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Scrap-worlds in Ghana: assembling migrant livelihoods, metal markets and transnational interventions

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« Scrap worlds in Ghana: assembling migrant livelihoods, metal markets and transnational interventions »

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Abstract

Based on ethnographic work in the scrapyards, five year long engagement (2014-2018) with political life in the informal settlement in which the scrap dealers live, and observations in an Asian company that buys metals from informal scrap dealers, the thesis follows scrap-worlds. Scrap-worlds are a dynamic set of relationships between different actors, where scrap metal is a medium and a connector between them. How and to what effect do informal scrap dealers find themselves connected to global circuits of scrap metal? What are the arrangements of labour and capital that emerge between peripheral scrapyards and international metal markets? How is the scrap economy appropriated to serve communal and individual needs of scrap workers? The thesis examines scrap economy as an emergent extractive system that competes with primary metals, while creating new urban livelihoods, financial risks, and environmental and bodily hazards. Borne out of material destruction, scrap labour retrieves value from industrial collapse, infrastructural disrepair, and discarding. Scrap labour has made such material destruction profitable and part of the global economy. Different scrap metals feature in multi-directional global flows. Scrapyards in Ghana are organised around the conjunctions of scrap metal, ethnic community, and global flow. These conjunctions solidify and refract global and local inequalities.

Résumé

Cette thèse suit le monde de la ferraille en se basant sur un travail ethnographique dans les décharges à ferraille ainsi qu'un engagement de cinq ans (2015-2020) dans la vie politique de quartiers des ferrailleurs, et d'observations dans une entreprise asiatique qui achète des métaux des ferrailleurs informels. Ce monde est fait d'un ensemble dynamique de relations entre différents acteurs, où la ferraille est un connecteur. Comment et dans quelle mesure les négociants informels se retrouvent-ils connectés aux circuits mondiaux des métaux recyclés ? Quels sont les formes de travail et de capital qui émergent entre les parcs à ferraille périphériques et les marchés internationaux de métaux ? Comment l'économie de la ferraille est-elle appropriée pour servir les besoins communautaires et individuels des ferrailleurs ? Cette thèse examine l'économie de la ferraille comme un système extractif émergent qui entre en concurrence avec les marchés primaires des métaux, tout en créant de nouveaux moyens de subsistance urbains, des risques financiers et des dangers corporels et environnementaux. Née de la destruction matérielle, la ferraille récupère la valeur de l'effondrement industriel, du délabrement des infrastructures et des rejets quotidiens. En effet, la ferraille a rendu cette destruction matérielle rentable et l'a intégrée à l'économie mondiale. Les différentes ferrailles font partie de flux mondiaux multi-directionnels. Les parcs à ferrailles du Ghana sont organisés autour des conjonctions de la ferraille, de la communauté ethnique et du flux mondial. Ces conjonctions solidifient et réfractent les inégalités mondiales et locales.

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This thesis is dedicated to my late grandfather, a landless peasant and a coal miner, whose biography entailed a migration from the natal village in the mountains to the urban centres of Silesia amid Poland's tumultuous 20th century. The conversations with him, the memory of our long card games (not unlike the card games during my fieldwork), and his acerbic commentary on all aspects of life merged together with the research and the writing of this thesis extending the sensation of his presence.

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Abbreviations

AMA - Accra Metropolitan Assembly

EU - European Union

ECG - Electricity Company of Ghana Limited

ECOWAS - Economic Community of West African States

EPA - Ghana Environmental Protection Agency

GIZ - German Corporation for International Cooperation (Deutsche Gesellschaft für Internationale Zusammenarbeit)

GHS - Ghanaian cedi (Ghanaian currency)

ICT - Information and communication technology

IMF - International Monetary Fund

IOM - International Organisation for Migration

NYA - National Youth Authority

NDC - National Democratic Congress

NPP - New Patriotic Party

MESTI - Ministry of Environment, Science, Technology & Innovation

OECD - Organisation for Economic Co-operation and Development

VRA - Volta River Authority

Note on Dagbani and Twi Letters

Language	**Additional Letters** **[Pronunciation same as international phonetic alphabet]**
Dagbani	ɛ ɣ ŋ ɔ ʒ
Twi	ɛ ɔ

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Introduction

Our present times are sometimes referred to as 'the mineral age' (Jacka, 2018: 62) due to a rapid expansion in the production of mineral resources from the late 1990s onwards that correlates with growing consumption, be it for transportation, building, or digital technologies. The demand for metals and minerals and weariness about their present-day entanglements with landscapes and territories has led to the search for new resource locations. Besides far more speculative ventures, such as asteroid and deep sea mining, urban mining of the 'anthroposphere' has become a subject of investment, intervention, and focus. Urban mining implies the recovering of metals and minerals from things made by people, as opposed to extracting them from nature. This is not necessarily new. The recovery and recycling of materials from waste have long histories that span centuries. However, the specificity of present-day urban mining is due to its scale, scope, circulation, and significance.

The scale of urban mining is greater than ever before because of growing demands for metals and minerals combined with a growing supply of discards. The scale is also extended in time as urban mining seeks to 'anticipate and capture the value contained in the waste of tomorrow' (Espionza, et al., 2020: 6). The scope is greater because ever more metals and minerals can be recycled due to technological advancement. And finally, the significance of urban mining has been recognised and valorised by a growing set of international organisations, corporations, and governments that cast it as a solution to planetary issues such as the depletion of resources (wherein recycling is a remedy), and geopolitical issues such as supply chain diversification (wherein relying on homegrown discards is favourable to importing materials from abroad). Most articles that refer to urban mining present it as a prospect and promise[1] rather than an ongoing, present reality. This thesis focuses on people who have been pioneering the scale, scope, and significance of urban mining, namely: urban miners.

[1] E.g. Espinoza, L. T. et al. (2018) *The promise and limits of Urban Mining: Potentials, Trade-offs and Supporting Factors for the Recovery of Raw Materials from the Anthroposphere,* Karlsruhe: International Copper Association; UNEP (2013). *Environmental Risks and Challenges of Anthropogenic Metals Flows and Cycles*, A Report of the Working Group on the Global Metal Flows to the International Resource Panel; Ciacci, L., Vassura, I. & Passarini, F. (2017). Urban Mines of Copper: Size and Potential for Recycling in the EU. *Resources,* 6 (6).

Out of the different materials that can stem from urban mining, this thesis focuses specifically on scrap metals. Such a focus is not accidental. As the following chapters show, scrap metal has distinct value, labour, circulation, and politics. In urban Ghana, where the thesis takes the reader, scrap metal is a domain of scrap labour that operates in dedicated spaces. Such forms of specialisation are not Ghanaian phenomena alone: anthropologists and social scientists have located their fieldwork in scrapyards in other parts of the world (Zimring, 2005; Saleh, 2016; Sanchez, 2020). They have been drawn to such places to investigate the transitions between waste and value, and to analyse scrap labour as an expression of marginal livelihoods.

The ambition of this thesis is to examine the distinctive nature of scrap metal, scrap labour, and urban mining as an emergent extractive system that connects actors across the globe, competes with primary metal markets, and creates new urban possibilities as well as risks and hazards. To that end, I follow scrap-worlds unfolding through dynamic sets of relationships between different actors making scrap their medium and connector. Some of these actors are scrap dealers, who engage in collection, segregation, pre-recycling and bulking of scrap. There are also companies and brokers, which involve all sorts of actors who buy scrap from scrapyards either to feed their own industrial production or to export the scrap to Asia, Europe, or the Middle East. Finally, there are other stakeholders, such as state actors, NGOs, international organisations and activists, who seek to define and regulate issues surrounding scrap either alongside or against the two groups mentioned above.

To talk about scrap-worlds implies that such a set of assemblages is distinct from the worlds assembled around other commodities. Scrap metal emerges out of processes of material destruction. It circulates from discarding to production. The majority of 'commodity ecumene'[2] literature de-fetishises commodities by connecting them to their spaces of production, thus asking questions about the relationship between consumers and labourers, marketing representations and production realities, transformation of value along the commodity chain, and the social effects of global capitalism (e.g.

[2] As per Arjun Appadurai's definition, a 'commodity ecumene' is 'a transcultural network of relationships linking producers, distributors, and consumers of a particular commodity or set of commodities' (Appadurai, 1984: 27).

Mintz, 1985; Freidberg 2004; West, 2014; Tsing, 2015). In contrast, when it comes to scrap metal, unexpected revelations emerge from following its chains, which invariably flow in the opposite direction compared to those of most commodities. Among the revelations that can be gleaned from this tracing is that discards are subject to competition, dealing in discards requires money, and scrap is transmitted in multi-directional global flows that connect even the most marginal urban spaces to the global demand for metals. As this thesis shows, scrap labour and scrap circulation attach themselves to larger economic currents through an entrepreneurial pursuit of livelihoods and metals. They draw a connection between discarding and production in multiple ways. Some countries organise waste infrastructure to ensure that waste finds its productive use: they might, for instance, introduce legislation to shift the responsibility onto producers and consumers and demand that they dispose of their discards in predictable ways. In Ghana, like in other places, drawing this connection has been the focus of the pioneering efforts of scrap dealers. In the process, they have managed to create economies of scale that have brought international metal markets into the country. They also patented an economy based on the demand for work, and thus an economy able to include ever more migrants. Finally, by connecting the demand for metals to the supply of discards, scrap dealers make discarding profitable.

Connection-making

Ghana's scrapyards are busy places of connection-making between the discarding of scrap and the demand for metals. The connection-making engages urban labour, landscapes, and communities that are mobilised to partake in national and international metal markets.

In May 2018, a scrap dealer beamed with joy at a surprising turn in his prospects. As a loyalist of a political party currently in opposition, Ibrahim's[3] luck had been in short supply ever since the November 2016 election, when his party lost power and his powerful patrons lost their positions in the government. This meant that Ibrahim stopped getting scrap from governmental institutions through his political connections. Instead, he was spending the days patrolling the city on his motorcycle, looking for scrap, and occasionally visiting internet cafes to write e-mails of interest to companies. The

[3] I use people's real names.

Figure 0.1 Landscapes of scrap work on the day of Ibrahim's luck.

grind of locating scrap was slowly verging into an occasional despair, as Ibrahim was afraid of 'eating into his capital', which means lowering the amount of money available for scrap business.

On that day, he found out that his participation in a scrap auction by the Volta River Authority (VRA) earlier that month had finally yielded an outcome. The VRA is Ghana's main generator and supplier of electricity. The recurrent breakage and ruination of its infrastructures means that it is also one of Ghana's main generators of scrap waste at volumes that permit high profit margins. On this fateful day in May, Ibrahim was sitting under a tree with other dealers in one of Accra's scrapyards, Mortuary Road (see Figure A in Appendix). The units arrived on a hired truck from the VRA's branch in the port and oil city of Takoradi-Sekondi, some 200 kilometres away from Accra. This particular branch of the VRA underwent a construction of a thermal plant to ramp up electricity generation for the serviced regions of the country[4]. Official reports did not mention that a diminutive man with no formal education, a workspace that included an hourly rate at an internet cafe and a sitting spot under a tree would attach himself to the fortunes of such infrastructural discarding and revamping. But here was Ibrahim beaming at the turn of luck.

[4]'Experts to assist in the maintenance of Ghana's Takoradi thermal plant'. Construction Review Online, Jun 24, 2014. Available at: https://constructionreviewonline.com/2014/06/experts-assist-maintenance-ghanas-takoradi-thermal-plant/ (accessed February, 2 2020).

Ibrahim's thermal units were dislodged from the truck right by the riverbank of a prong of one of Accra's rivers, Odaw, where their rusty and ruined appearance fit incongruously with other features of the landscape: a river filled to the brim with plastic packaging, specks of green grass and trees that recalled the lagoon's past wildlife splendour, and occasional seagulls searching for food amid the Styrofoam boxes (Figure 0.1). The units weighed around a ton each and looked too massive for anything to be done to them.

Unfazed by their appearance, four 'brothers'[5] were hired by Ibrahim to dismantle the units into constitutive metals. The VRA warned Seidu about the toxicity of the insulation inside the units. As such, the men were to pack the insulation into separate burlap bags and then bury it at a safe distance from human habitation. Ibrahim received photos on his WhatsApp from the contractor as to what the final effect of this health and safety precaution should look like. He committed to taking own photos upon completing the work to show his compliance with the measures. Ibrahim avoided telling anyone how much the units cost him, but after much teasing admitted that it was more than 25'000 Ghana cedi (around 4'000 USD).[6]

Once the dismantling was concluded Ibrahim sold the iron to a Chinese-owned smelting company located near Accra, Sentuo, that relies entirely on scrap dealers to provide raw metal for its operations. The company smelts iron into iron rods that are later sold for regional construction markets. The less voluminous aluminium scrap went to Ibrahim's long-term trading partner, K.C., a Nigerian broker in non-ferrous metal scrap, who operates from the scrapyard of Agbogbloshie, a media-famous 'e-waste dump'. K.C. then sold the aluminium to a Lebanese company that operates nearby. Though the purchase of the day was judged lucky by Ibrahim and his friends, it contained many of the recurrent features of scrapyards' life: a toil of locating scrap preceded the eventual purchase; a group that finds ties in a shared ethnic and migration background performs a strenuous work that is linked to real but

[5] Term used to signify people coming from the same ethnic group - the detailed analysis of the designation appears in Kevin Hart (1973).

[6] For comparison, most scrap dealers at the lower end of Accra's scrap economy earn between 20-30 GHS a day.

invisible hazard; and a range of international actors bought the metals to either fuel domestic industries or export abroad.

Such quotidian occurrences brought up for me and others in the scrapyards pressing questions. How did Ibrahim - who otherwise dwells inside a kiosk in a squatter community - manage to pull together the impressive capital that allowed him to buy the scrap? How is the government agency trying to rid itself of hazardous waste able to earn money on it rather than having to pay someone for taking the burden off its hands? How did the smelting industry and international exporters of metals fuelled by investments from all around the world come to rely on businesses such as Ibrahim's?

Drawing on fieldwork in scrapyards and observing their activities, I conceptualise the work of scrap dealers like Ibrahim as instances of shifting away from dependence on primary metals and mining towards scrap metals and recycling. Such contribution is 'inter-scalar' (Hecht, 2018): the sheer assembly of quotidian activities across geographies makes it possible to imagine the shift and also the changing notions of what the shift should be influence in turn people like Ibrahim.

Scrapyard meanwhile are sites of the shift. They are where the supply of waste meets the demand for metals. These are places that are simultaneously unified and fragmented. They assemble metal-bearing waste in a shared space and they are unified though daily conversions between scrap and money. They are fragmented in that different actors and communities specialise in different metals, work processes and categories of scrap. And the fruits of their labour feature in distinct global metal flows between Ghana, Europe and Asia. These create clusters of community, metal, and flow.

In Ghana, the iron trade is mostly in the hands of Dagomba people from the country's north. By contrast, copper and aluminium buyers within scrapyards tend to be Nigerian migrants. Scrap work involves myriad forms of expertise such as collection, segregation and pre-recycling and bulking. Scrap metals come from processes of discarding and are channelled to national and international commodity chains. Some - like the iron that Ibrahim recovered - stay within the borders of the country, while others travel abroad. Some of the scrapyards' work and discards become the object of growing legislation and public outcry, while others are perceived as quotidian and go unremarked. In other words, it is a context of commodity niches and work diversification along communal lines, participation in multiple commodity chains, and divergent legal and policy interpretations of scrap work.

Scrapyards are sites for cosmopolitan encounters between actors - this is an iteration of 'mining encounters'[7]. Ibrahim is a migrant from north Ghana, K.C. comes from Nigeria, Sentuo is a Chinese company, and the two companies to which K.C. usually sells his metals are headquartered in Lebanon and Lithuania respectively. Ghana's scrapyards are places located inside cities, which means that - while they may fall outside official city plans - they are nonetheless accessible not only to workers but also to outsiders who come here to explore these sites. These actors were drawn to the sites' communal significance or their importance as hubs of liquidity. One finds here also journalists or photographers who respond to the charismatic quality of certain discards, or exporters who conscript individual scrap dealers to pack containers full of scrap metals and prepare them for shipment abroad. They might also be international and national non-governmental organisations that want to enter into collaborative projects with scrap dealers or alert them to dangers of scrap work. The city-ness of the site opens the place up to the transformational possibilities that exist nonetheless amid structural inequalities.

Studying scrap in Ghana

Scrap rather than e-waste

I opened this thesis with a reference to an average day in the life of Ghana's scrapyards involving large metals like iron and waste associated with infrastructural discarding. In this story, we do not see any of the 'e-waste' that has attracted so much attention in existing coverage of Ghana in media, non-governmental and governmental publications in Europe and North America. Such international narratives have particularly focused on the scrapyard of Agbogbloshie in the capital of Accra, one of

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[7] The term has been proposed by Robert Jan Pipers and Thomas Hylland Eriksen (2019, 21) to describe negotiations and frictions between actors in the context of mining. The term is to suggest moving away from the triad of state, community and company. The authors emphasise that 'mining encounters' allows them see extractive contexts as 'fields of connection and negotiation, of friction and contradictions' while exploring different scales of operation, resources and life worlds (*ibid*). It emphasises thus that people in the encounter are not monolithic entities.

the sites of my fieldwork. Media worldwide, from publications like *National Geographic* and *The New York Times* to blogs with a more limited circulation, have been calling Agbogbloshie 'the biggest e-waste dump in the world' and 'one of the most polluted places in the world'[8]. The common thread of these narratives is that safe electronic waste disposal in the geographies of the Global North is costly, so poorly identified actors[9] pack up consumer electronic into containers and send them to the Global South, where similar restrictions are lacking. Hence Agbogbloshie is, as one of the newspapers put it, 'the hellscape where our computers go to die'[10]. In 2010, the *New York Times* printed photographs of Agbogbloshie with a caption: 'a global graveyard for dead computers in Ghana'. Thereafter the number of publications grew and the media attention fuelled e-waste science and further research into the e-waste dumping. Much of this is covered in greater detail in Chapter 5, but suffice here to say that the identification between Ghana, Agbogbloshie and e-waste has had effects on how the problem of e-waste is understood and how actors in Europe and North America seek to solve it with multiple effects for scrap dealers in Ghana.

Research in Ghana's scrap worlds has meant learning to un-see scrapyards as 'e-waste dumps' through fieldwork to allow for the larger worlds to come into view. My first encounter with Agbogbloshie came via a friend, Abdallah Ibn Alhassan. A University of Ghana graduate and a former scrap worker in Agbogbloshie, the immensely resourceful Abdallah was frequently contacted by the media to orchestrate contacts on the ground. His occasional income stream was in effect to guide outsiders such

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[8] E.g. Chris Carroll. 2008. "High-Tech Trash," *National Geographic*, January: http://ngm.nationalgeographic.com/2008/01/high-tech-trash/carroll-text (accessed April 26, 2018) PBS. 2009. *'Ghana: Digital Dumping Ground'. Frontline.* June, 23. *At:* http://www.pbs.org/frontlineworld/stories/ghana804/video/video_index.html (accessed on March 29, 2018); Pieter Hugo (2016), "A Global Graveyard for Dead Computers in Ghana," *The New York Times*, August: http://www.nytimes.com/slideshow/2010/08/04/magazine/20100815-dump.html?_r=0; NOS, "Dumping across the Digital Divide," *The New York Times Magazine*, August 15 (accessed April 26, 2020).

[9]Most of the narratives focus on the logic of exports (i.e. that they cost less than recycling) than pointing to specific actors that would propel that logic into action. United Nations Environmental Programme (UNEP) dedicated some research into identifying these actors (informal communication). Interpol projects aimed at preventing the movement of waste were also filling the blanks (although their effects were not published). Tangential and personal research shows that much of the exports of electronic waste from the West to Ghana are charitable donations and entrepreneurial ventures of the West African diaspora and other small-scale exporters.

[10]This specific formulation appeared in WIRED: Jacob Schiller (2015) 'Inside the hellscape,where our computers go to die", *Wired,* April, 24: https://www.wired.com/2015/04/kevin-mcelvaney-agbogbloshie/ (accessed April 1, 2020).

as journalists and video makers through Agbogbloshie. Although in our personal conversations, Abdallah was befuddled by the 'white people's' reduction of the complicated place to 'an e-waste dump', in the beginning, he assumed their superior knowledge and constructed a tour that reflected their expectations. Both this first contact and the pervasive literature on Agbogbloshie meant that my research had been predictably centred on the question of electronic waste, its labour, and economy. The e-waste narrative has mobilised specific actors on the ground and as such it is altogether possible to walk through Agbogbloshie as if it were a space of electronic waste: passing between the groups that deal in computer and fridge waste, tracing a further path down to the burning site, where the small cables from computers are incinerated in the open, and onto the nearby bank of a lagoon, where amid all types of waste including organic and plastic, one can discern traces of monitor cases and chips of computer motherboards.

