Government of India 2013), it points towards a socio-economics of this occupation that is closely tied to caste identity. In addition to the recognition of a wider variety of occupations that comes within the purview of manual scavenging and the recognition of the link between manual scavenging and caste identity, the 2013 Act also recommends the introduction of new technology for the purpose of cleaning sewers and septic tanks, and also recommends rehabilitation measures for manual scavengers in the form of loans and scholarships. While such measures and recommendations are popularly viewed as potential solutions towards the eradication of manual scavenging, I will show how, in the case of Ahmedabad, such 'solutions' have been unsuccessful in the context of the close relationship between sanitation occupations and caste identity.

Dalit leaders and activists such as Bezwada Wilson of the Safai Karamchari Andolan have argued that manual scavenging needs to be viewed not as an issue of sanitation but rather as one of caste (Subrahmaniam 2016). As various scholars have pointed out, manual scavenging and sanitation work is performed by a particular group of Dalit castes (Jodhka 2002; Prashad 2001; D'Souza 2005) in India. While most of these castes are known commonly as "Valmikis"[9], Om Prakash Valmiki points out that there are at least 276 different caste groups that are deemed to be traditional inheritors of scavenging work (Valmiki 2014). In recent years, documentary films on manual scavenging, such as Kakoos (2017) by Divya Bharati have also extensively highlighted the relationship between manual scavenging and caste identity. However, while it has been highlighted by scholars and filmmakers that manual scavenging is a caste-based occupation and not simply a problem of sanitation, there has been little study carried out on the solutions that have been devised for the eradication of manual scavenging and the contradictions faced by civil society organisations to articulate and contest the occupational practice of manual scavenging. Hence, I show that, despite the recognition of manual scavenging as a form of caste-based discrimination, it continues to be a problem that can purportedly be solved by technological innovations, innovations that have failed to dismantle the relationship between caste identity and sanitation occupations in Ahmedabad. In the next section, I argue that, in the case of Ahmedabad, despite various actors working towards the eradication

of manual scavenging, it is crucial to differentiate between the approach towards manual scavenging as a problem of labour rights, and approaches that emerge from a critique of caste as such. Finally, I indicate that even though manual scavenging is one form of caste discrimination, the issues faced by the Bhangis seem to be isolated from the larger Dalit movement in Ahmedabad.

In Gujarat, the most widely known caste of hereditary scavengers are the "Bhangis"[10]. According to D'Souza, the Bhangis are the third largest group within the Dalits in Gujarat (D'Souza 2005: 73). He argues that most Bhangis originally lived in rural areas and are typically landless. 21.3% of all Bhangis in Gujarat live in Ahmedabad district. 22% of these listed Ahmedabad as their place of birth, while the rest claim to have migrated from villages. Some of the older respondents claim that their forefathers migrated to Ahmedabad centuries ago. This at least suggests a very long span of time. D'Souza explains that many Bhangis found occupation as sanitation workers under the Ahmedabad Municipal Corporation (hereafter abbreviated as AMC) after they were laid off from their jobs in textile mills. According to D'Souza, new migrants to the city have been unable to find living quarters, unlike those that were provided to an earlier generation of sanitation workers by the AMC. Hence, the majority live in slums spread out across the city, slums that D'Souza explains to be largely 'transitory' and/or 'peripheral' territories composed of residential structures built out of relatively impermanent materials. He argues that many of the older generation have even moved to 'better' residential localities that constitute territories composed of more permanent and sturdier residential structures. Overall, their population can be said to be distributed between hamlets, quarters, housing societies and slums. According to D'Souza's study, 52% of the Bhangis in Ahmedabad live in slums, 13% have managed to get homes in ‚better' residential areas, and 29% have availed of quarters provided by the AMC. He argues that while urbanisation has managed to break traditional caste barriers and their geographies to some extent, it is still inconceivable for most lower castes, and especially Bhangis, to live in mixed-caste localities. Nonetheless, during the course of my fieldwork, some of my respondents who are occupied as scavengers, also remarked that in mixed-caste localities, Bhangis daily face practices of untouchability at the hands of upper-caste Hindus and higher Dalit sub-castes, such

as the strict segregation of dwelling spaces and non-partaking of food and water, which serve to reinforce caste hierarchies and are supposed to be reminders to the Bhangis of their caste status. These hierarchies and relationships also tend to get translated into the kind of occupations that are available for the Bhangis[11].

In his research, D'Souza notes that there is very little occupational mobility amongst the scavenger community in Ahmedabad, and that nearly 58% of men and 44% of women from these communities are engaged in scavenging work (D'Souza 2005: 116). Moreover, he argues that the process of urbanisation has, in fact, firmly established the role of the Bhangis as scavengers. While in this essay I do not look closely at the effects of urbanisation and the occupational practices of the Bhangis in Ahmedabad, some of my respondents currently occupied as scavengers argued that they and their forefathers were engaged in similar occupations even before migrating to cities like Ahmedabad. A majority of the scavengers in Ahmedabad are employed in the formal sector as contractual workers and the rest work as daily wage labourers in private companies and residential colonies (D'Souza 2005). Nonetheless, as D'Souza notes, the Warasdar[12] system is still in currency amongst scavengers working in private residential colonies and those employed in the municipal corporation. While the Warasdari system is regressive in that it reproduces the caste basis of sanitary work, it is also seen as crucial in the absence of alternative occupations. Moreover, in the case of manhole workers, I show how the contractual system of employment and specific conditions regarding promotions in the case of manhole work, have reinforced the Warasdari system and preserved the correlation between caste identity and sanitation occupations in Ahmedabad[13].

In Ahmedabad, manual scavengers engaged in sewer cleaning work are known as manhole workers and, like other manual scavengers, manhole workers tend to be from the Bhangi caste. Keshavbhai is a supervisory officer for manhole workers and one of the founders of the "Manhole Workers Union" in the Ahmedabad Municipal Corporation. His employment with the municipal corporation began as a contractual manhole worker in 1988. In 2001, Keshavbhai and his colleagues formed the Manhole Workers Union, and their primary work in the initial years was to make safety gear available for manhole workers. The urgent need to unionise was felt after

a study conducted in 1997 (KSSM 1997) that revealed a range of chronic ailments among a sample of 400 manhole workers in Ahmedabad[14]. Keshavbhai explains that, according to the policy of the AMC, all temporary employees are eligible for the post of permanent employees after a period of five years or 900 days. Since many manhole workers were in employment as contractual employees for many years, one of his main efforts was to get permanent employee status for about 2,500 manhole workers employed as contractual labourers in the AMC[15]. In 2004, the Manhole Workers Unions succeeded in getting permanent employee status for about 2,500 manhole workers employed in the municipal corporation. Keshavbhai argues that while the promotion to permanent employee status ensures greater salary, basic job security and healthcare, it has not done away with the insecurities of workers from the Bhangi community regarding their future. Hence, even though permanent employees may seem to be in a better position, they implicitly favour the Warasdari system and the security that it offers by ensuring jobs for their next of kin. Keshavbhai argues that such an attitude is in fact implicitly promoted by the municipal corporation. For instance, he explains that, after the granting of permanent status in 2004 to those manhole workers who were working on contractual basis, he and his colleagues wanted to promote more workers from the Bhangi community to supervisory posts in the municipal corporation, since supervisory posts entailed a lack of involvement with manhole work itself, a permanent job and a higher salary. Keshavbhai and his colleagues believed that this was important as it could lead towards a dismantling of the correlation between Bhangis and manhole work. However, according to the rules laid down by the corporation, whoever would be promoted to supervisory posts would not be able to avail of housing facilities, and their offspring would not be assured employment in the case of their death. While such a system may seem fair in a rational sense, it dissuaded many workers from taking up supervisory posts, and, according to Keshavbhai, it was a deliberate ploy to keep Bhangis in non-supervisory posts as far as manhole work was concerned.

In 2006, following the deaths of several manhole workers, a Public Interest Litigation (hereafter abbreviated to PIL) was filed by a number of organisations (including the KSSM and the Manhole Workers Union), bringing to the notice of the government the dangerous and inhuman

working conditions that manhole workers were subjected to. Subsequently, the Gujarat High Court declared, in what is considered a historic judgment (Vyas, Mehta 2006), that no worker could be asked to go down manholes unless it was "absolutely necessary" (Vyas, Mehta 2006: 25)[16]. In any case, the workers were instructed to be provided with adequate safety gear, and it was made mandatory for a fire brigade to be on standby in case there was any threat to the life of any worker. Hence, while the judgment prohibited manhole work, it also implicitly assumed the inevitability of this work. Nonetheless, Keshavbhai argues that this condition is not simply contradictory or reflective of inconsistency. He explains that, in the early 2000s, expensive suction machines were imported from abroad by the Ahmedabad municipal corporation in order to clean sewage lines. However, he argues that the structure of the sewage lines in Ahmedabad is such that they cannot be de-congested using these machines. Hence, one necessarily needs to send workers down manholes to manually de-congest the sewers in cases of clogging.

Kadarbhai, the founder of a company based in Ahmedabad that specialises in the manufacture of hydraulic machines and waste disposal equipment, explains that, following the High Court judgment in 2006, he was commissioned by the municipal commissioner to construct machines that were affordable and structurally adequate to de-congest sewer lines in Ahmedabad. He claims that, while his company was able to develop such machines, it was not clear as to who would operate them. In the bid to allegedly preserve the livelihoods of workers from the Bhangi community, a scheme was conceptualised whereby these workers could use loans provided by the Gujarat Safai Kaamdar Vikas Nigam (GSKVN)[17] to buy these machines, operate them and contract them out. While such a plan potentially provided them with the possibility of entrepreneurship, it did not do much towards dismantling the correlation between their caste identity and occupation. It is worth noting here that the GSKVN was envisioned by the government as an organisation that would help rehabilitate the Bhangis through opening up access to alternative livelihood opportunities.

The Indian government has allocated nearly US$ 325 million to rehabilitation schemes for scavengers, such as "The Self Employment Scheme for Rehabilitation of Manual Scavengers", which is one of the better-

known schemes initiated by the Ministry of Social Justice and Empowerment in 2007 (Human Rights Watch 2014), that provides loans and training programmes for manual scavengers or their dependents, who are 18 years old or above[18]. In the case of the GSKVN, many of my respondents, ranging from sanitation workers to activists engaged in the struggle against manual scavenging, argue that the loan schemes provided by the corporation have not only not proved useful for most of the recipients, but have pushed them into deeper cycles of debt.

According to D.K. Dubey, one of the founders of the Manhole Workers Union, most of the recipients of these loans tend to 'misuse' these loans on motorbikes, stereo systems and electronic luxury items. While such characterisations seem to reinforce already existing harmful stereotypes regarding the Bhangi community, Dubey argues that the size of the loans do not enable investment in new business ventures but only enable immediate spending on what one may consider to be luxury goods. According to Deval Vaghela, an independent Dalit activist and lawyer based in Anand in Gujarat, the size of the loans offered by corporations such as the GSKVN are connected to the contractual systems of employment, and reflect a larger ploy of the government to keep individuals from these castes dependent on the Warasdari system as their only source of security and power. He explains that the majority of the loans that are available range from 25,000 to 40,000 rupees (340-545 US$) and so do not help in setting up new business enterprises. Nevertheless, not only is the application process for loans a tedious process, but Vaghela argues that it is often not possible to avail of these loans without the help of middlemen. Ultimately, applicants often receive less than half of the already insubstantial loan that they have applied for. According to Vajjubhai, who works as a scavenger in residential colonies in the Jodhpur area of Ahmedabad, while the loans provided by the GSKVN might be helpful, it is crucial to note who is actually eligible for these loans. He argues that for anybody to be eligible for these loans, they are asked to produce utility bills and other documents that would indicate domicile. Vajjubhai argues that such documents are only possible to produce in the first place if one is the owner of property in the form of land or a house, which in the case of Bhangis such as Vajjubhai is an impossibility. Schemes designed by the GSKVN then, seem to address the lack of alternative opportunities for the members of scavenging

communities through monetary assistance, but are ultimately not able to take into account the lived realities of social life in which caste identity and historically accumulated oppression prohibits the receipt of these loans.

In the case of Ahmedabad then, while technological solutions and rehabilitation schemes seem to offer solutions towards the eradication of manual scavenging, they are beset by a range of contradictions that are not only unable to dismantle the correlation between caste identity and sanitation work, but also have produced new cycles of debt in the Bhangi communities. Ultimately, it seems as if the municipal corporation, government bodies such as the GSKVN, and even the legislations prohibiting different kinds of manual scavenging, assume the occupation of manual scavenging to be inevitable and as something that cannot actually be 'abolished'. Nevertheless, what is also revealing about the socio-political economy of manual scavenging is that it in fact cannot simply be 'eradicated' or 'abolished'. While in this section I attempted to problematise the different solutions that are devised for the 'abolishing' of manual scavenging, in the next section I look at the efforts by activists and civil society organisations, such as NGOs and trade unions in Ahmedabad at addressing the issue of manual scavenging and the various problems encountered therein.

3. The articulation and contestation of manual scavenging: between CBOs, NGOs, and trade unions

In Ahmedabad, a variety of actors, such as NGOs, CBOs, trade unions and independent activists are engaged in the struggle against manual scavenging and in efforts to guarantee the basic rights of sanitation workers. However, owing to the gross violation of basic human rights that is inherent in this occupation, its presence is frequently denied by government bodies and officials (Shah 2013: 2). Moreover, as I will show subsequently, scavengers in Ahmedabad are often in too vulnerable a position to protest this practice. In this section, I will attempt to present the tensions inherent in the articulation of manual scavenging through a discussion of the various actors in Ahmedabad, who are engaged in the struggle to contest manual scavenging and caste-based discrimination as such.

Naval Karthik, the former director of an Ahmedabad-based NGO engaged with Dalit issues in Gujarat, argues that the Gujarat Government has often declared the state to have been free of manual scavenging since 1992[19]. However, in the same year, an incident where six manhole workers died at work, led to a case of caste atrocity being filed by a grassroots Dalit organisation, "X". In this case, "X" had implicated persons who were private contractors and also officials in the AMC. However, none of the accused were eventually punished. In 1996, "X" and a few other organisations filed a PIL (Public Interest Litigation) in the High Court regarding the issue of manual scavenging in Gujarat, with special reference to a village near Botad in Gujarat where 45 households were engaged in the practice of manual scavenging. However, the state did not accept their research and the form of evidence that they had collected. According to Karthik, they accused "X" of having fabricated the images and of orchestrating these acts to falsely represent the village and the status of manual scavenging in Gujarat (Macwan 1998: 81). Karthik argues that it was in only response to the PIL submitted in 1996 that the 1993 Act prohibiting manual scavenging – that requires states to enact their own laws – was even enacted in Gujarat in 2000. According to some of my respondents, in response to a PIL by the Safai Karamchari Andolan, "X" and 17 other organisations demanding a survey of the number of manual scavengers from state governments and central government ministries in 2003, the Gujarat Government filed an affidavit in the Supreme Court declaring that there is no manual scavenging in Gujarat. Similar affidavits were also filed by the government in 1996 (Macwan 1998: 73) and more recently in 2014 (Jha 2014), denying the existence of manual scavenging in Gujarat. In 2007, the Tata Institute of Social Sciences (TISS), in a study sponsored by the GSKVN, identified nearly 12,000 manual scavengers in Gujarat (Shah 2013: 2). One of the respondents in my study, H.K. Tripathy, a former director of the GSKVN, notes with reference to this study that the government constituted a committee of its own and conducted another survey by engaging various district collectors to verify the results of the TISS study. Subsequently, he argues that the state government declared that Gujarat did not have any manual scavengers and that the results of the TISS study were false, and possibly fabricated.

However, the state government's denial of the existence of manual scavenging is part of its denial of caste-based discriminatory practices in general. In 2009, "X" conducted a study spanning more than 1,500 villages in Gujarat, and revealed the presence of nearly 100 kinds of untouchability practices in rural Gujarat[20]. While it is not the first study of untouchability in Gujarat, it is unique for the scale of the survey and its emphasis on the need to recognise "horizontal discrimination"[21] in the case of the lowest Dalit sub-castes such as the Bhangis, who are forced into manual scavenging and face the full extent of caste-based discrimination. However, the Government of Gujarat not only did not accept these findings, but also commissioned the Center for Environmental Planning and Technology (CEPT) in Ahmedabad to undertake a study of untouchability in rural Gujarat, aimed to refute the study undertaken by "X" (Shah 2013: 2). In contrast to more than 1500 villages surveyed by "X", the study by "P" consisted of a survey of 5 villages in the state. As Shah (2013: 11) notes, it not only refuted the "X" report on flimsy grounds, but also endorsed the caste system by noting that the dominant caste sects in one of the villages promoted "positive thinking" among its followers through the Chatur-varna system[22]. Hence, the report was furnished not only to refute any claims of untouchability in Gujarat, but also indirectly endorsed the caste system.

An important factor that complicates any attempt to highlight the existence of manual scavenging is the vulnerable position that such an attempt puts manual scavengers in. Shankarbhai, the founder and director of the community- based organisation (CBO) "Y" in Ahmedabad that works towards the eradication of manual scavenging, pointed out that, after the 2013 Act, neither the AMC nor any other government organisation had put in any efforts towards conducting a proper survey regarding the status of open defecation and manual scavenging. In 2013, "Y" conducted a survey over a period of two to three months and submitted reports and petitions to the AMC providing accounts of people who were engaged in manual scavenging. Subsequently, senior AMC officials such as the Deputy Commissioner visited the wards (that were mentioned in the study) and interrogated the workers about their claims. Shankarbhai explains that the scavengers cowed down under such pressure and told the municipality officials that "one of their own" came to them and asked them to fill in a

form that they did not understand. Ultimately, the AMC got written testimonies from the sanitary workers that they were not engaged in this practice. After this, the workers confronted Shankarbhai, arguing that even though his engagements (demanding the implementation of laws prohibiting manual scavenging and the enforcement of caste atrocities legislation in their favour) may have been for their good, they could not participate in this effort since this would lead them to losing their livelihood and leave them completely helpless. In another instance, the NGO "X" organised a demonstration in 2009, at which more than 1,000 children of manual scavengers from 12 districts across Gujarat were assembled at the Gandhi Ashram in Ahmedabad to give accounts of the discrimination faced by them. In response, government officials seemed to take these testimonies into consideration and to move towards taking addressing the situation. Subsequently however, the officials are said to have tracked the wards of those children who were employed in municipalities, and removed them from their jobs. In both of the cases outlined above then, attempts to reveal the existence of manual scavenging and the implicit caste-based discrimination are often met with crippling consequences.

In contrast to NGOs such as "X" that primarily seek to address caste-based discrimination at the grass roots level, trade unions in Ahmedabad are primarily involved in struggles for basic rights such as regularisation of jobs, pensions and other matters pertaining to the rights of workers. In Ahmedabad, nearly 3,000 sanitation workers employed in the municipal corporation are members of trade unions such as "U". Ashokbhai, a union organiser and member of "U", explains that their work mainly involves the filing of litigations and organising protest demonstrations. While their strategies and methods seem to overlap with the NGOs and CBOs that I have discussed earlier, Ashokbhai attempts to clearly demarcate the role of trade unions from NGOs. According to him, the work of trade unions such as "U" is of a sustained nature, as compared to NGOs that occupy themselves with "project based" work. Such sentiments were also evoked by other respondents such as D.K. Dubey and Govardhanbhai. The apparently sustained nature of work performed by trade unions is also articulated as "practical work" , in contrast to NGOs that are seen as engaged in projects that do not lead to transformative changes in the lives of manual scavengers or lower caste sanitation workers. On the other

hand, NGOs and CBOs in Ahmedabad involved in fighting against caste-based discrimination and the occupation of manual scavenging, see trade unions as frequently engaging in practical and ideological compromise in order to achieve their aims. For example, Shankarbhai argues that in some instances where manhole workers have lost their lives while on duty, trade unionists prioritise the procuring of a minimum amount of compensation for the families of the deceased, rather than pursuing the persecution of contractors or other agents who employ manhole workers in the first place.

Since the occupation of manual scavenging often involves hazardous working conditions, it is often primarily framed as an issue of labour rights by trade unions. On the other hand, CBOs and NGOs in Ahmedabad, which are primarily engaged in Dalit issues, tend to frame manual scavenging primarily as an issue of caste-based discrimination. The manhole workers union may be taken as an exceptional example since it seems to address both kinds of issues as far as manhole work is concerned. Nonetheless, what is also important to consider here is the composition of these groups. Trade union leaders and organisers that I had a chance to speak with tend to be upper-caste, while leaders and founders of the NGOs and CBOs primarily engaged with the Dalit issues, are Dalits. Besides the arguments regarding problems with the project-based work of NGOs, trade union organisers such as Ashokbhai also feel that some of the NGOs are too aggressive and radical on an ideological level. As I observed in other such similar comments, 'aggressive' and 'radical' seem to point towards caste-based activism and the Ambedkarite[23] character of some of these organisations. It is this kind of tension then, which reveals itself as the difference between framing manual scavenging as an issue of labour rights or of caste-based discrimination. It would seem then that caste plays a very important role in the way in which the issue of manual scavenging is framed by different organisations.

Nonetheless, Shankarbhai argues that amongst Dalit activists and organisations in Ahmedabad, there exists a hierarchy where the issues faced by the lowest dalit sub-castes, such as the Bhangis, tend to be given the least priority in what he argues to be an apparent hierarchy of Dalit issues for Dalit activists and thinkers in Ahmedabad. He claims that Dalit NGOs engaged in struggles for the rights of Dalits do not seem to consider the eradication of manual scavenging as an issue of high priority and there-

fore have not made serious efforts towards collaborative work with organisations such as the Safai Karamchari Andolan. Many of my respondents remarked that in Gujarat the Bhangis are known as 'the Dalits amongst Dalits'. For instance, Kantibhai, a scavenger who works in private residential colonies in the Thaltej area of Ahmedabad, argues that higher Dalit sub-castes engage in similar acts of untouchability with the Bhangis, as upper caste individuals do in general with Dalits, involving practices such as not partaking of food and water using the same utensils. On a broader level, Keshavbhai and Deval Vaghela claim that even though the Bhangis in Ahmedabad have participated and been allies in larger Dalit movements, other Dalits tend to distance themselves from the issues faced by the Bhangis. This is however, not to speculate about or argue for any kind of equivalence between the kind of caste discrimination faced by Dalits from upper-castes and the discrimination faced by Bhangis from other Dalits. Rather, it is to highlight the effects of what is referred to as the graded hierarchy of caste[24] and its effects on the representation and contestation of manual scavenging.