The longer I spent time doing my fieldwork, however, I started to share Abdallah's problem of describing what was going on in Agbogbloshie and other scrapyards as strictly 'e-waste dumping'. I understand why e-waste specifically has been a charismatic sub-category of waste[11] - there is indeed something unsettling in the realisation that the very electronics that are ubiquitous in our homes can produce toxic ecosystems in Ghana after their disposal. At the same time, the category of 'e-waste dumpsite' as it applies to Ghana's scrapyards focuses attention on sentiments of culpability and shock in the West.[12] There is a problem of 'e-waste' and 'dumping' that is global and that has specific manifestations in Ghana but to see the scrapyards solely through its prism is reductive. It is reductive because it obfuscates the enormous labour that scrap dealers engage in to locate scrap, sponsor its collection and deal with its domestic scarcity compared to available labour. It is also reductive because e-waste is not the sole scrap object that circulates in scrapyards and as such it is only a subset of the scrapyards' assemblages. This follows Joshua Lepawsky's (2016; 2018) urging for the need to 'de-

[11] As per the use of the term in recent research about the properties of certain categories of waste to capture popular attention (e.g. Reddy, 2014; Liboiron, 2016).

[12] A similar thesis is extended by Adam Minter (2015) 'Anatomy of a Myth: the World's Biggest E-waste Dump Isn't', 16 June. Available at: http://shanghaiscrap.com/2015/06/anatomy-of-a-myth-the-worlds-biggest-e-waste-dump-isnt (accessed February, 2 2020)

familiarise' e-waste - interrupt our perception of what might be to allow for new and creative solutions to the challenges it poses.

There are different definitions of e-waste. There is one that exists in popular imagination - computers, mobile phones, and televisions. There is also a definition that takes the Basel Convention as a reference and incorporates such toxic discards as leaded car batteries.[13]To produce research that focuses on e-waste would mean singling out specific commodities that circulate in the scrapyards from their larger social contexts and economic associations. It would also mean forcing the language of international media onto people, who talk about their place of work as 'a business centre' not a 'dump' and their commodity as 'scrap' and not 'e-waste'.

These are crucial distinctions that bring into the frame new actors and concerns. To talk about scrap is to take the perspective of Ghana's scrapyards seriously, these are spaces that are assembled around metal-bearing discards and they are spaces of encounters between communities. One finds here people who deal in oxygen tanks, cars, and all sorts of other discards that do not fit easily within the definition of electronic waste. Theorising from the scrapyards as specific political economic contexts should seek incorporate these actors into explanations. Secondly, e-waste represents only one out of many concerns of the scrapyards and a specific subset of geographies of scrap metal demand. Chapter 5 argues that narratives about e-waste centre around specific concerns that are recognisably North American and European, namely these are concerns about access to strategic metals, electronic discards, and intellectual property in technological design. To understand how scrapyards feature in multi-directional processes of globalisation requires paying attention to other metals such as iron that are not necessarily associated with e-waste but with construction and infrastructural waste. Scrapyards are grounds for numerous politicisations where struggles over value and work conditions take place and they are not necessarily ones that share the same concerns as the narrative of 'e-waste dumping'.

[13] The Basel Convention is an international treaty effective since 1992. Its objective is to reduce the movement of hazardous waste between nations, specifically from rich to poorer countries. For example, Lepawsky (2018, 25) in writing about e-waste uses Annexes VIII and IX of the Convention as his definition of e-waste. It includes waste lead-acid batteries and waste metal cables beyond electronic objects popularly associated with the definition of e-waste.

Ghana's scrap: Past and present

By focusing on scrap metal, we can re-contextualise the scrapyards of Ghana into a wider political economy in West Africa. The early circulation of scrap exemplifies mobility that is fundamental to West African social and economic life. As numerous studies have reported, West Africa has been shaped by commercial routes and trading networks that have created multi-directional exchanges of commodities across space both along the coast and in-land through sub-Saharan routes (e.g. Diouf, 2000; Fauvelle, 2014; Green, 2019). Ghana has been in this respect defined by processes in the wider region.

Different scrap metals each have separate chronologies of adoption, networks of circulation, and uses. Rarer metals such as copper, brass, silver and gold partake in longer histories of being re-melted after their importation from Europe as manillas, basins and kettles. They had fungible uses as currency and also served as material for other productions such as regalia, weights, spoons and containers for gold dust.[14]As Alessandro Tana writes, 'from all these assorted bits of metal the African blacksmiths have obtained some of the most interesting and attractive objects we have now in our museums' (1985: 63). Some examples include Benin bronzes hewn from manillas and containers, or Gbandi silver jewellery and Agadez Tuareg crosses re-melted from Maria Theresa thalers that circulated as a currency in the 18th century.

Scrap iron and aluminium became popular at the beginning of the 20th century. This is when cheap scrap iron from European goods such as automobiles came to be adopted by blacksmiths for their artisanal production to the detriment of locally smelted iron. The shift to scrap iron led to the collapse of iron smelting industries in West and Central Africa (Warnier and Fowler, 1979; Jemkur, 2004; Darling, 2016). Meanwhile the market for scrap aluminium expanded around the same time. According to research by Emily Lynn Osborn (2009), the dynamic sector of artisanal economy of recycling scrap aluminium dates back to the post-second world war period when France established industrial foundries in Dakar. Labourers in these foundries learnt new skills of casting that they diffused

[14] The research into circulation of such metals has been done by (among others) Daaku (1970); Reynolds (1974); Garrard (1983); Tana (1985).

throughout West Africa. This has led to the ubiquity of aluminium productions such as bowls and pots and iron productions such as coal-pots that West Africans use in cooking or the hawking of goods across distances. Such aluminium and iron artisanal products are perishable and require re-mending. In consequence, they regularly transition back and forth from scrap to signs of household's wealth.

These early adoptions of scrap extended networks to gather and channel scrap to artisanal production. There are records of scrap merchants and caravans from the North as early as 1900 (Gerrard, 1983: 40). Osborn's research on aluminium also documents the diffusion of skill and demand for scrap through transnational movements of mostly Muslim brotherhoods.

In the 20th century, the development of industries, infrastructures, growth of auto-motorisation and electrification in Ghana and West Africa have increased the volume of scrap and diversified its content.[15] This meant that its processing requires new spaces and labour. Until the 1990s, scrap in Ghana had no specific location: it was dispersed in waste-sites or circulated between workshops and markets for spare parts. But from the 1990s the mountain of scrap needed to be put somewhere and this gave rise to the scrapyards that dot Ghana's urban fabric. These changes meant two important shifts vis-a-vis the previous history: scrap collection and re-sale have become skills that could fuel new livelihoods and scrap metal could act as a substitute for mining at an industrial scale. Scrap workers became a labour group inside cities, scrapyards emerged as urban spaces for bulking and processing of scrap, and demand for scrap came not only from artisans, but also from international metal markets and industries.

The mounting discard heap in Ghana represents the country's socio-economic fortunes in a reverse mirror or as Brenda Chalfin points out discards are 'inversions of the marketplace' (Chalfin, 2019: 507). Wires that accompany the extension of the electrical grid, the profusion of auto-mobility and industrial

[15] These are some of the works that document the development of industries, infrastructures and auto-motorisation in Ghana: Kwakwa and Aboagye (2014); Hart (2016); Osseo-Asare (2019).

plants are not only signs of economic change . Their future ruination, breakage and replacement create new waste streams.

At the time of its independence in 1957, Ghana was considered a middle-income country due to its extensive cocoa and gold exports. The country's first president Kwame Nkrumah launched the country on a path of industrialisation, electrification and extension of other infrastructures that in turn created markets for electronics and cars. Nkrumah's government ended in a coup in 1966, opening up a turbulent period of fifteen years, which created economic setbacks. In 1981, J.J. Rawlings assumed power as head of Ghana. His initial revolutionary drive to monopolise export and import and lower dependence on imported goods reaffirmed a commitment to agricultural self-sufficiency. The country's (and regional) economic crisis in 1983, however, required a change of course in the form of a loan from the International Monetary Fund and structural adjustment policies. Ghana divested from its industries and opened its ports to imported goods once again. In 1992, Rawlings was the only unelected head of state to organise democratic elections and assume a role as a democratically chosen president for two terms after his political party, the National Democratic Congress, obtained a majority. 2001 marked a peaceful transition of power after a democratic election of the country's second largest party (National Patriotic Party) headed by John Kufuor. The transition combined with President Kufuor's explicit policy of attracting foreign investment, resulted in the country's consolidation as stable regional hub for neighbouring countries of Ivory Coast, Togo, Benin and Burkina Faso. All these developments have had their impact on the generation of scrap and prospects of its economy. Ghana's industrial collapse has turned into the fortune of individual scrap dealers (more of this in Chapter 1) and the growing consumer markets generate quotidian discard afterlives.

At the same time, the country's consumer markets have their specificity that are reflective of the country's status in 2000s as a lower-income economy. As Chapter 5 discusses this creates its own challenges where issues of fairness and equality are concerned. Consumers rely on second-hand goods of various types (including second-hand electronics) which stem from discards in richer countries. In 2009, 70% of imports of electronics in Ghana were second-hand products according to a UN-sponsored report (Amoyaw-Osei et al., 2011). According to a report by Ghana Revenue Authority (GRA) of around 1 million vehicles imported to Ghana between 2005 and 2016, 80% were second hand.[16] Similarly, a 2011 report by the National Road Safety Commission found that approximately 75% of tyres in the country were second-hand. In fact, a fairly common business idea for migrant networks is to find products that have a shorter shelf life in Western contexts and can be re-used as second-hand in Ghana. The country's reliance on second-hand goods, including electronics, is what made it into a place associated with the scandal of 'e-waste dumping' from rich countries. From the perspective of scrap economy, second-hand imports mean that Ghana is encumbered with waste that links it to discarding in other geographies - this invokes questions about attribution of responsibility for the waste's management and fairness. In addition, such second-hand products require frequent repair, 'tropicalisation' (that is updating the products to the needs of its second-hand users) (Verrips and Meyer, 2001), and as such their status between waste and value is blurred and subject of continuous individual and communal struggles.

The country's stock of metals has also fluctuated with its economic fortunes. As development papers put it, Ghana lagged behind other markets when it came to the installation of copper cabling which means that it relies on the more often breaking aluminium (Oxford Business Group, 2014). According to my interviews with spare parts sellers in Accra, many of the country's imported second-hand cars lack catalytic converters that reduce toxic gases. The converters contain platinum, iridium and palladium, which fetch high prices and which might incentivise exporters of second-hand cars to remove them before shipment to Ghana.

Meanwhile, Ghana's openness to foreign business and comparative ease for foreign investors created a local demand for scrap metals from the country and its neighbours. While there are no exact statistics as to the levels of scrap discarding, one can gauge that scrap is enough to feed five iron smelting industries (at the time of writing in 2021). These industries rely entirely on scrap from scrapyards. They

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[16]"Over 1 milion vehicles imported into Ghana in 10 years', *Graphic Online,* 25 January 2018. Available online at: https://www.graphic.com.gh/news/general-news/over-1-million-vehicles-imported-into-ghana-in-10-years.html (Accessed 23rd June 2020).

are all located in Ghana's port city of Tema and owned by investors from Asia and the Middle East: Sentuo Steel is owned by the Chinese government, Ferrofabrik is owned by private Chinese investors, Tema Steel and B5 are owned by different Indian families, and Raider Steel and United Steel are owned by Lebanese and Syrian investors. They have all come in operation after the 1990s. While they are recent investments, one of the companies (Tema Steel) was erected on the remains of government-owned industry built during the country's post-colonial independence in the 1960s. The opening of smelting industries from the 1990s onwards meant that the most ubiquitous type of scrap (iron) found its demand and together with it more and more people could make a livelihood out of locating and channelling it.

Non-ferrous metals such as copper, aluminium and lead come from auto- and electronic scrap and are bought by a cornucopia of international companies, whose exact ownership and presence in Ghana fluctuates fast (as is explained further in Chapter 4). The export of Ghana's scrap was limited to individuals until the country's economic boom and opening to foreign investment in the 2000s brought a number of such corporate exporters, who tapped into existing scrap collection networks.

Different scrap metals have specific geographies of circulation. Thus, scrap iron has been subject to export bans since 2014 in Ghana to ensure stock for the country's industries, which together hire some four thousand people and produce cheap iron rods for regional construction markets and castings for the mining sector. Copper, aluminium and lead (and their alloys) are usually directed to Asian and Middle Eastern markets. Certain metals that come from electronic waste find demand in Europe, where they have been renamed 'strategic' and become the subject of policies explicitly aimed at diversifying their supply chains.

For all the country's specificity and regional importance, Ghana is not an isolated geography of urban mining. Arguably, peripherality is an intrinsic aspect of scrap economy in that discarding (including of metal bearing waste) is ubiquitous and as such scrap economy can emerge anywhere. Peripherality is also a value that sets scrap metals apart from metals obtained through traditional mining, where metals are resources of specific states and thus mining is tied to questions of sovereignty and national wealth. As scrap can come from anywhere, industries that rely on it can feed off diversified or substitutable supply chains. Locating the research in Ghana means therefore to pursue a specific social manifestation of urban mining. Yet Ghana's connection to global and regional supply chains of waste and demand for metals means that Ghana is also a place from which one can observe the globalisation of urban mining.

Scrap worlds: urban mining and scrapyards

Urban mining: scrap and its political economies

'Mines are a synecdoche for the modern age of industrialisation' (June Nash, 1993 [1979], *We eat the mines and the mines eat us: Dependency and Exploitation in the Bolivian Tin Mines,* Columbia University Press, pp. 15)

'Scrap metal is a salve to the wounds inflicted by our industrial age' (Thomas Parry, 'The Crucible', *Grid Magazine*, Issue #83, March 2016)

Scrap worlds are relevant for urban mining and realisation of its promises. The term 'urban mining' finds its origins in Jane Jacob's (1961) prediction that 'the cities are the mines of the future' (in Graedel, 2011: 43), although others believe that the term's origins are murkier (Reddy, 2016). The term emphasises a geographic distinction from the rural landscapes of mining and refers to the urban geographies that are destinations for metal flows, places where the above-ground stock of metals are concentrated, and as such are the main sites of its discarding. Its invocation of urbanity has also been at the origin of the term's contestations. Marzan Labban (2014) reviews the term in tune with arguments about planetary urbanisation, which proposes that urban processes are not confined to cities and rather spill over and can be found across different geographies. He offers the term 'planetary mine' to emphasise that there is no geographic end to the extractive limits and that extraction moves through ever extending networks that include scrapyards, shipyards, ruins, abandoned machines in mining sites and agribusinesses as well as all sorts of buildings and languishing infrastructures (2014: 564). Both terms are underpinned by a geographic imagination that focuses on 'urban' as a specific *site* of material flows.

Baccini and Brunner (2012) refer to urban mining to emphasise the specific *process* of reclaiming metals from 'anthropogenic stocks or environmental media receiving anthropogenic emissions', a process that is followed by the recycling and recovery of the materials. 'Urban mining' has also been used to draw attention to the *specific type of discards* in urban environments such as electronic waste as a repository of metals (Noyles, 2014). In such contexts, the term is tied to specific corporate agendas and pyrometallurgical companies that recover precious metals such as gold and palladium from e-waste. Such companies use 'urban mining' as a specific claim to access these resources (Peters, 2011; Reddy, 2016). It is often in these contexts that the positive qualities of urban mining are extolled.

These three approaches have their nuances. A focus on site - the urban - means a focus on infrastructure of collection. The process meanwhile emphasise the specific set of activities that are to invoke the potential of the cities as urban mines. The corporate-driven definition of urban mining as strictly linked to electronic waste emphasises concerns about specific metals and industrial interests that process these metals. In this thesis, I am drawn to the term of urban mining for its epistemological usefulness - not only does it emphasise the specificity of the resource that is being mined (metal from waste) but also it encourages an anthropological scholarship between literatures on waste and mining.

Some of the academic writings on urban mining recognise that scrap's ubiquity is not tantamount to the mine's profitability. This is partly because of the need of multiple labour processes: collecting scrap and separating it from its larger material contexts (removing iron rods embedded in concrete buildings; copper from plastic coating) and only then are the metals ready to be channelled to other uses that represent their own calculations (artisanal production or industrial smelting)[17]. Partly the hindrance to

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[17] The question of profitability is usually teated with regards to specific metals privileging thus a perspective of refineries that deal in specific metals over scrapyards that deal with a range of metals. There is a fairly extensive research that estimates profitability vis-a-vis electronic waste of especially computers or TV sets. For example, Krook and Baas (2013) offer a review of urban mining and raise the question of profitability.

profitability comes from competition from primary metal markets - as evidenced by the fact that for the most widely traded metals (steel, aluminium and copper), recycled metals make up only around 20% of global output[18], while the statistic for other metals can be as low as around 1% to 11% (Baladé et al., 2017).

There are different reasons for the competition between primary and secondary metal markets. One relates to metals having different quantities in urban mining stocks. Iron is considered integral material of the economy and as such it is easy to find. Aluminium is the second most common metal in waste streams, while copper, lead from car batteries are becoming common alongside auto-mobility and electrification, and finally other metals appear in smaller quantities. The majority of these 'other', rarer metals are found in electronic waste. Recycling is an economy of scale, which means that high quantities are integral to enabling the economy's viability.

Another reason for competition is quality and technological advancement. The substitutions that come from scrap metals might not be as durable as their primary equivalents. For example, the iron rods smelted from scrap in Ghana can only be used for the construction of smaller buildings and would not meet European construction standards. But such difference of quality is not always given and has been variable depending on metal and technologies inside smelting industries. For example, Umicore, the European smelting giant, has developed technologies that make smelted secondary gold and palladium almost indistinguishable from their precious ore equivalents. The company's own trajectory is touted as the example of a progressive shift from primary to secondary markets. Umicore was formed after a merger of different companies in the mining and smelting sectors. The company's colonial origins go back to the *Union Minère du Haut Katanga* formed in 1906 to operate in the Belgian Congo. The company exploited the Congo's copper, cobalt, tin and uranium and accounted for the bulk of colonial revenues. After independence, the Congolese government nationalised resources and the company

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[18] As per OECD (2016) 'Working Party on Resource Productivity and Waste: Mapping Support for Primary and Secondary Metal Production', Environment Policy Committee, ENV/EPOC/WPRPW(2016)2/FINAL, Available at: https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/EPOC/WPRPW(2016)2/FINAL&docLanguage=En (Accessed 2nd March 2021).

restructured to move away from mining towards refinement and recycling, which were especially prevalent in the 1990s. Currently, the company claims that the majority of its revenues comes from clean technologies (including recycling) and it has been receiving recognition for developing technologies that promote sustainability in resource management (Roome and Jadot, 2018).

Competition is also due to state and regional policies around the world that have supported primary mining over its substitutions making the former more profitable. A number of recent reviews, including by international organisations such as the OECD or the EU, sought to lay out the sources of the uneven competition pinpointing factors such as tax-related support and other forms of public subsidies to mining companies that reduce their operational costs.[19] Such reviews recognise that there are paths forward for secondary metal markets through increased financing of state and corporate ventures using public budgets supplemented by innovative financing mechanisms such as landfill tax or Extended Producer Responsibility (EPR). The recent interests stem from the growing exploration and re-casting of scrap as *salve* or a remedy, as seen in the opening citation for this section, amid the ideologies tied to circular economic thinking. Such discourses in Europe have specifically focused on precious metals that are sourced from electronic waste.

The growing consensus in scientific research is that metal recycling reduces the exploitation of natural resources, saves energy, and diminishes pollution (Baladé et al., *ibid*). Such an assessment invites an analysis on a planetary scale, where global demand and supply are held constant (or growing) and thus the replacement of mining with recycling offers comparative gains in terms of sustainability. Shifting the scale from planetary to local poses questions about the uneven manifestations of hopes linked to scrap. Hecht urges 'a means of holding *the planet* and *a place on the planet* on the same analytic plane' (2018: 112). To appropriate this observation for the discussion of scrap would be to emphasise

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[19] OECD (2016), *ibid*; EUNOMIA (2015) *Study on the Competitiveness of the EU Primary and Secondary Mineral Raw Materials Sectors*. Final Report for DG Internal Market, Industry, Entrepreneurship and SMEs. Eunomia Research & Consulting Ltd: Bristol. (Funded by the European Commission). Available at: http://www.euromines.org/files/news/ec-report-study-competitiveness-eu-primary-and-secondary-mineral-raw-materials-sectors/study-competitiveness-eu-primary-and-secondary-mrms-april2015.pdf

that recycling might have planetary benefits that are refracted through regionally differential manifestations.

Scrap's political economic regimes emerge amid changing legal arrangements around scrap which require firms to be fairly dynamic (much of this dynamism is discussed in Chapter 4). Governments might pursue an array of different types of regulation: export bans of scrap that require parts of the supply chain to reorientate from export-oriented to value-added (as seen with the scrap iron bans in Ghana and other countries of West Africa) and various environmental regulations that forbid specific activities within their borders. Such prohibitions might affect specific metals and the processes that can be performed on them - for example, lead has seen a growing body of regulations in the EU that seek to influence the ways in which it can be recycled or whether it should be phased out altogether.[20] Other prohibitions affect the circulation of specific anthropogenic stocks between countries as is the case with the Basel Convention that explicitly targets and prohibits the movement of electronic waste from developed countries to developing countries. Solar batteries are also coming under increasing scrutiny in different places around the world. Such regulations mean that parts of a scrap supply chain might need to shift, search for new locations with laxer regulations, or move technologies across borders to be able to apply new techniques in new geographies. Like in the case of waste management regimes as described by Zsuzsa Gille (2007) these changing political regimes refer to the materiality of specific scrap metals but also represent changing social and political ideologies about how people assess their environmental impact.

Companies in the scrap sector deal in different metals, and different actors perform a variety of processes, from collection, and segregation to melting, export and industrial production. This means that it is a fragmented world where actors are in competition with each other and specific regulations can benefit one group to the detriment of another. In Ghana, it is therefore a mining context that is *currently* not over-determined by any single actor or metal - making it distinct to the mining described in the large body of literature that looks at complicated corporate-community relations where the former

[20] Regulation (EC) No 1907/2006 (also known and the REACH Regulation)

overpowers the latter (e.g. Welker, 2009; Kirsch, 2014). At the same time, it is not a level playing field. Different actors make vastly different profit margins. Some are recognised by the state while others face threats of evictions. Yet the fragmentation is crucial to understand the complicated labour politics and economies that converge around the scrap sector.

Theorising the place of scrapyards

This thesis situates the macro-scale in scrapyards that are often the places in which the larger processes are refracted but also co-constituted. Scrapyards are sites in which two key problems of urban mining are acutely experienced namely that urban mining emerges amid unpredictable discard rhythms and changing political economic regimes. The response by scrap dealers to these changing currents has been to rely on diverse collection networks and assemble different discards, metals and processes into a single place to allow for flexibility vis-a-vis changing possibilities of scrap.

The vast majority of mineral resources come through large-scale, state or corporate mining.[21] These are mining contexts based on dialectic operations of capital and labour that create regimented labour conditions, consolidate capital's power that translates into political leverage and ensure that the engineering operates to make the mine predictable (e.g. Golub, 2014; Welker, 2014; Jacka, 2018). In contrast, anthropological literature on artisanal mining see it through the prism of embodied skills, communal synchronisation of labour, extended networks of middlemen, and what Robyn d'Avignon, in the context of West African gold mining, calls ritual labour combined with technological expertise (d'Avignon, 2017: 21) (e.g. Cuvelier, 2016; Rosen, 2020). Scrap mining in Ghana bears resemblance to artisanal mining in that it is similarly organised communally and requires embodied skills, while the uncertainty of its flows creates complicated moral economies.

[21] Specific metals and minerals have dispersed ASM supply chains - majority of gem stones come from artisanal mining, some twenty percent of gold, twenty percent of diamonds, and ASM represents an important contribution to supply chains to metals used in precision industries of computers and mobile phones (amid others).

Scrap collection brings to mind Anna Tsing's (2017) distinction between economies of scale and supply chain capitalism. She draws a distinction between a commodity of a rare mushroom (*matsutake*) vis-a-vis a plantation economy of sugar as described by Sidney Mintz (1985). Sugar, in Mintz's account, was an example of an economy of scale, where imperial actors, who developed plantations, calculated with precision the relationship between acreage, slave labour power and sugar output to create practices of accounting and the matching of supply and demand. Mintz's historiography is one where capitalist actors aim for growth, as their pursuit is to first increase demand and then whip workers to meet it. In the context of the *matsutake* and the supply chains that it moves through, capitalist accumulation does not progress through standardisation. The mushroom cannot be cultivated; instead individual pickers develop skills of synchronising with its whimsical growth rhythms. Their collections are translated into a standardised commodity by people further up the chain, who sort the mushroom and introduce price categories before selling it to Japanese merchants. The resultant supply chain capitalism then exists across diversity, where translation across difference is capitalism's crucial feature and source of wealth (Tsing, 2015, 62). Urban mining in some important respect requires both skill and rhythmic synchronisation with scrap flows, which gets progressively abstracted further up the chain. Tsing's account is about a luxury good where the mushroom's unpredictability does not threaten a survival of specific industries. In urban mining, industries that rely on scrap often remark on the uncertainty of collection, as they need to meet specific production quotas to ensure survival. At the same time, there is little else to do to ensure stock other than expanding and diversifying the collection networks or switching to primary metals. In a stark reminder of the real consequences for scrap livelihoods, Ghana's smelting industries occasionally express their fears over the collection of scrap and threaten to start importing iron billets for their production (Oxford Business Group, 2014).

The unpredictably of flows generates the need to develop skills of scrap collection, which entails sponsoring, locating and buying scrap. These are skills that constantly push scrap dealers to convert between different forms of capital such as political, financial and social, and in the process assemble new worlds that bring money and discards. Following Jane I. Guyer's (2004) inspiration to search for institutional regularities amid uncertainty, this thesis shows that many of the institutional arrangements that organise economic arrangements are communal.[22] This is a context where the bread and butter of scrapping everywhere - units of scrap and units of money - are entangled in communal moral economies, which act as cushions for risk, as platforms for redistribution and bestow scrap with communal value. Scrapyards are places where people dependent on different metals that each have their separate economies.

The internal fragmentation of scrapyards enables scrap dealers to explore possibilities of scrap amid change. The shifting political economies have microscopic influences on the daily lives of scrapyards, including in Ghana. Scrapyards are a shifting ground of illegalisation, criminalisation, changing technologies and environmental expertise that cluster around specific metals. For example, in Ghana's scrapyards, covert traders in solar batteries experience recurrent intimidation from the police, spend their days fearfully fidgeting atop containers that hide used items and move them breathlessly under cover of the night. At the same time, colleagues dealing in scrap cars can spend days in the open with less fear of the police, emptying acid from car batteries onto the ground, and performing strenuous dismantling tasks with chippings flying in all directions. Meanwhile, the areas where young boys burn cables attract journalist and scientists who inspect the soil or take photos to alert to the environmental dangers of electronic waste as cables and burning are used as examples of e-waste's environmental fallout.

I read scrap economy in Ghana together with Jane I. Guyer's (2016) work on platform economies and her longer scholarship on niches and marginal gains that explores market change (1997; 2004). Scrap economy in Ghana is the effect of legacy of longer history of scrap circulation, logics of scrap's value and scrapyards operations, and logistics of changing supply chains. In addition, the shared space of scrapyards is productive for the distribution of risk. Similar to the trading floor described by Zaloom (2004; 2006). Writing about risk, she theorises financial markets as 'technologies for distributing risk' (367), where 'bigger traders [like Ibrahim in the opening anecdote] cultivate their own spaces to

[22] Institutions are understood by Guyer with regards to Mary Douglas definition that 'institutions reduce uncertainty by providing a structure to everyday life' (Douglas, 1990: 3 in Guyer, 2004: 127).

create a 'neighbourhood' of risk takers that will support their deals' (376). I show that scrapyards are ultimately places in which people learn to cultivate a risk-taking self amid discarding and metal markets fluctuations (as seen in detail in Chapter 1).

Scrap's value

Anthropological studies of value have long focused on its twofold character of value: value as it relates to the exchange of gifts and commodities, and value as a worldview that informs people's understanding of what is right or good (Otto and Willerslev, 2013). Attempts at combining these two strands focus on the process of value creation (often influenced by the work of David Graeber, 2001; 2013), while anthropological fieldwork that follows commodities has permitted the study of how, together with the commodity's relocation, 'their economic and social value as well as their social and symbolic meaning change' (West 2012: 3).

Scrap's value can be thought of across different scales and from different perspectives. Previous pages traced its significance for emergent urban mining systems from the perspective of governments, international organisations and companies that seek to incorporate secondary ores to their supply chains. These actors appreciate that scrap metal is under certain conditions cheaper than primary resources, does not require risk capital[23], reduces dependency on specific supply chains, and represents the promise of sustainability. Its value (as price) is potentially cheap, and its value (as worldview) is favourable. As our scale of analysis shifts to consider the practices of labourers, who collect discards and prepare them for resale as scrap metal, scrap's value (as price) becomes worrisome, and its value (as labour) ambiguous. In the following pages, urban mine is shown not to be an automatic creation. The sheer fact that discarding happens at great volumes does not mean that those volumes are easy to capture. Ghanaian scrap dealers talk about their business as 'try and luck'. The luck signifies here that discarding in as much as it is statistically massive might seem unpredictable and competitive to the many scrap dealers involved. Who gets materials and when they get them might seem random and thus lucky.

[23] Risk capital is a capital needed to explore and develop mines (Godoy, 1985).

Scrap metal in Ghana is perceived to have monetary value even if it has lost its use value that is its physical quality for which it was originally intended (Marx, 1859). This is why owners of metal-based infrastructure (rails, electric grids, and open constructions) are aware of the need to secure it against theft and households and small businesses stockpile their metallic scrap (electronic waste such as computers or mobile phones but also metal chairs and car batteries) to convert it into money. This means that urban mines, much like other mines, must negotiate claims of ownership and scrap dealers are routinely accused of theft. Scrap's indeterminacy is shaped by the three following factors which are worth exploring in detail: it is exchangeable for money, which is why studies that focus on scrap tend ask about scrap's value and its exploration rather than waste and its management (Minter, 2013; Zimring, 2009); scrap has a communal and individual significance that is in excess of its material value; and dealing in scrap produces risks and hazards.

Scrap as money

Scrap's association with monetary value is readily appreciated by a wide range of actors, from those who generate scrap in Ghana, to those who process it, as well as those who buy it. 'If you don't have money, you don't have scrap' is an often-recited motto in scrapyards. The money one has to buy scrap is often referred to as 'capital'. The distinction between two types of money – money as cash and money as capital – is crucial for scrap dealers. This is because the amount of capital one has determines the amount of scrap one can buy and thus the amount of disposable cash (to redistribute or spend) one can make. Whether money should remain capital or circulate as cash is a crucial judgement to make vis-a-vis one's business prospects and other obligations and desires. The capital can occasionally be converted into scrap and thus represents an asset that can eventually make cash when the right customer comes. The distinction between cash and capital means that some scrap dealers might have 'capital' but no 'cash' to spend on their families - thus creating stress.

Scrap's association with monetary value is readily appreciated by everybody: those who generate scrap in Ghana, those who process it, and those who buy it. 'If you don't have capital, you don't have scrap' is an often-recited motto in scrapyards. Scrap's price tag is solidified by the London Metal Exchange (LME). It is also broadcast to scrap dealers daily by scrap metal companies. The LME is the largest futures exchange of metals, as such the prices that it sets for metals are widely adopted standard references. All scrap dealers in copper and aluminium in Ghana's scrapyards check the pendulum of the LME to inform their bargaining. The exact ways in which these prices are reflected in scrapyards is the subject of a longer discussion in Chapters 1 and 4. Most of the time, scrap is measured per unit (kilogram or pound) before being bought or sold in Ghana's scrapyards, further standardising its monetary value. Such attempts at standardisation are not free of entanglements with moral economies and cultural production: one can cheat with scrap, one can gamble with scrap, one can use it as a capital rather than as a circulating commodity. The attempts at standardisation are also not free of entanglements with identities: many Dagomba men claim to only trade in iron, while most Nigerian scrap dealers specialise in copper and aluminium. Still, the referent for these entanglements is scrap's exchangeability for cash.

Inasmuch as scrap is valued because of its exchangeability, it is equally valued for its specificity. It partakes in the practice of thesaurisation of wealth, that is, keeping wealth in multiple forms of capital and currencies (Roitman, 2004; Guyer, 2008). Importantly, the popularisation of scrap economy in Ghana has meant that scrap dealers are not the only ones who perceive scrap's convertibility to cash, but this quality is also recognised by those who generate it. As such, scrap has become a widely adopted form of capital, where a multitude of individuals and businesses makes decisions as to when and for how much it is best to sell their defunct cars, car batteries, machines or other goods. This popularisation of scrap economies has meant that scrap accumulates in people's homes and businesses like deposits in a bank. A reader in Switzerland might be bewildered to hear that a small pile of broken electronics such as a kettle, an iron, a computer, a mobile phone, often stockpiled in homes amid confusion about their proper modes of disposal, in Ghana, would not only be picked up from the doorstep by a scrap collector, but one could also receive a small amount of money in exchange for it. The way in which scrap dealers who often hail from the country's poorest regions manage to organise enough capital to sponsor such transfers to the population will be elucidated further in the thesis, and it is an important puzzle to keep in mind.

Finally, scrap is not only associated with money but with how money is earned. Different scrap metals fetch different profit margins. While it takes weeks to get enough iron to sell, copper and aluminium are bought and sold on a daily basis, meaning that they are often said to constitute 'fast money'. All these small distinctions partake in moral evaluations of the economy and entwined with ethnic groups identity-making, thus imposing ethnic boundaries in scrapyards that are otherwise multi-lingual and multiethnic.

Scrap's exchangeability for money means that it assumes significance that is in excess of its metallic significance. Through pursuing scrap economies, scrap dealers appreciate their capacity to define larger life projects. As certified by photos stored on their mobile phones, they make Christmas visits to orphanages in their home states in Nigeria to earn merit and redistribute from their business to the progress of their communities. The Dagomba people have made the scrapyards into something akin to development banks for the agricultural North, as certified by the number of money transfer points and frequent transactions between Accra and northern villages (as explained further in Chapter 3). The remittances pick up around the beginning of the rainy season (March), when rural families depend on cash from urban centres to purchase fertilisers, remunerate agricultural labour, and replenish depleting food stocks.

Scrap's risk and hazard

Scrap has different qualities as metal or a distinct commodity - scrap can move between reuse, repurposing and recycling values, which have different forms of valuation. As Brenda Chalfin (2019) points out while engaging with Caitlin Zaloom's (2004) scholarship on risk, waste work is 'speculative rather than directly productive'. Similar things might be said about scrap. There are a number of risks associated with dealing with scrap and bearing those risks falls on the shoulders of scrap dealers. Scrapyards as chapter 1 shows are effectively created to manage the financial risk and many of the chapters show that scrap dealers are encumbered with the requirement to manage financial risk - that is think about the future value of goods, estimate the value in the context of changing prices, and decide when and how to make profit. The managing of such risk thus becomes an unexpected new challenge for urban miners.

The ability to explore scrap's value and hedge risks is linked to the existence of multiple markets for spare parts: markets for metals for artisanal production, and (inter)national markets for metals for industrial uses. This is where the urban mining's urbanity is crucial as the networked character of cities and their importance as hubs means that any single product can be plugged into different markets or have different customers. This is often done through movement between markets and movement to find goods. Clipperton C. Mavhunga writes that mobility in space is often a crucial part of innovation in the African contexts, where 'the republic of absence ushers in a republic of mobility, whereby the most powerful technology for exercising one's democratic choices is the ability to move and make through moving' (Mavhunga, 2014: 98). The following pages show scrap dealers use multiple forms of capital such as political and social to locate and obtain scrap or to find markets for its demand. And their attempts to navigate these worlds. Simone's (2001) analytic of 'worlding' captures African urban space as "fundamentally in contact with an elsewhere" (Mbembe and Nuttall, 2004: 351) and reaching beyond the rural-urban scales that is otherwise often revisited in continental literatures. Worlding is simultaneously the state of being 'cast out' (Simone, 2001: 22) into the world as a marginal subject that lacks the autonomy to define socio-economic integration and that of engaging with the city as a resource to formulate global connections. These two meanings are necessarily entwined: to experiment is to take risk; to cultivate an entrepreneurial openness to the world brings precarity understood as being exposed to eventfulness from afar. African cities are characterised by the "seemingly arbitrary circulation of the unknown" (*ibid* 17) with regards to what works for making a livelihood.

In addition, the speculation and risk are partly due to product design. Scrapyards are places where planned obsolescence, cheap products with limited life-spans, and the privileging of propriety over modularity in product design create their own possibilities or foreclosures of social mobility. Planned obsolescence and limited life-spans mean that products are designed not to last and as such the preservation of their value by reuse becomes difficult. Modularity versus property in design (explored further in Chapter 5) is a condition for the existence of spare parts markets. Modularity is when machines can be disassembled into parts by anyone and different parts are substitutable across machines (making it akin to a Lego brick) and propriety is when products are designed so as to prevent them from being disassembled into parts (Apple products or Tesla cars are perfect examples for the latter as all its constitutive parts vary over generations of products and cannot be used for other brands). These tweaks of design have their spillover effects in scrapyards where they influence possibilities for repurposing and repair.

Finally, scrap is a hazard that affects bodies and environments. Karg Kama (2015) argues that e-waste (the same logic can be extended to scrap) brings two opposite assessments - the 'logic of hazard' and the 'logic of resource', which according to the author are complementary in that they allow the enclosure of waste. These two qualities are present at the same time (as emphasised by Corwin, 2019). However, their footprint as a hazard is unequally distributed. Scrap dealers expose their bodies to pollution and toxins that get released during separation of scrap (Little, 2019), while specific communities contain these exposures within their communal frontiers. The urbanity of the scrap economy means that these toxic entanglements always create the possibilities of a spill over that affects communities beyond the perimeter. The urbanity also means that such forms of entanglements with toxins and pollution are 'in the open' for anyone to see meaning that these are specifically 'charismatic' forms of environmental fallout. Indeed, many scrapyards can be pinpointed on the urban map by the black plume of fumes hovering above them. Chapter 2 explores these specific hazards and their entanglements with bodies and communities and their uneven distributions within scrapyards. Chapter 5 explores how the fragmented worlds of scrap posit distinct challenges to pinpoint and distribute responsibility for scrap's environmental fallout.

Methodology

I followed scrap metal across its urban landscapes in Ghana to bring to light its connection to urban processes and the obscured links between scrapyards and the various sites of demand and supply. I interviewed people across scrap-worlds: people who work in scrapyards, employees of companies that buy from scrapyards and governmental and non-governmental actors that work to intervene in Ghana's scrap-worlds. The thesis is based on around 120 interviews and 12 months of participant observations that took place in stages - from January to August 2018 and over the summer breaks of 2017 and 2019. My knowledge of local languages of Twi and Dagbani is still incomplete and I had to occasionally rely on research assistants to help me with in-depth interviews. I had four research assistants in 2018 and 2019 — Abdallah Ibn Alhassan (for Dagbani), Faidal Rahman (for Dagbani and Hausa) and Kubura Fusheini (for Dagbani and Twi). In 2019, I worked with David Aladago, who helped me in interviews in the languages from the Frafra family and in Twi.

Through following scrap metal and its worlds, ethnic identity soon emerged as a relevant category. In scrapyards, ethnicity organises scrap economies. Following different scrap metals, I ended up doing participant observation with specific groups. Iron scrap and recycling activities inside scrapyards in Accra led me to work with Dagomba men for whom they constitute communal livelihoods. When following copper and aluminium scrap, I spent time with Nigerian migrants. Scrap dealers also self-identified through reference to ethnic identities, which in turn was solidified and made relevant through their communal lives, socio-economic contexts, and economic pursuits in cosmopolitan scrap-worlds. Ethnic identity thus functions along Fredrik Barth's (1969) argument that it is as an effect of social organisation and inter-group relations.

Ethnic boundaries were also relevant beyond scrap metals. As Dagomba men lived in the immediate vicinity of where scrap activities took place, and treated scrapyards as their social fora, it was easier for me to become attached to larger Dagomba life-worlds. By comparison, Nigerian traders worked in the more capital-intensive copper and aluminium trade. Their aspirations were usually to expand into other forms of entrepreneurship (import-export) and specialise in new commodities (spare parts, clothes, equipment). They treated scrapyards as workplaces, and would travel back to their families in better to-do parts of Accra at the end of their workdays. Many of the social activities that they engaged in displayed their entrepreneurial aspirations beyond scrap. On Sundays, many of the Nigerian men I knew would meet in regional development groups that brought together all sorts of entrepreneurs of Nigerian descent (usually Igbo and Yoruba) and a shared regional provenance. In consequence, following the trade and work activities around different metals meant interacting with representatives of different ethnic groups and becoming acquainted with different social worlds. Chapter 2 further considers the relevance of ethnicity for scrap economy and explores how far it reflects and solidifies communal and socio-economic differences.

On top of following the circulation of specific scrap metals, I also followed the life of different scrapyards (See Figure A in the Appendix for maps of different scrapyards). All scrapyards in Accra were established and controlled by Dagomba male scrap dealers, with Nigerian dealers being allowed to trade inside them. Since Dagomba men controlled scrapyards, these spaces reflected internal Dagomba politics. At the beginning of my fieldwork in 2017 and 2018, my days in Accra usually began in the scrapyard of Mortuary Road (opposite the morgue of the Korle Bu hospital) that was established in 2016 in the vicinity of Agbogbloshie following the election of the New Patriotic Party (NPP) to the Presidency and government. The bipartisan divide in Ghana maps onto Dagomba intra-ethnic conflict in which two sides – Abudu and Andani – are represented by either one of the parties – the NPP and the National Democratic Congress (NDC). Agbogbloshie has been experiencing outbursts of intra-ethnic conflict taking place around election times since 2005. Around such moments, the grassroots Dagomba members of the two parties act as leaders for the scrapyard and evict political opponents. They also occasionally extort money from the Nigerian traders, who are otherwise not threatened with evictions. Moving between scrapyards (rather than staying in Agbogbloshie alone) was crucial to understand these places' entanglements with politics and the traumas of conflict.