As I have tried to indicate above, the existence of untouchability in Gujarat is a highly contentious issue. Since caste-based discrimination and caste-based occupations such as manual scavenging are recognised as gross violations of human rights, the existence of these practices has often been denied by the state government and by government officials in Ahmedabad. Owing to the vulnerable socio-economic position of the Bhangis in Ahmedabad, it is often not possible for scavengers to assert their rights and contest the very existence of the occupation of manual scavenging. Moreover, for NGOs and trade unions in Ahmedabad, the articulation of manual scavenging as an issue of caste-based discrimination or labour rights constitute differing negotiations where it is often not possible to simultaneously make socio-political assertions and demand job security, for instance. Finally, owing to the relative lack of agency that the Bhangis seem to have had even in Dalit movements in Gujarat, it remains to be seen what kind of critique of manual scavenging will emerge from the Bhangis in Ahmedabad.

4. Conclusion

In this article, I have tried to emphasise that manual scavenging is not simply an issue of reforms in sanitation technology or occupational hazards, since such negotiations are not able to effectively dismantle the correlation between sanitation occupations and caste identity. Through a discussion of the role played by NGOs, CBOs and trade unions, I have tried to show how caste plays an important role in the way that manual scavenging is articulated, negotiated and contested. Hence, I argue that even well-intentioned-solutions to manual scavenging can be problematic or ineffective at the least, without situating manual scavenging in the context of caste. However, this is not to say that the efforts of various actors to improve the conditions of work of sanitation workers, for instance, are insignificant. Hence, while I have tried to problematise the efforts of trade unions and NGOs, it was done only to highlight the complexities that are present in the effort to articulate manual scavenging. Similarly, it cannot be denied that the introduction of new sanitation technology might make a real difference towards the eradication of manual scavenging. However, without approaching manual scavenging primarily as an issue of caste, it will be rendered an extra-ordinary issue, the solution of which purportedly lies in the form of technological innovation and reform of policy. Otherwise, regardless of these steps, the work of sanitation will continue to be carried out by Dalit castes.

Here, I will refrain from commenting in detail on the effects of neo-liberalisation on sanitation work in Ahmedabad, since I have not looked at it closely enough. Nonetheless, in the case of Ahmedabad, where there has been an increasing contractualisation of sanitation work, and amidst debates regarding the allegedly project-based concerns of internationally funded NGOs with regard to the issue of manual scavenging, any subsequent analysis of the existence of manual scavenging and contestations of it, will need to closely look at the ramifications of neoliberalism on the socio-political economy of manual scavenging in Ahmedabad.

1 The Hindi word "Dalit" roughly translates into "broken" and refers to the Scheduled Castes or the Untouchables in the Hindu caste system. The coinage of the term "Dalit" to refer to the scheduled castes is attributed to Dr. B.R. Ambedkar, a Dalit of the Mahar caste who founded the Depressed Classes Federation in 1930 and is argued to be primarily responsible for the system of "reservation" in the Indian Constitution for the scheduled tribes (ST), scheduled castes (SC) and other backward castes (OBC). He is one of the most powerful symbols of Dalit emancipation and political articulation (Keane, 2007).

2 Words like 'eradication' and 'abolishing' are frequently used with reference to manual scavenging. In this article I argue that, owing to the complex nature of the issue of manual scavenging, it is not something that can simply be eradicated or abolished.

3 While the word "caste" does not appear in any human rights treaty, various human rights organisations from India and Nepal have sought to highlight caste-based discrimination in their respective countries. Subsequently, in the International Convention of the Elimination of All Forms of Racial Discrimination 1965 (ICERD), and the Committee on the Elimination of Racial Discrimination (CERD), caste-based discrimination has been noted as both a form of descent-based discrimination and racial discrimination (Keane, 2007).

4 The Bhangis are a Dalit sub-caste in Gujarat commonly associated with sanitation and scavenging occupations.

5 The term "CBO" was used by some of my respondents to describe certain organisations in Ahmedabad working closely with the issues of the Bhangis.

6 A strike was organised by the sanitation workers employed in the Ahmedabad municipal corporation from the 22nd of August to the 27th of September, 2016. Their demands included the regularisation of full-time employees, the adjustment of salaries to inflation, and the provision of safety gear for work. In the absence of alternative livelihood opportunities and the continued existence of manual scavenging, these basic rights are very important for sanitation workers in Ahmedabad.

7 In the following discussion, I have changed the names of all my respondents to keep their identities confidential.

8 The 2013 Act also includes sewers and railway tracks as spaces where manual scavenging is practised, hence a wider range of occupations are recognised as manual scavenging practices.

9 The name "Valmiki" can be traced to the worship of the Hindu religious figure, Maharshi Valmiki, among the "Chuhra" and "Mehtar castes" in Punjab in the 1920s (Prashad, 2001). In the case of Ahmedabad, since "Bhangi" is often used as an abusive word by upper-caste individuals, many Bhangis prefer to use the name "Valmiki" to refer to themselves and their community. Hence, the name "Valmiki" has also somewhat acquired the status of a politically appropriate alternative to Bhangi to refer to this community.

10 The name "Bhangi" is apparently derived from "bhanga" or broken, implying a community the character of which is broken or destroyed, and is argued to have derogatory connotations in Gujarat (D'Souza 2005: 20).

11 For instance, one of my respondents, Kantibhai, a Bhangi who works as a scavenger in private residential colonies in the Thaltej area of Ahmedabad, argues that, unlike higher Dalit sub-castes like the Vankars and Chamars, the Bhangis are not employed in any sanitation work inside the homes of upper-castes.

12 In this system, in the event of the death or inability of a worker to carry on his/her work, a close family member such as the offspring of the worker may be given the job. "Warasdari" possibly derives from the Gujarati word "Warasdar" which translates into English as “inheritor”.

13 The term “manhole workers” was used by some of my respondents who have been or continue to be engaged in this work. It specifically refers to workers who enter manholes in the street, to enter sewage lines and clean them.

14 The KSSM is the Kaamdar Swasthya Suraksha Mandal, a trust founded in 1991, dealing with the health of industrial workers in Gujarat.

15 Keshavbhai explains that while there has been contractual employment in sanitation work since the 1980s, he argues that in the early 2000s, subsequent to the deaths of many manhole workers, the AMC urgently began to contract out manual manhole and all kinds of sanitation work. While the AMC argued that the contract system was an effort to hire sanitation workers irrespective of caste, Keshavbhai argues that it was an obvious move by the corporation to escape culpability and responsibility. However, as D'Souza (2005) has also observed, while the contract system got individuals from other, higher Dalit sub-castes as a part of the payroll, the actual scavenging work continued to be performed by the Bhangis.

16 By the phrase "absolutely necessary", I mean to indicate the argument in the judgment regarding manhole workers in Ahmedabad, where Justice Vyas and Justice Mehta of the Gujarat High Court clarify that in some cases, manual manhole work would be inevitable since certain kinds of cleaning cannot be performed by machines or other equipment.

17 The Gujarat Safai Kaamdar Vikas Nigam, also known as the Gujarat Safai Kaamdar Development Corporation, was set up in 2001 and is considered to be the only such state-based organisation in the country for the rehabilitation of sanitation workers.

18 Information regarding various loan and non-loan-based schemes for those currently engaged in the occupation of manual scavenging is listed on the website of the National Safai Karamchari Finance and Development Corporation (2018).

19 In response to my questions regarding the existence of manual scavenging in Ahmedabad, one of my respondents, a former director of the GSKVN, claimed that there are no manual scavengers any more in Gujarat. It is worth noting that only a few weeks before our conversation, a manhole worker died while on duty, in the Vastrapur area in Ahmedabad. In another instance, while I was on my way to meet one of my respondents, Shankarbhai, a Dalit activist who has conducted numerous surveys and catalogued manual scavenging in many parts of Ahmedabad, we came across two men entering a manhole to clean a sewer line outside an office complex. On notifying a nearby police station regarding this, none of the police officers, including an inspector at a high post were aware of the 1993 or the 2013 Act. When Shankarbhai insisted on filing an FIR (First Information Report) against

the caretaker of the office complex who had employed the workers, the inspector suggested against such a move and let off the caretaker with a warning. Instances such as the above, of the denial of manual scavenging by government officials and the ignorance of law enforcers regarding the laws prohibiting manual scavenging in Ahmedabad, provide a glimpse of the apathetic nature towards the occupation of manual scavenging and, by virtue, the blindness towards caste.

20 Examples of untouchability practices include the segregation of food and water, segregation of seating arrangements, walking paths, denying access to Dalits to public facilities such as common water reservoirs, schools, post-offices, and denying entry into temples and other daily amenities such as the barbershop and milk dairy.

21 "Horizontal discrimination" refers to the discrimination faced by Dalits such as the Bhangis by higher Dalit sub-castes as opposed to "vertical discrimination", that is the discrimination faced by Dalits from non-Dalit upper-caste groups.

22 Chaturvana refers to the conception and categorisation of Hindu society into four broad groups (or varnas) of the Brahmin, Kshatriya, Vaishya and Shudra (Ambedkar, 1944: 33).

23 The term 'Ambedkarite' refers to those individuals, groups or thought processes that are based on Ambedkarism i.e. the philosophy and political position that recognizes its genesis in the philosophy and work of Dr. B.R. Ambedkar, who argued that the untouchables could only seek emancipation from the caste system by relying on their own assertions, in contrast to upper-caste reformists like M.K. Gandhi who believed that caste based society could potentially be egalitarian.

24 By 'the graded hierarchy of caste' I am referring to B.R. Ambedkar's theorisation of the caste system amongst the Hindus, where he argued that the caste system not only divided men into "separate communities" but that it "places these communities in a graded order one above the other in social status". According to him, each of these castes "takes its pride and its consolation in the fact that on the scale of castes it is above some other caste" (Ambedkar, 1944: 46).

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Abstract *Obwohl Gesetze die Beschäftigung zur manuellen Reinigung von Abwasserkanälen verbieten, ist diese Berufstätigkeit in Indien weit verbreitet. Während es sich einerseits um eine gefährliche und würdelose Tätigkeit handelt, die die manuelle Handhabung von Fäkalien miteinschließt, kann man in ihr andererseits auch eine Form der Diskriminierung aufgrund von Kastenzugehörigkeit erkennen. Die Reinigung von Abwasserkanälen wird in Indien von Angehörigen der niedrigsten Dalit-Kasten – wie u.a. den Bhangis in Ahmedabad – übernommen, die keinen Zugang zu andere Berufen haben und die Hauptlast der Unberührbarkeit tragen. Während SanitärarbeiterInnen, AktivistenInnen, NGOs und Gewerkschaften versuchen, die weite Verbreitung von manueller Abwasserkanalreinigung aufzudecken, leugnen staatliche Stellen weiterhin die Existenz dieser Beschäftigungsform und kastenbasierter Diskriminierung. Der folgende Artikel beschäftigt auf der Grundlage einer Regionalstudie in Ahmedabad damit, wie die oben genannten Akteure die Berufstätigkeit des manuellen Abwasserkanalreinigens sichtbar nach außen tragen, anfechten und neuverhandeln.*

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The Double Burden of Environmental Injustice in a Female Waste Pickers Cooperative in Brazil

Abstract *This article examines the relationship between the environmental injustice and the consubstantiality present in everyday life of female waste pickers from a cooperative in Brazil. For the French materialist feminists perspectives, consubstantiality means intersection among class, race, and gender. In this case-study, were interviewed 16 female waste pickers of the Rose Cooperative in Flowers Garden Slum, City of São Paulo. In order to analyses the consubstantiality, three concepts were adopted: urban spatial segregation to understand class aspects; racial division of labour for race; and, sexual division of labour for gender issues. These three concepts are related to environmental injustice and form the framework applied to analyse waste pickers' housing conditions and workplaces. Environmental injustice in housing was identified. Environmental risks associated with the waste picking activity and the infrastructure conditions of the cooperative were also recognised. It has been observed that women are more exposed to risks on account of the double burden. The consubstantiality defines the daily life of the housing and working conditions of the female waste pickers. It was concluded that the female waste pickers are exposed to a 'double burden of environmental injustice': one related to housing risks and the other one to the precariousness of their work.*

Keywords *gender and environment, consubstantiality, environmental injustice, sexual division of labour, female waste picker*

1. Introduction

Solid waste generation in big cities is one of the most significant global urban environmental conflicts (Wilson et al. 2012). In most countries of the Global South, especially in Latin America, Africa and Asia, large scale recycling became possible because waste sorting is a cheap labour: unemployed workers turn into waste pickers that accept low wages to survive in economic adversities (Samson 2009; De Pádua 2008). Besides that, waste picking is characterised as a precarious and unhealthy activity due to the working conditions. The exploitation of cheap labour and the resulting generation of profit for the recycling industries exacerbate the unequal distribution of the environmental costs and benefits related to recycling, demonstrating how the waste picker's work constitutes an issue of environmental injustice.

In this context, studying the Brazilian case is relevant because the precarious working conditions of the waste pickers is closely linked to the number of women and black people working in the area. According to the Brazilian National Movement of Recyclable Materials Waste Pickers (Movimento Nacional de Catadores de Materiais Recicláveis – MNCR; cf. MNCR 2014), approximately 70 per cent of the workers in this sector are women and represent 59 per cent of those working in cooperatives. The participation of blacks is 66.1 per cent of total workers (Silva et al. 2013). These data which may indicate a feminisation and racialisation in the sector (Cherfem 2014).

And then, the research questions is: how the environmental injustices inherent to waste picking activities are related to the massive presence of black women in the sector. Thus, this study aims to examine the relationship between environmental injustice and the French materialist feminism concept of consubstantiality, in the daily life of female waste pickers of cooperative in the city of São Paulo, Brazil.

The intersection between environmental justice and consubstantiality arises from the fact that both consider that social relations of class, race, and gender affect parts of the population in an unequal way. In this sense, the dialogue between these two theories becomes possible. While environmental injustice helps to identify environmental inequalities, the concept of consubstantiality helps to analyse the intersection between

these inequalities and social relations. It is assumed that the combination of these theories is consistent with the context of the daily life of female waste pickers. The hypothesis of this research is that the environmental injustice experimented by those women exceeds the limits of the waste picking activity; therefore, housing was also defined as analysis axes.

This study assumes a material perspective based on French materialist feminism (Kergoat 2010; Hirata 2014) and Environmental Justice (EJ) (Porto 2011; Acserald et al. 2004). Once the majority of conflicts in unequal societies still related to survivability of the individuals, it is understood that the material perspective is necessary to better understand these contexts. Further, the concepts of urban spatial segregation, racial division of labour and sexual division of labour complement the framework of this study. These concepts integrates the analysis of class, race and gender, and enable the connection between environmental injustice and consubstantiality.

Often, environmental injustice studies address class and race analysis, but few include gender (Unger 2008). Furthermore, in general these studies do an isolated analysis of social relations (Acserald et al. 2004). In these terms, this research contributes to the environmental justice field, pursuing an analysis that integrates gender through the consubstantiality concept.

The extended case study of Burawoy (1998) was adopted as a reference method. The case study was conducted during three years in the Rose Cooperative[1]. The cooperative is a group composed only of female waste pickers, located in the Flowers Garden Slum, a territory of the City of São Paulo.

This article is divided into three sections. The first one presents the research framework and background of the recycling chain and the waste pickers' cooperatives in Brazil. Secondly, the methodology adopted and the case study itself are exposed. In sequence, the results are presented through the axes of housing and work. Thus, the discussion was done regarding the existing similarities and differences in the daily life of women waste pickers, in which the intersection between environmental injustice and consubstantiality is evident. Finally, this study concludes that poor black women who work as waste pickers experience a 'double burden of environmental injustice': one related to reproductive work with a greatest exposure to risks in housing, and another with the precariousness and risks of the workplace.

2. Literature review

2.1 Framework: integrating inequality perspectives

One possibility for understanding the inequality between social groups is through an Environmental Justice perspective. An EJ approach, known as "environmentalism of the poor" highlights the fight against environmental impacts that threaten the poor in various ways (Martinez-Alier 2003). In addition, it considers the environment in terms of its material perspective, as "source and condition for sustenance" (Martinez-Alier 2003: 34). Even though this research is aligned with this perspective, it utilised Brazilian authors who address the work and health of workers (Acserald et al. 2004; Porto 2011).

The idea of Environmental Justice adopted in Brazil is given as a set of principles and practices. This set ensure that any social group, defined in terms of ethnicity, race or class, supports a disproportionate share of the negative environmental consequences of economic operations, federal, state, and local policy and programme decisions (Acselrad et al. 2004). The absence or omission of public policies are also considered questions related to EJ (Acselrad et al. 2004). In this way, environmental injustice is understood as a condition of unequal societies in which the greatest burden of environmental damage of development is directed towards the more vulnerable social groups (Acserald et.al. 2004).

Another way of analysing inequalities is through the consubstantiality concept. It establishes that the social relations of class, race and gender are intertwined. In other words, they are coextensive and mutually constructed with the same relevance (Kergoat 2010). It is important to note that consubstantiality concept (Kergoat 2010) differs from intersectionality concept (Crenshaw 1989).

Intersectionality refers to a transdisciplinary theory that aims to understand the complexity of identities and social inequalities through an integrated approach (Bilge 2009). While consubstantiality addresses class, race and gender as fundamental and transversal elements (Hirata 2014), intersectionality considers multiple social aspects beyond these three, such as age, religion, nation and ethnicity, and places them all on the same plane. Further, it emphasizes the gender-race relationship, putting social class on a less visible plane (Hirata 2014). Because this study has

its subject of analysis female waste pickers, it was necessary to adopt a work perspective. Hence, the concept of consubstantiality was taken as the central approach.

In order to facilitate the connection between the two theories, this study used three key concepts: urban spatial segregation, racial division of labour, and sexual division of labour. Urban spatial segregation can be understood as a process in which different social classes tend to live in different neighborhoods of the metropolis, functioning as a spatial mechanism that controls the displacement and time of individuals (Villaça 2011). In this dynamic, it can be noted that public resources are primarily directed to places where reproduction of capital is possible, as noble districts and central areas (Acserald et al. 2004).

It is assumed that urban spatial segregation is related to the racial division of labour, since most of the population living in peripherical areas and slums of Brazil are black (IBGE 2010). The idea of race arose from an Eurocentric worldview, in which the population was classified as the exploited (black) and the coloniser (white) (Quijano 2005). In this context, race and division of labour were structurally associated and reinforced each other, initially by through slavery, and these constitute the racial division of labour (Quijano 2005). This division establishes that there are positions for whites and positions for blacks, in which the former is better valued and recognised, while the latter is marked by subalternity and precariousness.

The reality of black women is very complex, since the sexual division of labour ensures that the reproductive, and less valued work is destined to women (Kergoat, 2010). While the productive work is destinated to men (Kergoat, 2010). There are two organisational principles for sexual division of labour: a) separation, exists kind of works directed for men and other ones for women; b) hierarchy, in which the work directed for men is associated to a better 'status quo' than that directed for women (Kergoat, 2010). The accumulation of both reproductive and productive positions leads women to a double burden, which puts them at a disadvantage.

The poor are exactly the ones who are spatially segregated. In this way, it is demonstrated that the three concepts presented connect with one another. The racial and sexual division of labour are presented here

as a vector of urban spatial segregation, and 'vice versa'. Furthermore, the intersection between racial and sexual division, and spatial segregation reinforces the difficulty of people achieving better positions. Finally, the intersection mentioned above promotes a feedback among social and environmental inequalities that can shape environmental injustice situations, as presented in this case-study (figure 1).

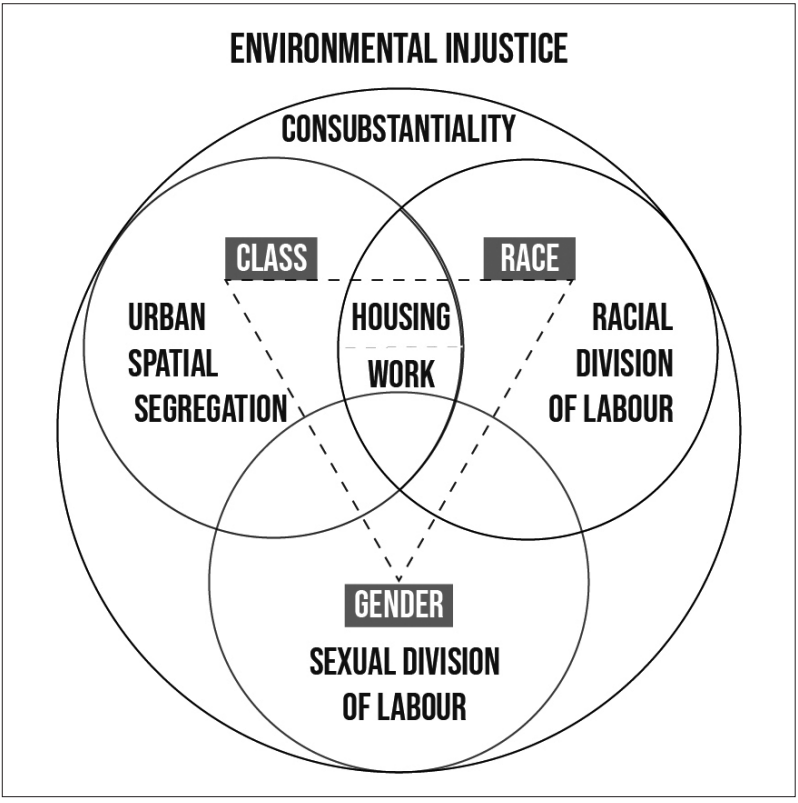


Figure 1: Key conceptual framework of this study
Source: own elaboration

2.2 Context

In Brazil, spatial segregation plays an important role in the shaping of urban space (Villaça 2011). Most of the residents of slums areas in the country are black (IBGE 2010), which can be considered an inheritance from the Brazilian colonial period and its slave roots (Pádua 2002). Due to the slavery abolition, work positions were created. Consequently, in the early twentieth century, a few decades after the slavery abolition, immigrant people (in general from Europe and Asia) came to Brazil. They started to work in positions previously occupied by slaves, both in cities and in the countryside (Pádua 2002). In this process, paid and privileged work were associated with white people, while black people became marginalised and underemployed, remaining vulnerable and extremely poor (Hasenbalg/Silva 1999). Because of the few existing opportunities, an educational and salary gap was created between white and black people. In the following centuries, few blacks managed to ascend to the middle and upper classes (Hasenbalg/Silva 1999), and the vast majority were segregated in marginalized residential areas and positions. This process implied in disadvantages in terms of access to education and the formal labour market (Hasenbalg/Silva 1999). In summary, in Brazil the class structure was established by racial oppression and it accentuated the mechanisms of racism, which since then have been constantly updated (Hasenbalg/Silva 1999).