An additionally important aspect of carrying out fieldwork in different scrapyards was that, on some occasions, I found that I was known there prior to my arrival, as I had already been seen in

Agbogbloshie, Mortuary Road, or during communal events. A friend called the network that spans Ghana's scrapyards 'a Dagomba-wide web', emphasising the extent to which ethnicity was a relevant and present feature of scrap organisation.

As I worked between scrapyards, my days were usually timed according to the calls to prayer. Benefitting from these regular breaks, I would schedule my location changes with the times when many of my interlocutors went to the mosques that dotted scrapyards, as Dagombas tend to be Muslim. In as much as religious ceremonies and sites represent part of the life of scrapyards, they mostly feature in the following pages through their entanglements with sociality (via funerals, the celebrations of religious festivals, or the communal observance of prayers) and individuals' references to religious beliefs. The thesis does not offer a theorisation of scrap economy as it relates to Islam or Christianity (the religion of the majority of non-Dagomba traders). Although scrap dealers would self-identify as religious, I would often struggle to inquire about the relationship between their religion and work. My questions were blocked by answers such as 'my trade has nothing to do with religion' or 'religion and scrap are different'. There were many reasons why such a distinction would be made. Here are some hypothesis I reached on my own or through conversations with Dagomba men who tried to elucidate the silence: men had to occasionally cheat in scrap, which went against their religious mores; they felt that their religiousness was insufficient due to a lack of knowledge of Arabic or a lack of literacy (and they might have feared that as a researcher I could have spotted this); they combined religion with traditional beliefs (and knew that this could be frowned upon). Religious idioms nonetheless stepped into the work-life, but often in ways that were individualised. For example, specific Koranic sentences appealed to individual dealers. Both Christians and Muslims claimed to be god-fearing and thus avowed that they did not cheat others. Different men would judge the piousness of others based on how often they prayed. There was, however, no compulsion to be religious. Some of the men who appear in the following pages were attached to the rituals of prayer, while others shunned religious ceremonies. Some claimed to follow religion because of their attachment to traditions and family, while others even went as far as to become imams.

I made three trips to the second biggest city of Kumasi in late 2018 and 2019 – three weeks altogether – to interview men and women in the scrapyards of the Dagomba Line and the Frafra Market. There, I focused on talking to the representatives of the scrap dealers' associations: the Dagomba Line Scrap Dealers Association and the Progressive Scrap Dealers Association (based in the Frafra Market). Through the latter Association, I met Fiddaus Iddrisu, a female scrap dealer my age, who invited me to work alongside her. Sadly, this encounter happened late in my fieldwork, and I was not able to take her up on the offer. This means my research lacks a hands-on experience of scrap work, an experience which would have been possible in Kumasi, where many women work in the trade, and some of the workshops are out-of-sight. I also visited smaller scrapyards in Tamale and Koforidua on a one-off basis.

Most of the research however took place in Accra, where scrap-worlds are dominated by Dagomba men with Nigerian men focusing on the less voluminous non-ferrous trade. There are individual scrap dealers who are women in Accra, but their numbers were few. Scrapyards are not the sole economic sectors in Ghana to be de facto defined by gender segregation (see Clark, 1994; Chalfin, 2004), but they are nevertheless not explicitly segregated. Many of the scrap dealer women that I met suggested that they did not face discrimination or ostracism, rather they had to negotiate the strenuous nature of scrap activities and learn scrap skills without having a network of 'brothers' to come to their aid. Scrapyards in Accra were masculine spaces, but not closed to women's attempts at being included. During my fieldwork, I occasionally engaged in more masculine forms of socialising such as teasing, and the sharper my wit become, the more control I felt over social interactions.

Scrapyards are divided into workshops, and individual scrap dealers are differentiated with regards to money, seniority, education, piety or life choices. Almost every scrap dealer mentioned in the following chapters had their own reaction to my presence. To some I was wealthy, to others I was poor (I had two scrap dealers in Agbogbloshie go so far as 'dash' me money). Some saw me as impressive due to my academic pursuits, while others thought that I must be committing an error by delaying having children. Some admired me for my knowledge about scrap-worlds in Ghana, while others thought I was silly for not monetising that knowledge and entering into business deals with them ('you should trade with me!'). I was viewed as a woman unable to perform certain scrap work activities, but I would always be invited into the male section of funerals, naming ceremonies and weddings (which differentiated me considerably from Ghanaian women). Some knew about me through my previous research on party politics and community engagement around children's issues, while to others I was initially (and perhaps remained) a confusing presence.

As a function of these differences, some men wanted to talk to me for hours on end and did not mind my presence in their workshops, while others would be suspicious of my questions. Over the duration of my fieldwork, my access grew. I was able to expand beyond the circle of men that took an initial liking to me. The eventual expansion of my research participants base was indebted to the scrapyard's sociality even amid the internal differentiations delineated above. The scrap dealers would talk about me to each other, and this would often result in raising my credentials. I also grew knowledgeable about scrap and its contexts, which meant that my questions alone would suggest that I was – as Ghanaians would put it – 'serious' or 'trying'.

Finally, I followed the links from the scrapyards to international smelting and export companies. Much of Chapter 4 ('From the scrapyards to the world') is dedicated to scratching the surface of how this wider world works and creates connections with scrap workers. Interviews in the company setting were particularly challenging. The smelting and export companies represent a hodgepodge of international actors. All of the companies were run by managers from Central Europe, the Middle East and Asia. Only one of the companies (an exporter of non-ferrous metals) granted me an opportunity to conduct a participant observation in 2018. This resulted in two weeks of observation along Pakistani and Indian scrap dealers. On the first day, I received a portable telescopic magnetic pickup from the men who christened me a 'real scrap dealer'. This was a fascinating time in which I would see my friends from Agbogbloshie and other scrapyards engaging in boisterous bargaining and a dance of cheating with the buying company. My two weeks at the company were soon over and the manager suggested that he could get into trouble with 'Dubai', the location of the company's headquarter, as it turns out he had not consulted with them whether I can be present at the company for my fieldwork. The workers still contacted me afterwards but there was a slight distance between us. The material in Chapter 4 refers to the fieldwork in as far as it was allowed by a regional manager.

Thereafter, my luck with the smelting and export companies was in short supply. Ghana's scrap economy has the feel of a gold rush, as various people encouraged by media reports about e-waste flood into the country to establish export of metals. I might have been occasionally perceived as a corporate spy - wanting to get information in order to convert it into a market advantage of my own. In the end, I learnt about this secretive world from various people at the edges of the corporate world. I pieced together information from the employees who were willing to grant me extended interviews. I was able to interview Ghanaian agents working for smelting industries. Finally, I learnt about international metal circulation from the Ghanaian scrap exporters, who were squeezed out of the market by their foreign competitors and wanted to talk to me about their biographies, businesses and grievances.

To understand the nature of state and international intervention into scrapyards and then capture these spaces into new forms of policymaking about urban mining, I also conducted interviews with government agencies in Ghana and international organisations. In early 2018, for a month, I also did participant observation in Green Advocacy - the main NGO that worked to diagnose the extent of the 'e-waste' problem in Agbogbloshie and heralded green interventions into the economy. Finally, I worked as a consultant for the GIZ (the German Development Agency) on two consulting projects. This experience afforded me a perspective on scrap economies as sites of non-governmental and governmental intervention and informed discussions in Chapter 5. My work for GIZ has led to my attendance to conferences and workshops on 'circular economies of strategic metals', which inform my analysis of the different political significance of urban mining. I restrain my incorporation of the GIZ fieldwork *per se* into the writing as the project is ongoing and rather limit myself to the analysis of the ideological scaffolding that has driven the project at the planning stage.

Structure of the thesis

The thesis is divided into three parts that look at specific actors and their sites. Chapter 1 takes the reader through the processes of collection. It shows the wider economies that produce scrap and how they are reflected in the scrapyards. Chapter 2 and 3 take a detailed look inside scrapyards. The focus is to show how scrapyards are constituted along urban processes and cosmopolitan encounters. The following chapters take the reader beyond scrapyards to consider wider worlds of scrap and Ghana's place in the globalisation of urban mining. Chapter 4 focus on companies that buy scrap from collection networks and scrapyards. Finally, Chapter 5 zooms out to look at a wider array of actors - governments, NGOs, and international organisations - as they seek to define scrap economies and politics vis-a-vis resource management challenges.

Collection Networks

Chapter 1 ('Inversions of the economy: scrap, money and uncertainty') shows how scrap has become articulated as a resource (rather than waste) and why its prices have soared over time. I focus on the operations of scrap collection and its correlation with the dynamics of the wider economy. Everyday scrap collectors in Ghana pursue their expansive sweep of the country's metallic waste. The collection calls for cash to buy scrap from households, government institutions, and businesses that generate it; there is thus a need for the financing of scrap collection. Through rendering scrap dealers' experience of 'try and luck business' as the suspenseful process of matching money to find it is often dubbed, I show some of the effects of the blurriness of waste and wealth: scrap is easier to locate than to collect; scrap dealers not only dispose of people's waste but also share with them potential profits; and the centrality of trust associated with exchanging credit and debt to sponsor collection challenges presumptions linked to the disposability of labour. I also show how this wealth-waste creates new evaluations of money: ghost money, fast money, 'spoiling money' and specific labour regimes that are based on work for profit margins (rather than wages) and associated stresses of being disciplined by money.

Inside scrapyards

Chapter 2 ('Scrapyards: cosmopolitan encounters and informal spaces') argues that urban mining is shaped by fights over urban land and habitat and cosmopolitan encounters (as an iteration of 'mining encounters') between migrants coming from different geographies, classes, and linguistic backgrounds, and other actors. I show that scrapyards in Ghana are insertions onto the urban map and are concomitant with fights for land and habitat. All scrapyards operate on a contested urban land. As such, urban mining cannot be subtracted from larger processes of urbanisation without industrialisation and the emergence of squatter communities. I argue that these create a continuum of scrapping and squatting that articulate unique financial stressors and body burdens. The chapter shows that the continuum is unevenly refracted through ethnic distinction in scrapyards. The entanglements between ethnicity and position in scrap economy organise recycling processes, infrastructures of capital, and communal care and redistribution within ethnic hierarchies. Ghana's scrapyards are therefore defined by both the nature of urban processes and historical changes that have affected different ethnic groups over time, making them into microcosms of urban and regional transformations.

Chapter 3 ('Circular Livelihoods: intimate portrait of Agbogbloshie') focuses on the interconnection between Dagomba ethnicity and the scrap economy. The Dagomba migrants from the country's north have experienced multiple forms of precarity linked to the viability of subsistence agriculture in the north and intra-ethnic conflict. They have forged the scrapyard of Agbogbloshie (and Dagomba Line) which are key places of the scrap trade in Ghana. As scrap is dubbed the 'economy for the illiterates' and Agbogbloshie a site for communal development, I look at the intersection between community and commodity. I argue that scrap economy is seen as a means to address problems of the north leading to 'circular livelihoods' that assemble subsistence agriculture and urban scrap economies. Such livelihoods are expressed together in idiom and agricultural metaphors.

Global entanglements

Chapter 4 ('Connecting scrapyards to demand: business partnerships and labour organising') shows the distinct globalisation of urban mining through connections between scrapyards and companies that buy their metals. It sheds a light on why companies buy scrap in Ghana and who these actors are. On the one hand, this is a dynamic world based on the flexibility of companies to buy and operate without taking considerable financial risks (making their work widely different to that of traditional mining that is based on geo-spatial fixity). On the other hand, it is a context of industrial interests. I show how metal buying companies work with scrap dealers to transform the ubiquity of scrap into a material profit for themselves. Ghana's scrap-world encounters between companies and scrap dealers create two dynamics: networks and business partnerships. The companies rely on the networks of scrap dealers who perform scrap collection, segregation, pre-recycling, and bulking, and they enter 'business partnerships' with individual scrap dealers who translate and convert the commodity from networks to commodity for companies. The individual scrap dealers who translate between networks and companies meanwhile think of their relationship with the companies as 'business partnership'. These 'partnerships' are relationships that are personalised, cultivated, multiple, aspirational, and variously fleeting. In this context, 'workforce of scrapyards' as a cohesive interest group neglect the decades-long challenges by scrap dealers of creating a labour movement in such a dynamic world of networks and partnerships.

Chapter 5 ('Politics of e-waste: dumping and strategic metals') focuses on the importance of e-waste as constituted by questions of technological access, hazard and resources. Scrap's material ambiguity comes from its divergent life-cycles: scrap can be channeled into spare parts markets, metal markets, or perceived through its toxic footprint. Such ambiguity results in its interpretational ambiguity, which creates the politics of scrap and e-waste in particular. I show that interventions spearheaded by European and international development agencies into Ghana's scrap worlds focus narrowly on e-waste. I argue that such a focus is expressive of changing concerns about resource management and the responsibility of electronics' producers that characterise debates in European and international agencies. Emergent solutions to e-waste that seek to reshape scrapyards in Ghana create alignments between European Union strategies of access to 'strategic metals' and corporate notions of circular economy based on increasing their power over how consumers engage with their products. Images of 'e-waste dumpsites' contribute here to the alignments between technological change and strategic resources that foreclose scrap livelihoods. 'E-waste' is shown as relevant for bringing Ghana's scrap-worlds into the fold of developmental thinking and resource concerns in the Global North. Because developmental institutions have had the greatest power - through finance and impression of change on the Ghanaian government that adopted European-style electronic waste legislation - these forces are likely to shape the future of scrapyards. The last chapter thus acts as an invitation to deconstruct a specific manner of thinking about resources and consider its potential future consequences with regards to the livelihoods of urban miners.

The dissertation's *Conclusion* brings together some of the unique challenges of scrap-worlds and the workers caught up in these fragmented contexts.

Collection Networks

Chapter 1 - Inversions of the economy: scrap, money and uncertainty

This chapter looks at the infrastructure that brings scrap to the scrapyards. This infrastructure comprises of an extensive collection network that covers the whole of Ghana and the financial arrangements between scrap dealers that sponsor the collection. The scrapyards are thus places of network convergence. They create platforms for capital to trickle down between capital-intensive collection of scrap from companies and government agencies and the daily routines that scrap dealers call a 'try and luck business'. The collection of scrap around Ghana from households, businesses and government agencies is a speculative process, since collectors incur the risk of overestimating scrap's value or, on the contrary, earning money so fast that they struggle to evaluate such gains vis-à-vis existent value regimes that praise hard work (cf. High 2013). Through collection they also expose themselves to theft and police harassment. Like in financial markets, the risks associated with collection are partly a burden for individual collectors and partly distributed within scrapyards. Those who exchange scrap for money operate measuring scales and work to have enough capital to ensure the market's liquidity. Meanwhile, scrap dealers with extensive experience in the business learn to be able to estimate scrap's use value[24] and how to price it. Together they ensure that scrap can always represent two potential values: exchange value[25] and use value.

In as much as this chapter is about the operations of scrap markets, it is also about the communal arrangements and moral excess related to conversions between scrap and money that take place across ethnic lines and value regimes. Ghana's scrap collection exemplifies AbdouMaliq Simone's (2004; 2012) notion of *people as infrastructure*. This concept is characterised by a radical openness of infrastructures to human invention and reinvention as well as their ability to expend people's capacities by requiring them to stay hyperaware of their surroundings, engage in daily interactions with potential antagonists, and

[24] A metallic discard might contain spare parts that can be sold per item.

[25] A unit of a specific scrap metal such as iron is exchanged for a set amount of money.

negotiate between regularity and improvisation. Scrap economy is open to newcomers, which confirms its flexibility to adding new people. Even if only 'brothers' or elective relations are integrated into scrapyards by mentors and given a training, anyone else can also bring their finds to scrapyards and earn money in exchange. Such openness creates a growing competition that is expressed in mounting scrap prices across the economy (see Figure 1.1). While discarding public benefits from such competition as it is able to ask higher prices for metallic waste that it generates, financial infrastructure within scrapyards and scrap collectors incur ever greater risk of losing money due to over-estimation.

As argued by Jane I. Guyer, conversion and its complexities are mundane categories in African social history, as they partake in the 'regular practice of linking disjunctive value registers' (2002: 51). Scrapyards are meeting points of different ethnic groups, individual and communal value judgements, and operations of power between generation, gender and political status. Conversions create the basis for frictions and negotiations that mean scrap and money are entangled with communal processes, migrant life-worlds, and individual projects. This chapter explores a discipline by money in which people measure their expenditures of energy, relations to others, and morality by reference to money and the heterogenous forms of its generation.

The chapter is divided into two parts. The first part explores scrapyards as meeting points for heterogenous ways of making money and the trickle-down effects these create. It also shows that scrapyards are places that are both 'inversions of the marketplace' (Chalfin, 2019: 507) and of the country's economy at large. I show how scrap economy unites capital-intensive operations and hand-to-mouth entrepreneurship. The second part of the chapter looks at the moral excess of conversions between scrap and money in the context of collection risks and challenges to social trust. I draw attention to the racial, ethnic, and gendered conjunctions in literatures that build on and go beyond the 'social life of things' (Appadurai, 1986) to suggest that the identity of the people who partake in exchange is crucial to the negotiations that take place (Tsing, 2018). In that sense, economic value is not only a result of judgement by subjects about specific property of objects, but also judgement by subjects about others.

Metal (1 kg) / Place	Agbogbloshie (Accra)	Frafra Market (Kumasi)	Wtórstal (Poland)	Groupe Barec (Switzerland)	Greengate Metals (UK)
Copper	4.22	4.22	5	3.99	4.88
Aluminum	1.46	1.46	1.06	0.2-0.54	0.44
Iron	0.18	0.2	0.16	0.056	0.16

Figure 1.1 A comparison of prices between Ghanaian scrapyards and firms buying scrap in Europe (Poland, UK, and Switzerland) in July 2019.[26]

Scales of scrap collection

Ghana's scrap economies have always relied on two forms of collection of scrap that were crucial to the generation of money: metallic waste from households and shops, and waste from industries and government agencies. These two forms of collection create different returns on capital. Buying and selling small quantities of scrap from businesses and households fetches profit margins capable of supporting individuals and – if pursued with a level of commitment and luck – supporting extended families. Large scrap contracts bring substantial profit margins and become a path to 'big man' (and in limited cases 'big woman') status. Such capital can be invested into bulk buying inside scrapyards, which entails keeping a scale and buying small increments of metals. It can alternatively be used to establish capital-intensive spare parts shops and machine rentals. Scrapyards are thus highly heterogenous spaces uniting people that run on capital of five digits and more, and those whose 'working capital' is in tens of cedis, or who earn 'hand-to-mouth'. These inequalities shape status and self-perception and inform paths for mobility. They also contribute to assessments of people's masculinity and generational status.

[26] I chose companies that buy scrap from small collectors. All prices are for 1 kilogram of metal. Since prices in Ghana's scrap markets do not necessarily make a distinction between type of metal (e.g. copper milberry or new copper), indeed often scrap dealers sell their goods bundled up, I used the prices for the lowest quality metal from European companies. Some companies in Europe change prices based on the quantity of goods supplied, again I follow the price for the lowest quantities. All prices are given in USD.

Capital-intensive value chains

To understand the beginnings of capital-intensive value chains, one must venture to the Gallaway Market in Accra, one of Ghana's oldest spare parts and scrap market. While the majority of scrap dealers in scrapyards like Agbogbloshie and Mortuary Road are Dagomba men who came to Accra in the 1990s, the pioneers of the trade are Hausa speakers who operate from the Gallaway Market. The market was established in the colonial-era first as part of Katamanto market, dedicated to imported goods, and next as a specialised market in spare parts. The market is located next to the rails that since the 1970s connected Accra to the port of Tema. Now the rails are no longer in operation, and indeed some of them were sold for scrap.

Today's Gallaway consists of not much more than three-lanes of stands, and is squeezed between the Timber Market and the squatter settlements around the Korle Lagoon that are also the location of Agbogbloshie. Most of the vendors are in their forties and older and their trade is capital intensive and requires technical skills. Like other scrap-related markets, here too the economic activities are paced by calls for prayer from the local mosques that take prominent space in between the stores. Gallaway is a fascinating testimony to the country's small-scale and context-appropriate technological innovation. Different shops specialise in spare parts and machines for agricultural and artisanal mining. Local engineers are able to make custom-made technologies such as fufu makers[27] or mini-dredgers for artisanal miners. Some of the engineering skills come from formal training, others from small-scale innovation and vocational learning, and yet others are a spill over from the country's large-scale industrialisation, as some men worked in industries like Valco or Sanyo[28].

The Gallaway Market developed side by side Ghana's industrialisation. Part of its stock would come from 'cleaning industries': when factories refurbished or closed down, men from the market would be hired to dismantle them for spare parts and scrap. A subtle divide informed such operations. Hausa speakers specialised in machine parts, while Zaberma migrants from Niger recuperated iron rods from

[27] Fufu is a staple food in Ghana that is made from pounded cassava or plantain.

[28] The Japanese electronics company Sanyo had a branch in Ghana in the 1970s and 1980s.

buildings for re-sale – a strenuous job that requires hammering concrete walls to separate iron supports from the slab. The effects of these early specialisations still define communal market niches in the Gallaway.

Steel (as well as aluminium and copper) are metals of industrialisation. Ghana needed steel to make good on Nkrumah's wishes to develop value-added industries of tyres, construct infrastructure, and expand the electric grid. Ghana's industrialisation drive established, among others, the Kwame Nkrumah Steel Works in Tema as part of the Seven Year Development Plan (1963-70). The planned capacity was to produce 30,000 tons of steel relying in part on domestically assured scrap that Karssowski judges made the mill 'commercially viable' (1974: 87). According to vendors at the Gallaway, their fathers added scrap collection to their business after the representatives from the Steel Works enlisted their collection efforts. Gallaway thus united a market that focused on up-cycling scrap through repair and recycling through selling scrap to industries. Tema Steel, however, became inoperative soon after its opening, which meant that its reliance on scrap from markets in the 1960s was short-lived and only lasted until around the early 1980s. Soon thereafter steel began lingering in the country's waste-sites.

Ghana's industrialisation dates back to the last decade of colonialism. After the Second World War, Britain was under pressure from its subjects to invest in the development of its colonies (Cooper, 2002). The British administration in Ghana allowed for the organisation of democratic elections to choose members of the Legislative Assembly from Ghanaian parties under universal suffrage. The Legislative Assembly launched on a mission to upgrade Ghana's transport infrastructure and build the Volta River Dam. The Assembly announced the First Five Year Development plan in 1951 followed by a three-year Consolidation Plan in 1957. Kwame Nkrumah, Ghana's President at the dawn of Independence in 1957, introduced two more development plans in 1959 and 1964. They fit within the larger programme of Work and Happiness announced by his Convention People's Party (CPP) in 1962. Nkrumah's wish was to limit trade dependence on the West. The first (Five Year) Plan thus followed a 'shopping list' approach, whereby priority was given to the development of industries that would permit long-term trade independence, while relying on foreign investment to kickstart the process. Foreign companies were granted tax holidays and liberal provisions for the repatriation of profits (Gocking, 2005: 120). W. Arthur Lewis – Noble-prize laureate in 1979 – was appointed as Ghana's economic advisor. Upon assuming his role, he anticipated that a hundred new factories would be opened in Ghana as part of the first Five Year Plan. The eventual number was more modest, while the number of working-class people employed in industries reached 304,000 in 1960 (Gocking, 2005: 121). Among the industries that were established were factories making sugar, textiles, insecticides, bricks, processing milk, and canning tomatoes and mangos, as well as a steel mill and a vehicle assembly plant.

The second (Seven Year) Plan was far more ambitious and promised to bring about 'an intensive socialist reconstruction of [the] country' to dispel the 'dark clouds of neocolonialism [that] are fast gathering all over Africa' (Nkrumah, 1962: 185-6). The Plan's aim was to finish the Volta River Project, open the Kwame Nkrumah Steel Works in Tema, extend the Tema Harbour, complete an aluminium smelter in Accra, expand rubber production, open a ship repair yard, and complete the Accra-Tema freeway. Most of these projects were underway or completed before the coup of Kwame Nkrumah's government in 1966. In his later writings, Nkrumah called the Volta Dam the greatest of all developments, and referred to the aluminium smelter built in partnership with the American Kaiser Industries as symbolic of his government's plan to give Ghanaians control over the whole process of production – in this case, aluminium production from the national repositories of bauxite through to the value-adding in smelters that transforms it into aluminium (Nkrumah, 1967). The two projects were interlinked, as the prospect of a large-scale export economy of aluminium required the building of the Dam to permit sufficient electricity generation (Gocking, 2005: 119).

Industrialisation was rapid and sometimes unplanned, especially when it came to foreign investors exploiting opportunities to dump faulty or excess machinery in the county. For example, the outfitting of the textile mill was supplied with a faulty machine that had already been discontinued in France due to mechanical defects (Krassowski, 1974). The Komenda Sugar Factory financed and supplied by Czechoslovakia opened in 1967 (Whitfield, 2018). Yugoslavian credits were used to open three canning factories for pineapples in Nswam, mangos and tomatoes in Wenchi, and tomato at Pwalugu. The feasibility of these factories was poorly studied. The mango factory's output was assumed to be double of the mango's world trade at the time, and the assumed capacity of the tomato canneries was enough to meet the total domestic demand (Krassowski, 1974; Killick, 2010).

The early industrial drive carried forward to 1970. The total employment in the manufacturing sector increased by 90 percent between 1962 and 1970 (Ackah, Adjasi, Turkson, 2016). Following the coup that toppled Nkrumah's government, the 1970s continued being tumultuous, characterised by other coups that led to frequent policy reversals with regards to trade and currency control. By the end of 1970s, Ghana lacked foreign currency to import needed raw materials and spare parts to keep the industries running (*ibid*).

The situation in the country stabilised again in the 1980s, when General J.J. Rawlings assumed power following his second coup d'état. In 1982, he founded the Provisional National Defence Council (PNDC), which was the name of the Ghanaian government under his leadership. The industrial sector's contribution to the GDP decreased from around 20% in 1970 to 11% in 1984 (World Bank, 1985). J.J. Rawlings launched the first Economic Recovery Programme (ERP) in 1983. It was informed by the conditions of a recent IMF loan and thus followed the dictum of austerity which required lowering industrial subsidies. In 1986, J.J. Rawlings introduced a second ERP. The main concerns of this second attempt to 'restructure the economy' included divestment from thirty-two companies in the agricultural and industrial sectors. Simultaneously, the government invested in upgrading road infrastructure and extending the electrification of the country through the Electricity Company of Ghana (ECG) and the Volta River Authority (VRA), which recorded the highest growth rate of all industrial sectors in the 1980s. The ERP argued for the development of appropriate technologies for the small and medium-scale manufacturing sectors and for divesting from the large-scale industries of the Nkrumah period. As a result, the industrial sector growth eventually declined in 1980s and 1990s and iron smelting companies were only revived in the mid-1990s due to growth in construction and mining (Ackah, Adjasi, Turkson, 2016). Ghana transitioned into a democracy in the 1990s. 2001 marked a peaceful government transition which opened the country to foreign investment. The industries then faced a new set of problems coming from trade liberalisation, especially with the flooding of cheap goods from Asian markets, as Ghana signed trade agreements with China in 2003 under the Kufuor administration.

These industrial histories have their unexpected interlinkages with the dynamics of scrap economies in Ghana. These are explored in this chapter through the life histories of two of my interlocutors: Boniface Amandi and Alhaji Karim. The two men are figures that shaped scrap economies in Ghana and have become so famous that one cannot help but keep stumbling upon their names. They have also assembled, at one point or another, the most significant fortunes in the scrap world.

Boniface Amandi

Amandi came to adulthood in the mid-1970s. Ghana had by then lived through two independence-era governments – Kwame Nkrumah's and Kofi Abrefa Busia's – and was at the time moving from one military government to another, both of which had been slowly sinking the economy. Similarly to many of his contemporaries, Amandi had quit school at fifteen to enter a job market defined by high unemployment. He began roaming the streets until he stumbled upon Hausa speaking men making aluminium pots. As Amandi explained to me: 'it was fascinating to me as a young man to see a black man producing pots.' He initially wanted to join these men, but they would not allow him, considering their craft a privileged skill. His account dramatised the encounter: 'they threw stones at me.' Amandi says he had grown 'obsessed' with finding aluminium to sell to the craftsmen. The time of Kwame Nkrumah was marked by busy post-independence re-invention. Amandi's search for sources of aluminium in the 1970s led him to the industrial waste site of Kaiser Industries. Initially, he stole from the company's premises, and later introduced himself and entered a contract for the buying of its waste: aluminium dross. The then Kaiser Industries (present-day VALCO) helped Amandi establish business partnerships in Europe. Soon, Amandi was exporting scrap metal to Europe and opening offices in different parts of Accra, including near today's Agbogbloshie. As his capital increased, his business grew ever hungrier. He mobilised collectors from whom he would buy nonferrous metals for export, and stockpiled iron for the future. When in mid-1990s Tema Steel was bought by Indian businessmen, Amandi sold them more than 5,000 tons of iron on credit that they paid over the course of the next year, a proverbial grist to the mill. The opening of Tema Steel increased the demand for the country's most available scrap metal – iron – and thus increased the demand of scrap labour that would collect it and sell it to the company.

Alhaji Karim

Alhaji Karim was a scrap dealer who made his money by selling iron to Amandi. His biggest contract in the mid-1990s was for scrap from industries affected by the 1980s and 1990s IMF-conditioned structural adjustment. Alhaji Karim put Azanda, a fellow Dagomba, in charge of manning his growing mountain of scrap. Azanda at the time did not have much capital and relied on the daily collection of scrap to convert for cash. Azanda mobilised many of his fellow Dagombas to follow in his footsteps in collecting scrap and selling it to big men like Alhaji Karim and Boniface Amandi. Agbogbloshie is affectively referred to as 'Azanda's place' among migrants from the North who followed in Azanda's footsteps by coming to Accra with no capital of their own but with a willingness to dedicate their days to the labour of scrap collection.

By the time I met Alhaji Karim in late 2018, he was spending most of his time either on a motorcycle between scrap markets or in Dzowrulu, a scrapyard under the Ghana Electricity cable highway, next to one of Accra's main arteries, the Accra-Tema Motorway. When I called him on the phone to schedule a meeting, he announced with a certain grandeur: 'I will tell you my story.' Arriving to Dzowrulu, I learnt that people were aware of Alhaji Karim's presence and every move: 'he's in a chop bar'. Indeed, there he was, straight from a flight from the northern city of Tamale, sitting at a table and eating from a large bowl of fufu. Alhaji Karim is a man in his fifties, characterised by boundless energy and leading a life on the move. Once in his open-air 'office' buzzing from the electricity passing above us, Alhaji told his story. When asked about 'e-waste dumping in Ghana', Alhaji's voice rose in indignation: 'they don't know! There is no logical reason for scrap in Ghana. I bought it all out already (…) As for whatever remains, it is for the lucky.'

Upon further questioning, Alhaji argued that what he actually meant is that all of the companies that remain can only produce small amounts of scarp. This was not the only condemnation of the scrap economy's ascending difficulties that I heard during interviews. His list of scrap success ran long, and his conclusion suggested that not much remains:

'I bought Asutsuare and Komenda Sugar Factories, they were 500 metric tons each. The Mango canning company in Wenchi was 1000 metric tons. Ghana Harbour is 3000 metric tons. There is no company in Ghana that can produce more than 2000 metric tons of scrap at the moment. We already dismantled all the tonnage in Ghana. Chop all finish. Today people are hungry for scrap.'

All of the industries mentioned by Alhaji Karim were core to Nkrumah's ideology of import substitution and value-adding in exports, and were ultimately part of his fight against 'neo-colonialism'. The Komenda Sugar Factory, for example, was to use the sugar cane that grows in Ghana, refine it, and add value to the imports.

As I later compiled the list of the wealthiest scrap dealers, some would point to specific industries that they scrapped in the last decades, such as the African division of the Sanyo factory, which opened shortly after Kwame Nkrumah's overthrow and had been finally scrapped in 2006. Another scrap dealer based in Agbogbloshie bought some of the production lines of the Ghana Textile and Manufacturing Company (GTP) after it had to strip down production due to competition from China. Another one based in Kumasi bought some of the production lines of the Bonsa Tyre Company - a brainchild of Nkrumah's import substitution plan. The Bonsa was using rubber coming from Ghana's Western Region to produce tyres for local and international markets. The beginnings of the media-famous scrapyard of Agbogbloshie is related to Alhaji Karim buying scrap (in partnership with Azanda) from a bridge that collapsed in the late 1980s. The amount of scrap required them to search for new spaces for the resultant scrap. They informally arranged to take over the area opposite today's Agbogbloshie, which with time spread to englobe the scope of today's scrapyard.

These days, in response to questions about the provenance of their scrap, the scrap trade's big men tend to respond: 'the ECG and the VRA' – the Electricity Company of Ghana and the Volta River Authority. Both are government-run companies. The VRA is a generator and the main supplier of electricity in Ghana, while the ECG is the main distributor. The companies replace decaying infrastructure to keep the country powered and organise tenders to sell off old cables and transformers. In addition, around twice a year Ghana's biggest industrial plant, the government-owned aluminium smelter Volta Aluminium Company (VALCO), organises tenders to sell its own waste. These are high tonnage purchases that infuse the trade with capital that is distributed across scrapyards. Indeed, the big men are often mindful of spreading their purchases across scrapyards to allow different people to 'chop' (or make money) from these deals. The big purchases are also investments that require scrap dealers with different portfolios and levels of capital to come together. The risk is shared and so are the gains. To take the opening anecdote of the thesis as an example, Ibrahim bought almost all of the scrap from his own budget, except that some 5000 GHS was provided by Shaibu, a scrap dealer who operates an iron scale in Mortuary Road. The profit that Shaibu made was re-invested to ensure daily liquidity at the scale. One of the men whom he hired to perform the dismantling was another Ibrahim, a soft-spoken man, whose narrow specialisation was in office chairs and scrap collection. The latter Ibrahim's participation in the work created a small capital that he could fuel into his own small-scale scrap collection that would bring occasional car batteries and aluminium cables into the yard.

Inversions of marketplace

The scrap trade in Ghana underwent an enormous change around the 1990s. At first, the senior scrap dealers would get scrap from industries, while the competition for collection of other metals was small. Newcomers to the economy in the late 1980s and early 1990s viewed iron scrap as a common metal that one could pick up from landfills. The notion that iron had exchange value had not yet taken root and as such it would be thrown out or abandoned as waste and not yet enclosed, it did not magnetise competition over its value making. It was thus slowly moving from its status as a common to a commodity (Gidawni 2012). The situation changed as more scrap dealers started coming to Accra due to a series of localised ethnic conflicts in the North in the 1990s that coincided with the collapse of agriculture. Scrap became scarce, commodified, and enclosed.

In parallel, Ghana's economy had opened to imports and relied heavily on second-hand goods from the Global North to access technologies (see Amoyaw-Osei et al., 2011). Previous academic research on second-hand clothing imports in African contexts focused on the effects of cheap clothes on home grown clothing industries and production of new market opportunities and risks for sellers (Hansen, 2000; Brooks, 2015). Arguments also explored how second-hand imports partake in the construction of identities (Burke, 1996; Ferguson, 2006; Newell, 2012). Meanwhile, imports of second-hand cars (Verrips and Meyer, 1999) or computers (Burrell, 2012) to Ghana opened questions about reverse engineering, repair cultures, and forms of repurposing of imports to fit local needs. In the following, I would instead like to focus on the specific 'inverse' political economies that such imports create. Second-hand products importers and sellers of second-hand goods are engaged in two economic struggles: the first to ensure that faulty products are not dumped on them and the second to make sure that machines that are broken or unsellable preserve some use or exchange value. Some sellers keep 'repair archives' that consist of spare parts: dormant values awaiting to realise their use or exchange value.

All second-hand markets are crucial parts of the scrap dealers' network of urban daily collection. In Accra, aside from Gallaway, where scrap dealers find scrapped machine parts and sell spare parts, other markets also developed. Abossey Okai is a substantial market in Accra for spare parts. Vehicles and their spare parts account every year for Ghana's biggest imports, which in 2018 meant they accounted for almost 16% of all imports (as per UN-COMMTRADE data). LaPaz and Circle are in turn markets for second-hand electronics. The key propellant of financial status in these markets is to be able to control the supply chain from rich countries such as Europe and the US, where the second-hand goods originate (also in Minter, 2020). Many of the importers in these markets have managed to wield a powerful governmental lobby – visits to Abosseyokai spare parts market (and its Kumasi equivalent) are central to presidential campaigns. During a recent election in 2016, President Akuffo-Addo's campaign ended up in the markets, promising to give the workers tariff breaks that would allow them to increase their imports.

Those who control imports are able to increase the quality of goods and stave off dumping. For example, Wahab, whom I met in the smaller town of Koforidua (which hosts the first university in Africa to send a satellite into the universe), lives between Japan and Ghana. As we talk, he continues browsing on Japanese eBay, where he bids on second-hand goods. At the time of our interview in 2018, he had been in the business for many years. He identifies such auctions as the most reliable source of imports: since all auctioneers receive stars based on how honest they are, he is able to eliminate the risk of buying junk. His imports come in airport bags, which again reduces the extent to which he can afford junk. He always flies through Dubai, where he buys European keyboards. His small-scale operation is not a lonely one, but is instead part of a subset of similar businesses, where migration and kinship ties propel supply chains based on trust. His shop produces little electronic scrap and whatever computers are broken they are added to the repair archive, from which they can be pulled if needs be.

Meanwhile, mass second-hand markets mean that to sort goods is to lose time, and to lose time is tantamount to losing money. Such risks of loss are pushed down the supply chains onto small-scale market sellers. Brooks (2015) writes about second-hand markets in Mozambique, where market women gamble on bales of second-hand clothes. Some of them are sent out of business as bales are full of torn clothes that no one might be interested in buying. The other side of the same coin, as Minter (2020) relates, comprises of stories of bale buyers in second-hand markets whose economic chances can get completely re-calibrated due to finding a designer item inside a bale of clothing.

Conversions and excess

'Try and luck business'

Scrap dealers use a variety of metaphors to describe what searching for scrap in Ghana entails. Whenever they leave the scrapyards in order to roam in search of scrap, they say '*n'chang muane*' ('I am going to the bush'). The second most persistent saying is that scrap search is a 'try and luck business'. As one visits Ghana's scrapyards with their buzzing activities and heaps of scrap, it is difficult to imagine the amount of labour that goes into locating and bringing scrap, or the persistent feeling of uncertainty that emanates from the work of collection. Scavenging is a practice that thrives on three premises: limited centralisation of waste resources, lack of disciplinarian regimes that put forward incentives and sanctions to dispose of waste in predictable ways, and economies of survival, which push people to pursue economic activities. Tsing (2015) talks about 'transformative mutualism'. Of particular interest is her assessment that such forms of mutualism are contrary to scalability that characterises earlier plantations, where inputs translated into outputs and accounting was key to understanding their economies.

The economy is driven by a demand for livelihood rather than a supply of waste. Throughout my fieldwork, I would meet men who had recently arrived from the north of Ghana or Nigeria, and who would come to the scrapyards to find their 'brothers'. The newly arrived take a plethora of positions in the redistributive economy of the scrapyard. One of the entry positions is truck pushing. The search for scrap in Accra is hence akin to a rite of passage for most scrap dealers, and it was key to one's urban identity. This entry position is said to have been initiated by Alhaji Abdulai 'Member' and Azanda, both pioneer Dagomba scrap dealers, around the mid-1990s, as scrap in industries and landfills was becoming scarce. 'Trucks' stand for carts pushed by humans.

Every day, tens of men either pick their own trucks or borrow them from owners to begin the search at dusk after the first prayer of the day. They may not be back in the scrapyards for days. The truck-pushers rarely have capital of their own and instead get credit from more senior dealers. The cart is a visible sign of collecting scrap. Pushing a truck is demanding work. There is no end to stories about how the visibility of the pursuit meant vulnerability to thieves and discriminatory comments from other urban residents. The reliance on capital coming from higher up the scrapyard hierarchy creates dependencies and needs of mutual trust. The strenuous nature of truck pushing means that most scrap dealers save money to get a motorcycle, which allows for greater mobility to cover a larger area in one day. The scrap dealers on the motorcycles have substantial capital and they are interested in locating voluminous scrap, which they then move by hiring cars. At the highest level of the capital spectrum are senior scrap dealers who have established formal companies and get scrap through writing offer letters to government institutions and companies. They usually do not need to spend time zipping around town, and the sheer immobility of their life signifies an achievement of status and a cut to personal expenditure of energies.

To help me understand what scrap dealers are experiencing first-hand, some of the dealers invited me onto their expeditions. 'You will suffer too much', Adam told me while inspecting my shoes in the wee hours of the morning. Adam always works with Iddrisu. They are both in their forties. They used to have motorcycles, but a recent wave of ethnic conflict in Agbogbloshie meant that their motorcycles were claimed by political opponents. Now they had to rely on their feet, hence Adam's attention to my shoes. The word that I would be joining Adam and Iddrisu spread, and others were coming to give me tips or to verify that I was indeed ready for what was to come. Ibrahim, a soft-spoken scrap dealer, came to ask me if I had water. Jamila, the scrapyard's cook, would not hear any of my opposition to her offers of bread and tea. She also took it upon herself to alert every customer that I was about to 'go to the bush' ('*chang muane*'). It all felt like a workplace baptism. When Iddrisu came around at dawn, the three of us left for our mission. Our ensuing march covered 30 kilometres and traced an alternative city of businesses and government institutions that the men knew from past conquests. We stopped at an Indian business that sells second-hand refrigerators, at a second-hand computer shop, at Accra Polytechnic that occasionally has broken engines in the stock, at the Ghana Revenue Authority, at the Supreme Court, at the Ministry of Tourism, and, to wrap it all up, we tried to see if there was any building waste from the extension works at the Movenpick Hotel, Accra's prime five-star hotel.