The slums are "segregated spaces, where the highest environmental loads are concentrated for discriminated and low-income populations" (Bullard/Johnson 2000: 26). It can also be understood that the slums are territories marked as "sacrifice zones", in other words, they are areas with high deprivation. Slums are places without basic infrastructure, with risks, dangers, which concentrate incidences of environmental injustice, and where the poorest are forced to live (Bullard/Johnson 2000). Accordingly, Davis (2006) states that "such sites are poverty's niche in the ecology of the city, and very poor people have little choice but to live with disaster" (Davis 2006:121f.).

However, even in the slums, which are segregated spaces, another spatial segregation occurs. Typically, in Brazilian slums, the households headed by black people are the ones with worst conditions of access to public service, such as the general network of water, energy, sewage and garbage collection (Bonetti/Abreu 2011). The precarious or non-existent

access to these services configures an "iniquitous ecological distribution" (Acserald et. al. 2004). This iniquitous distribution exposes population-wide illnesses, such as amebiasis, hepatitis A, tuberculosis, dengue, and toxoplasmosis, among other diseases (Davis 2006). In addition, due to economic factors, the women's housing, especially that of black women, in the slums' territories occur in the most precarious areas, and are exposed to environmental risks (Tavares 2015).

Although there are specificities within the space and the population living in the slums, they cannot be considered as singular and standardized. Slums are "urban spaces where a dialectical relationship between resistance processes and socio-spatial segregation are established" (Tavares 2015: 19). The emergence of slums can be understood as a resistance movement in the face of real estate speculation and urban development projects that limit the access of low-income and ethnic groups to live in central areas of the city. Due to this limitation the groups became displaced to the outskirts (Tavares 2015: 19).

Many workers are disadvantaged, as regards both their work and housing environment. In this dynamics, the individuals who receive the least advantage of production are precisely those most exposed to environmental degradation and risks. Exclusion from the formal market has led to part of this group working in waste picking.

The recycling chain in Brazil is essentially structured in three stages: *recovery* (collecting, sorting, pressing and baling of recyclable materials); *revaluation* (processing of the material and production of intermediates); and *transformation* (processing of the recovered materials to be transformed into new products). Recyclable materials pass from the waste pickers to the scrap merchants, from them to jobbers and, finally, to the recycling industries. At each step, value is added to the recyclable material (Gonçalves-Dias 2009). The waste pickers are the fragile link in the chain, since they do not take part in the waste recovery stage. Besides, the recycling market is configured as an oligopsony, whereby a small number of companies absorb the recyclables and dictate conditions and prices to the waste pickers.

Approximately 43 per cent of the waste pickers in Brazil work collectively (Silva et al. 2013). The cooperatives are self-managed organisations which claim to follow the Solidarity Economy principles and operate in the stage of recovery of materials in the recycling chain. In relation to the handling

of materials, working with waste picking is associated with several physical, chemical, and biological risks, making waste pickers more vulnerable to health problems such as dermatitis, infections, worms, and autoimmune diseases (Galon/Marziale 2016). Moreover, workers are exposed to possible occupational accidents due to the handling of sharp materials, inhalation of toxic gases, and ergonomic factors associated with posture and weight overload (Galon/Marziale 2016). So, it is noted that the risks are inversely proportional to the economic gains assigned to the waste pickers in the recycling chain (Gonçalves-Dias 2009). While these workers are those who have the most strenuous work, with risks that directly affect their health, they are the ones who get the lowest incomes.

Despite the precariousness, the organisation of the waste pickers through MNCR led to several achievements that have made their experience unprecedented in the world, mainly due to the programmes and public policies focused on this category. Inclusion of the waste pickers in the National Policy on Solid Waste was an important advancement for their recognition (Brasil 2010). In addition, some cooperatives were hired for municipal selective collection service. In this sense, we agree with Leubolt and Romão (2017) that waste pickers' cooperatives in Brazil represent a social innovation. However, there are some challenges to be considered for the effective social inclusion of these workers and their life quality. Firstly, there are no strategies that favour the progress of waste pickers in the recycling chain which would also allow cooperatives to participate in the more advanced stages of *revaluation* and *transformation* of materials. Secondly, the degree of inclusion of the waste pickers in the selective collection depends directly on who occupies the municipal public power structure and its interests (Godoy 2015). Furthermore, the fact that the waste picker's work is not regulated and considered informal, still allows its exploitation by the industries. Simultaneously, the work of the waste pickers is appropriated by the State (Wirth 2013).

The fact that the majority of workers organised in waste pickers cooperatives are women is due in particular to the typical flexibility for absences and delays in these organisations, making it possible to combine reproductive and productive work (Cherfem 2014) However, this malleability results in contradictions. The absences corroborate the persistence of the precariousness of women's work, since the more women are absent from

work, the less productive the cooperative becomes, and the lower their income can be (Wirth 2013). Even if incomes are low and work is precarious, women 'accept' to work in these conditions due to the lack of other alternatives to reconcile the double burden (Wirth 2013).

Moreover, in Brazil, while men work in the press and transport stages of materials (better valued and paid jobs), women are predominant in the material sorting stage (the stage which is most devalued, poorly remunerated and highly exposed to occupational risks). The allocation of women to a specific function in the productive process is directly related to a biologizing speech in which the minuteness and dexterity of women are naturalised, making them apt for such functions (Wirth 2013; Kergoat 2003). On the other hand, the material transport and pressing functions are conceived of as masculine jobs, due to the demand for greater physical strength and the use of machinery such as presses and forklifts (Wirth 2013; Kergoat 2003).

This leads to an impasse: on the one hand, the most important step in the recycling chain is sorting, because it is at this stage that garbage is transformed into residue and economic and environmental value is added to the materials. On the other hand, it is precisely the sorting, the most devalued and worst paid stage of the production chain, which is the work performed by women.

Contradicting this logic, women have been articulating and appropriating activities that are considered masculine. Even in this context, the permanence of the sexual division of labour and the need to discuss and deepen this issue in the cooperatives should not be disregarded. As Wirth (2013) puts it, it must be recognised that the sexual division of labour is not only a construction, but also a structuring social organisation that imposes itself on each cooperative.

3. Methodology

This study has adopted a qualitative exploratory approach as a descriptive-analytical study (Denzin/Lincoln 2000) using the Extended Case Study method (Burawoy 1998). Two techniques of data collection were used in order to perform the information triangulation: the narrative inter-

view (Hollway/Jefferson 2008) and observation as a technique for collecting primary data, and surveying documents as secondary data (IBGE 2010). The field diary was also a relevant tool adopted to validate observation. The narrative interviews followed the script in which stimulus questions were made in three axes: life trajectory, trajectory in the slum and trajectory in the cooperative. Sixteen interviews were conducted, which represented all the women who worked at the cooperative at the time. The cooperative was tracked for a period of three years, from May 2013 to April 2016. The Narrative Analysis technique was used to analyse the data (Fraser 2004).

The area studied was the Flowers Garden Slum, located in the East Zone of the city of São Paulo in Brazil. The East Zone has the worst income distribution in the City of São Paulo (IBGE 2010). The low supply of positions forces the population to move to the living area of the wealthy to find employment, which leads to a process of appropriation of the travel time of these workers by the upper classes (Villaça 2011). These characteristics influence the East Zone to be the poorest large region of the metropolis and, therefore, one of the most segregated (Villaça 2011). According to the data of the last demographic census, there are 4,052 people residing in the Flowers Garden Slum, and 66 per cent declared themselves to be black (IBGE 2010).

The Roses Cooperative is located in this territory and constitutes a group of female waste pickers organised by women resident in this slum. The Roses Cooperative has existed since 2010. The cooperative was self-built and has a precarious infrastructure. Rose Cooperative was chosen as a case study because it allowed combining the dimensions of housing and work, since both are in the same territory.

4. Results

4. 1 Environmental injustice in the household

The landscape of Flowers Garden Slum is sloping and mountainous and, in some parts, declivitous and steep, and two streams pass through the area (SVMA/SEMPLA 2002). Given the environmental conditions of the region, the slum presents characteristics of geomorphological risk:

namely landslide. In addition, a portion of the slum lies just below high voltage transmission lines, which poses risks to the safety and health of the population living in that territory. It is important to highlight that the section of the population that is not exposed to the geomorphological risks suffers the risks associated with the electromagnetic field. This causes the great majority of the population living in the slum to be exposed to some type of risk, as can be seen in Figure 2.

When asked what the main problems in the slum are, most respondents answered that it is sanitation. In the Flowers Garden Slum, most of the population uses the sewage ditch (44 per cent) or the streams (44 per cent). The absence of basic sanitation was noted in the interview, as follows: "For me, the biggest problem is sewage. Everything falls into that river, so it is harmful, right? On the upper side there is an open sewage and many kids have already fallen in there. Besides, it was very disgusting to pass by and see all that filth stuff and that bad smell" (Interview 1).

Another big sanitation problem is the garbage collection. There are few garbage dumpsters in the slum. Because of this, garbage is everywhere throughout the slum. "The problem is that there are few trash dumpsters for a lot of people, it gets filthy. Here, nobody recycles anything, and I think that's pretty crazy, you know? We work with recycling, but our trash, our recycled material here from the slum goes all to the landfill or to the river." (Interview 2)

We can observe in this speech of a waste picker a great contradiction, in which precisely those who work with waste are those that do not have their materials recycled, due to the lack of public policies of selective collection in the slum. Even more problematic is the lack of proper waste collection in these territories. The sanitation and garbage problems generate several diseases and infections that compromise residents' health. Moreover, as the focus of the problem is not solved, the diseases tend to be recurrent.

Among the interviewed (16), the heads of households and blacks (7) have the most precarious housing and live close to the streams, while white and black women with spouses (9) are in a relatively better situation, living in houses made of bricks or in less vulnerable places. When questioned about why they live in those places, all of them replied that it was because they found the lowest prices to rent houses. As they do not have partners to share their living expenses, those places appeared as the best deal for them.

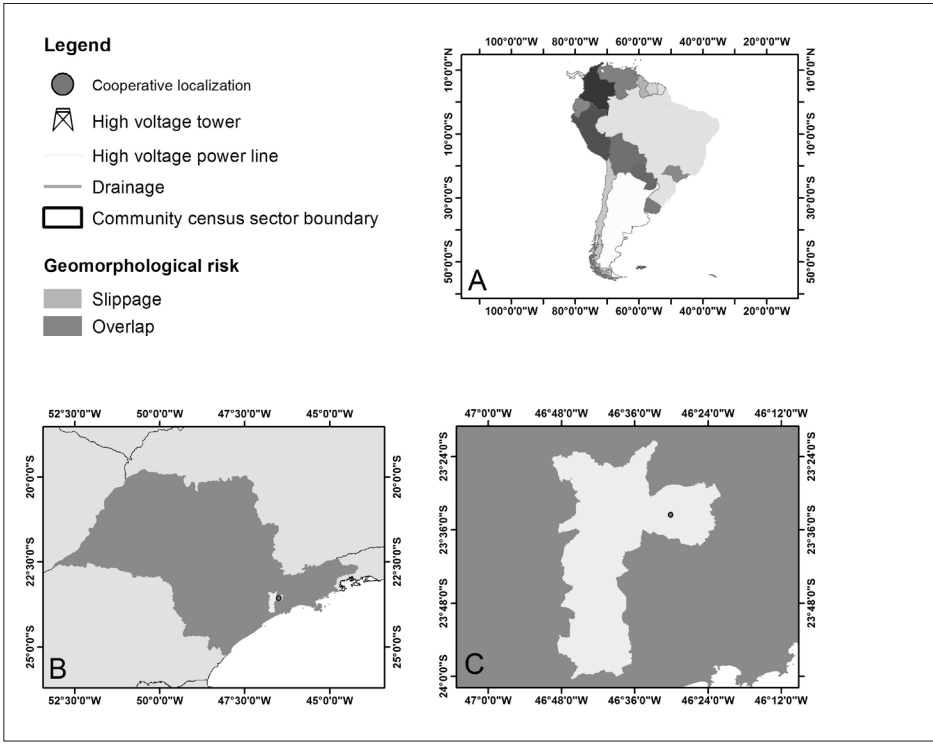
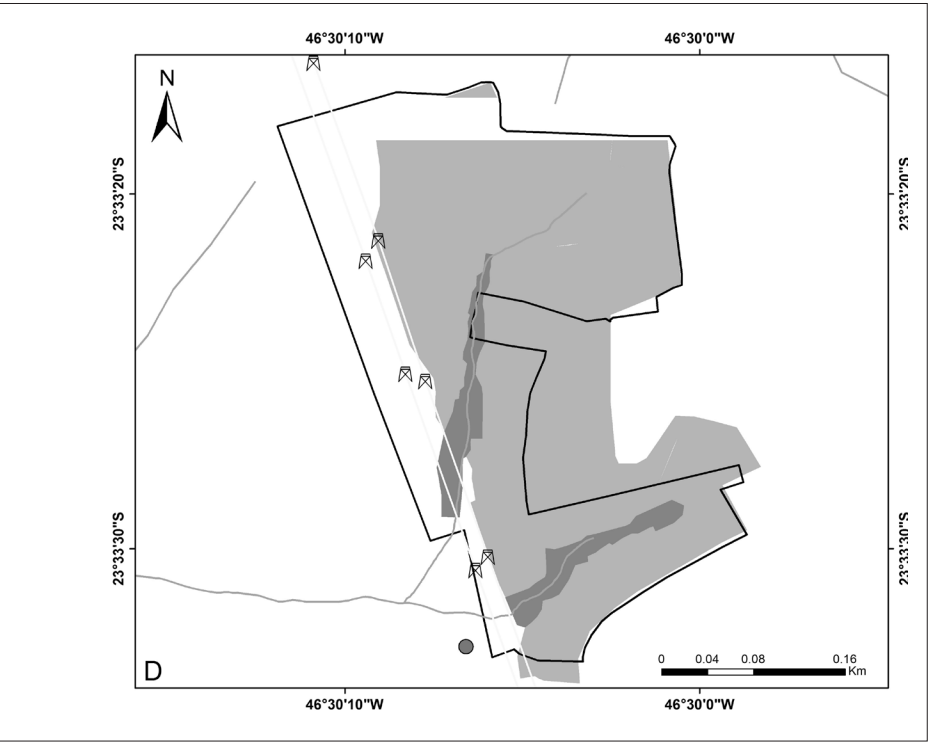


Figure 2: Geomorphological risks and high-voltage lines in the Flowers Garden Slum.
Source: Data from IBGE (2010)

Nine of the women interviewed were born and raised in The Flowers Garden Slum. Although some of the women have previously lived in other places, the great majority lived most of their life in other slums. The one who lived the shortest time there, has lived in The Flowers Garden Slum for 12 years.

Four female waste pickers had already lived in neighborhoods with better infrastructure until their families became unemployed and were unable to remain in those neighborhoods. However, it was noted that this occurred only with white women. In the case of the black waste pickers, the phenomenon of living in slums areas crosses several generations. Even



amongst the ones who had previously lived elsewhere (3), these were other slums areas. This fact evidences the connection between class and race of those who live in the slums of Brazil.

The following statements note the obstacles to changing this situation. "Because here in the community the rent is cheaper, right? Outside is very expensive. I pay BRA 300.00 (EUR 70.02) for two rooms, there's no other place I can get that price, so that's it, I know the City Hall can get us out of here, but what can we do? I have no husband to help me" (Interview 3). "I left Barra Funda because there they destroyed the slum, they said it was dangerous to live there, they gave some money to the people,

to people to save. Then my cousin said there was a shack here to sell and I came here" (Interview 4).

As noted, the Interviewed 3 does not have the financial resources to live in a place other than the slum. In addition, interviewed 4 left an area of risk to live in another area of risk. In this way, it can be understood that Interviewed 3 and Interviewed 4, as well as most women under the same conditions, are in a situation of permanent risk. Ideally this scenario would change when the economic condition of these women increases. However due to the factor of class, race and gender, the scenario of segregation remain an obstacle to be surpassed.

The major part of the population from the Flowers Garden Slum are black, and are exposed to geomorphological risks, electromagnetic field, and the absence of basic sanitation. Therefore, this population carries a disproportionate environmental burden as compared to other social classes and races. Thus, this characterises a life of daily environmental injustice. In addition to these factors, it was also observed that the women are more exposed to environmental risks than men.

The daily routine of the interviewees consists, in brief, of waking up early, getting their children ready, taking them to schools and daycare centres, working in the cooperative, going home and washing clothes, cleaning the house, and cooking. After that, picking children up from schools and daycare centres, bathing and feeding the children, cleaning the house, and preparing children's backpacks and uniforms for the next day. As one of the interviewees said, "I finally go to sleep". It was observed that this routine differs greatly if compared to the female waste pickers' male partners. Men wake up early and go to work, mostly downtown, come back at the end of the day, go to the bar, play football, go home, eat dinner and go to bed.

The interviewed women reported spending an average of five hours a day on reproductive work, while their spouses spent an average of 0.6 hours. Regarding productive work, women reported spending eight hours a day and their spouses, on average, nine hours, as can be seen in the Table 1.

Reproductive work (hours / day)		Productive work (hours / day)	
Women	Men	Women	Men
5	0.6	8	9

Table 1: Average daily amount of hours devoted to productive and reproductive work by female waste pickers and their spouses.

Source: own elaboration

The discrepancy between the hours spent by women compared to men doing household chores is unfair between genders. However, women also reported that, given their responsibilities to their homes and children, they spent more time in the slum, almost never leaving that territory. On the other hand, they said that their spouses spend the day outside, returning only at night to the slum.

This dynamic suggests that the injustice associated with the sexual division of labour is also an environmental injustice, since these women end up being exposed to the environmental risks associated with housing. Other studies (Tavares 2015; Neumayer/ Plümper 2007) also demonstrate the greater vulnerability of women to environmental risks, such as landslide, due to reproductive burden. Evidence indicates that impoverished women living in slums have a greater burden of domestic activities and a greater burden of risk exposure as compared to men. Therefore, the reproductive burden of these women is also a burden of environmental injustice.

4.2 Environmental injustices in the workplace

The Roses Cooperative, located at the entrance of the Flowers Garden Slum, is situated in a flat region outside the geomorphological risk area, but exposed to the risk of high voltage lines. However, the structure of the cooperative constitutes another risk for its members. The cooperative has two floors with a mezzanine and occupies an area of 24x36m, with its structure entirely made of timber and medium density fiberboard (MDF). In its cover there are aluminum plates that, on hot days, cause an intense thermal discomfort. On the other hand, on cold days, and due to the gaps between the structures, women are exposed to low temperatures. In the area where the municipal truck dumps the material, also known as 'the

mount', women work under rain and sun without any protection. Many women have had sunstrokes because of this.

The cooperative has electric power; however, it is not connected directly to the general network. Some of the improvised wiring is peeled and exposed, posing a fire hazard. In addition, the sanitation of the cooperative restrooms is a rudimentary septic tank, with imminent risk of soil and water contamination. Due to the gaps between the pieces of wood, pigeons have nested in the structures and, throughout the day, they perch above the heads of the women, near the ceiling. This animal is a vector of several diseases, such as salmonellosis and meningitis. In addition, it is common for women to find dead animals among the materials, such as rats that are vectors to serious infections, such as leptospirosis.

It was noted that, during the three years in which the cooperative was tracked, sharp materials caused the most frequent accidents at work. Several of the women presented scars near the neck, legs, and arms, due to cuts. Also, they reported risks related to hospital materials, such as syringe needles, that appears among the recyclables. Women use the basic Personal Protective Equipment, such as gloves and boots for work that is available for carrying out their activities. They just do not use them when there is no money to buy them.

It has been noted that there are environmental risks associated with waste picking, due to the handling of the materials and the precarious working conditions. In addition to the risks to which they are exposed, waste pickers are exploited by middlemen and the recycling industry, thus earning low wages. In the case of the interviewed, their incomes vary from BRL650 to BRL800 (approx. EUR 150 to EUR 187.50), with an average of four dependents, and most of the women (10), are head of household.

Regarding sexual division of labour, it was observed that among the 16 women, only two were married to male waste pickers. It was observed in the interviews, that the two women complained about their responsibilities when compared with those of their partners. "They earn more because we had, besides to work full day, look after the kids and take care of the house. We come back home and have to cook dinner, wash the dishes, clean the house and a lot of housework, and they don't. They take shower, rest in the sofa and wait there till the food is done" (Interview 5). "I had to cook every day, wash his dirty underwear and endure that nasty breath. And if I didn't

want to do it all it would be because I supposedly had an affair. And I still had to hear that he earned more and worked more than me. So, in the end I am better alone" (Interview 4).

These statements explain the extent of the double burden of women, but also the sexual obligation and the dislike of doing these tasks. It was also observed that, due to the childcare obligation, women's productive capacity is affected, which in turn means smaller incomes compared to men performing the same job. Thus, female waste pickers have their productive work devalued and their reproductive work is turned invisible.

Maternity plays an important role in the interviewees' identity. Low expectations about the future in teenage years directly contributed to the female waste pickers becoming pregnant, abandoning studies, and then becoming pregnant again. Among the 16 members of the cooperative, 13 gave birth during this time of their lives. There is a repetitive cycle in the trajectory of the female waste pickers families, once their mothers and grandmothers also abandoned their studies due to pregnancy in their teenage years. This fact contributes to keep the pre-existing exclusion of poor women from the formal labour market and the persistence of their poverty for generations.

Furthermore, there seems to be a tendency of repetition of family life trajectory to female entry in the activity of the waste picking, as both parents and siblings of female waste pickers, for the most part, work in the construction industry. Comparing the work carried out by the sons and daughters of the female waste pickers, a gender pattern was identified. Among the seven female waste pickers who have children over 19 years old, it was observed that the sons are unemployed, imprisoned, or work in other professions such as bricklayers, waiters, drivers, and security workers. None of the sons are waste pickers, while the daughters, for the most part, are either housewives or waste pickers. Only two out of the 11 daughters worked in another activity: one in the metallurgical industry and one as a health agent.