In government institutions we talked to the security guards, and in shops to the keepers. Everywhere we were turned down. In the Supreme Court, we saw a heap of scrapped air conditioners that my companions wanted to buy. 'Air conditioners are the best deal. Everyone thinks they are worthless, so they ask for small money, but inside you find copper and aluminium', Adam said while eyeing the five air-conditioners. However, the security guard didn't want to sell to us. 'It's a try and luck. It's how it is. One day it's us, who is lucky. On other occasions, it's someone else', Adam concluded eventually. Our six-hour hunt around the city rewarded us with only one small find. We bought a 'motor', a car part from a mechanic. The part weighed 40 kilograms and the men struggled with it for some kilometres, until another dealer spotted them and liberated them from the cumbersome scrap. Iddrisu and Adam made together 15 GHS profit that day. As we were heading back to the scrapyard, Iddrisu pulled out the money and wanted to split it evenly between the three of us. I resisted and they eventually agreed to exclude me from the accounting.

From then on, my credentials in the scrapyard escalated and everyone agreed that I was 'trying o' - in Ghana, the 'o' is used as emphasis. Soon invitations to other scrap trips were extended in my direction. Some scrap dealers wondered if I would bring them luck, which meant locating scrap that the owner considers cheap but that in fact brings a substantial profit margin Abossey Okai. Remarkably, however, all of the trips that I participated in resulted in nothing. I momentarily wondered whether I was 'cursing' them with my presence. During pointed interviews, it became clear that the main component of the 'try and luck' approach is the 'try'. The preponderance of 'try' only truly came through in participation. I compared the interviews from before my first missions and there was a consistent emphasis that deals were taking place. Through my first-hand experience of the fruitless combing of Accra to no apparent result, though, I realised that I needed to press harder to learn more. Part of the reason for the evasion might be the mental strain of 'try and luck'. As the soft-spoken Ibrahim explained pointing to his temples: 'We are all freelancers here. This means our mind is important'. According to Ibrahim, it was easy to lose motivation, the lack of sure gains meant that one needed extra commitment. The success comes down to being in the right place at the right time. Scrap collection is marred in perpetual uncertainty. Part of the reason is that once deals finally materialise they might lead to considerable earnings. Some scrap dealers I knew boasted of having earned up to 1,000 GHS after a one-hour ride around the city. How to make sense of such amplitudes and the seemingly random way in which they could be distributed among people was a definite strain on communal and individual ties.

The try and luck business creates forms of desperation too – exhaustion, the loss of willingness to carry on. Adam and Iddrisu's search for scrap was uncommon for men of their age who aspire to have power – to go around searching for scrap is perceived to be the rite of passage of young men, to still be doing that work in the more senior age is a sign that one has not been successful. Thus, the continuum of truck-pushing-patrolling-and-sitting are not solely modes of finding scrap but also modes of acquiring and displaying status.

Aside from the prospect of no luck, the search is expensive. 'Here, everything is money' is among the perpetual complaints about the strains of urban life. One has to have money in order to travel around Accra and beyond, to cover ever more ground combing different areas for scrap. One also needs to have money to buy scrap. Lack of money means lack of buying prospects. Together the needs represent the twofold risk that the scrap dealers have to shoulder in the perpetual pursuit of scrap.

My trips around Accra and its surrounding communities on a motorcycle with Musah, a Dagomba scrap dealer in his thirties, who had more capital than Adam and Iddrisu and could engage in bigger deals, made the expensiveness of collection clear. Musah specialises in lorry scrap and spare parts. He was a mysterious scrap dealer, who did not like talking much to me or to anyone else, but who enjoyed showing me the nooks and crannies of the trade and its social worlds. Our 'patrols' entailed long hours on a motorcycle. Musah kept running out of money, which meant that the two times that our wheel got punctured, we needed to buy second-hand tyres, which would break in no time. We pushed the motorcycle and hoped to run into other Dagomba men who would 'dash' us some money or we planned to reach one of the Dagomba 'sitting spots' spread across the city, where Musah knew he would be given a lower price for the repair.

'Patrol' is what the men referred to as surveilling an area to see if there was scrap. Musah's favourite place of patrol was the nearby port city of Tema. Others had their own locations of preference. Two men were using their patrol areas as their nicknames. Ibrahim 'Labadi' would patrol the leafy, ocean-side district of Labadi. And 'Korle Chief' did businesses around the Korle Lagoon, which was in the vicinity of the scrapyard. At the same time, there was no explicit territoriality, and all operated according to free market principles.

Musah was methodical about showing me the different places where he buys goods. We would pass by streets where mechanics stationed cars that seemed to be on the brink of falling apart. I assumed that the number of cars would result in Musah being able to strike business, but most of the trucks were being kept by the mechanics for spare parts and as capital. On rare occasions, Musah pulled over and pointed to a single truck in between the lanes: 'This one is for sale', he said pointing to a single specimen identical to the others. Musah said that he did not have the money the owner demanded. 'I am waiting for him to change his mind', he said. How long had he been waiting? 'Over a year'. Far from collecting cumbersome waste from someone's backyard, scrap dealers are engaged in patient courting, 'trying' to synchronise their own capital with the other's wish to sell. Such a synchronisation may take a long time and require multiple visits to identified scrap heaps spread across the city.

To any scrap dealer involved in the search for scrap, the uncertainty never stops. Even the wealthiest dealers I met, Alhaji Karim among them, would still need to lead a life in motion to get scrap. Setting up to meet Alhaji Karim was like trying to catch a bird. His schedule was unpredictable, he jumped on his motorcycle whenever someone called him about a potential deal. His days are spent on making himself known and finding out what was happening in different markets. All required motorcycle travels around the city.

At the same time, position in the scrapyard was made visible through his amount of movement. Moving less or moving electively is what scrap dealers aspire to. During one of our excursions Abdul Fatawu voiced a judgement – 'some of the men don't have enough money to sit'. While the 'try and luck' business requires readiness to move, exigencies of status require sitting down – participating in daily social life, not missing out on what is happening, partaking in political discussions, and being accessible to others. The sitting thus builds other forms of capital - political and social - that are convertible to financial capital in scrap economies. The daily travail of political capital included going to party meetings, 'being there' when emissaries of politicians or chiefs came round and thus be able to partake in the political decision-making.

Figure 1.2 A lucky day in Mortuary Road after a purchase from MTN.

Other than that, scrap dealers rely on making themselves known in order to catch the unexpected flows of more voluminous scrap. In the eight months of doing research in Agbogbloshie and other scrapyards, there were two examples of substantial scrap dealers that were known to me, as they were visible enough to catch my attention (other than the ones coming through the ECG and VRA as mentioned above). One was a deal to segregate a container-load of Huawei outdoor connection boxes that came from MTN Ghana[29] (Figure 1.2), the country's biggest telecommunications company. And the other was a huge set of aluminium cables from Valco. Often the ways in which scrap dealers manage to get hold of their scrap is through auctions but also informal arrangements. I know of a deal of a bundle of cables from Vodafone Ghana, another telecommunications company, that was a result

[29] A Ghana subsidiary of South African multinational mobile telecommunications company.

of its security guard taking a sovereign decision to sell it to a scrap dealer, which eventually put the scrap dealer in prison. The fate that he was able to limit in time after an MP from one of Accra's richest areas intervened on his behalf. The scrap dealer bought at some point the MP's scrap and thereafter arranged a bus of voters from Agbogbloshie to register and vote in the MP's constituency to boost his chances of an election. Here, the social capital established through being a powerful scrap dealer was important to constitute a political capital that in turn was debited after a scrap sale gone wrong.

For the general public, 'going to the bush' meant that scrap got monetised at the doorstep of people's homes and workshops, realising previously dormant forms of capital, or transforming something that was either considered waste or a spare part. Every computer shop, workshop, or mechanics place now keeps scrap in the corner as a form of additional bank account that can be cashed at will. In West African contexts, anthropologists have been pointing to practices of thesaurisation (Guyer, 2003; Roitman, 2005), which is the practice of keeping wealth in a variety of socially recognised currencies. Thus scrap here emerges as a form of capital. Cash has a tendency to leave hands as various social problems in the neoliberal context have their price tags. Saving scrap to sell later might therefore be a strategy to convert it into cash at will or strategically. Simultaneously, mechanics might not sell all cars is that they are still waiting for customers that brought them in the first place for repair to claim their possessions. A persistent worry of every repair shop is that the customers ran out of money and never come to claim their goods and pay their services. As such, many of the goods that could otherwise be scrapped do not yet have a clearly defined status as unowned goods. They instead linger around repair shops, where mechanics hope for their owners' return while trying to avoid being accused of selling other people's possessions for personal gain (Figure 1.3)

Figure 1.3 An electronics repair shop. The unclaimed televisions accumulate on the rooftop.

Enchantments of capital

Since scrap economies are intensely reliant on capital and capital is generative of the ability to access and participate in scrap, capital and its whims are a subject of moral, religious, and affective excess. The histories of discovery of scrap's value and the stories of the 'first capital' uncover an enchantment with two aspects of the conversion between scrap and money, especially among older scrap dealers. The first aspect is that the conversion is so beneficial that it can cast salaried work in other parts of the economy as inferior. The second is that this line of work inevitably involves unexpectedness, understood to lie on a spectrum between lucky coincidence and cheating.

Duɛtɛɛ is now in her early 60s. She is the only scrap dealer to have a shop inside the sprawling second-hand market of Abosseyokai. Duɛtɛɛ's reflection on her own work is a good precursor for thinking through the conjunctions of scrap and money. Her own name is a stark reminder of the conjunction:

Duɛtɛɛ's 'document' name – as she calls it – is Mary, but she is known as Duɛtɛɛ, meaning cash (also gold) in her mother tongue of Fante. To find her shop, it is enough to ask anyone across the almost two-kilometre perimeter of the market for a scrap dealer. One is immediately pointed in the direction of her kiosk: nestled between car repair operations, it comprises of a yellow concrete structure. Duɛtɛɛ's name is famous with mechanics across neighbouring communities – some of the older ones told me that until she visited them in the 1980s-1990s, they would bury defunct car parts in the ground. Thanks to Duɛtɛɛ, they learnt of scrap's value. Above the steel door of her kiosk, that is kept shut with two locks, a white chalk inscription reads 'Fa dade bɛgyɛ Duɛtɛɛ', Fante for 'bring your scrap and get cash'. In 2019, when I visited Duɛtɛɛ for the first time, she was not at work. I was directed instead to the car repair shop of her adult son, Amandi, named after Ghana's scrap exporter Boniface Amandi – revealing further transpositions between her business and her life at large. His mother, the renown scrap dealer herself, had suffered from a heart attack and was recovering at home. Her children pleaded with her to take a break, but she was anxious to get back to work. Duɛtɛɛ's house is in the sprawling suburbs of Accra – a perimeter where one can find land prices fit for Ghanaian budgets. Unbeknownst to her children, Duɛtɛɛ was continuing to run a small scrap operation from her home. As she showed me during my visit, a shed outside the house was filling up with iron, and she kept bits of copper and aluminium in plastic bags near her bed. These occasional buys and sells were buoying her through the experience of recovery. She was also receiving money for housekeeping from her Ghanaian business partner, George, who had been buying scrap from Duɛtɛɛ for the past thirty years.

She was introduced to this line of work in the 1980s by her husband, 'Mr Asante' (Duɛtɛɛ always used this title), with whom she would have four children. Mr Asante's nickname was 'one pound, one pound', as prices in the copper and aluminium trade are calculated per pound. She became part of her husband's business at the urging of a female friend: 'By the time I was carrying Kwaku, my second child, my friend told me: "woman, how can the selling of this pure water support your feeding after delivery?"' She collected the scrap, brought it to her husband, and helped with the dismantling. When cutting aluminium, a piece of scrap hit her stomach and Kwaku was born with a scar on his skull. Duɛtɛɛ remembers that her three pregnancies after Kwaku brought with them a surge of strength: she was able to do more strenuous work than usual.

A year after Kwaku was born, Duɛtɛɛ managed to break free from Mr Asante by building her own capital. The story of 'first capital' was as significant to her as to many other people I interviewed. Before Duɛtɛɛ recounted her story, she prefaced it with praises to God: 'Look at what God has done. The precise God is here. The dependable God is here.' Ali Fatma, another scrap dealer whose life story I gathered days after, also emphasised: 'My capital come from God.'

To many scrap dealers I know, the 'first capital' originates in an encounter that is perceived as a coincidence that might be so excessive in its rewards that it becomes spiritual. For Duɛtɛɛ, the luck consisted in happening upon a scrap dealer who in exchange for her ironing his shirts would give her enough 'coins' to pursue her own profit margins. For Ali Fatma, the luck came during the first day of work as a scrap dealer: she was shouting 'everything condemned woman' to attract attention to her business in Accra's suburbs, when a female resident peeked out of her house and was positively surprised. 'Are you a lady and you are buying scraps?', Ali Fatma recounted. From her previous business of selling pure water by the sachet, she managed to save fifty cedi over the course of six months (equivalent to around eight dollars). This was not enough. The curious woman sold Ali Fatma a pile of scrap for seven cedis, which later fetched Fatma a profit margin of 23 cedis – about one year later, during our interview, Ali Fatma remembered her 'first profit' margins to a tee. In one day, she managed to earn half the amount it took her months to save from hawking water as an ambulant seller. Both women converted their first capital into more lucrative business.

Alternatively, scrap dealers would see their 'first capital' as a reward for good deeds. Chief Awal came to Accra in mid-1990s, he initially worked as a security guard, but on his day-off followed his brother, who within a single day earned more money than Chief's monthly salary. Chief immediately left his other job and pursued scrap instead. His 'first capital' came from a coincidental encounter with an engineer, who wanted to hire Chief to weed his plot of land on the outskirt of Accra. While his brother resisted hard labour, Chief assured: 'We are in the city to find money. Not to do lazy things'. His reward was getting the engineer's pile of scrap for free, which fetched Chief Awal much more than his monthly salary. 'It was the first time in my life that I was counting 100 Ghana cedis…'.

Money, morality, and cheating

Dagbani language distinguishes between two types of profit in money: *woligu liɣri* (lit. 'sweat money') and *alaha liɣri* (lit. 'cheap money'). The former codes forms of income that come out of expenditure of energies, while the latter comes from luck – thus money from the lottery is *alaha*, while money from farming and scrap is generally *woligu*. Unlike in agriculture, however, working in scrap one can slip from *woligu* to *alaha* by cheating others. These distinctions are also expressed locally in English as 'fast money' and 'suffering'. The 'fast money' comes to the pockets and leaves them again with high velocity. It also tends to require little exertion of energies to make.

Scrap dealers also talk about 'ghost money'. The scrap dealers that are further up the scrap chain pre-finance scrap collection efforts. On a daily basis, they distribute money ('advance') to people who bring them scrap. These are moments laden with frictions: they require relations of trust and careful accounting. The scrapyards abound with stories of people who were overcome by having money in their hands for the first time and ran away as a consequence, or who have gone mad. These stories have numerous variations: (a) 'the person never saw that much money, so he ran away' – stories where the money exudes such a powerful potential that people succumb to it, are confused by it, and are eventually overcome, pursuing spending sprees; (b) 'the person took the money to sort their problem' – these genre of stories relate to the moral economy of post-structural adjustment Ghana, where health and educational problems are entwined with money. The sudden liquidity leads to a choice between social trust and kin generosity – whether to be trustworthy vis-à-vis the person who pre-financed the scrap collection or generous towards kin and allies. Duɛtɛɛ has worked with many women and men over the years. She sums the experience in the following words:

> 'when they get to know how the business is done they would take money and would not return (…) then they take the money they don't return. Sometimes, when I meet them at Tommy's place [Thomas Buxton's scrap business] you hear them shouting "the woman is coming" then they run away. I tell them not to worry. I am not coming to arrest you.'

'Ghost money' creates secrecy around how much profit margins people make. Afa Suley is a scrap dealer who has a sprawling workshop that hires six men in Agbogbloshie. When he came to Accra in 1995, Afa Suley remembers that all he could afford was 'soak *garri* and eat (…) I add sugar to it (…) sometimes I wouldn't add water so that others don't steal it from me, I would only add it once it's in my mouth.' During one of our interviews, he explained to me how the 'boys' in his workshop earn money:

> 'I may have wanted to sell it at a 1000 cedis, if you are able to sell it at 2000 cedis or just something on it, it is yours to keep. When you get merchandise somewhere and come and tell me, I can give you money to go and pay for it and bring it here. If you bring it here and it is something I am interested in, I buy it from you and pay you your money so you can also get something. If it also doesn't interest me, you can send it somewhere and sell and then bring me back my money […] if I also keep it here and somebody comes to buy, I will not go and sell it, you will go and sell it. As you know how much I bought it from you, you will know how much you should sell it. If you do that for some time, whenever you meet some goods somewhere, you will know how much you should buy them and how much you should sell them.'

Scrap economy and scrapyards are meeting points, where scrap material, economic changes, as well as diverse regimes of value become basis for negotiations. While 'sweat' and 'fast' money and the social strains of 'ghost money' represent the precariousness of conversions between moral values, work, and gain, the conversion of scrap into units of money done through the medium of scales is similarly complicated. In late 1990s most of the scrap markets were using scales solely for the purchase of copper and aluminium (which has been taking place for a long time) which comes in small quantities and is expensive. Iron scrap is chunkier. 'Elders opposed the use of scales', I was often told, as they believed it would be to their overall disadvantage. Thus, scales were initially associated with evil. According to the scrap dealers who followed the controversy, there was a fear that the information about value would spread and prevent the achievement of profits, but at the same time this put pressure on those buying to 'objectify' the price. In the end, the introduction of the scale had the opposite effect. Those who have scales are currently making the most profit, precisely because of the fixed nature of prices. While the pickers are dealing with the uncertainty of how much they will be able to negotiate, those who have a scale enjoy the privilege of relatively stable profit margins.

Scales are also the subject of politics and religion. After a religious revelation, one of the Nigerian brokers announced to everyone that he was not tempering with it, and as such it can be used as a reference by all sorts of people. Other men with a scale who have greater power might fix their scales because they know that no one will negotiate with them were they to find out. One of the men who has an executive position within the scrap dealers' union, for example, is stealing as much as 2 kilograms off each purchase. These remind that the price and scale are never fully objectified and can be coloured by social and political status, moral conviction and the exploitation of others' ignorance.

The buying of scrap creates a recurrent sense of competition between scrap dealers as they are competing over goods that are scarce vis-a-vis the available labour. The newcomers in the economy - the young Dagomba men from Ghana's north who have become the dominant group of scrap dealers are specifically accused of hiking the prices as they fight for limited scrap. Alhaji Omar, an elder scrap dealer explained the hiking of prices in the following terms:

> 'What I know is: a boy will come from the North. Maybe that person hasn't been to Accra before, (…) because his brother is here doing this aluminium business. He will hear go, go to

> town [to search for scrap], bargain and see how we buy it. This boy he will comb the whole area and don't get anything and the only thing he'll get, he'll make sure to buy it, because the person is anxious to get something and bring it back. He can't price it to high and then lose, because he's very anxious. That is some of the reason why the overbuying is happening…'

The veteran Duɛtɛɛ's notion of the changing economy focuses on castigating the 'Dagomba people' as the reason why goods became expensive rather than specifically 'young desperate boys' as is the case for Alhaji Omar. 'They took over and spoilt the business', she explained: 'when you give about a hundred thousand for the goods, they will give out one hundred fifty to buy.'

The recurrent references to cheating and truth represent the moral pressures of partaking in a competitive economy. The desperation to get scrap, overestimate and then try to turn profit nonetheless is at the centre of accusations and explanations of cheating. Olu 'Old Man' during our conversation would repeatedly argue that 'cash is spoiling the truth'. Thus the other complaint voiced by Duɛtɛɛ is that: 'when they burn they add rubber, so that it will melt and increase the quantity and the weight. They put sand in the water tank and then place the cables inside. They do this because they want more money. When they come to weigh, the weight doesn't match what you weigh later. They use *juju* but we look up to God.' Duɛtɛɛ's assertion in contrast that she looks up to God was not atypical. The notion of 'truth' is an important dimension of scrap economies – people emphasise that they follow truth. The truthfulness is manifest in the relations of taking other people's money ('when I take people's money, I supply to them') and not lying to others.

In this context, how people earn money can also bring suspicions of cheating. For example, Nigerians specialise in copper and aluminium: nonferrous metals that require using a pound scale and close accounting due to high prices and small profit margins. They are thus occasionally believed to have a 'secret of the aluminium and copper work', as per the words of one of my interlocutors, Yusif.