There seems to be a broader outlook for men who have the same race and class as female waste pickers. At first, they do not think about working with waste picking, because they expect to get some better work. According to one interviewee, her son, who was raised in the waste landfill, is totally averse to the idea of working as a waste picker. "My boy curses me, when

I tell him to work with me. He says: 'I'd rather be unemployed, I'll get a job soon, I'm not good at messing up in waste, not at all'" (Interview 4).

Moreover, because women spend more time in the slum because due to their household duties, the cooperative has a much greater appeal than just the financial aspect. Even though there are several reasons that have led women to pick waste, one element in common is that they found in the activity a relatively safe and long-lasting way to obtain income and to reconcile productive tasks with reproductive ones. Seen in this way, one can reflect that, while the man seeks a job, mainly for the remuneration it brings, the woman looks for an alternative that guarantees her some income, but also flexibility. Potentially, this is the reason why women accept the precarious job conditions and thus represent the majority of employees in the waste picker's cooperatives in Brazil. Therefore, these social forms of appropriation and exploitation which lead to the exposure of women to environmental risks in workplace, culminate in the condition of environmental injustice associated with their work.

Regarding race, no racial division of labour was observed in the dynamics of the cooperative, since women perform the same activities and are remunerated in the same way, which creates a sense of equality among all of them and silences racial issues. At the same time, women find it difficult to identify themselves as black and even to recognise the other women as black. Some interviewees believed that most waste pickers in the cooperative were white. They recognise each other as "pardo" ("morenas" in Portuguese). After being explained the characteristics of each race, the women came to identify themselves as black. However, even after this new perception, no discussion of racial issues in the cooperative was observed.

Although no differences were observed in the cooperative, it was possible to identify them during the interviews. Three main groups were identified: 1) Waste pickers who had worked in dumps and in the streets; 2) Waste pickers who had had other work prior to the cooperative; and, 3) The ones who had never worked before (who were housewives).

The group of waste pickers who worked in dumps consisted of five black people and one white person. In general, they began the activities of waste picking during childhood and in the company of relatives. Because the early initiation in waste picking, they are the ones who have spent the

most working time in activity. They have the lowest levels of education, are illiterate, or have only incomplete elementary schooling. They all worked uninterruptedly throughout their lives, even during pregnancy. In this group, all women are heads of families. The strategy adopted to reconcile the double burden was by taking children with them to work (collecting waste in streets).

The double burden was not the main factor that led them to work in the cooperative, but rather the desire to increase their income and avoid urban violence. According to these women, their incomes were lower when they worked on the streets (approximately BRA 500.00 or EUR 117.16). It was also reported that during their work on the streets they have suffered attempts of sexual abuse and violence.

Five of the women interviewed had other work prior to waste picking. These women are three blacks and two whites. Their previous occupations were as house maid, cleaning lady, cook, and dressmaker helper. These women had to commute to downtown, taking on average two and a half hours of travel. Others got jobs in the East Zone region, but they still needed to take buses, and spent an average of an hour and a half commuting. For these working women, distance was one of the great causes of conflict, because they could not be there on time to pick up their children at schools and daycare centres, while having to pay other women to take care of them, which had a direct impact on their wages and their maternal identities. In addition, because jobs were often far away, women were often absent when needed to take their children to the doctor or to resolve family issues. For this reason, after staying for a few months in the jobs, either they were fired or quit.

Some of the women were better paid in the activities they had before waste picking. However, all of them said they preferred working in the cooperative in order to be close to their homes. This was because it facilitated their routines with their reproductive work and reduced transport and the costs of caregivers for their children. The male partners of women waste pickers also experience urban spatial segregation and take about the same time (two hours) to commute to their jobs. However, because they do not have the responsibility of the reproductive work, they end up having greater stability in their jobs and do not have as much pressure with the necessary time for their travel.

Although urban spatial segregation impacts working men and women, the women are most affected, and reveals important contradictions in the world of precarious work. It was observed that female waste pickers leave a better paid job in downtown for a job with lower income and in precarious conditions, but closer to their houses, which can represent a gain in their life quality.

Five women, three white and two black, were housewives before working as waste pickers. They are the ones that have the best schooling and the ones who have spent the least time in the area, from two years to a few months. For them, working in the cooperative initially represented an income supplement, since they were married and their partners financially supported the household. Many said they felt lonely for spending all day at home, but they did not want other jobs where they would not be able to take care of their children. When families and friends talked about the cooperative as a flexible workplace where they could eventually be absent to look after their child, they accepted. For them, the work brought autonomy and self-esteem. "It is the issue about our own appreciation, as a woman and owner of my life; now I can spend my own money the way I want. When I started to work in the Cooperative I changed my vision of life, I started to want to conquer my own things and value what I have" (Interview 6). "For me it is very important to work, I can't only stay at home anymore. It is great to work, and besides all the difficulties, I really like it" (Interview 7).

This sense of accomplishment is related to the change in the women's life structures allowed by the work in the cooperative. On the one hand, the continuity in the cooperative may represent a limitation of possibilities, but, on the other hand, it represents the achievement of not being merely a housewife. For these women, it represents an important space of socialisation and opportunity.

5. Discussion

It can be seen due to urban spatial segregation, the whole population of Flowers Garden Slum is exposed to some type of risk. The dynamics of the segregation ensures that the more the population is in "economic despair",

the less freedom individuals have to live in safe places and reject jobs that could eventually adversely affect their health (Acserald et al. 2004) This mechanism was well illustrated when some waste pickers indicated that they did not have enough income to live in other places. Furthermore, there were also cases of waste pickers that were removed from other slums because of risks associated with living there, but, without enough money, they eventually had to returned to live in slums. This indicates an important limitation of possibilities and a situation of permanent risk, indicating a process of environmental injustice in housing.

Urban spatial segregation also has a direct effect on the working conditions of individuals that live in peripheral areas (Villaça 2011) The population living in these territories is marked by a consubstantiality of social relations, which excludes them from the formal labour market and pushes them to accept the most precarious jobs. The appropriation of the waste pickers' workforce is profitable for those who own the means of production in the recycling chain. They transfer the negative externalities of the production process to the waste pickers, profiting from the degradation of their bodies, exposing them to environmental risks. In this logic, there is a kind of "environmental surplus value", whereby the capital accumulates through the appropriation of environmental benefits (Acserald et al. 2004).

Therefore, waste pickers do not have the same purchasing power as those who generate the waste they collect. Thus, in one hand a small social segment with high consumption patterns and an ultra-intensive appropriation of natural resources (Acserald et al. 2004). On the other hand, the waste pickers remain below of the consumption patterns required for a decent quality of life and still suffering from the undesirable risks of working with waste. In addition, the work carried out by waste pickers mitigates the problems created by the excessive waste generation of the high purchasing power group. This dynamic indicates an environmental injustice in the work of waste pickers.

However, it was also noted that the daily experience of environmental injustice is differentiated amongst those who experience it. The results of this study show that the experience of women in slums differs from that of men, due to the sexual division of labour. The unpaid reproductive work performed by women is often invisible and favours their staying

in the private space of their homes (Hirata 2014). In the context of this study, the reproductive work leads women to spend more time in the slum while almost never leaving the territory, which makes them most exposed to environmental risks. Thus, besides their overloading with child care and housework, there is also an overload of environmental damage. This demonstrates the intertwining of the reproductive work of these women with the environmental injustice they experience.

It was also recognised that this reproductive work favours the entry and remain of women in waste picking, even following a pattern of family trajectory. Since waste picking is a flexible job that allows the reconciliation of reproductive and productive work, it becomes an attractive option for women. Even in informal jobs, the working conditions of black men are better than those of black women (Cherfem 2014). This is especially due to the sexual division of labour, in which women's work is more undervalued (Kergoat 2003). These elements can explain the why there is a greater pressure on black women to work as waste pickers, instead of black men, in the Cooperative of Roses. In addition, there are several risks inherent to waste picking and it was also possible to identify several risks related to the infrastructure of the Rose Cooperative. Considering these elements, an environmental justice case was configured for female waste pickers. Therefore, there is also an interweaving of environmental injustice with the productive work of the waste pickers.

The crossing between environmental injustice and consubstantiality shows that the more imbricated the class, race, and gender relations are, the greater is the oppression and the environmental burden, in the case studied here, for the female waste pickers. The double burden placed upon these women ends up also causing them to suffer environmental injustices in their productive work and greater exposure to risks in the household, forcing them to experience what we called in this study "the double burden of environmental injustice".

In addition, differences between the waste pickers themselves were also identified. In the dynamics of the cooperative, no racial division of labour was observed. This may be associated with the women's own difficulty in identifying themselves as black. This phenomenon can be understood as a consequence of the great racial discrimination existing in Brazil, which interferes in how individuals identify themselves as black people

(Hasenbalg/Silva 1999). In this context, few blacks self-declare themselves as such. However, because of social conditions, low income, low schooling and the phenotypic traits of the black population, they also cannot identify themselves as white (Cherfem 2014).

However, differences were noted in the individual trajectories of the interviewees. Most of the workers in the Cooperative are black, but the white ones have better schooling and a shorter working experience as waste pickers. Most of the white workers live with partners, have a higher family income, and are located in areas with less risk in the slums, as compared to the black families. It was also found that the black women who had previously worked in dumps and on the streets are the most vulnerable, since they have been exposed to the risks associated with the activity for their entire lives. Considering also that they are the most impoverished women and the ones who have the worst housing conditions in the Flowers Garden Slum, it is possible to say that they are those who most intensely experience the double burden of environmental injustice.

However, despite the situation of environmental injustice that permeates work in the Roses Cooperative, it was also observed that what had been a burden later became an opportunity. Working in the cooperative facilitated the double burden of female waste pickers because the following factors: a) better working conditions (related to safety) and income; b) to escape of the long commutes to the previous jobs; c) financial autonomy; d) possibility of socialisation for those who had been housewives before the activity. For these women who were already exposed to risks and a condition of environmental vulnerability, the cooperative represents better conditions for dealing with the challenges of their daily lives. Thus, the activity of waste picking should not simply be condemned because of the risks associated with the activity, but also needs to be better structured and organised in order to guarantee adequate working conditions for those who live from this activity.

Although this study deals with a single case study, the literature reveals that the reality of the female waste pickers presented here reflects the daily lives of poor black women under the same conditions around the world, especially those from the Global South. The double burden of environmental injustice experienced by them is inherently local, but its root lies in global structural economic inequality.

1 The real names of the cooperative and the slum were kept anonymous to preserve and respect the female waste pickers interviewed.

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List of interviews

Interview 1: slum dweller/waste picker [descripton, A.C.P.], 25 years old, white, 10/14/2016, translated by authors.
Interview 2: slum dweller/waste picker [descripton, M.C.S.], 37 years old, black, 10/14/2016, translated by authors.
Interview 3: slum dweller/waste picker [descripton, J.M.], 36 years old, black, 10/14/2016, translated by authors.
Interview 4: slum dweller/waste picker [descripton, H.D.S.], 48 years old, black, 10/21/2016, translated by authors.
Interview 5: slum dweller/waste picker [descripton, F.C.B.], 48 years old, black 10/21/2016, translated by authors.
Interview 6: slum dweller/waste picker [descripton, V.S.], 31 years old, white 10/28/2016, translated by authors.
Interview 7: slum dweller/waste picker [descripton, R.E.F.], 25 years old, black 10/28/2016, translated by authors.

Abstract *Dieser Artikel untersucht den Zusammenhang zwischen Umweltungerechtigkeit und der Konsubstantialität im Alltag von Müllsammlerinnen einer Kooperative in Brasilien. Zu diesem Zweck wurden 16 Müllsammlerinnen der Rose Cooperative im Flower Garden Slum, São Paulo, befragt. Zur Analyse der Konsubstantialität werden drei Konzepte herangezogen: räumliche Segregation in Städten zum Verständnis von Klassenaspekten, rassifizierte Arbeitsteilung zur Untersuchung von Rassismus und vergeschlechtlichte Arbeitsteilung für die Analyse von Geschlechterverhältnissen. In Bezug auf Umweltgerechtigkeit bilden diese drei Konzepte den Rahmen für die Analyse von Umweltbelastungen auf Grund der Wohnsituation sowie Umweltrisiken in Zusammenhang mit der Müllsammeltätigkeit und den Infrastrukturbedingungen innerhalb der Kooperative. Es wurde festgestellt, dass Müllsammlerinnen aufgrund ihrer Doppelbelastung verstärkten Umweltrisiken ausgesetzt sind: Einerseits im Zusammenhang mit den Wohnverhältnissen und andererseits mit der Unsicherheit ihrer Arbeit. Dabei bestimmt die Konsubstantialität von rassifizierten, vergeschlechtlichten und Klassenverhältnissen das tägliche Leben der Bewohner_innen von Flower Garden und die Arbeitsbedingungen der Müllsammlerinnen.*

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Waste De_marginalised? A Comparative Analysis of the Socio-Economic Effects of In_formal Recycling Activities. Argentina, Brazil and Germany Revisited

Abstract *Waste collection and recycling increasingly appears on the socioeconomic and political agenda both in the Global South and North. In the case of waste pickers, Latin America has a long-standing past of dealing with informal and marginalised activities, slowly making their way towards formalisation. In this paper we make two arguments. First, on a conceptual level, we highlight the implication of the semantics and synonyms of waste, which are then reflected in the ambivalence and de-dichotomised way of understanding de_marginalisation and the in_formal. Second, we empirically compare cases from Argentina and Brazil with Germany to highlight the pitfalls of Eurocentric perspectives on in_formal waste management.*

Keywords *waste, informality, marginalisation, Global North/South*

1. Introduction

At the end of 2017, the Chinese government decided to drastically reduce the import of plastic waste; some European countries such as Germany and Great Britain became alarmed (Der Standard, 1/5/18): As their recycling capacities were not able to handle all the growing amount of plastic waste, the question of how and where to recycle became evident. This is not an isolated example. On a global scale the quantity of all types of waste is increasing, and new forms of recycling activities are subsequently developing.

It becomes increasingly obvious that waste is more than simply its materiality and the desire to get rid of it. This comes along with 'new geographies of waste', where, beside a traditional conceptualisation of waste (e.g. as a hazardous material to be processed), social science approaches are becoming popular. Via a (socio-) spatial perspective, it has become a topic in its own right to analyse waste as resource and to bring together the informal and formal aspects of waste and consumption, environmental behaviour and (social) marginalisation (Moore 2012).

Our approach focuses on a socio-economic view of waste, based on different perspectives on the in_formal, (de_) marginalisation, and the social construction of waste. In so doing, we begin with a critical review of the theoretical concepts at hand. Methodologically, we rely on qualitative research methods and long-term fieldwork periods in our case study countries of Argentina, Brazil and Germany (c.f. Hafner 2014; Zirkl 2007).

With our contribution, we want to open the discussion about the terms 'waste', 'marginalization' and 'informality' in such a way that waste picking can be understood not only as a problem, but also as a first step towards conceptual expansions of marginalisation (seen here as a form of "de_marginalisation") and a reconceptualisation of informality (towards the in_formal). Our focus is based on the questions of how terms such as marginalisation, informality and waste are perceived by the local population and which conclusions we can draw by analysing these different positions. Here, we compare commonalities and differences among the different perspectives taken from case studies in Argentina, Brazil and Germany.

We develop three conceptual aspects. First, in a theoretical framing, we call for a semantic and synonymic outlining of waste, highlighting the normative baggage that comes with the terms applied. Second, we critically analyse the concepts of marginalisation in order to raise the question of pre-set notions and interpretations that may hinder the reconceptualisation of recent trends in waste collection and recycling. Third, we discuss the notions of the informal and formal, giving an overview of the different interpretations. The result thereof will be our proposition of 'in_formal' in the framework of recycling, highlighting the trans-dualist notion of the informality concept. To put it differently, we are interested in the waste-related actions that are positioned in the fluid gap between the informal

and the formal. Here, we argue that socio-cultural and political contexts have to be explicitly taken into account for understanding the normative conceptualisation.

Waste, de_marginalisation and the in_formal are then contextualised within the case studies from Argentina, Brazil and Germany, in order to empirically visualize alternative interpretations of the activity of waste collection. Argentina and Brazil have long-standing experiences in the informal waste handling business. The socio-economic and human aspects are at the foreground, which then move towards more technical and formal modes of action. Germany acts as a counter-example. With a significant focus on technical solutions to waste, informal activities of bottle collection have re-emerged during the last decade, opening up new – and unintended – opportunities to create informal income.

2. Waste, garbage, filth, rubbish – different wordings and conceptualisations

Waste is primarily seen in a materialistic way. From a human geography perspective, we focus on waste as a social construction. Regarding the situation in France and Germany, Keller (2009: 22) shows that waste is part of the materialistic culture of a consumer-related society. When a product reaches the end of its life cycle, the transition from a desired good to an undesired (and hopefully soon invisible) piece of waste remains in the common perception of consumers. However, how do we define the materials that we – after their use – consider as garbage (and which we try to get rid of)? Besides this material aspect, a socio-cultural meaning of waste is present: waste and its symbolic connotations reflect certain social practices, not only regarding how people produce and dispose of waste, but also how in_formal waste economies are organised in different cases.

When writing about the connection between waste and human action and perception, it has to be borne in mind that the term 'waste' is normatively loaded. Moore (2012: 782), for example, plots the different connotations of waste on the axes of positive-negative (x) and relational-dualist (y). While helpful at first glance, she however mixes different definitional categories, ranging from synonyms for waste (e.g. resource)

to others, such as disorder. When focusing on informal waste collection and recycling, Sicular (1992: 19) makes the distinction between 'waste-as-waste' (it is what it is, no adding of socio-economic value is considered) and 'waste-as-ore' (the material and socio-economic potential is recognised). The former definition is predominantly applied by formal waste deposit companies, while the latter attributes to waste the characteristic of being an additional economic resource, as it will be shown by in_formal waste collectors in the three case studies below.

Besides the diverging normative definitions of waste, the semantic aspect of pseudo-synonyms also has to be considered: waste is not the only term used in this context. Bierbrauer (2011: 25f.), in the Argentine example highlights the distinctions between *basura* (residuals of household waste that are not recyclable or do not have enough economic value to be sold), *residuos* (disposed materials that have the potential to be recycled), and *materiales* (where recycling is highly likely). To further contextualise, those normative attributions are not only observed in the Spanish language, but have their counterparts in the languages of our three cases (i.e. Spanish, Portuguese, German, as well as English). Table 1 classifies the terms most commonly used in the four languages. While waste is the more general and technical expression, garbage (among others, c.f. table 1, column a) stands for materials that are considered without value and to be disposed of. This category is represented by the traditional waste business, where economic aspects (e.g. collection, treatment, deposition of municipal garbage) as well as socioeconomic implications (e.g. different types and quantities of waste regarding different socio-economic urban neighbourhoods) and ecological problems (environmental implications through garbage treatment) can be observed. With the third category (recyclable materials), a more ecologically sound characteristic of waste management is at the foreground, contributing to a more sustainable process of waste treatment (resource recovery etc.), including formal and informal recycling business activities.

	a. Materials to be disposed of (not recyclable)	b. Technical definition: materials that can be treated and recycled	c. Materials (recyclable)
English	garbage, rubbish, litter, refuse, trash	waste	recyclables
Spanish	basura, deshecho	residuo	material reciclable
Portuguese	lixo	resíduos	material reciclável
German	Müll, Reststoffe	Abfall	Wertstoffe

Table 1: classification of waste-related terms in English, Spanish, Portuguese and German
Source: own elaboration

Consequently, we want to highlight the fact that frequently-used synonyms for waste – in addition to their contextual usage and translational incommensurabilities with other languages – do come with their own normative baggage and have to be critically evaluated according to the intended use.

3. De_marginalisation

The second concept closely related to in_formal waste management is marginalisation. To avoid confusion, there are three different shapings of the word: marginal as an adjective, marginality as a situation, and marginalisation as a process. 'Marginal' used as an adjective is connected to a physical or cognitive location distant from the centre and considered insignificant. 'Marginality' expresses a situation (relative to the status quo, i.e. a marginal position). In this sense, Braun and Gatzweiler (2014: 3) define marginality as "an involuntary position and condition of an

individual or group at the margins of social, political, economic, ecological, and biophysical systems that prevent them from access to resources, assets, services, restraining freedom of choice preventing the development of capabilities, and eventually causing extreme poverty."

We, however, are more interested in the processes behind the marginal. 'Marginalisation' focuses on the process of becoming marginalised in different ways. Two perspectives arise: first, marginalisation is anchored in a spatiality located at the edge or even outside of pre-set spatial limits. A focus is put on spatial (and socioeconomic) aspects of peripheral areas and the analyses of the circumstances by which these spaces become marginalised. Geographies of marginalisation (cf. Trudeau/McMorran 2011, Pelc 2017) focus on spaces on the margin and on how social inequalities produce (spatial) exclusion and marginalisation (which can be instantiated in, for example, minority groups or the socio-economically underprivileged).

Taking a socio-economic view, marginalisation is normatively characterised as a process towards poverty and social exclusion. Poverty and marginalisation are mutually dependent (being poor can lead to a marginal position, while facing a marginal position very often is the reason for being poor) and appear for example in vulnerable settings and living conditions in fragmented urban areas (see e.g. informal squatter settlements in the vicinity of gated communities in Brazilian cities).

Marginalisation thus implies two aspects: (a) It is a shift of a person's movement towards less favourite circumstances; and (b) this movement is not desired or initiated by the person(s) affected. While we agree with (a), it has to be understood that marginalisation comes along with (and in part has to be differentiated from) other characteristics such as stigmatisation, precarity or (non-)participation, adding additional normatively laden conceptions to the table. Bearing this thought in mind, (b) is challenged. Does somebody fall into a marginal position because of personal activities ('external marginalisation', or being regarded as marginal by others) or do people consider themselves to be marginalised because of their individual situation ('auto-marginalisation'; here, the person considers themselves marginalised through her/his own actions)? The point we want to make here is to highlight the fact that marginalisation depends to a large degree on interpersonal interpretations, contextualisation, and perspectives.

Marginalisation is one central parameter for our observations regarding waste / recyclable pickers. From an external perspective, people become marginalised – in a socially constructed perspective – because their socioeconomic (i.e. marginalised) situation makes them collect waste. Due to this activity, their marginalisation is reinforced. However, as modern consumption patterns are becoming increasingly critiqued (e.g. as regards environmental aspects, sustainability, socioeconomic problems), some impacts arising from discourses on local and global waste management can be detected. As shown later new forms of waste and recyclables management emerge, reducing the generation of waste as well as improving recycling activities. Consequently, particularly in the Global South, veteran marginalised actors such as the South American *catadores/cartoneros* start to lose their negative (marginal) image and become important partners in modern urban waste treatment. While waste picking is still stigmatised, the inclusion of the actors in the waste management cycle does, however, lead to a partial trend reversal of marginalisation. To semantically express the ambivalence of remaining in the realms of marginalised life conditions but managing to move beyond it, we suggest the term 'de_marginalization' within the 'in_formal' (see following chapter below) urban economy of recyclables.

4. The concept of the in_formal

Our three empirical examples will show that waste collection and recycling is carried out in the grey area between the informal and the formal. Remaining in the realms of established definitions of informal and formal, the question arises, however as to which aspects of waste collection are to be classified as informal, formal, or something in between, and what the legal, social and economic implications are thereof.

We identify three forms of positioning the informal towards the formal. First, the informal can be seen as an equal-level alternative to the formal. Being praxis-driven, the main argument here is that there are many actors in the whole system and some are informal, while others are formal. Here, the actors' positioning within the Global South or North does not have any significance, since all are a part of the whole system.

The informal, however, is located outside of the formal (Samson 2015); the informal can then be used as an "unregulated arena in which micro-entrepreneurs choose to operate in order to lower costs and increase profit" (Phillips 2011: 384). Thus, the informal is considered as a tool to influence and change settings. The goals for doing so are twofold: closely connected to neoliberal theories (Komlosy et al. 1997: 16), the orthodox objective is to remove regulations in order to enable an expansion of the formal setting to previously informal actions. Thus, it acts as a blueprint for changing formal rules. The pragmatic goal goes in a different direction and celebrates informality as an answer to 'modernist' large corporations' actions (c.f. Samers 2005). With the informal challenging the boundaries of the formal (and ultimately expanding them), this becomes a subversive expression of the current formal system.

The second form of positioning considers the informal as subordinated to the formal. Here, in the modernisation theory inspired (Komlosy et al. 1997: 14) dualist understanding, the spotlight lies on unskilled and labour intensive work. Focusing on the workers rather than on the structure, the informal is seen as inferior to the formal and considered a last resort for those who cannot make it within formal structures. This was well-defined by an early ILO definition of a "non-structured sector that has emerged in urban centres as a result of formal sectors' inability to absorb new entrants" (International Labour Office 1972: 9). It was later revised to a "viable alternative to formal sector employment" (International Labour Office 1993: 3), showing the problematic vertical dichotomisation of the informal and the formal. Nonetheless, the main goal of the dualist framework remains to formalise the informal, a task that has to be carried out through public policy. Addressing the main critique of the dualist approach, the structuralist perspective acknowledges that the formal and informal are intertwined. The informal is still considered a subordinate part of the whole system, by being subordinated to the formal's goal of improving competitiveness, flexibility and reducing costs (Moser 1978; Portes/Castells 1991). The goal here is not so much system change, or the informal's absorption by the formal, but rather to maintain the status quo of production and informal labour. Thus, normative elements are not so prominent; as it neglects the forms in which micro-enterprises use their social networks (Cheng/Gereffi 1994). What remains is the valuation

asymmetry in favour of formality. For better analytical purposes, Komlosy (2015: 41–46) uses conceptual coupling and synonymisation to describe the formal vs. the informal: legal vs. illegal, legally regulated vs. unregulated, socially secured vs. nonsecured, and the combination of different work relationships. While the first three category pairs are manageable in empirical fieldwork, the latter plays tribute to the increasingly ambivalent working and living situation between informality and formality. Thus, Komlosy implicitly acknowledges the boundaries of binary classification methods. This viewpoint is also found in the latest ILO topologies, where instances of non-standard forms of employment are used to avoid the bipolar dichotomisation of formal vs. informal work (International Labour Office 2015: 32–33).

The third positioning of the informal is diametrically opposed to the second: which is a romanticised portrayal of resistance. This occurs particularly in the debate on housing, where it is praised as the "reconquest of the urban" (Brissac-Peixoto 2009: 246), reflects "informality as subaltern practice" (Varley 2013: 7), or even talked about in the form of "'inverse' colonialism" (Yiftachel 2009: 91). Thus, it comes as no surprise that traditional characteristics of the 'informal' – low entry barriers, lack of organisation, irregular income, or health risks related to the working conditions – are increasingly questioned (Oteng-Ababio et al. 2014: 164). This form of informal economy is rich in synonyms such as 'underground economy', 'shadow economy', or 'survivalist economy'. The terms remain ambiguous and are accompanied by negative connotations (Mingione 1983: 311), an aspect that Oteng-Ababio et al. (2016: 267) criticise as being too narrow minded. This is also underpinned by transformations observed in this sector; key words here are crowd- or click workers or solo-entrepreneurs experiencing similar hardships as in the 'classic' informality-scheme, but who are – legally – in formal settings (cf. Mahnkopf/Altvater 2015: 28). To overcome the normatively and negatively charged sensations, a particularly interesting alternative is the concept of 'system D', originating from the French/Caribbean *débrouillard* (i.e. resourceful), which attempts to add a positive spin to the negative connotation of informality through the active visualisation of elements of social capital and improvisation (cf. Meagher 2003; Neuwirth 2012; Grant 2015: 136).

As shown with the example of the crowd and click workers, the boundaries between the informal and the formal are blurred economically, legally, and socially. Similar amalgamations between the informal and the formal are observed by Mahnkopf and Altvater (2015: 19) when they consider the changing nature of work of the 18th century (i.e. the transition from an agrarian to an industrial society; Sittel et al. 2015: 61). Like in the 18th century, work relationship and dependencies are now re-structured. They do not go along with 'the usual' historical forms and norms of doing and organising work, and are thus considered informal. Even though those workers emerged in a digital age, significant similarities are observed in the case of waste collectors. Thus, we go along with the critical remark by Inverardi-Ferri that we should move beyond the informal–formal divide (and particularly the gap between theoretical concept and the "fact"; 2017: 2) but to beware of a simple substitution of the term with others. Formal-informal do not stand on their own but are rather intertwined and blurred along axes of context-based categorisation (e.g. legal–illegal, registered–unregistered, visible–invisible, etc).

As a result, we consider informal and formal as still important umbrella terms. We will show how the different positionings of the informal towards the formal (equal, pejorative or superior) have an effect on the respective waste collectors' (auto-) perception and economic as well as social strategies. Additionally, we want to highlight the conceptual challenges of binary frameworks as being too black-and-white by introducing a new written form of the informal and formal: in_formal. In so doing, we want to make the fluidity of actors' movement between the informal and the formal explicit and semantically visible.

5. Waste, the in_formal and de_marginalisation: experiences from the Global South and Global North

So far, we have stressed both the negative effects of 'not being part of the norm' and also clearly highlighted the potentials that arise thereof. Thus, we agree with Oteng-Ababio et al. who argue from a Global South perspective that informality is neither exclusively a matter of the Global South nor "just a set of marginal last-resort survival activities" (2016: 267).

This is further highlighted through our understanding of the in_formal as a "mode of practice" (Roy 2004), emphasising that these modes (in our case the act of collecting recyclable material) do not only occur in the Global South but are increasingly visible in cities of the Global North (e.g. deposit bottles in Germany).

When dealing with the topic at hand, the sentence "there where somebody lives, there will be waste", has to be refined and expanded with the phrase "and those who live off it" (Hafner 2014: 79). Each of the three examples from Argentina, Brazil and Germany show their proper dynamics, presenting three contexts on in_formal waste management. To analyse the different realities in the Global South and Global North, (participant) observation was the entry point to obtain first-hand information on the respective situations (for example, in Buenos Aires, Rio de Janeiro, and Curitiba). Additionally, we conducted narrative interviews to better understand how people have started working in in_formal waste businesses and how their experiences and their expectations look like now, and are considered in terms of the future. We also conducted group interviews with recycling material collectors to identify everyday problems, as well as obtaining their individual views on organisational aspects such as participating in a recycling cooperative. In-depth interviews were carried out with community leaders and stakeholders from the formal garbage segment. In a few cases, we mapped waste collectors' movements in public space and their identification of locations with conflict potential.

5.1 Waste treatment in Brazil: the in_formal and de_marginalization

Profound socioeconomic disparities are a major characteristic of Brazilian life, which is also reflected in the country's formal and informal waste management. While urban areas, especially in the southern and south-eastern region, account for an elevated sanitation infrastructure, the rest of the country still needs to improve significantly. Some brief facts characterise the waste sector in Brazil (data for 2016/2017, see IBGE 2018; Perreira/Goes 2016):

- more than 90% of households receive some kind of public waste collection,
- almost all of the collected municipal waste is destined to landfills (one third of the garbage still goes to illegal dump sites);
- technical know-how as well as a juridical basis (the first comprehensive waste law, nº 12.305, from 2010) do exist, and waste management is widely discussed in the political realm; waste engineering techniques are well known and put into practice;
- waste reduction still has to be improved, and even if the so called "3 Rs" (reduce, reuse, recycle) are discursively popular, their implementation is still lacking;
- waste separation on a municipal level started in the 1990s, and official (municipal, national) as well as private programmes do show some primary results (e.g. aluminium recycling is very common, due to an individual initiative by an aluminium can producing company);
- a significant number of environmental education programmes have been implemented (some governmental, some by NGOs), but there is still a gap as regards putting the initiatives more efficiently into practice;
- informal waste management (e.g. recycling material pickers, so called *catadores*) and recovering recycling materials are quite common in urban areas.

The organisation and monitoring of urban waste management are tasks of the municipality, while in practice private companies are in charge of waste collection, treatment and disposal. The third group of actors are a significant number of usually informal collectors of recyclables. These *catadores* look for recycling materials in two locations: on municipal landfills, remaining invisible to the general public and thus both spatially and socio-economically marginalised, or through mining in waste containers on their intensive waste collection walks in urban areas. As participatory observations and go-alongs have shown, the second mode of collection is prone to greater socio-cultural vulnerability, as they are visibly marked as the 'informal ones'. Thus, it comes as no surprise that the self-perception of their work is anchored in the latter positioning of informality being subordinated to the formal.

In both cases, as interview results have shown, the most desired materials are paper, plastic, aluminium cans and metals, as well as glass. For a long time, *catadores* usually worked on their own without any subsidies from the municipal government, but experienced increasing integration into more formalised structures through the creation of cooperatives or the individual ways of cooperation of the local *catadores*. Consequently, a shift from the informal to the formal occurs, leading to the blurring of boundaries (much like in the case of click-workers). The in-betweenness becomes apparent, which is a central feature of the in_formal.

Coming back to the empirical level, this trend is grounded in an increasing collaboration between the formerly marginalised *catadores* and the municipality. Being part of a cooperative partly changes their legal status (documentation of activities, legal work conditions, some entrepreneurial structures etc.). Furthermore, as a member of a cooperative the social position changes: usually supported by the municipal government through some financial and administrative help, there are also educational and marketing initiatives to promote recycling activities and stimulate the local population to separate recyclables from garbage (a well-known example since the 1990s is the southern Brazilian city of Curitiba, see Zirkl 2007).

Those municipal-level initiatives became up-scaled to the national level and left some traces on new and progressive ways of managing the Brazilian waste economy. With the national Movement of Recycling Material Collectors (MNCR), the *catadores* established the first nationwide network of its kind in Latin America. In the past decade, the Brazilian Government did launch some legal instruments to strongly support the work of the *catadores*. Politically subsidised by an inter-ministerial platform (CIISC, as part of the nationwide project of solidarity economy), the long-established informal work with recycling materials is becoming increasingly formalised (e.g. integration into formal national and local recycling programmes). This also helps to draw the *catadores* away from a long-standing image of filthy marginalised second-class citizens ('dirt-scavengers') and now promotes them positively as 'specialists for recyclables' instead (see for more details Demajorovic/Lima 2013; Pereira/Goes 2016). Through those semantic changes, the process of de_marginalisation is started.

5.2 From waste surgeons to environmental promoters: the case of Buenos Aires, Argentina

As much as in the Brazilian case at the beginning, the topic of waste in Argentina has always been treated on a municipal level. However, the Argentine system is still rooted in municipal, local level initiatives and reactive political agenda-setting. From a legal perspective, since 1905 (due to the growing number of illegal waste collectors) it was permitted to individually collect and sell waste (Suárez 1998: 17). This accomplishment, however, experienced major drawbacks during the 1970s military dictatorship and the official discourse of removing slum villages and waste treatment sites from the city – a new mega-landfill was then created in the province of Buenos Aires, depriving *cirujas* (so-called waste surgeons looking for recyclable materials on landfill sites) of their livelihoods and disengaging citizens of Buenos Aires from the field of waste (c.f. Schamber 2009). *Cirujas*, nonetheless, continue their work, but now they carry out their tasks on illegal landfill sites in the province of Buenos Aires, in absolute informality and illegality (Hafner, 2014: 83). Spatial as well as social marginalisation becomes apparent.

The end of the 1990s re-visibilised waste collectors in Buenos Aires (Boy/Paiva 2009: 2f.): (1) The neo-liberal economic politics of the 1990s drastically reduced the workforce of the urban middle class. (2) On a political-legislative level, the handling of waste was theoretically regulated, but the system did not work in practice – waste remained in the streets of Buenos Aires. (3) The de-coupling of the Argentine Peso from the US Dollar and the subsequent devaluation of Argentina's currency drastically increased the prices of raw materials; recycling became – as often stated in interviews with waste collectors – economically relevant. Those three factors led to an increasing number of people collecting predominantly cardboard from the streets of Buenos Aires. Many of them did not fall under the classic scheme of the *cirujas* but seized the opportunity to compensate for their job loss. Referring back to the theoretical discussion, the auto-perception circulates around the theme of stepping back from the formal, respectable life, towards some subordinate informal activity of waste picking. This perceived negative turn also becomes apparent when waste collectors refer to the shift in their discursive description of work, as the pejorative term *basura* is used instead of a more neutral *residuo* or

material reciclable (c.f. Table 1). Out of necessity, a less favourable and not prestigious task is carried out to maintain and improve one's livelihood. In other words, an auto-marginalisation of one's own socio-economic status is performed to survive.

A new term, the *cartoneros* (cardboard collectors) is introduced, giving the Argentine economic crisis a face of people who are "*pobre pero digno*", poor but dignified, working in an informal (and still illegal) setting but without opting for criminal activities. Their work ethics resemble those in a formal setting, even if the work itself is informal/illegal, yet the perception of their work shifts towards positive acceptance in the dominant societal discourse. *Cartoneros* become visible, and their actions are increasingly positioned at the space between the informal and the formal.

As a result, the pressure of the street (scientists talk about 100,000 to 300,000 *cartoneros*; Mesa 2010: 45) and the support from civil society puts pressure on politicians to pass Law 992 to re-legalise individual waste collection in public spaces, also introducing a semantic change from *cartonero* to *recuperador urbano* (urban recuperator) (Hafner 2014: 86).

This semantic change provokes a couple of consequences. One of the most prominent features of change is the encouraged registering of waste collectors, making a transition from being legally invisible (and pre-law 992 illegal) to officially becoming part of the waste collection system alongside traditional and formal waste collecting companies. The former are in charge of recyclable goods while the latter now deal with organic waste. Furthermore, the facilitation of the registration of cooperatives of urban recuperators allows for a diversification of action: cooperatives such as *Del Oeste* are now in charge of one of the recycling centres (so-called *centros verdes*) where they "work on a formalised, isolated island" (*centro verde* worker, own translation) receiving recyclable material from other cooperatives. Even though they have a limited contract with the city of Buenos Aires for running the *centro verde* (and are thus legally formalised), members of the cooperative still see their work as a way of earning money that is nurtured by a prescribed informality from society – numerous interviews unearth the feeling of workers' shame at carrying out their task of recycling. Other cooperatives studied for this paper, such as *El Ceibo,* follow a dual strategy of managing a *centro verde* (and being proud of it, maintaining a high profile on an international level with perfect marketing strategies), as

well as collecting recyclable material directly from individuals and shops in the borough of Palermo. The cooperative is formally registered, but at the time of conducting interviews there were still members of the cooperative that have not individually registered as urban recuperators. So, they work under the radar of official authorities but within a formalised framework. Another approach is carried out by the largest group, *Amanecer* (MTE), self-defined as a movement of excluded workers. Here, the legal framework of a cooperative is used as a strategy to get access to financial means provided by officials to waste collectors, but the organisational structure and goal of the movement is criss-crossed by elements of resistance against the current political (and legal) system, also reflected in their motto: "If you touch one, you touch everyone" (interview, 2014). Lastly, cooperatives like *El CorreCamino*, in a more anarchic manner, have their clear focus on the materials they collect and the local neighbours they collect them from. Formal registration of members is no priority among the few members. They want to stay below the radar of visibility of legal authorities. An anything-goes hustle in the streets mentality is observed: whatever you can find on the streets is the finder's property. This praxis still reflects the thought styles of the dwindling early-day individual waste collectors; in short, marginalisation does not play a major role here. Members of *El CorreCamino* pride themselves with their task, auto-branding themselves as *promotores ambientales* (i.e. environmental promotors).

5.3 Leisure marginalisation 'made in Germany': the 'not so formal' collection of deposit bottles

The perception of waste treatment in Germany is defined by two basic characteristics: technical solutions are predominant (landfills, incineration, separation and recycling, but also significant waste exports) and citizens' participation in waste separation seems to be more engaged than in other regions.

Waste management is far more formalised than in the above cases, nurturing the pre-assumption that there is not much space for informal activities. Nonetheless, a growing number of people collects deposit bottles in public spaces in Germany. Two recent laws ("Kreislaufwirtschaftsgesetz", "Verpackungsverordnung") are responsible for the charging of 25 Euro-Cent deposit fees for 'one-way' bottles, creating this new informal business.

Nowadays, waste bins in airports, train stations, in public areas, as well as in special events (e.g. music shows) are being searched for deposit bottles. But who are these people, and why are they doing so? Some of our own empirical work, combined with various research studies (cf. Moser 2014; Catterfeld/Knecht 2015), show that this phenomenon is making its way to urban realities in Germany. They usually work on their own, evoking similarities to the Argentine case around the economic crisis and job losses of the early 2000s. However, no cooperation-like organisational structure comparative to, for example, the Argentine or Brazilian cases has so far been established. The dominant groups are pensioners and people on social welfare. Unlike in South America, their often daily collection of deposit bottles is rarely used to secure their livelihood. It can, on the contrary, be considered as an extra supplement to their usually small pension or governmental support. Through the last years, due to increasing immigration rates, migrants can be identified as another important (and growing) collecting group (e.g. people that migrated from South-Eastern Europe to Germany, especially from Romania, are heavily involved in the deposit bottle collection at Munich Airport).

Broadly speaking, we observe that there is a certain suspiciousness towards these people in parts of the society (on the other side some compassion can be noticed as well), and interviews show that a significant number of bottle collectors do certainly feel embarrassed about their situation, as they consider themselves auto-marginalised. However, in this context, a new form of marginalisation is identified: particularly for the ones that started collecting bottles without a severe economic need to survive on this task, we consider their somewhat involuntary 'hobby' (not to be understood in a pejorative way) of collecting deposit bottles as 'part- or leisure time marginalisation'.

6. Conclusion

Perceptions of waste collection and management are changing. In this paper we have taken three short examples to open the spectrum to address how aspects of the in_formal and de_marginalisation are dealt with in different socio-economic and cultural contexts. It was important to us to

show that the in_formal does not only occur in the Global South (looking at Argentina and Brazil), but is increasingly visible in the Global North (e.g. Germany) too.

We have shown that waste management is predominantly a matter of municipalities. However, the Brazilian case highlights the potential of national and supra-national cooperation and the networking of in_formal waste pickers to demonstrate the impact of bottom-up structures on national legislation (e.g. the waste law of 2010). Argentina, entering the stage later than Brazil, still maintains the close local level structures with little inter-urban or national exchange of waste pickers. Nevertheless, low level structures and elements of the in_formal do not have to be interpreted as a negative feature; the strategies of recyclers' cooperatives have to be analysed to identify whether further growth and/or formalisation is *desired* at all. Re-coupling results from the Global South to the North, Germany is the youngest example of in_formal material collection; the activity is carried out on an individual level, often due to the socio-economic and cultural contextualisation (e.g. basic income plus additional income from bottle collection). Viewed from a temporal perspective, a deeper path analysis (from Brazilian, via Argentine, to German experiences) has the potential to add more social components to the predominantly technically-structured form of German waste management.

All three examples have in common the fact that actors are moving between the two poles of informality and formality. To pay tribute to this feature, we have conceptually coined the term 'in_formal', expressing the inherent in-limbo situation, be it desired or not. The goal of the introduction of in_formal was to go beyond the dominant ascription that the informal is bad *per se*, while also rejecting the romanticisation of informality as a counter-capitalist reaction to the dominant society's thought style. The in_formal can shed light on a more pragmatic, context-based understanding of varying living and working situations. In so doing, the artificial dichotomisation of informal and formal is abolished, allowing for a less conceptually restricted and more context-adaptive analysis of heterogeneous living situations.

Finally, it was important to show that in most studies of in_formal waste management, the concept of marginalisation has too much of a bias towards the victimisation of waste collectors. We could instead show

that, depending on the individual and/or cooperative strategies, the act of collecting recyclable materials can be both a mode of social and cultural marginalisation, and at the same way a vehicle to escape said marginalisation. Context matters, as do individual strategies and perspectives in order to be able to de_marginalise waste, and even more so, focus on the process of de_marginalising the waste collectors.

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Abstract *Abfallsammlung und -recycling tauchen in zunehmendem Maße auf der sozioökonomischen und politischen Agenda auf, sowohl im Globalen Süden als auch im Globalen Norden. Auf Abfallsammler fokussierend hat Lateinamerika eine lange Tradition im Umgang mit deren informellen und marginalisierten Aktivitäten, die sich langsam in Richtung Formalisierung bewegen. Zwei Argumente sind in diesem Artikel zentral. Erstens heben wir auf einer konzeptionellen Ebene die Semantik und Synonymität von Abfall hervor. Diese werden in weiterer Folge bei der Diskussion der Ambivalenz und des de-dichotomisierten Verständnisses von De_Marginalisierung und In_Formalität relevant. Zweitens werden empirische Beispiele aus Argentinien und Brasilien mit Deutschland verglichen, um die Tücken eurozentristischer Perspektiven auf in_formelles Abfallmanagement aufzuzeigen.*

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Photo Essay

Kathrin Eitel

Matter in and out of Place: A Story About Wastefulness, Hybridity, and Flows of Plastic

Wasted, discarded things and rubbish all over the world. A global problem with which we are all connected. According to a study conducted over more than three years (Jambeck et al. 2015), plastics are in our oceans, creating garbage islands, contaminating seawater, and are a serious threat to the world's environment. Therefore, plastic and its debris are highly visible in scientific and societal discourses and common knowledge. Looking from a different perspective of waste and its debris, especially in its relation to question of what is (from) human and what not, we may, from a phenomenological perspective, examine different angles of the visibility and non-visibility of plastic. The unwanted, or the dirt, which is called a 'matter out of place', according to Mary Douglas (2001 [1966]), is omnipresent. But if dirt is out of place for one person, couldn't it conversely then be *in* place for someone else? The following photo-essay aims to answer this question while focusing on the visibility and invisibility of material waste in its environment. Concretely, it allows an insight into the ecology of waste.