The differences of buying and selling become significant in creating identities. According to Afa Sualey:

> 'we [Dagombas] look down upon small amounts of money. An Igbo man may weigh scrap at 1000 cedis, he will then go sell it at 1001. On the 1000 he has a profit of a cedi, but you a Dagomba man will want that one the 1000 you make 10 times or 20 times of the profit he has made (…) So the Igbos having the scales here, only they can tell the benefit they get from it (…)'

Dagomba men often claimed that they patiently wait to gather scrap, while the Nigerians engage in fast buy and sell. The capital intensive nature of Nigerians' work also meant that they had to receive money from the companies to which they would eventually sell copper and aluminium - such a relationship of credit and debit with 'white people' in companies was perceived by Dagomba men to be potentially a source of stress, shame, and dependence that they tried to avoid.

Small increments

The scrapyards are also places where people can earn 'hand to mouth' - such an end of the economy is usually the domain of children or people who cannot dedicate themselves full-time to the work for other reasons. These are examples of scrapyards' internal economy. Scrap dealers often leave chips and residues of metal in their workshops, such small bits are then collected by children, who make 'coins'. Alternatively, people act as connectors between workshops. For example, they buy car battery in one workshop and sell in another. These are contexts that verge on redistribution - a redistribution not necessarily based on intentions of solidarity with those lower down the economy, but with individual estimations of energy that renounces certain types of profit. Such leaks of resources thus create their own livelihoods.

Not all scrap dealers make their business to buy such fractions of scrap from the pickers inside scrapyards. This is because such fractions are layered with dust, which inevitably increases their weight and can lead to overestimations at the scale. Karim 'Ustaz' was one of the scrap dealers in Agbogbloshie, who nonetheless dedicates part of his business to buying fractions from mostly children.

Ustaz – meaning teacher in Arabic, a nickname derived from having completed three years of Islamic schooling in the North – arrives to his place not long after the first Adhan. Despite being only in his early thirties, he is one of the wealthiest people in Agbogbloshie. He works seven days a week from 5AM to 10PM and rarely takes a holiday: 'If you don't show up one day, the people selling metal to you will start going to someone else'. He also sincerely worries about the children that sell to him on daily basis: 'If I don't show up, they will go hungry'. Karim deals in scrap iron. There are various people who bring him goods. Some receive bills of money in the morning before a scrap hunt in the city. Others bring him small chips of iron that they collect from around the scrapyard. The latter is a preferred job for small boys, who go there early in the morning.

The boys are as young as six years of age. They find bits of iron, which they weigh until they gain the money equivalent needed for breakfast, then they play around using the abandoned cars and pieces of found objects as props. They also watch television in the neighbouring workshop or play computer games. When they are a couple of coins short of the amount needed for their meal, the boys sweep the soil around Ustaz's scale and sell him whatever they manage to collect. They use for this big magnets that are called 'Singapore' in the scrapyard parlance. The common joke is that everyone steals Ustaz's goods during the night and then sells them back to him in the morning. Even the small boys would occasionally weigh the same goods twice as the bits that they sell are so minuscule, they inevitably get lost on the way and picked up again for another scaling.

As the small boys shuffle around, Ustaz and his two brothers sit and stare into the distance or act as the children's informal keepers. Until the scrap pile gets substantial and needs to be loaded onto a truck, their sole work is noting down the kilograms of incoming scrap and handing out bills in exchange. Ustaz's backpack is stuffed to the brim with paper money; more than 6000 GHS in 20 GHS bills. The two boys that work at his place get between 30 and 40 GHS a day and are allowed to pursue side businesses. One of them sews Northern attire that he sells to other scrap workers. Ustaz's capital in the accounts is far greater than the bills stack in his backpack. He is building a house in the North of Ghana, he sponsors his wife's education as a nurse, and he helps with his father's farming. Being in his early 30s and with no prior education, he assures me that his 'capital' is in six digits, although he is secretive about its actual amount. I infer that since he is able to load weekly around 23 tons of iron to sell in Tema, he has to have, at the very least, 23,000 GHS in his bank account (equivalent to 4,000 USD), but it is likely to be more, as each such truckloads fetches him around 1000 USD in profit. The pursuit of different scales of the business - one that brings scrap in bigger quantities and one that consists of the daily grind by the scale is what eventually cushions losses from buying fractions.

As I observed Ustaz's kiosk over the course of the day, it became clear that his attempts at keeping accounts were not always possible. Each morning he began by taking out a weathered notebook with tables where he wrote down how many kilograms he was buying. However, the amount of transactions – especially from the small children – meant that some of the kilograms got lost from his accounts. He also failed to keep good track of the money he was paying out. For example, on a single day, he might begin with 6000 GHS in his backpack and some additional money in his pocket. The money in the backpack was intended for the scrap business, while the pocket was for social redistribution (this is not unlike the habits of the market women described by Jane Guyer (2008), who have two pockets for different obligations). He is known for being charitable, so people passing by often tell him their worries, and he promptly dives into his pockets to relieve them with small bills. The money from the pocket should be dedicated to addressing the social problems of the different people who came to visit him over the course of the day. These were 'blessings'.

His usual 'small increments' customers were occasionally incapacitated which also meant that Karim would dash them money that is give them something out of his heart rather than in exchange for scrap. During the day, there were occasional visits from former child labourers who grew up or a man who suffered from mental health problems and who would receive money from Karim - 'he can't work today but he brings goods on other days', Karim would explain.

Figure 1.4 Ibrahim, Guabuliga, July 2019 (By Jurgen Strohmayer)

Such reliance on small-scale purchases is also present in scrap economies further away from urban centres. Distant villages in the North are territories of entrepreneurial activity of solitary scrap dealers. They travel to faraway villages and live there slowly gathering piles of scrap. Figure 1.4 shows Ibrahim, one of such travelling scrap dealers. The photo was taken during his work trip to the village of Guabuliga, a small village in the north of the Northern region, some 50 kilometres away from the nearest city of Bolgatanga. During such trips, Ibrahim positions himself in the same sitting spot. Aside from burlap bags to store scrap, he travels with a kettle to wash hands and legs before prayers and a portable coal pot to brew tea. Every day, children and teenagers bring him scrap from their households and local dumps. Ibrahim said he always stays until he sees that the scrap finishes and then moves to another village. Once he is no longer able to carry the scrap, he travels to Tamale to sell it. These daily finds fetch his young pickers small rewards in the form of pesewa coins that quickly get converted into ice-creams, pure water or Milo cubes – all representing small, sweet pleasures or necessities. Ibrahim's venture had the full support of Guabuliga parents, who were happy to see their children engaged in some form of economic activity.

Police harassment

The state-versus-traders dynamic is experienced across African urban contexts and has assumed new relevance as migrants come to cities to partake in what is referred to as the 'informal economy' (Clark, 1988; Rotiman, 2004). This dynamic reveals itself in confrontations between the representatives of the state and its actors, and occurrences of confiscation of the traders' goods (*ibid*). Actors in Ghana's scrap economies experience such forms of confrontation and confiscation from the police on a regular basis: they are persistently perceived to be thieves who have stolen their goods or in all cases such perception is voiced to legitimate the seizure. Such confrontations underlie the extent to which scrap is perceived as someone's possession – often the government's. The sole purpose of the visit of the current Mayor of Accra to the scrapyards in 2019 was to urge dealers to cease stealing the metal gratings used to cover drains around the city at the risk of being prosecuted. The Mayor, while intent on underlying the importance of road safety, argued that this practice must be fuelled by failure: 'Your boys go to the town to collect scraps and when they don't get any, they decide to remove the metal covers on the drains.'

The truck pushers are visible (as their carts are conspicuous), everyone knows they must be carrying money in order to buy goods, and the goods can be presumed to have been stolen – all of these conjectures become pressure points during contacts with the police. While the scrap economy entails other actors – those who generate scrap through discarded material, the scrap dealers, and the companies that buy scrap metals for further recycling – the scrap dealers point out that they usually bear the brunt of suspicion. There was no truck pusher who had not reported having experienced police harassment in our exchanges. When they are stopped, it is rarely to restore the presumed stolen goods to their owners, but rather to extort money. Razak, a scrap dealer who hires truck pushers to bring him goods, explained this in the following terms:

> ‘Sometimes the police ask for 50 Ghana cedis or 100 Ghana cedis [for comparison, most entry level jobs in Agbogbloshie earn around 30 Ghana cedis a day (=5-6 USD)]. Is it good that the police should do that to a fellow struggling Ghanaian? You see, they go to the bush in search for metals and leave by 6am. Those who don’t go very far, by this time [3pm] they would have been back. Those who go further start coming from around 4pm–5pm. That is the time that they often arrest the boys on the way back [when they carry goods].’

If the truck pushers are arrested together with the goods, they expect for their ‘masters’ or big men in the scrapyard to bail them out. On some occasions, the scrap dealers organise funds to bail out their friends.

The presumption that the goods that they carry are stolen is especially difficult to shed as scrap dealers buy people’s waste materials. This creates a feedback loop – the truck pushers are asked to present receipts, which would be difficult for them to have in the first place, and thus they end up having to pay a bribe in order to be allowed to walk free. In addition, some of the pushers might struggle to speak Akan languages or English, which are instead the means of communication in the South, further impinging on their capacity to negotiate with the police. These encounters are remembered as traumatic. An elderly truck driver, who had problems with his driving license, reported the pressures:

> ‘I spoke until I started sweating, you see. My child had to calm me down so that my BP doesn’t rise. The police didn’t know what to say. They said I should calm down. If the police stop you, he is not going to arrest you, he wants money. Meanwhile, I only took a little money from the goods owner and bought fuel. Sometimes as a driver, you can ask your friend to buy tea or porridge and they will. But we often move without a penny’.

When asked to estimate how much money they would spend on the police per year, the estimate tends to be between 200 and 400 cedis, which is equivalent to around half a month or a full month of work depending on the level of the economy.

Conclusion

Unlike in other waste contexts, where waste is associated with abundance and with generating value out of waste hinging on securing access to waste, scrap dealers in Ghana are having to juggle between two unpredictable variables: scrap and money. The technologies that allow for this conversion are pricing, weighing, and exchanging vis-a-vis social and political capital. Therein, the conversion exposes scrap dealers to multiple forms of precarity, be it from international metal markets, national political changes, instability of social relations, police extortions, unpredictability of gains or religious unease.

Scrap collection in Ghana is ever more competitive, which increases prices of scrap inside scrapyards (see Figure 1.1) for comparison of prices between scrap companies in Poland, Switzerland, and the UK). The increasing prices have meant that scrap dealers compete with each other as well as fight for the competitiveness of their own markets in the globalising world of urban mining, whilst still retaining an ethos of inclusiveness, providing work for newcomer 'brothers', migrants from the North as well as children, and bailing out those unlucky enough to have come across the police while 'going to the bush'.

This chapter has also shown the ways in which 'try and luck' remains a key aspect of scrap dealing at all levels of this urban mining business chain. The founders of now (in)famous scrapyards (such as Agbogbloshie) created a niche market for themselves in metal scrap thanks to post-independence economic and industrial visions and policies. By examining their views on how their business has changed over the years with the opening up of Ghana to world markets and with the depletion of metal stocks, the chapter shows the instability and precarity that tangibly and painfully affects especially newcomers. The newcomers often feel themselves to be disciplined by money - they have to go on working in order to be able to earn enough, they also engage in cheating to make up for losses, and in turn experience the pressure to show dedication to truth despite odds.

Chapter 2 - Scrapyards: cosmopolitan encounters and informal spaces

Urban mining is not only 'urban' in terms of space, but also in terms of its amalgamation with urban processes. In urban Ghana, corporate scrap activities are located in industrial zones demarcated by city plans. The majority of the non-ferrous companies that process scrap prior to its shipment abroad are in the industrial areas of Accra and Kumasi, while the iron smelting industries are located in a designated industrial zone in Tema. Scrapyards meanwhile are in places subject to struggles over land or where the land underneath has been identified for other purposes by municipalities. Thus companies are located on a land cast as 'industrial' and thus subject to specific forms of urban zoning and workplace regulations, scrapyards fall outside official cartographies and are organised communally. Together they represent two manifestations of scrap labour and economy - industrial and communal; recognised by the state and subject to informal and tenuous arrangements that confront the state. This is also a context where one type of pollution associated with scrap operations is designated as 'industrial'[30] and thus permitted to exist, and the other is believed to be the result of specific communal arrangements and subject to threats of eviction from municipality. In the latter scenario, specific communities are blamed for the pollution by state actors and urban neighbours, and their societal organisations work to contain the pollution within communal borders, which is difficult given the urban context.

This chapter references four of the most prominent scrapyards in Ghana - Agbogbloshie and Mortuary Road in Accra and the Frafra market and Dagomba Line in Kumasi. The bulk of the research conducted was done in the first two. These are spaces that share key characteristics: peoples' ethnicity predicts their specialisation in metals and work activities; they operate from marginal land that faces

[30] Ghana's official zoning guidelines distinguish between Light Industrial, General Industrial, Noxious and Extractive Industrial Zones. Ghana is not a sole country with similar zoning guidelines. Noxious industrial zones are ones that emit noxious, hazardous or offensive substances. These require sizeable plot areas. Smelting activities are designated as noxious under the guidelines.

threats of eviction form authorities or landlords; and workers in these spaces circulate between them for work, social life, and maintenance of kinship links.

In the first part of this chapter, I will focus on scrapyards as sites of cosmopolitan encounters between people from different linguistic and ethnic backgrounds, where conjunctions of metals and ethnicity characterise work, economic and social life in scrapyards across Ghana. Scrapyards are also places where masculinity is associated with scrap work, while women engage in ancillary activities such as selling food or hawking goods. These scrapyards, whilst in different cities and locations, are spaces, where scrapping takes place on a squatted land and where northern identity - Dagomba or Frafra - is associated with a heightened exposure to the economy's financial and 'body burdens'[31] as workers live and work in these areas. Northern migrants live and work in scrapyards or in their proximity. They perform tasks that put them on the frontline of toxic exposures associated with scrap economies[32] such as burning cables to retrieve metals or recycling car batteries by emptying sulphuric acid onto the ground.[33] They also bear the brunt of discrimination by the state's authorities and have to dedicate significant energies to patrimonial politics to preserve their footing in the city and access to capital.

I show how scrap economies are imprinted with West African histories and a regional distinction between north and south (Chalfin, 2001; Piot, 1999; Shaw, 2002; Newell, 2012). I show patterns of differentiated fortunes and economic practices that contribute to 'grassroots productions' of ethnic identity in scrapyards (Newell, 2012). The academic literature on West African urban spaces has probed the extent to which ethnicity is a fluid category as migrants move to urban areas[34] and how it becomes

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[31] Body burden is a scientific term for the total amount of a substance inside a body. Vanessa Agard-Jones uses it to emphasise that the burdens can be both material and metaphorical. E.g. 'Vanessa Agard-Jones: On toxicity', https://www.newmuseum.org/calendar/view/715/simone-leigh-the-waiting-room-vanessa-agard-jones-on-toxicity

[32] My observation in this regard is corroborated by a systematic material flow analysis by engineer Karoline Owusu-Sekyere, 'Orienting Process Analysis of relevant e-waste recycling processes at the Agbogbloshie/Old Fadama Scrapyard in Accra, Ghana', Technical Report, *Institut für Siedlungswasserbau, Wassergüte- und Abfallwirtschaft der Univer-sität Stuttgart*, 2019 (accessed thanks to the curtesy of the author).

[33] Plates inside car batteries are submerged in sulphuric acid to recycle the batteries the acid is poured out.

[34] In Ghanaian context, Keith Hart (1979) 'Migration and the Tribal Identity among the Frafras of Ghana', Carola Lentz and Paul Nugent (eds.) (2000) *Ethnicity in Ghana: The limits of Invention…*

meaningful or reified through exchanges and encounters within urban and national spaces (Apter, 2005). This chapter too shows that scrapyards along with their fragmentation into metals and processes, create specific clusters of metal and ethnicity.

In the second part, I look at how communities work to contain pollution within its borders - something that is a difficult task in the urban context of proximities. In the third part, I scale up from the consideration of the specific manifestations of cosmopolitan encounters to consider the scrapping and squatting continuum that defines urban mining in Ghana which is especially experienced by Northern migrants. I treat the continuum as both a form of a political economy and a distinct sensory regime that produces unique and multiple burdens.

Cosmopolitan Encounters

Dynamics of urban processes

Accra and Kumasi, like other cities in the region, are terrains of struggle for space between city-making processes that privilege capital over practices of communal life. The municipal governments seek to facilitate private sector development and valorise urban space, which usually engages the space that is 'subject to existing patterns of collective use by the city's working-class inhabitants' (Gillespie, 2015: 70). Herein, thus often lies a central tension - the land's aspirational versus present use.

Scrapyards are dubbed to be 'informal' by state actors - a language that is also often reproduced in international papers about their workers. Ananya Roy asserts that 'informality must be understood not as the object of state regulation but rather as produced by the state itself' (2005: 149). Informality according to Roy can be strategically used by planners - to mitigate the vulnerabilities of the urban poor while keeping them outside the purview of municipal planning. City-making as espoused by state actors designates spaces as primarily abstract and physical rather than layered with communal significance and thus responsive to such needs. Meanwhile, communal spaces, while fulfilling communal functions, tend to be subtracted from large-scale planning, and community members are pushed to appropriate marginal spaces for their needs. Such forms of carving out of space are recurrent features of numerous studies. Gillespie (2017) argues that affected urban residence practice 'quiet encroachment' that is they occupy space from which they were dispossessed in order to be able to access urban economies and modes of reproduction. Ato Ouayson (2014) argues that residents in Accra have to engage in improvisation as they negotiate the confrontation between planned versus unplanned, communal versus hegemonic, regularised versus improvisational (Quayson 2014). The resultant competition for urban space is highly uneven - street hawkers operate from sidewalks, where they face persistent danger from the passing cars, low-income employees in rich districts are pushed to live in squatter communities for want of reliable public transport, and all sorts of other activities need to search for vacant areas. Thus the very improvisation that Quayson describes is always threatened by evictions or bans.

Simultaneously, the communal space is at the same time not a unified social fabric that confronts such state drives. Rather, it is a composite of waves of migration and distinctions between autochthonous and migrant populations made up of 'strangers' (Cohen, 2019). These fuel grammars of interaction that oscillate between hospitality and incorporation, as well as perceptions of encroachment and illegitimacy. Such grammars are not set in stone but translate and capture larger processes into an idiom. For example, processes associated with neoliberal economies that rely on small-scale entrepreneurship and scarcity of urban space have given fuel to the latter. Such tensions have not however resulted in conflict in Ghana as is the case in the neighbouring Ivory Coast (Newell, 2012) or Cameroon (Bayart, Geschiere and Nyamnjoh, 2001) but evictions of especially northern migrants have occurred, as described later in the chapter, and emphasise that distinctions premised on waves of migration have relevance in Ghana.

The autochthonous communities of Accra and Kumasi are Gas and Asante, respectively. Living quarters in Accra and Kumasi are marked by their various timelines of settlement and demographic characteristics. The autochthonous populations similar to others experience problems of overcrowding and insufficient municipal services, but enjoy a more stable hold on land due to ancestral titles. At the same time, chiefs of such communities have contributed to the making of urban cosmopolitism by granting land to newcomers to the city leading to the emergence of zongos[35] (Schilkrout, 1979; Pellow, 2002). Such spaces are diverse as over many years they came to incorporate all sorts of other strangers. The city and traditional owners also converts ancestral land titles into private land titles that are either leased to individuals in exchange for money or transferred to the state for development projects (e.g. Strohmayer and Mueller, 2020). This means that growing parts of Accra are defined by gentrification and modernisation that characterise cities around the world.

Ghana as a divided space

Ghana's scrapyards are meeting points for different groups of migrants. Most workers are migrants from the country's north. They perform some of the most strenuous tasks inside scrapyards and the entire collection of scrap lies on their shoulders. Two northern ethnic identities are specifically present in these spaces - in Accra and Kumasi, the majority of scrap dealers are Dagomba and in Kumasi, there is a sizeable population of female scrap dealers too, who are from further up north and self-identify as Frafra. Dagomba come mostly from the Northern region. The Frafra people live further up north near the border with Burkina Faso and they are a subset of the Gurunsi that divides into smaller groups. As per Hart's account (1978, 22), the term 'Frafra' crystallised out of army and labour recruitment documents and was adopted in the context of migration to urban centres. The Frafra greeting 'Ya fara-fara?', which translates as 'and [your] suffering?', is at the origin of the category.

The importance of Dagomba and Frafra identity is related to the history of discrimination. As migrants move from the north to the cities, they rely on ethnic networks. Once in the city, they experience discrimination that maps onto the histories of the divide between the country's northern and southern territories. The 'northerners' - as they are often referred to - are either explicitly thought of as inferior or the north's predominantly rural geography means that they are stereotyped as 'villagers' without the knowledge of urban life - an ignorance that can be exploited. Such stereotypes and prejudice inform self-perception. For example, while I conducted interviews, I often heard that

[35] Zongos are mostly populated by northern migrants from all across West Africa, where Hausa tends to be the most common language and values associated with Islam translate onto urban landscape.

scrap economies are economies ‘made by illiterates, for the illiterates’, which was especially resounding in the context of a long-term gap in educational infrastructure.