1. A delusive paradise

A vast and increasing amount of garbage can be discovered along Cambodia's coasts. Discarded items litter the beaches and stick themselves to its land – even though most of the washed up garbage does not come from Cambodia itself, nor has it been produced here. It comes mainly

from countries of the north, where it was manufactured and then sold to enterprises around the world. Every day, masses of waste products are transported across the sea and washed ashore on long beaches, patterned in colourful plastic shreds and adorned with flip-flops. Hair shampoos, fragments of former Styrofoam packaging, plastic bottles, fishing hooks and nets in all colours: crushed, deformed, dismembered. Gone with the wind, dissolved in the oceans of the world, the deformed garbage reaches the last stop of its journey. And it whispers of what it has experienced.

On a small island in the south of the country, about one hour by speedboat away from a popular destination for Cambodians, the former French colonial city *Kep*, lies the island of *Koh Seh*. *Koh Seh* has about to 50 residents, depending on the season. The island is small. And, depending on tides and annual rhythms, it is flooded with garbage from the West or the East – constantly. Here, a small centre of dedicated people opened their doors some years ago, aiming at the conservation of marine cultures and fighting against the fringing coral reef directly in front of their door. In a study, the centre identified 25% of the coral which were bleached during 2016 (Reid/Haissoune/Ferber 2017: 1). While focusing on the conversation of aquatic environments in the sea, they have also inevitably taken on the task of keeping large parts of the island clean from garbage. This also includes the daily accumulation of silt. Marine cultures are also threatened by ghost nets forgotten by fishermen, who leave them at sea after using them. Those nets figure as sometimes deadly traps for fish and marine birds. *Koh Seh* is just one island in a growing number of islands, which face the threatening growth of unwanted materials – especially plastic – in the world's oceans. However, due to the active engagement with washed-up rubbish by people inhabiting the island, the entanglement of the global interrelatedness of this matter, which are visible or non-visible from different angles, seem very graphic.

"We find everything here", one person tells me, while we're walking by the blazing mountain of plastic flip-flops, ready to burn out and leave nothing else visible for our eyes on the beach. "If we don't clean twice a week, we have a serious garbage problem on the island", he continues, and points to a wooden house at the other side of the island. "Here, we are not allowed to clean, because the Vietnamese police officers, who are situated at this house, allow no one to enter the area". He shrugs his shoulders

and goes back to pick up things with the other helpers, who have already cleaned up some metres while we've been talking. I'm looking around: most of the garbage that finds itself in the sand next to the palm trees comes directly from Vietnam or China. In the dusk of the rising morning fog, one sees the extent of the debris washed up over the previous night, while in the background Vietnam's most popular tourist destination, *Phú Quốc*, stretches itself along the horizon.

The wrappings reveal their original manufacturing facility, which are from Danone or Coca Cola, which produces the bottled water Dasani, and ranges from Vietnamese and Thai shampoo packaging to sweets and rice sacks. The waste has travelled long distances without any further action of its producer, but ultimately didn't get disposed of. In this case, the garbage is not carried away by paid operators to poorer countries, as is often the case, for example, within the recycling industry or in the flow of e-waste, but rather it sets off on its own. *Koh Seh* and its inhabitants therefore have to deal with an unusually high amount of foreign waste. This small island becomes the representative cumulative place for various practices, tactics, and tides. The garbage collected here is not the only a representation of global inequality; it also reproduces it.

2. In-/visibility of waste

If we think of waste – and especially plastic – it is indispensable to look at its origin, and its possible 'ending' in a timescale as well as in our socioeconomic system, in which it is embedded. The discarded here is, therefore, not only waste in a material sense, but also in its meanings (Discard Studies 2019), pointing to the inherent character of waste of *being* somewhere – in or out of place, depending on one's perspective (in-/visibility). Hereby, I'd like to differentiate between the measurement scales of time and place, arguing that waste is, under the belt of a decreasing time 'slot', de/fragmenting (time), while it is discarded in respect to social interactions and economic flows (place). If waste is out of place, it becomes invisible in a literal sense. Out of one's sight, there seems no necessity anymore to follow and trace the discarded.

When waste is discarded by someone, it happens according to a cultural habit within a system of social and moral injunctions – as Mary Douglas (2001 [1966]: 3) has pointed out. "I believe that some pollutions are used as analogies for expressing a general view of the social order". Or, to put it briefly: to structure our daily life. Wasting fulfils us with pleasure, says Douglas, but also with an experience of virtue, a concrete practice which gives the action of discarding waste a moral dimension (Hawkins 2006: 93). This happens intentionally. Waste, or dirt, becomes matter out of place, which is, to say it in Douglas' (2001 [1966]: 36) words, "(…) the by-product of a systematic ordering and classification of matter, in so far as ordering involves rejecting inappropriate elements". Traditionally, it then got burned, reused, or buried; yet this is no longer valid for a transnational and globally connected digital world, where waste goes its own (partially still very unclear ways) only to end up in another place from whence it originated: on the island of *Koh Seng*, in fishs' stomachs or on our plates. In short, it's everywhere. This common image of wandering plastic becomes graphic in the case of *Koh Seng*, where people pick up waste from the beaches, in their living places and their direct environment, for the sake of conserving marine cultures and their own well-being.

When people from the conservation centre start their weekly waste collection tour, they separate each piece of waste according to its type, count it, and then partially burn it. Aluminium cans are held back and sold later to the mainland once every few weeks. "We have no other possibility than to burn all that stuff!" answers one informant when asking her why they burn it, causing, with that, direct harm to the CO_2 household and the atmosphere. "We cannot collect these mountains of garbage here each week and then bring it to the mainland to dump it there. And there will be no one taking all these things over", she adds. Waste here is visible for everybody; it lies around in its colourful or already bleached wrappings, and even at the start of its decomposition process. Still, these materials are seen as waste, as something unwanted, unusable – and as something one has to get rid of. After the cleaning process, the beaches seem clean. Nevertheless, bending one's knee and having a closer look, one might still see small and tiny pieces of plastic, which haven't been collected because there's not the time, nor the amount of people to pick up everything washed ashore from all over the world. While locals of the island

collectively dispose of waste, they put it further to another place, either as particles into the atmosphere, or as leftovers, which are eventually washed into the sea again. What happens here is the transformation of place that waste goes throughout the world – coming "from somewhere" in the world through sewages and from the seawaters to the island, where human and non-humans have to deal with it.

This intended action of discarding waste is putting waste, respectively its fragments, into another place, where it becomes invisible to our eyes; yet, time and environmental conditions are the constant companions of waste. So, plastic is not per se toxic, but when it meets other agents (sun, fish or water), it 'translates' itself and constructs a new hybrid form of *natureculture*. In the process, the shampoo bottle becomes plastic debris and then dissolves into particles (micro-/nanoplastic), of different sizes, which disperse to every last corner of the world, either by themselves or as or heteroaggregates mingling with other trace components such as organic matter, trace metal, metal oxides etc. (Gigault et al. 2018: 1032).

Eventually, it's a process of 're-naturalization', insofar as it merges again, as micro- and especially nanoparticles, with organic and environmental agents. To answer the introductory question: for many living beings, these particles are highly 'visible', in the sense of being recognisable, and are used in different ways, as fish eat them or coral reefs die because of the vulnerability created by a single marine plastic token hitting their surface. Material, therefore, is not only active, dynamic, and a present part of our world (Barad 2007), but it assembles and merges itself with other agents, becoming part of our nature again, being waste^{x} – even if we're not able to see it anymore. To sum up, what we do see is not only the fatal environmental outcome of our collective actions, but also global inequalities, visible through the simple quantity of waste in a place. The irony of the affluence of society is the abundance of waste in marginalised countries in the world. Moreover, it is pleasant when the garbage disappears from one's field of vision by being taken away from the land or lost in microscopic invisibility. However, eventually, it does not care about these limits because it follows its own (purely physical, moral-free) global agenda.

3. How to read the essay

The following pictures show the daily practices of discarding and re-using waste by residents of the island, as well as sea level waste[x]-pollution and functions. As part of my field research on the infrastructures of waste in Cambodia, those pictures were taken in spring 2017 and are to be understood as seeing the world how I perceived and grasped it while visiting the island. Thus, they are subjective. The knowledge, and how it is produced by the academic text written above, is hereby substantiated by the following pictures. At the same time, the photo-essay sheds another light on the relationship between environment, society, and human practices, and touches on further anthropological and sociological questions.

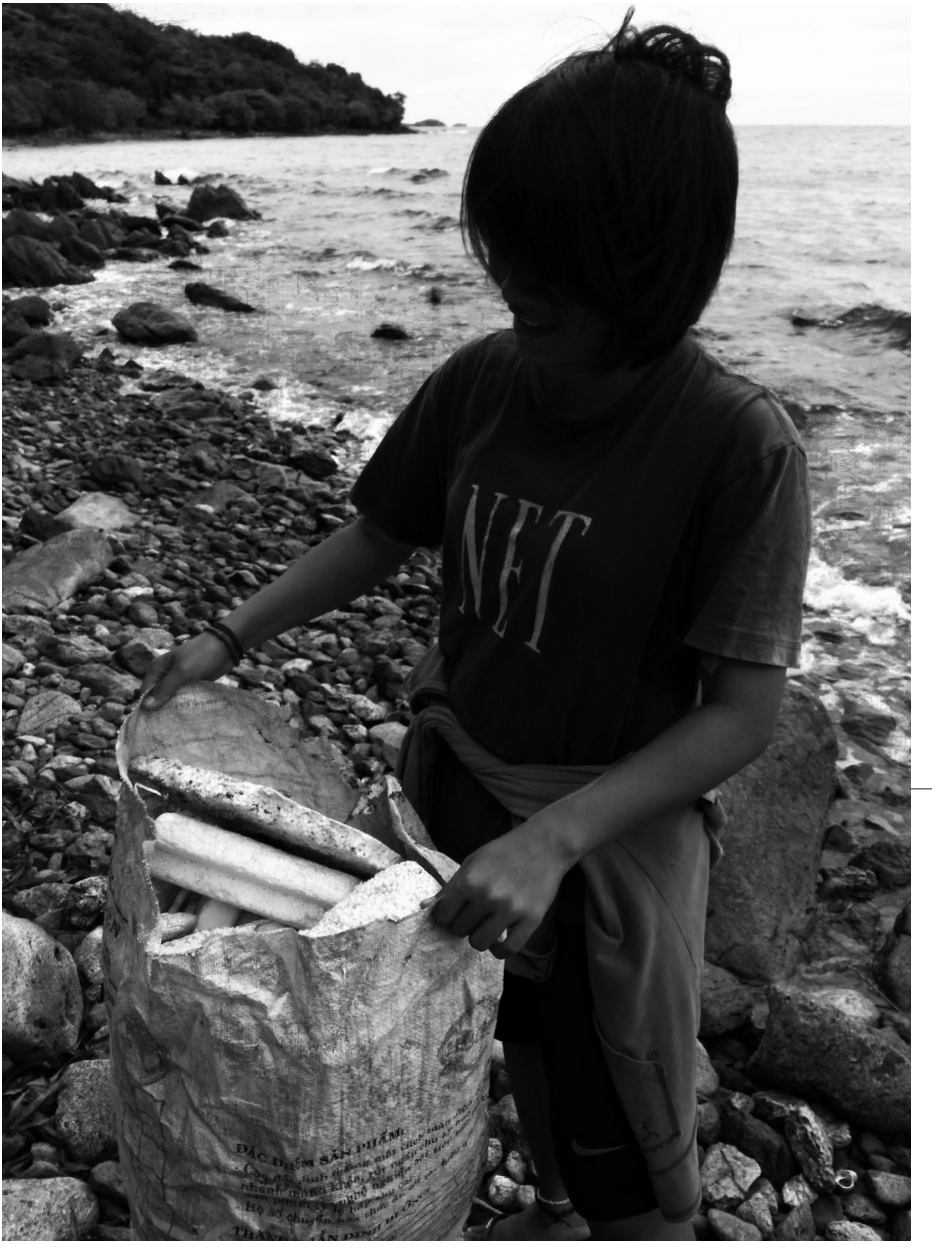
Photo Essay

The island. Within a grid of tourist places, fisher villages and little towns and its material emissions, the island finds itself within tides and ocean currents, being an attractive spot for many waste materials to land and stay, after traveling a long distance from unknown places.

Here it likes to stay. It flaps in the wind, covers plants and the ground, and hugs the island's curves. It lies one on top of the other, seemingly with no order – over and under plants and stones, on a wooden tray or in a tree's branches – getting used to being a part of the island. With the help of storms, wind, and weather circumstances, the plastic only moves further. A shoe tread may be used as a fast-track to another place, children's fingers enclose quick pinkish materials, which function now as a toy, or animals carry waste unconsciously in their fur while they wander around.

Empty plastic water bottles, tiny shampoo bottles, colorful soft drink and milk bottles, and cardboard packages paired with cosmetic leftovers, tubes, and little tins and boxes pattern the island's surface. In between pieces of styrofoam, fragmented and unidentifiable materials of plastic and parts of fishing nets and gear lie awkwardly among bamboo branches and twigs, brownish stones and dead fallen leaves.

This is the time when the team of the conservation centre starts cleaning, because they know that the longer plastic, styrofoam and cardboard lie around, the faster they fragment into tiny pieces and either flow back into the ocean or are taken over by other agents on land.


NET

Here, a young woman is collecting styrofoam, which she, after the rice bag is full, brings to a weighing scale, which is carried by residents to every single collection activity. The weight of the gathered material is then inserted into a form for documentation, which is eventually sent to *Trash Free Seas*, a programme of the NGO *Ocean Conservancy*[1].

After weighing, the majority of trash is burned. The practice of burning waste is often used in Cambodia in order to quickly get rid of trash in huge amounts. Especially in rural areas, where no infrastructure of (further) waste collection exists, people frequently burn their waste. This common practice is a direct hazard to human health, as it releases huge amounts of toxic gases and particles of dirt. It also pollutes the air with the carbon dioxide produced. From one place, it goes to another. Ashes, micro- and nanoparticles remain on the ground, while other substances are produced and released into the air.

Some waste materials get eventually upcycled and used for different purposes, as with the filled plastic bags, or plastic bottles, as shown in this picture. After being filled, bottles are bound together to form the shape of a couch.

Additionally, aluminium cans are often saved from the fire and/or collected at households. They are shipped to the mainland to be sold to middlepersons who often transport materials further abroad, for instance, to Vietnam, for recycling.

The beach seems clear now. Flourishing plants have distributed their branches around it, immersing the surface with a green paradisiacal bed. They invite one to lie down for a moment and listen to the whispering waves rippling around the stones: the mediators between what is called land and ocean. On the horizon, a fishing boat follows its route in the rhythm of the clouds, and the paradise unfolds its beauty, embracing everything.

Taking a closer look, tiny whitewashed plastic particles flashing through the green bed break the elusive picture. The picture bursts and shows that waste is part of nature now, too.

The view wanders to the ocean, where a multiplicity of these materials in even more fragmented sizes pervade marine cultures. They merge, assemble, fight, and kill. In different forms and sizes, off- and onshore, plastic shows us that it is hybrid, dynamic and vibrant – it changes its forms and its material, fuses with other agents and separates again. Out of the human perspective, it is still within something's perspective, as it has been shown that fish may consider plastic debris as food (visible), whereas inhabitants of the island don't recognise it as something anymore (invisible).

Even though we cannot always trace and follow it, it is clear: no one is excluded from these effects, not even the humans who once created this material. And it is also clear: that there are different inequalities and underlying power regimes helping to carry waste to certain places, where it is supposed to stay. The residents of the island have to deal with externalities, and it is only due to the fact that they count the waste they collect and are quite active publicly in regards to the conservation of marine culture, that 'their' waste problem hasn't become entirely out of control, yet.

1 Ocean Conservancy (2019): Fighting for Trash Free Seas. https://oceanconservancy.org/trash-free-seas/, 10.01.2019.

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Interview

Max Liboiron

Discard Studies: Doing Science Differently

The interview below with Max Liboiron, managing editor of *Discard Studies* and director of the Civic Laboratory for Environmental Action Research (CLEAR), deals with the establishment of the blog *Discard Studies*, the principles and practices of the feminist, anti-colonial research lab CLEAR (Civic Laboratory for Environmental Action Research), and a critical perspective on waste and plastic pollution. Liboiron is a feminist environmental scientist, based at Memorial University, who works with innovative methods and considers herself an activist. Our conversation functions as an alternative introduction to matters of waste and globalised inequalities.

A few notes on the setting of our discussion: the interview was held by Stefan Laser, Nicolas Schlitz and Kathrin Eitel in December 2018. Below, we the interviewees, appear as one collective voice, because we had prepared our questions collectively. Apart from a few minor corrections, we stayed true to the 'natural' occurrence of our Skype discussion. There is just an additional example of Liboiron's research materials that we added at the middle of the text (the text was provided by Liboiron herself). The example helps one to grasp the idea of embracing another kind of science – an open, reflexive and critical science. Last but not least, please note that we differentiate between *Discard Studies* (the blog) and Discard Studies (the interdisciplinary field of studies) with formatting. Both subjects will be introduced and discussed extensively. Only once we write "Discard Studies" (with quotation marks) – this has to do with a little surprise that Liboiron reveals at the end of the interview.

1. How to end up in Discard Studies

Interviewees: Can you please briefly introduce yourself to the readers? So, what is your background and how did you do end up in what you are doing now – Discard Studies?

Max Liboiron: I am an Assistant Professor in Geography at Memorial University; there, I'm the Associate Vice-President of Indigenous Research, and I am also the managing editor of *Discard Studies*, an academic blog. I'm a scientist who uses science and technology, especially Feminist Science and Technology Studies, to do science differently – namely to incorporate social science into scientific practices. My expertise lies in plastics in particular, but garbage more generally. I have been running *Discard Studies* since 2010, for a long time posting every week and now every second week. So, that's a lot of textual garbage (laughs).

Interviewees: Yeah, that's a lot (laughs). Today, you are working in the Sciences, but we find it very interesting that your background in fact is in Arts and Cultural Studies.

Max Liboiron: I actually started as a biologist, not as an artist. I dropped out of Biology into Art during my undergraduate degree, because I decided that science had very bad ethics, and so I'd go to Art to do the good work because they didn't have such compromised ethics. I got an Art degree and I have a major in Biology, without a Science degree. Yet during my Master's degree in Art, I started to decide that actually art had horrible ethics too, way worse than Science (laughs).

I started doing Cultural Studies, trying to find different ways to talk about accountability and representation. At the same time, I was making all of my art out of garbage. I did not think that was exceptional. I'm from a small northern place in Canada, where it's very normal to go both: dropping and shopping at the dump. You drop some stuff off, you pick some other stuff up, you always have a full truck to and from the dump. You build things out of discards. We had to burn all our waste in burning barrels and we weren't connected up to a curbside recycling – or any sort of municipal waste system where I grew up – nobody did. I had a very

different relationship with waste growing up; this was a very unexceptional sort of flow; this wasn't disgusting. It just was. People started remarking on this in my art, as if it was the point of the art that it was trash. And I'm like: "No, I'm just poor". There is so much good trash in New York, so clearly I made things out of *this*, instead of buying it, because that would be stupid. But again, over and over people were quite enchanted with that, and being a good artist I branded myself accordingly in order to be more successful. I became known as 'garbage girl', which was demoting me, because I was actually a woman the entire time. Trying to correct some of people's assumptions of our waste, I started doing a lot of research into waste, because I felt a lot of things to be true but I didn't have the sort of evidence that people seem to respect more than (say) experimental insights.

So, I became a garbage expert. I started doing my PhD with some knowledge of waste under my belt, but I became an expert while studying under Robin Nagel[1], who's an anthropologist of waste in New York City. She was one of my professors and committee members. She is actually the one who started *Discard Studies*, the blog. If you go back in time, the very first few blog posts were all Robin Nagel and then at a certain point they all became Max's (laughs). That's when I started to go over and post regularly, building up a community around critical insights into waste, trash and pollution. Robin is the one who called it *Discard Studies* instead of Waste Studies, because she wanted to be very clear that this wasn't about trash. This is about a way of being and doing and valuing, that was very often brought to bear on trash, but also pollution, also people, also places, also history – there's a lot of things that get wasted, using very similar logics and only some of that is stuff we call 'trash'. And then during my PhD I'd come to look at this through Science Studies, which is the social study of science: looking at science as a culture, how value circulates in science, how objectivity is crafted as opposed to being given. I was originally going to do my dissertation on different moments in history when waste problems seemed absolutely impossible and then became possible, like universal sanitation in New York City in the 1880s.

And someone asked me if one of my case studies would be plastic pollution. I said 'No, because that's actually impossible.' Like, that's not solvable under business as usual, that's never going to stop. No, I can't use it as a case study because there is no success there. After thinking about

that for weeks, however, I was like 'Ok, I'll need to change my dissertation to only talk about plastics now' (laughs), to talk about the structures that make it currently impossible to not have global plastic pollution.

Because I had a background in biology already, I read a lot of scientific articles on plastics. At that time there weren't many available. This is before plastic pollution was a hot topic. I ended up knowing the science inside and out, and when I got my first tenure track job here in Canada, I was ready to critique the plastic science. But Canada already had a very conservative government, like America has Trump. Canada had its Trump earlier and less ridiculous, but still very conservative. He had stopped all environmental programmes for two terms, for eight years. So, when I came to critique the science, there was no science to critique. That's when I realised that having pollution science, as sometimes fraught as it is, is also an incredible luxury. I started doing the science in a specific way so that there is actually less to critique from the social science perspective, doing it with insights of social sciences, from the beginning. So that it's not as biased towards women and people of colour when valuing work. So that it doesn't assume that local knowledge isn't valid, that it doesn't think that universalism *exists* – as a real thing, as opposed to something you have to work really hard to produce. So that it doesn't think that pollution and waste is a ready-made molecule that is just in the wrong place. To know that actually there is a whole lot of valuation that goes into that first. That's how I got where I am, and how waste has played a major role in my career the entire way, and now I'm a scientist.

2. Doing Discard Studies: about a blog and a critical methodology

Interviewees: Earlier this year you closed the blog *Discard Studies* for a few months, and it got an update. What happened? What is new?

Max Liboiron: It turns out that posting every week or multiple times a week is really laborious. As a PhD student it was still extremely laborious, but I had more leeway with my time. I was still working multiple jobs, but it was part of my intellectual production. Now, as a tenure-track professor,

who controls over a half million dollars in grants, who has a lab full of 16 to 24 people (plus being an Associate Vice-President), I don't have that many minutes anymore.

What was starting to happen is that I was posting things that were good enough but not good, and I felt that *Discard Studies* was losing its critical edge instead of being at the forefront of demythologising, deconstructing and reconstructing waste critically. It just started being *about* waste, which was insufficient to its original goals. Therefore, I decided it could not go forward until it got back to those roots. So it was dormant for about six months. During those six months I got an editorial board together. It's now myself, Josh Lepawsky[2], Robin Nagel again, and a graduate student named Alexander Zahara[3]. That increases our board of expertise and it means that reviewing guest posts isn't just on me anymore; it's now shared. But also we decided to post less and really go back to the roots of *Discard Studies*, to break open what people think is common knowledge or common sense about waste and show that its roots are actually deeply cultural and specific, and not given or universal. And that's been our focus now.

Interviewees: What kind of experience did you make with your blog as a place for different opinions, to foster a debate? Does it work?

Max Liboiron: I think one of the most important, maybe not the biggest, but to me the hallmark of success of *Discard Studies,* is that our readers include traditional academics, waste managers, members of the public, high school students, and people who use it to teach. And it's been referenced in policy, it gets picked up by news and reporters. It is accessible, used and useful to such a great variety of audience members. I think that is its real story of success. We get between 300 and 500 unique views a day, on days we do not post – on days we do post, that increases a lot. But even when we were dormant, we were getting like 300 to 400 views a day. And I don't mean bounces, I mean people who've stayed on the page for over 30 seconds, which meant they were reading or maybe they've gone to the bathroom (laughs), one or the other.

Interviewees: How charming (laughs).

Max Liboiron: Some of our most popular posts I published five years ago, and people are still referencing them. So, we're a public service and the reason we know that we're public service is *how* we're being used and who is using us. It was never its initial purpose, but because we've become that way we now also host dissertations, and we know that publishers go to our dissertation list to see who the hot new talent is. We host the bibliography and we know students go to that for their comprehensive exams. We host a list of news and events. Those are our highest ranked posts, job postings in Discard Studies, because there is no single department. There is a community that uses us, and through their use they start to cohere and find each other in different ways.

Interviewees: This is very interesting.

Max Liboiron: This is quite the most important academic thing I've ever done. Like, screw my papers, managing a blog has been way more important.

Interviewees: Is it a blog? Or is a journal? It's almost a journal…

Max Liboiron: … I call it a publication platform. We do have titles like editor, managing editor, co-editor. But we're also a little more flexible than an average journal.

3. Building a lab: striving towards new values in science

Interviewees: From our point of view this blog is also interesting because it could be proof of something new in science and technology studies. It shows how a field moves from a person-centred, Latour[4]- and Haraway[5]-based science to collectives: to doing something together. Against this backdrop we now would like to turn to your new project and talk about new approaches, new collaborations, new methods in engaged science: How did you come from Discard Studies to the Civic Laboratory for Environmental Action Research (CLEAR)? What exactly is your new project CLEAR, and how did it evolve?

Max Liboiron: Okay. I'm going to start with 'What is Discard Studies' and then we get to 'What is CLEAR?'. In Discard Studies I think one of the main theoretical commitments is its understanding that power is absolutely central to questions like 'What is waste? And what is not waste? What is wasted? And what is not? And: what flourishes?' Central to power is externalising certain things, certain types of people, certain types of knowledge, certain types of materials, certain types of claims to land or belonging in order for the power centre to hold. There is no such thing as power without its debris. Consolidated power.

The point of Discard Studies is trying to recognise things that seem very mundane and ordinary, and unexceptional, like a waste bin or pro-recycling-behaviour or something like that. Like what is wasted and recycled? Now the answer is 'China'. Because China said, 'We're not taking your trash anymore'. And suddenly recycling fell apart. Recycling globally was only possible by shipping half the world's recycling to China. Environmental good does not work unless we use China as a scrap yard**.** So that's one of many examples. This doesn't only happen to objects like plastic, it also happens to science, including science around plastic. One of the ways that conservative governments consolidate their power and legitimacy is by eliminating attempts to disrupt that centre, like environmental science. Like what is happening in the United States, like what happened to Canada before. So you show up, and there *is* no waste – because no one has been counting it. We didn't have a plastic pollution problem, because no one has written that down. Of course, we had a plastic pollution problem. But it didn't exist in any 'evidence-based' way that would be in a register that would challenge governmental power and government policy, which has a very specific knowledge production. You've got rid of that type of knowledge production; you gag ordered most of the scientists so that they couldn't talk to the media, even if they were doing this kind of work. It's a classic power-consolidating move towards science.

When I built my lab, a couple of things happened. Firstly, I needed to address this knowledge and power situation. Take for instance archives and libraries on fishery science. It just got wasted, literally in dumpsters. Like the department of fishery and oceans archive[6] got put in the garbage as a part of the cleaning out of science. The 'cleaning out of science' was the 'garbaging' of knowledge. I was like 'Oh ok, I start with

this science' and the government can't touch me because the government doesn't pay me.

Secondly, science itself also has problems where it pushes certain types of knowledge away. If the centre holds it has to waste certain things away from it, externalise certain things. Local knowledge is part of that. Reflexivity about its own values is part of that. It's often assumed in science that science is objective. The truth is out there and we go find it, as opposed to craft it, and where nothing outside it is political. But there's this great piece by Mary O'Brien[7], who is a biologist from the 1990s, it's called "Being a scientist means taking sides". As soon as you choose a research question, you've chosen not to do other research questions. As soon as you choose some metrics, you've chosen not to do other metrics. As soon you have chosen to work with these people, you've chosen *not* to work with those other people. All of these are political questions. And if you disavow this, and this goes to STS – think of Haraway and Harding – and you disavow that? Now you're doing 'bad' science. You're not doing bad science if you're like: 'Oh here's all the values that go into it'. You're doing bad science if you fail to account for those things and how they are affecting your science.

When I built science, I had to ask questions like 'What are our politics? What are we beholden to? What are our goods, what are our bads?' For us, we're going to be action-oriented, we're going to be activists. We're going to put that on the table. We're going to be feminist, o.k. We're going to do equity, o.k. And now we do a lot of anti-colonial work as well. That's what we've evolved into. That means when I go to count plastics, I got to figure out 'Who am I counting for? Whom am I counting with? What am I actually counting?' Most scientists don't worry about that! (laughs)

4. Doing research differently: from getting fish from fishermen to new place-based ways of counting plastic pollution

Max Liboiron: The only plastic pollution research I do (almost exclusively) is about ingestion, about those animals that people here eat for food, because in Newfoundland and Labrador most people depend on wild food in a way they don't in Toronto or they don't in Berlin. People here catch

their food, especially Indigenous people. That's what I count. It's a form of Discard Studies, it draws on a Discard Studies methodology brought into science, which doesn't happen very often. So yeah, bring the methodology in, bring the politics in – to do science differently.

Interviewees: Can you please explain the feminist and anti-colonial approach behind CLEAR with a little more detail?

Max Liboiron: Sure, we started CLEAR as a feminist lab, not because I am more feminist than I am anti-colonial, or more Métis. But because feminist science exists, and anti-colonial science didn't exist when I started the lab – to my knowledge. Feminist science is all about recognising the values that are already in science and how, weirdly and magically, say, primatologists who are from America study the way apes do violence against women, and scientists from Japan study the way apes honour their elders. How weird, right? That those cultural projections would have to do with what questions are asked, and if you don't realise it, you are doing something wrong. Feminist science is all about recognising those things *and* correcting them. In so far as we can be really accountable to our positions, our social positions, our economic or political positions – and direct our science accordingly.

In the lab we value equity. The most obvious example of how this plays out in the lab is our "author equity protocol". When you write a paper in science usually, there are many authors, unlike the social sciences, which have a lot of solo-authors. Usually, there are 6 to 12 people on a science paper. And the order you are in really matters in science, where the most value goes to the very first and usually the very last person.

Interviewees: So, how do you decide who goes in?

Max Liboiron: Usually the head of the lab, who in this case would be me, would decide it. I would just say 'By the way, I'm first, by the way, you're second, you're third, carry on...' That's how that decision usually gets made. "Of course, it's obvious, because I did the most work, you did the second most work and you… barely didn't work, so we're not writing you on the paper."

What we do in the lab is, number one, we do this decision by consensus. It is not the most powerful person's decision about who gets left in, who gets left out and what order they're in – which is following key insights of Discard Studies: the valuation does not come from the centre of power. Number two: we value forms of labour that are usually not recognised in science. And they are usually not recognised because they're feminised, like cleaning up, like contamination protocols, like organising meetings, like taking notes of those meetings so we can tell what we are supposed to do. Cleaning up the freezer is super important to our science. Without that scientific labour we don't have any validity. That's part of what gets counted in a paper, because that's part of what produced the knowledge, the good knowledge. And number three: the equity part, too, is that we recognise that people start from different social locations. Magically, weirdly, women of colour who are queer and have disabilities, for some reason, aren't winning the Nobel Prize as often as white males. How strange? Why is that? Is it that they don't know things? Absolutely not. It's that entire systems keep those people from succeeding, while white men continue to succeed. Over and over again, in seemingly magical ways that are actually structured. And that is actually what Discard Studies is about: those structures that constantly value some things, and constantly devalue other ones. Not because someone is an asshole. But because it's a system that just steers things in certain ways.

Interviewees: What does this imply in practice?

Max Liboiron: What we do is to say: 'O.K. if there are two people who have done basically similar work in the lab, what is the social location and how is one social location often devalued over the other – and let's promote the one that is usually devalued'. So if the two of you do exactly the same work, you guys are both white males[8], but let's say one of you is gay disabled and has five kids and no partner. You would get the bump in author order. And the other person would go second. That sounds very competitive, but because there's a lot of care work that goes into the lab, what ends up happening in our lab is, people say 'You go first.' 'No, you go first.' 'No, you go first.' 'I think she should go first.' 'Why? I think he should go first.' 'Let's both go first.' 'We can't both go first.' 'You go first.'

Over and over again, these celebratory, generous things start happening, because we start recognising people's social locations and how they're different and how some of us have privileges. Even if you cannot always do something about your privilege, because they're in a system – here's a moment where you can. This is the thing I get the most hate mail about of anything I do. And I do a lot of political things. But white male scientists usually write me in a very concerned way about this process. Because they feel that (say) black women are getting kudos that's unearned, because they get to go first for *no reason*, other than they're black women. They are not understanding the overall process. That's an example of equity. We've now matured into an anti-colonial lab, where we also include things like humility: that we're connected to things around us, that we're on stolen land, that we're guest on this land. And that we're behold to care-takers of this land that might not be us.

Interviewees: Is this what you refer to as "place-based science," a notion we find very prominently in your research?

Max Liboiron: Some of this is the place based-ness. We stay in place, we stay to this land, because land is all about the specific relations that are here. To go and universalise things really does a lot of damage to land relationships. For instance, if you're a scientist and you go to count plastics in fish, what you're supposed to do is to grid out the ocean and get a certain number of fish from each of those locations, so you can say it's representative of the ocean. That's universalising, that's how you can say: 'This is true of fish.' We don't do that. We go to the people who have harvested fish, and killed fish, and who are eating the fish, and say: 'Hey, can we get the guts of that fish that you're about to eat?' Since almost no one I know eats fish guts – seals guts yes, fish guts no, because they are gross – they will give us the guts and we will do our work on that. It means every single sample has been from eaten fish, which means we're studying people's actual food webs. It means we are getting truths about human food webs, not fish in general. This also means that we don't take samples that are not eaten, we have to eat them. We often have fish during lab meetings, we cook actual samples. So that also means we are studying *our* food. It locates the study in our lives, on this land, and is also behold to people who depend on this

food. That's not normal scientific protocol – although it's not 'unscientific' protocol either. There is extra validity, because we're also dealing with social things, we're also dealing with political things, we're doing things that matter. And then also we get scientific peer review.

Interviewees: Thank you for this beautiful example of methodology and its accountability in 'place-based science'. But, how do you actually connect to the community you are working with and what is their role in laboratory?

4. Towards an anti-colonial understanding of plastic pollution

Max Liboiron: One of the core components of colonialism is the assumption of access to Indigenous land for coloniser's goals. In this case colonisers include a lot of settlers… *and* academics. Academics often assume they have access to land for their science. We don't assume that. Which means that you need permission from the Indigenous groups that live there or have lived there, to do the research. We do that – first of all.

The second thing is that we understand plastic pollution as land, because land doesn't just mean dirt, soil and air, it means all the relationships, the spirits, and all the sort of stuff that I don't even understand a lot – that go into that. That means plastics are land, plastic pollution is land. Because that's still in relationship, it might not be a great relationship, but still in relationship. And so because that's land we bring into our lab, I specifically hire Indigenous people from those nations to process the samples. The people to head up those projects are people from those nations, they're called 'beneficiaries' here. It means they are beneficiaries of those lands. My lab manager is from NunatuKavut[9], and another student who processes geese is an Inuk from the Nunatsiavut[10]. We do this because it is their land, and they still steward it.

When we're done with the guts, what you do in normal scientific protocol is you incinerate them as bio-hazardous waste. Back to Discard Studies. We say: 'No. this isn't hazardous waste, this is food. This is life. This is kin for some people.' It would be so rude. You don't incinerate

grandmother after dinner, that's rude. So, what you do is you bring that back to the land and you put it back. We have these big gut repatriation parties. There will be a ceremony and we put the guts back into the water. We have someone who has Inuit teachings on how to do that. Because when you hunt you distribute guts in a certain way, and he leads that and distributes guts in a certain way that he was taught. That's our discard protocol, because it is wasting in a good way. Which means it's not exactly wasting. It's 'discarding' in a different way.

BabyLegs is a surface trawl that can be used to skim the surface of water for microplastics that are smaller than a grain of rice. Created with baby's tights, soda pop bottles, and other inexpensive and easy to find materials in the North that cost ~$20, BabyLegs is an open source, DIY tool created by Max Liboiron that allows community members to ask and answer their own research questions. For instructions on how to build, use, and analyse samples from BabyLegs, see: https://publiclab.org/wiki/babylegs

Interviewees: It's giving back, basically.

Max Liboiron: Yes!

Interviewees: You mentioned 'kin', and I was reminded of Haraway. Making kin, or making kinship in the Anthropocene, Haraway shows us in her book *Staying with the Trouble*[11], is key. With this, she wants to emphasise how human and non-humans are intertwined, which should help us reflect on new modes of critique, and new collaborations – that are based on connections, which perhaps already exist but usually are neglected. It is fascinating when you tell stories about your very local and corporeal research; this also appears to be linked to global issues. Do you also experience your research as a global endeavour?

Max Liboiron: It depends on what you mean by global. We refuse to universalise, we refuse to say 'this is true of all places', because that's a very colonial move. But we do believe in generalisation and there are different methods to understand whether something generalises or not. There is something called 'provocative generalisation', which means that if it moves people in another place, that means those are the politics that are resonant and so it can generalise to that other place. There are also different ways to think about the power-relations that put plastics in Newfoundland's waters in the first place. Especially when you think about Labrador, which is the northern part of this province. There is oil extraction there, but there are no plastic factories. It's mostly Indigenous land and there is ton of plastic moving up. There are certain power structures in the world that produce plastics, that produce disposables. They assume that there's a place for them to go away, which includes Indigenous land, which actually requires Indigenous land[12].

That's another way to think about imperial networks, which tend to be on a planetary scale, and that's why waste moves to China and not to (say) San Francisco, when you ship your recycling. That's why now the new hotspot to dump things is Vietnam, and why Malaysia is protesting against recycling, because they don't want to be the next China. And who wasn't on that list? Britain and France were not on that list of places to dump things. These are global power relations that show up in Northern

Canada, in the Inuit territory, as well as in China, Sri Lanka, Malaysia, and the Philippines. This is not only because wealthy nations went and plopped their garbage down, although that happens all the time too, but because when things had to be discarded, they needed someone else's land.

The initial reaction of a lot of my students, especially when they start, is to blame consumerism and to talk about recycling when they think about plastic pollution. They're talking about recycling… but they're not talking about dumping in China, which is what recycling currently requires. 'Do you want to dump in China?' And they are like 'Oh no.' Of course. And I'm like 'O.K. so, let's talk about land and pollution?' And we start talking about oil extraction and the petrochemical industry, which is also a plastic industry, which is also the American Chemistry Council – which is the largest chemistry lobby in the world, which supports a lot of recycling when those programmes fail, because supporting recycling lets them keep making disposables. We start talking about oil production as opposed to bad consumer behaviour. It points to the routes of this global problem much more effectively, we believe.

Interviewees: So, you're really pushing your students.

Max Liboiron: Yes, it is my job. (laughs) It is my job to push my students, and to get them to think critically, to see systems (instead of instances), to think about power (instead of objects that already exist).

Interviewees: We would like to make a catch-up question with what you've already started in the beginning, how you started to engage with plastics. You said that "plastics is unsolvable ", as a problem, and then you thought about it. A week, right? (laughs)

Max Liboiron: Yes, a whole week (laughs).

Interviewees: Then you decided, 'Ok, that's the thing I have to deal with.' Since then, various things have evolved, especially the way in which you understand plastics: as part of the land. If you take this notion of "land" and "waste colonialism" on the one hand, and the notion of a "permanently polluted world"[13]–on the other – with these two notions at

hand, how would you today answer this initial question of 'solving the plastics issue'?

Max Liboiron: That's a big question. When I realised that I needed to work on plastics, it was not because plastics themselves are an impossible problem to solve, but that within business as usual, plastics are an impossible problem to solve. My job was to describe what business as usual meant, so that we could properly locate and dismantle it. What I've come to realise over nine years of working on that problem is that part of that problem is colonialism: this idea that you get access, that colonisers get access to land for their goals, whether that goal is disposability or oil extraction – or even environmentalism. We just get to get to that beach and clean it up and we don't have to ask whose this is, and who else is looking after it, or whose it was.

That's a serious nuancing of my thoughts a decade ago, when I started this thinking. The other thing is that I've come to realise that plastic is only a very specific thing as we know it now. Plastic isn't inherently bad, which is often the way it's cast in environmentalism. The industry says this a lot, for instance the American Chemistry Council: 'Well, do you want a pacemaker that is not plastic?' 'No. I want a plastic pacemaker. Of course, I want a plastic pacemaker. Because there isn't another type of pacemaker.' 'Do you not want,' they also insinuate, 'young babies who are suffering and would die without the plastic tubing?' Of course, I want the plastic tubing for that baby. What I don't want is disposable packaging produced at a mass scale. What I don't want is plastics to have replaced all of my clothing. What I don't want is things that could be glass to be plastic. What I don't want is industry to externalise its costs to municipalities with recycling. I want the industry to be accountable to that waste. There *are* other ways to plastic that would require less or no extraction, but also not massive cornfields, which is the other alternative. That would not require access to Indigenous land. One of the core questions of Discard Studies is: 'How to waste well?' The question is: 'How do you plastic well?'

I'm not the first person to say that plastic is kin or pipelines are kin or pollution is kin, Zoe Todd[14] has talked about it, Kim Tallbear[15] has talked about it, Kyle Whyte[16] as talked about it, a ton of Indigenous scholars

talked about this – mostly women. If plastic comes from organic matter and it's very old, coming literally through the earth that you're part of it, then you stay in relation to it. It might be bad kin, it might be acting horribly, but that doesn't mean you have to exercise bad kinship. Everyone's got an asshole uncle. He's bad kin. That, however, does not mean you have to be an asshole niece or nephew. You can still do good kinship with your asshole uncle. There are better ways to deal with him. Same with plastics. Doesn't mean you have to fix your crazy uncle. It means you relate to him in a certain way that is respectful, while also staying safe for yourself. The same can be true for plastics.

On top of that I spend, sometimes all day, looking at one piece of plastic and getting to know that very intimately, and I can see things. I know where it's been, I know whether it was in the water for a long time or in the ice. I know whether it went through the guts of an animal, got stuck in the gizzard or not. Or whether it got pooped out immediately. I can tell some of these things in different ways. Those are land stories. It's not isolated. And, to be like, 'We need to eliminate all plastics, period,' is another universalising move without recognising that plastics come from some place. There are some places that belong and a lot of places where it doesn't belong. That belonging is cultural and specific – and not universal. How to work through this is a hard question.

Interviewees: Is it, in a nutshell, a politics of production? Or is it too narrow a perspective?

Max Liboiron: That's one of the many perspectives that you may come from, Marxism, and it is great that Marxism gets in there. One of the problems with Marxism, this is something Sandy Grande[17] has pointed out, is that Marxism will *also* assume access to Indigenous land for a different set of goods, for a shared mode of production. We have to make sure that our Marxism doesn't accidentally go colonial. But there is also an anti-colonial Marxism, that's possible. So, let's do that. You can go through this topic through modes of production, you can come through it through accountability, you can come through it through local markets, you can come through it via toxicants and chemistry. There are many different ways you can approach the question of 'good plastics'. I think a great variety of those

are needed. Because the centre of power is so incredibly strong, you can't get it with one pitch from the front. When you're taking down power, you need a movement.

6. About Max's upcoming work

Interviewees: You twittered something quite exciting a few weeks ago: that there is a new book coming up. Maybe you can use this example to talk about your future work? So, what are you planning to do, what is your next project?

Max Liboiron: There are actually two books coming up, and you are the first who publicly hear about one of them – which is that MIT Press has agreed to publish a book that Josh Lepawsky and I am going to write, called "Discard Studies"!

Interviewees: Congratulations!

Max Liboiron: We are going to publish the blog! But a fresher and sharper version. So that's really big news. It is going to take a few years to come out. But we're excited about that, and very happy that MIT is picking that up. That book, however, hasn't been written yet, although we have a lot of post-it notes. The other book that does have a full draft, and is currently under review, is "Pollution is Colonialism", which I'm authoring with a lot of help from a lot of people. It is trying to basically talk about this project we've just been talking about: how the root of almost all environmental pollution is colonialism. And also the science behind most environmental pollution is colonial. It paves the way for more pollution. Pollution science has colonial roots, because it assumes more access to land – it makes a land 'pollutable' to begin with. There are regulatory thresholds that say you can pollute up to a certain amount, supported by a science of identifying and measuring thresholds... That book ends with the lab and our efforts to try and do science differently, so that we can imagine pollution differently. It has a little manifesto at the end.

The newest area in the lab is trying to produce animal respect protocols that don't waste animals. Like, how do you deal with killing well? Ending life well? – which are Discard Studies problems. How do you deal with the fact that you have more power than that fish, and you do not want to externalise that fish as a matter of course. What do you do with guts? How do you stay accountable to those guts? When there's no longer a flopping, feeling thing? We do not yet have answers to this, but we're working on it, with Nicole Power[18], who does Animal Studies, with other people in the lab. That's our next big methodological area. Killing.

Interviewees: What an ending, thank you very much for your time!

1 Robin Nagel is Anthropologist-In-Residence for NY City's Department of Sanitation and author of the book "Picking Up: On the Streets and Behind the Trucks with Sanitation Workers of New York City" (2013, Farrar Straus Giroux). She is founder and collaborating editor of the blog and researches mainly on the anthropology of waste and on Discard Studies. She also works on the establishment of a Museum of Sanitation.

2 Josh Lepawsky is an Associate Professor at the Department of Geography at Memorial University of Newfoundland and author of the book "Reassembling Rubbish. Worlding Electronic Waste" (2018, MIT Press). He is Collaborating Editor for the Discard Studies blog.

3 Alexander Zahara is a PhD Candidate in Geography at Memorial University of Newfoundland and is a Collaborating Editor part of the editorial team around the blog, too.

4 Like Latour's *The Pasteurization of France* (1988, Harvard University Press), and *Politics of Nature: How to Bring the Sciences Into Democracy* (2004, Harvard University Press).

5 Such as Haraway's *Simians, Cyborgs, and Women: The Reinvention of Nature* (1991, Routledge), and *When species meet* (2007, University of Minnesota Press).

6 Huffpost (2019): Why is the Harper Administration Throwing Away Entire Libraries? https://www.huffingtonpost.ca/desmog-canada/destruction-of-dfo-libraries_b_4569748.html, 28.01.2019.

7 Mary O'Brien was a feminist political philosopher who published, besides *Reproducing the world: Essays in feminist theory* (1989, Westview Press), and also the article *Being a Scientist Means Taking Sides*, in BioScience 43(1) in 1993.

8 The interview on Skype was conducted by Stefan Laser and Nicolas Schlitz.

9 NunatuKavut is the territory of the Inuit of NunatuKavut, located mainly in southern and central Labrador, Canada (www.nunatukavut.ca).

10 Whereas Nunatsiavut is an officially recognised autonomous area by the Inuit in the eastern parts of Labrador, Canada.
11 Haraway, Donna J. (2016): Staying with the Trouble: Making Kin in the Chthulucene. Durham: Duke University Press.
12 See Liboiron, Max (2019). How Plastic Is a Function of Colonialism. In: teenVOGUE, https://www.teenvogue.com/story/how-plastic-is-a-function-of-colonialism , 28.01.2019.
13 See Max Liboiron/Manuel Tironi/Nerea Calvillo (2018): Toxic politics: Acting in a permanently polluted world. In: Social Studies of Science 48(3).
14 Todd, Zoe (2017): Fish, kin and hope: Tending to water violations in Amiskwaciwâskahikan and Treaty Six territory. Afterall: A Journal of Art, Context and Enquiry 43(1), 102-107.
15 Tallbear, Kim (2016): Annual Meeting: The US Dakota War and Failed Settler Kinship. Anthropology News 57(9), e92-e95.
16 Reo, Nicholas James/Kyle Powys Whyte (2012): Hunting and morality as elements of traditional ecological knowledge. Human ecology 40(1), 15-27.
17 Grande, Sandy (2015): Red Pedagogy: Native American social and political thought. Lanham: Rowman & Littlefield.
18 Dr. Nicole Power is a full professor in Sociology at Memorial University and a CLEAR lab member. Her new work focuses on animal relations in science.

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Review-Essay

Stefan Laser

Who Carries the Weight of Digital Technologies? What is its Weight Anyway?

Josh Lepawsky: Reassembling Rubbish: Worlding Electronic Waste. Cambridge: MIT Press, 2018, 222 pages, Paperback 24,41 Euro, Hardcover 65,72 Euro.

When opening a book, many readers are keen on seeing how an author finishes his or her thoughts; they want to get an idea of where the text in front of them will lead them. On the last page of his book, this particular author confronts us with a set of rather unusual questions. "How will we keep electronics going", he asks. "*Should* we keep them going? If so, who and what must be considered; that is, whom and what do and should we care about and care for?" (Lepawsky 2018: 178)

"Reassembling Rubbish: Worlding Electronic Waste" (2018, MIT Press) is the new book of Canadian geographer Josh Lepawsky, and (as we can see above) it promises a radical perspective on the ubiquitous electronic gadgets and their industries. Lepawsky is a key author in the field of discard studies (closely linked with waste studies, see the intro to this special issue), where systems and infrastructures that drive wasting practices are put centre stage. It is a critical field of studies. For almost a decade now, Lepawsky has published various articles on waste-related topics – on matters of electronic waste (known as e-waste), and beyond. *Reassembling Rubbish* (or RR) is his most comprehensive take on the global issue of e-waste. It comes with a plea for a new kind of politics, and it tackles fundamental ethical questions (most importantly: what is the right thing to do with e-waste?).

The discussion about e-waste in Europe is still in its infancy, especially when we compare it to the numerous books and articles that discuss the information economy via themes such as Big Data, Artificial Intelligence (or AI), and automation. This is a pity, because Lepawsky shows us that we can learn more about these very things through the lens of discarded electronics.

In what follows, I will first introduce the author's theoretical and methodological approach (the way in which he makes sense of the world and uses empirical data), to then shine light on Lepawsky's key arguments. Crucial bureaucratic debates, the criminalisation of people of colour, the public's obsession with illegal exports, the questionable focus on post-consumer waste, and (most importantly) the toxic outputs of mining and production systems are some of the themes that are discussed by this author. I will only be able to discuss a few of them. Lepawsky dismisses various stereotypes surrounding discarded electronics – stereotypes that in part also haunt critical debates among the left in Europe – to then present us with more sophisticated data and a different approach to e-waste. This is the most important contribution that merits a review, last but not least because it indicates a particular kind of way of doing social science research. I will come back to this in the conclusion.

1. Engaging with science and technology

For readers not familiar with a particular line of thought, this book's title (both the main title as well as the sub-title) might be confusing, perhaps even unattractive. What does "reassembling [rubbish]" mean, and how does it relate a "worlding [of electronic waste]"? Lepawsky's choice of words is inspired by research in the field of Science and Technology Studies (STS); in fact, *Reassembling Rubbish* also works well as an alternative introduction to the basics of STS.

STS is an interdisciplinary field in which a new perspective on science and technology is championed. In German speaking countries (where this journal is based), most scholars are aware of a few key figures of STS (such as Bruno Latour), but the field has more to offer than what is often associated with single iconic individuals (and their eccentricities). Key to

the STS perspective is a closer engagement with the ways in which science and technologies are brought together, challenged or readjusted, while at the same time studying how people are moved, infrastructures are built, and hierarchies inscribed. By questioning sharp boundaries between nature and culture, or to use some examples: by interrogating the entanglements of a machine and its users, an industry and its infrastructure, a genius and an invention, plastic waste and the ocean, and so forth, fundamental questions about knowledge and knowing are put forward, all closely linked to the issue of social order.

STS first and foremost means developing and 'exploiting' innovative methodologies. Empirical research, theoretical investigations, and a critical reflection on one's own position go hand in hand. This is not to say that there are no sharp distinctions to be found (in fact, there are plenty of dualisms that have major consequences, especially when it comes to waste), but one obtains from starting one's analysis with a narrow set of categories. This is about preliminary decisions that (implicitly) drive one's analysis. In STS, knowledge is thus understood as a situated practice that has a history – that is often full of irregularities, disputes, and things that are forgotten. Scholars here try to develop descriptions that make a difference. Understanding e-waste then also requires digging into the historical remainders of discarded electronics.

Lepawsky emphasises that today's usual treatment of e-waste (in most countries) is characterised by a narrow framing. Only a small set of specific problems informs what the 'e-waste issue' is about, which also prioritises a particular set of solutions and a stabilisation of fierce hierarchies.

In chapter 3, he, for instance, introduces the captivating story of Joseph Benson to illustrate this argument. This Nigerian citizen was the first person in the United Kingdom, we learn, who was convicted of illegally exporting toxic waste (in the form of discarded electronics). This case first of all stands out because a ruling judge justified his decision by mobilising intergenerational justice – illegal exports of waste were described as "quite serious for society as a whole" (see RR: 50) – because of their environmental damage and long-term effects. This case, however, also sticks out because we can learn how crucial it is to decipher the practical work of formalisation practices. Lepawsky unravels competing ways of regulating discarded electronics. Benson's rather small warehouse in East

London got into trouble because it shipped a container to Lagos – and the container's contents were defined as hazardous waste. This was possible because the judges drew on a particular choice of legal documents and frameworks (from the EU, OECD and the Basel Convention), in which waste is mostly framed as a 'post-consumption' issue. Simply put, a focus here lies on how to treat discarded items. Lepawsky emphasises that it would also have been possible to embrace the Bamago Convention, a treaty that was signed by a number of African states to which Benson's shipments were heading, a treaty which allows for an alternative interpretation. Instead of putting the focus on post-consumer recycling, it appreciates waste prevention. The defendant himself framed his exports as deemed for repair activities – preventative measures, as it were.

To enable or support such alternatives, Lepawsky then wants to "make e-waste strange again", what he (also drawing on literary studies) calls "defamiliarization" (RR: 4). This move is very STS-ish. Up until the 1990s, the author shows, e-waste was found to be a problem mostly because of its hazardous ingredients, which were piling up in landfills. Then, it was 'discovered' as a valuable resource that could be reworked by 'professional' recycling machinery, that is, by energy-intensive shredders, smelters and refineries. This should be embraced, it is usually claimed, instead of the 'informal' solution that used to be (and still is) quite common in the Global South (see chapter 5, where he shows that environmental NGOs are also part of this problematic framing). We usually hear very little, Lepawsky then argues, about these 'informal' actor's skills, and, critically, we also rarely speak about toxic spill-overs during the production of electronics, which indicates a major problem to which I will return below.

STS scholars also embrace a non-reductionist reasoning (Law 2004). There is a general scepticism against powerful concepts, because they might be seen as driving one's analysis, thereby leading to blindness or overseeing particular actors and their realities (often suppressed ones). It is against this backdrop that Bruno Latour (most prominently) argued in favour of a new key term for the social sciences: reassembling (Latour 2005). Societies (or collectives, as Latour would say) hold together and are moved by complicated socio-technical assemblies: by concrete infrastructures, one's work routine, daily stories in the newspapers, that telephone call three years ago, etc. This intricacy is also the reason, it is argued, why societies

are in constant state of *reassembly*. And social scientists as well as activists are said to take part in this reassembling; they, in fact, should do this more actively – which is also what Lepawsky means when he captions his book with the notion of "reassembling rubbish". Again, very STS-ish. This emphasises Lepawsky's main goal: striving towards change – a different way of framing and dealing with waste and wasting practices. Theoretical and empirical reflection go hand in hand.

Note that the author does not focus on abandoning waste altogether (what some call 'zero waste'). Even if we were to stop producing electronics from now on, there would be waste to process, and production systems to rearrange. What we need is a different "worlding" of (e-)waste, new knowledge and new framings that enable alternative wasting practices. Drawing on Maria Puig de la Bellacasa (2017), worlding, then, is, in a nutshell, Lepawsky's normative claim. While unravelling empirical details, he shines light on the dynamics between "is" and "ought". In his own words: "How we world a problem like e-waste matters. Particular worldings make some proposals for solutions thinkable and, at least potentially, actionable." (RR: 6) Additionally, and crucially, as the author shows by engaging with the 2015 Conference of the Parties to the Basel Convention (on the Control of Transboundary Movements of Hazardous Waste and Their Disposal), today there are competing and "incompatible" worldings. This is a situation from which powerful actors are able to benefit (i.e., manufacturers, particular traders). Some actors (such as Benson) have to carry the weight of decisions that are to be made. What counts as waste counts, while a new political geography could help the push for change.

2. Towards discardscapes: mapping discards, enabling a change

Based on his previous research, Lepawsky was already well established as a scholar who critically explores the geography of e-waste (e.g., Lepawsky 2014; Lepawsky and Mcnabb 2010). Chapter 4 of this book, following his previous studies, charts the global flows of e-waste and provides us with some updates. Against this backdrop, I can also now move to what I see as the most important contribution of this book.

Many people seem to know how the global flows of e-waste are shaped. In the past two decades, the e-waste issue was framed as an issue of global injustice, highlighting shipments from the Global North to the Global South (which is why Benson's case mentioned above was discussed so vividly in the media). However, Lepawsky has had a closer look at key data that is available (provided by the United Nations Commodity Trade Statistics Database, examining scrap imports that a given territory reported). Most of the public discussions turn out to be too simplistic.

During the period of time studied (1996–2012), the overall flows of e-waste rose significantly. This is not a surprise. Nevertheless, unexpected things then surfaced. The global flows of e-waste are not dominated by countries from the Global North (even during the 1990s they did not make up the majority). Instead, most of the e-waste comes from, *and* flows to, countries from the Global South. Africa, Lepawsky for instance shows us, is a net *exporter* of e-waste (RR: 77) (Asia is a net *importer*, yet there is also plenty of international trade among countries in Asia). Even countries with low labour costs and low environmental standards (like Sudan) are net exporters of e-waste (RR: 78; check also Minter 2013). This is an example of a powerful descriptive finding. There is no simple dumping story to be told, especially based on the most recent data.

Apart from in-depth statistical analysis, the author here also uses ethnographic insights to underline his argument. They turn out to be rather short and anecdotal, but the encounters help to broaden one's mind. There is other waste scholarship that draws more heavily on ethnographic perspectives, but for this particular author it rather works as a tool to unsettle the readers in a productive way. Brevity, thus, is key to make turn the readers themselves into investigators. Lepawsky, for instance, reports from a visit to Agbogbloshie, an infamous e-waste recycling site in Accra, Ghana, which is constantly making the news as a 'high-tech hell' or a 'digital dumping ground'. The much-discussed movie *Welcome to Sodom* (2018, Camino) is the latest example of this doubtful fame (critically engaging with this: Oteng-Ababio and van der Velden 2019). In Agbogbloshie, Lepawsky indeed came across materials being burned – what some describe as 'hell'. But he first and foremost met technicians and was baffled by their skills (e.g., building new computers out of dispersed materials). The author here joins other scholars who creatively discuss the potentials

of repair thinking (Jackson 2014; Sormani, Bovet, and Strebel 2019). Yet there is more to this than simply supporting repair. Hence Lepawsky's transitional conclusion: "if equitable solutions to the e-waste problem are to be devised, then issues such as livelihoods, toxic risks, access to technology, pollution, learning, and enskillment need to be carefully examined together in their tangly knots and not as if they subsisted in isolation from one another." (RR: 90)

Chapter 6 – perhaps the most original chapter – presents the reader with "Weighty Geographies". It starts with a major problem of current discussions surrounding digital devices. It often *still* seems as if digital technologies are weightless and placeless (RR: 129). This is just wrong and misleading; here, waste scholars such as Jennifer Gabrys (Gabrys 2011) remind us of the dematerialisation narratives that are essential to this. Digital technologies rely on voluminous assembly, infrastructure and recycling networks that produce vast amounts of waste and various harmful consequences. Besides, Lepawsky underlines, most of the hazardous discards in fact materialise before any consumer gets hold of (or even thinks of) buying or using or disposing of a device. Therefore, "discardscapes" are introduced. This is one of this book's most important contributions. New data and visualisations enable a thorough discussion of the weight, as it were, of digital technologies, which includes a perspective on whom is carrying it as well.

Lepawsky differentiates between "minescapes", "productionscapes", and "clicksscapes" to map the impact of extraction, manufacturing and the use, as well as the disposal of, electronics (see RR: 131, for a succinct introduction). Drawing on insights of Discard Studies (Liboiron 2018; MacBride 2011), he uses his representations to make the tonnage, toxicity, and heterogeneity of e-waste comprehensible. The author here succeeds in putting forward critical data that indeed might be helpful in reassessing the e-waste issue – for a variety of actors and their struggles. I will briefly introduce one example for each of the 'scapes'.

Lepawsky first leads us to "minescapes", with the help of a visit to a field site: the "Lavender Pit", a copper mine in Arizona, USA, that was shut down in the 1970s. The author uses this example because copper, first of all, is a critical material for electronics. But he also refers to it somewhat metaphorically. A mine closed while the demand for electronics began rising.

This is at least how the official story goes, for instance told on an information plaque at the Lavender Pit site. In reality, however, this mine was still in operation up until the 2010s. Leakage had to be managed, and creative leaching processes were used to recover remaining copper out of the local waste (RR: 138) – producing even more waste. The amount of waste a mine produces is insanely high. Data show that "the annual average of waste generated from the Lavender Pit mine before it closed exceeded what the UN StEP [United Nations Solving the E-waste Problem Initiative] estimates was the total amount of e-waste arising in the entire United States in 2015." (see RR: 139) Yet, there is a crucial difference. The mine's waste is more toxic, while some of its waste is also regulated in the form of a commodity, so that it can be shipped transregionally and globally. This is an example where Lepawsky makes e-waste strange again. Things appear in a less familiar form, and new geographies are exposed. What is special to this perspective is its focus on particular data and their effects.

For "productionscapes" I would like to highlight a different finding, even though it touches on a similar message. Simply put, it centres on the following. "Postconsumer recycling cannot cancel out emissions released in production, transport, and use." (RR: 143) Therefore, Lepawsky, for instance, provides bar charts for different gadgets (phones, laptops, tables), and the relative amount of greenhouse gas they emit during recycling, transport, use, and production. Apart from some exceptions such as the Fairphone 1 smartphone or a laptop by Dell made from recycling materials, it is the production side that dominates these charts (see figure 6.6–6.8, RR: 143–146). An iPhone 7 produced by Apple, for example, emits 78% of 'its' total greenhouse gases during production (use: 15%, transport 3%, recycling: minimal). There are laws which try to tackle this, such as the EU legislation restricting the use of hazardous substances in electrical and electronic equipment (known as RoHS), but much more is required, as the author underlines.

With "clicksites", the author finally puts the material infrastructure of the Internet to the forefront. If we discuss themes such as Big Data, AI and automation, this perspective still is underrepresented. One compelling example here is the marine world of undersea cables. Statistics show that the cables laying on the ground stretch over one million km (RR: 154). And most of these cables will stay there, even if they are used for about 25

years (when properly maintained). Although these cables are not necessarily emitting toxicants, a focus on these things helps explore the seas in a fresh way. On the one hand, they are colonised by marine life and provide a space for living, while on the other hand, some companies envision setting up extensive recycling schemes to capture the valuable stuff of the materials. What shines through is a politics of energy residue. Ever greater amounts of energy are spent to increase the energy expenditure of certain industries. Excess (Bataille 1985) appears to be at the heart of these geographies.

3. Decriminalise, democratise, degrow

So what is the right thing to do with e-waste? Lepawsky concludes his book with a list of concrete next steps. The collection of approaches that is presented, I think, signals a will to be compatible – the possibility to make use of (say) a particular discardscape in a new report of your liking. From my point of view, the most crucial arguments here are a) efforts to decriminalise the export for reuse, repair and upgrades; b) sketches for a democratisation of the electronics industries' energy use; and c) a plea for degrowth. All of these arguments are then arranged to foster a politics of waste prevention, and they all underline a move away from putting the responsibility on individual consumers (or individual 'informal' recyclers from the Global South). After all, a lot is at stake: reducing the overall amount of toxic waste, while also tackling inequalities that are inscribed in the global recycling industries of e-waste.

This book's aim is to enable a new way of knowing electronic waste; therefore, it delivers refined knowledge and plenty of data with which to engage. Here, one has to situate this publication in the interdisciplinary field of waste and discard studies. On the blurb of Lepawsky's book appears sociologist and waste scholar Zsuzsa Gille, a key source for Lepawsky (see Gille 2007). She praises this book as a "game-changer". I'm not sure whether I agree with all the implications of this well-known yet somewhat extravagant statement. However, twisting this notion helps us to understand how this field of 'studies' operates, and what Lepawsky's role in this is. In the last two to three decades, the social sciences witnessed

the birth of several 'studies', just as there were numerous so-called 'turns'. This indicates that scholars constantly rearrange their theories and tools while encountering particular empirical settings, and also while constantly bringing a new set of actors together. The world is dynamic, and so should be our concepts. This is a sign of a social science that refuses to act as if it can keep a distance, without having to reconsider its modes and ways of thinking. Key to the 'game' of studies (waste studies too!), is to change and adapt, and Lepawsky succeeds in taking part in this game. For scholars doing research in this field, he illustrates how to proceed – namely that, indeed, proceeding is a crucial means for this kind of research. It is not enough to find out (and criticise) how waste is produced and dispersed in a particular setting. New perspectives, new practical approaches are required to contribute to the way in which waste is handled. Part of this is thinking about how to convey one's intervention, an idea with which I would like to end this review.

As a fan of Open Science and its ethics of democratisation, I like the idea that you may access the key take-away messages of the book by navigating to the website www.worldingelectronicwaste.xyz. There you can find all the illustrations used, and extra "online" figures, in which you can 'zoom in' and 'zoom out' to get additional information. So go there and make yourself acquainted. While (as indicated above) the author's STS writing style might at times challenge and provoke some readers, this website functions as a compensation, and I sincerely hope other scholars also supplement their book projects with a custom-tailed web-platform. It is a bit ironic, however, that the WWW, digital infrastructures and electronic devices are needed to displaying these infrastructures' and devices' very own foot prints.

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