The north-south divide in Ghana is firmly entrenched in imperial, colonial, and post-colonial histories. During the era of transatlantic slave trade, the current territories of Ghana were split between political formations characterised by discrepant languages, forms of rule, economies, and divergent paths of incorporation into the slave trade. The experience of slave trade has shaped Ghana’s geographies and social worlds (Holsey, 2008; Perbi, 2017). While the modes of enslavement in Ghana suggest that ordinary people experienced a persistent threat throughout the trade, which changed in intensity over time and across geographies, Bayo Holsey’s research into collective memories shows that many in Ghana today ‘imagine the North as the sole site of enslavement’ (2008: 82). This is sometimes solidified in ritual - Rosenthal (1998) shows how the Ewe people in south-east Ghana worship spirits of northern slaves as a repayment for how they were treated by coastal families (Rosenthal, 1998). The perceived distinctions between people of the coast and people of the North are encoded in everyday conversations, in which northerners are considered ‘backward’ or outright ‘barbaric’, although Holsey is careful to point out that these codes are not solely denigrations, but also attempts by coastal residents to attain an imagined cosmopolitanism. In a similar vein, Enid Shildkrout’s (1979) study of schoolchildren in southern Ghana found that the children would associate northerners with a ‘lack of civilisation’, a legacy of an identification of the north with enslavement and conflict.

The recent references to Northern communities around Agbogbloshie (notably Old Fadama where many of the scrap dealers live) as ‘Sodom and Gomorrah’ among politicians and the media represent further consolidations of such stereotypes about barbarism. The denigrating discourses are especially common during evictions, when politicians and the media use the Northern communities’ so-called ‘barbaric’ character in order to justify such brutal interventions – ‘this is how they are’ is a resounding phrase (Afenah, 2012). Most recently, the 2019 Ghana submission to the American Academy of the film ‘Azali’, a film in Dagbani written by two men of Akan background, Kwabena Gyansah and Gwandelen Quartey, who admit to having visited the North only for the filming, is a recent instance of the typification. Available on Netflix, the film follows the titular female character as she is trafficked by her impoverished mother, then manages to escape her oppressors and winds up in Accra's Old Fadama, where she is raped by a man, who, in the film's final scene, turns out to be her father. All the male characters are portrayed exclusively as sexual predators or idlers, feeding the now common circulating stereotypes of male savagery in the North (Holsey, 2008). Throughout my own research, whenever I explained that I worked with people from the North, I would occasionally hear derogatory comments, especially when ethnicity was combined with dwelling in city's margins. Scrap dealers in Agbogbloshie make numerous references to their experience of discrimination, instances of being presumed to be a thief or receiving negative comments on their tribal facial markings (associated with northern ethnicity).

At the same time, the 'North' is far from a singular and undifferentiated space. According to Der (1998), the transatlantic slave trade extended to the savannah in the early 18th century. This is when the Asante Kingdom, an expansionist empire between the coast and the north, began invading neighbouring regions to capture slaves. The Asante invasions of the Gonja and Dagbon kingdoms led to their defeat (Der, 1998). To avoid being captured, the Dagombas and Gonjas had to pay tribute through the offering of slaves to the Ashanti King. They began raiding neighbouring decentralised communities such as Konkomba and Talensi to procure them as slaves (Der, 1998; Goody, 1971; Holsey, 2008). Soon after slave markets were established in the main cities of the Dagbon kingdom and in other parts of the north, notably in Salaga, Yendi and Walewale. The tribute lasted up to the 1890s and eyewitness accounts record that the slave markets existed until 1894 (Der, 1998). In addition, independent raiding groups operated in the north (Ntewusu, 2017). Holsey (2008) points to narratives of a dangerous bush that is common in the north, where the outside is potent with wandering spirits that can entrap individuals. The experience of the trade is seen in villages that use landscape features to create remoteness and a natural protection. According to Der (1988) and Ntewusu (2017), other legacies include depopulation, stunted development of artisanal activities, and suspicions of witchcraft. Finally, present-day conflicts in the north play out along the lines of centralised versus de-centralised ethnic groups - consolidating the aforementioned axis of slave raiding (Tait, 1997; Goody, 1971).

By dividing the Gold Coast between the Colony, the Ashanti land and the Northern Territories, the colonial administration treated the north as a source of cheap migrant labour and a supplier of foods to other parts. Forced labour projects were consistently diverting scarce labour from the villages to achieve colonial projects such as roads, commercial agriculture or gold mines. The colonial administration is said to have had an 'inexhaustible' demand for head-porters (*kayayeyi*) to carry goods on foot before roads permitted transportation (Wiemers, 2017: 92). As chiefs were required to organise the recruitment, they came to be identified with the exploits of the colonial authority (Staniland, 1975; Wiemers, 2017). The attempts to generate a cash economy in the North were 'erratic', and in effect the need for cash was sustained by migration to work further down south (Sutton, 1989: 640). The British policy of indirect rule from 1932 meant that some chiefs were granted the power to act as proxies of the colonial administration which led to a reorganisation of relations between ethnic groups (Ntewusu, 2017). Some were put under Gonja rule, others under the Mamprusi, and finally others such as Konkomba, Bassare and Chokosi under the Dagomba king; those groups that had a centralised rule were termed the *majority* and those without such rule, the *minority*. Such rearrangements consolidated the regional discrepancies of power present, as mentioned above, during the slave trade. They have also been representing parties conflicting in post-colonial Ghana (Brukum, 2000-2001).

At the same time as they were exploiting the labour, the British enacted a policy of nondevelopment towards the north (Kimble, 1963; Plange, 1979; Songster et al. 2001). In 1912 Gold Coast Governor J.J. Thorburn stated that 'until the Colony and Ashanti have been thoroughly opened up and developed, the Northern Territories must be content to await their turn' (in Kimble, 1963: 534). The colonial government purposefully cut the North off from educational opportunities, seeing them as a potential source of resentment and challenge to its authority (Bening, 1975). There were only five schools in the entire Northern Territories compared to more than three hundred schools in the rest of the country on the eve of Ghana's independence (Kimble, 1963). To the same effect, the authority's blocking of missionary schools prevented the emergence of an educated elite (*ibid*). Meanwhile, political side-lining was evident in the Territories' belated admission to full membership in the Colony's Legislative Assembly in 1951, almost two decades after its creation.

After Ghana gained independence in 1957, Kwame Nkrumah's government created ten regions. The Northern Territories were split into three regions: the Northern region, the Upper East region and the Upper West region. All three regions experienced isolation from the country's politics and economy. Brenda Chalfin (1995) uses the term 'economic citizenship' to study the 'parameters of participation in and recognition by the nation-state' (133) of the shea nuts sector principally located in the Upper East region to show that different governments of post-colonial Ghana either withdrew from supporting the sector, extended limited development funds to it in the 1980s, or outright opposed its expansion to promote cocoa farming located primarily in the Ashanti and Volta region in central Ghana. Chalfin's research shows that Ghana's north sought to combat its political and economic isolation, and its membership within the nation-state was a terrain of struggle rather than an automatic incorporation. To show the north's incomplete inclusion into the national project, Abugri (2015) focuses on how the media specify the ethnic belonging of a person, only when the person comes from somewhere in the north while others are described as Ghanaian, and the media often confuse the names and locations of northern cities.

Ghana's north-south divide has been addressed by occasional political efforts. Kwame Nkrumah saw the need for a unification and an emergence of a shared Ghanaian identity above separate ethnicities (Fuller, 2014). He also recognised the need to develop the north and bridge the education gap by introducing free education and opening schools (Tsikata and Seini, 2004). He instituted the 'Northern Scholarship Scheme' that would relieve its participants of all burdens associated with pursuing education. At the same time, commentators claim that such steps were not sufficient - while new primary schools were indeed opened, only one secondary school was opened in the period of his government (*ibid*). Thereafter, most of the policies that would be directed specifically to address the situation in the north focused on agriculture. From the J.J Rawlings' times' (1979-2001) structural adjustment, the state withdrew its support from the sector. This means that the majority of people in the north now depend on subsistence agriculture with an addition of a limited cash cropping. Meanwhile, education is only free at the level of primary school. As many of the villages are remote, transportation costs impose further barriers to educational access for cash-strapped citizens.

The key indicators for Ghana show that the north-south distinction plays itself out as a developmental gap. In the 1990s and early 2000s, the highest poverty rates were in the three regions of the north (and remain until today). Although there has been a remarkable decline in the last decade, half of the inhabitants in the north are said to live below the poverty line. Moreover, the Northern region, where most of the Dagombas reside, has the greatest number of people defined as 'poor' by Ghana Living Standards Survey conducted by UNICEF (Cooke et al., 2016). The Northern region has also experienced the greatest levels of soil erosion with around a third of its soils suffering from severe erosion and gully erosion (Huq and Tribe, 2017). The illiteracy rates were much higher than in other regions in 2000 and stood at 76.2 percent (*ibid*). Only a fourth of the population in the region reached secondary education or higher in 2008 (GDHS). The extension of electricity to the region was equally belated (Dickson, 1975). The north's citizens are also undercounted in the national census - according to my interviews at the Ghana Statistical Services - which has had dismal effects on, among other things, the distribution of medical services and school subsidies.

The divide plays out in migrant population too. In her study of female head porters (*kayayeyi*) in Accra's food markets, a menial job that requires no entry capital and where women earn based on how much others choose to pay for their services, Yeboah (2008) found that some 70 percent of them were Dagomba and 80 percent of the women had never been to school. These larger processes are compounded by urban developments. Accra has been acting as the main place for foreign investment and represents a large part of the national economy.

Inside scrapyards

A walk inside Ghana's scrapyards reveals that these are spaces where ethnic identity plays an important factor in people's position in the economy. The most straightforward association is between an ethnic identity and a particular a type of metal scrap, especially when bought in bulk, while another association is linking ethnic identity to work activities.

Across Ghana, northern migrants collect scrap for sale. They rent out horse-drawn-carts that are carved with Koranic citations for encouragement. In groups of two, they proceed to comb the city for its metallic detritus, pushing the carts across distances - these are strenuous tasks that rely on bodily energies and perseverance. 'Truck-pushers' walk around until they find something of interest: a used car battery, a computer that no one can fix, a bike that collapsed in half, and they fill up their carts. Such a strenuous work exposes pushers to the unpredictable nature of urban life. It is widely known that truck pushers either carry capital in the form of scrap or money to buy scrap, and as a result there have been incidences of theft or grapple. As the collectors work without scales, they rely on 'visual' estimations to price goods (as seen in Chapter 1). The carts are also symbolic of northern identity. Across urban Ghana, the collectors are often referred to as 'northerners', thus people would say 'I sold my scrap to northerners', rather than truck-pushers or scrap dealers. Predictably, when collectors gather enough money, they buy a motorcar to be able to cover a greater expanse of the city and move around with anonymity.

Once inside the scrapyards, collected scrap is segregated by northern migrants and sold to workshops specialising in particular metals or items. Nearly all machines such as cars, air conditioners and fridges are dismantled in Dagomba-run workshops, while the initial disaggregation of computers (PCs and laptops) and mobile telephones takes place mostly in Nigerian-run workshops. The dismantling of the latter is further differentiated by ethnicity, the computer components that contain iron (such as DVD drives and hard drives) are sold to Dagomba workshops. The Nigerians keep power circuit boards (PCBs) that contain precious and they keep other non-ferrous (copper and aluminium) metals. All workshops hire the services of young Dagomba burners to extract copper from inside cables in exchange for a fee and a consent for them to keep some of the cables for themselves.

The goods are separated into iron, copper, aluminium, lead, and printed circuit boards that contain precious metals. Here too ethnicity predicts specialisation. Those who own scales effectively control the market. They position themselves as what Trivellato (2009) calls 'cross-cultural brokers' between scrapyards and the national and international companies that buy scrap metals. Northern migrants own kilogram scales and buy iron scrap, while Nigerian migrants (most of them of Igbo origin) buy non-ferrous metals using pound scales.[36] Everyone buys scrap car batteries, as the widespread use of cars in Ghana means they are easy to obtain. These distinctions are not innocent, rather they reflect *inter alia* people's capital - a kilogram of scrap iron is bought for around 1 cedis, aluminium for around 2-4 cedis per pound, copper for around 10 cedis per pound, and e-waste is bought per piece for an upward of 10 cedis. To trade in non-ferrous metals requires more capital and attuned accounting skills - losing a kilogram has little significance, losing a pound of copper represents considerably more risk.

There are some exceptions to these general trends, but all individuals of other ethnic backgrounds that I interviewed had to position themselves within this wider social map at one point or another. For example, a Ghanaian broker of Ga origin dealing in iron scrap told me that upon entering the business in the 1980s, he pretended to be working for a Muslim man (posing as a 'Sadik boy') in order to be able to penetrate scrap networks without running into challenges of social trust. Such distinctions are also evident in scrapyards, where non-northern young men arrive in the early hours of the morning (between 4am and 7am), to use the workshops of people with whom they have informal arrangements to separate metals and sell their finds thus substituting their income in other parts of the economy. One of such men comes here after his shift as a security guard in one of Accra's beach-front hotels that pays at the end of the month with recurrent delays. The man collects and sells small fractions of metal that upon sale reach around 10 cedi, enough to buy food during the day. He does not work here during the day. His decision not to work in scrap full-time is precisely not to be associated with the dirty work.

These forms of ethnic delineation are not set in stone, yet are the result of economic opportunity and its distribution within scrapyards. The entanglements between ethnicity and position in the economy determine recycling processes, infrastructures of capital and communal care and redistribution within ethnic hierarchies.

[36] The few Ghanaian scrap dealers who appear to buy these non-ferrous metals eventually sell them to Nigerians, who act as brokers between scrapyards and metal buying companies located in central Accra.

The Dagomba recyclers engage in processes that require strenuous work - as expressed by the need to use hammers, chisels and screw drivers. Their workshops are visibly more dangerous: chips project onto the ground and sometimes hit people's bodies leading to injuries that mobilise scrapyards informal infrastructure of care. The workers take numerous measures to address injuries without having to resort to medical institutions as getting back to work is a priority. Such a need of an efficient care led to scrapyard solutions: the fast cure for bleeding cuts is to rub them with dust from inside car batteries or with soil mixed with sulphur acid from car batteries - a painful but efficient method of cleaning a wound by effectively burning the wounded skin. Other quick fixes are pain medicine such as the opioid painkiller Tramadol mixed with energy drinks that are available from ambulatory sellers. The consumed energies are refuelled energy drinks that are ubiquitous and a top sale for all ambulatory sellers who hawk refreshments directly to the worksites.[37] A nap is a way for 'cooling' muscle strain, soothing a headache or recovering from the exhaustion of squatting and scrapping, and there are no prohibitions in scrapyards around taking naps whenever someone feels they cannot carry on. Any surface yields itself to such occasional rests - inside pre-recycled cars; freezer doors; and office chairs that come from office waste streams.

The scrapyards are also places of ambulatory medicine for sale - Dagomba and Hausa men tend to sell plant-based medicine (*tim* in Dagbani) that are prepared following secret recipes and fortified with prayers, and that adopt the traditional medicine of the savannah to accidents of the scrapyard. As one such healer explained to me, traditional medicine is adaptable as savannah seasons (dry and rainy) expose bodies to changing conditions from outside, while strenuous farm labour and food shortages replicate the hardships of scrap labour and life in squatter settlements that have been cut from municipal services. The ambulatory selling of 'Western' medicine - a parlance for packaged medicine irrespective of its country of origin - is a work for educated men and (mostly) women of Dagomba

[37] At the time of my fieldwork, seven brands of energy drinks were hawked in scrapyards: Lucozade, 5 stars, Run, Storm, Big Bo$$, Rush! and Bullet. Three of these brands are either owned or endorsed by some of Ghana's most popular public figures - musicians Shatta Wale and Stownboy, and football player Asmoah Gyan. The market choice combined with high profile endorsements suggests energy drinks are popular across Ghana and not only in scrapyards (see a study on popularity of energy drinks among drivers in a Ghanaian bus station: Emmanuella Yayra Saku (2020) 'Energy drink: the consumption prevalence, and awareness of its potential health implications among commercial drivers in the Ho municipality', *BMC Public Health,* 20 (1304).

origin, who collect a list of ailments and procure relevant medicine from pharmacies. All sorts of medical novelties circulate in the scrapyards - nurses come here on their off-days to check people's blood pressure; students on part-time courses share their knowledge of healthy diet and sell products to manage associated risks.[38] In those cases that require further medical attention and a visit to a hospital, communal organising is quickly put in place. For younger recyclers, who incur substantial accidents during their work, their protectors within the scrapyard (older kinsmen, chiefs from village of origin, executives) organise chaperones and money for medical fees. In particularly difficult scenarios, money is raised to send the injured person back to the North for recuperation.

The Dagomba workers in Agbogbloshie emphasised that their work does bring 'suffering'. 'We suffer', 'this is how it is for us', were among the circulating phrases that were met with nods. At the same time, the daily need to continue and thrive creates a repertoire of motivations, communal strategies, and beliefs. Some younger Dagomba men refer to power - a bodily constitution (sometimes enhanced by plant medicine) that protects them against the outside. On a daily basis, men tease each other for being weak. Whenever I participated in more strenuous tasks - following the work in the scrapyard from dawn to dusk or assisting in long collection walks - I would become the butt of jokes too. For example, 'You won't be able to do it!' or 'your feet will hurt you too much, your shoes will burn you', 'you will come back crying!'. After a while, I noticed that these forms of teasing were invitations to show others your strength and bask in words of recognition at their conclusion. The men were quite imaginative at inventing encouraging words - workers who persisted were called 'champions', 'olympic medalists', or (on one occasion) 'Mohammed Ali'. The Dagomba men assert that their bodies are sturdy from their past experience of farming and poverty. And the scrap work is assessed vis-a-vis a comparative scale of past experience. Chief Awal, a senior scrap dealer and a chief, who works in Mortuary Road, recounted the pains he associated with his youthful life in the outskirts of Savelugu, the second biggest town of the Northern region, during an extended interview: 'From a young age, we go farming, far, far away from [where] we live. Sometimes the food you get is not properly cooked because of problems with

[38] As scrapyards are places characterised by a constant circulation of money and exchanges between money and scrap, they become spaces of liquidity and in consequence, small-scale ambulatory entrepreneurship of all sorts. Medical entrepreneurship is sub-category of such entrepreneurship.

water or gets old as the dry season finish[es], your stomach pains you so much! You have to go to relieve yourself again and again. At the end of farming, your body hurts […] This is why for us this work here is not so hard'.

The Nigerian dealers do less strenuous segregation (such as dividing computers into parts with screw drivers), follow close accounting of exchanges between scrap and money, and hire a Dagomba workforce for their workshops to do the more strenuous tasks of lifting or recycling. They also engage in daily routines of distancing themselves from the scrapyards - be it by avoiding to eat food while at work or occasionally describing their fellow scrap dealers as 'those northerners', repeating in private conversation the stereotypes that circulate about 'northerners' in Ghana and follow similar patterns as regional politics in Nigeria. All sorts of Ghanaians would suggest that Dagomba scrap dealers are used to living amid scrapping and its associated pollutions, as one scrap dealer in the Dagomba Line in Kumasi put it bluntly: 'it's part of their life; it doesn't harm them'. When following the work in Nigerian workshops, I would occasionally be perceived as a confidante, who shares a common understanding – 'you see how these people are', my Nigerian interlocutors would say pointing towards their neighbours or workers. George, one of the Nigerian scrap dealers in Agbogbloshie, similar to his other friends, hired a Dagomba 'boy', who aside from performing the physical labour, was also responsible for handling cash exchanges. In effect, the worker shielded George from any dissatisfactions that might occur at the scale when the picker's expectations of gain do not match their eventual profit. George has been in Agbogbloshie for seven years now. He was anxious about the health effects of his work environment. His workshop was located near the standing waters of the Korle Lagoon and he consistently came down with malaria that he brought to work, as his work schedule permitted only a few weeks of holidays around Christmastime, when he travelled to his hometown in the Enugu state in Nigeria. Some Nigerian migrants moved their operations away from Agbogbloshie out of fears for own health. And doing such move or merely treating the scrapyard as a stepping stone was a recurrent feature of conversations and life projects.

The prejudice voiced by Nigerian sellers express attempts of making sense of inequalities and communal arrangements inside scrapyards. They were not acting as inhibitions for daily communication or business, although they made occasional cheating of each other easier and outside scope of moral evaluations. The men traded with each other and struck friendships across the board, usually along income class divides. The Dagomba men were not free of their own prejudice against the Nigerians, such suspicions were usually related to suspicions that they were cheating or earning too much profit. None of the scrap dealers' associations in Ghana (two of them controlled by Dagomba scrap dealers) have Nigerian members in executive or affiliative positions.

Pollution and its custodians

Scrap dealing in Ghana is associated with pollution and toxic exposures of different orders. The continuous challenge of scrap dealing is how to contain such exposures within the community in order to be able to continue.

Over the course of my visits between 2016 and 2019 to Kumasi's scrapyard of Dagomba Line, I saw one local controversy develop in stages. The Dagomba Line, as its name suggests, is inhabited by Dagomba migrants from Ghana's North. In contrast to the sprawling Agbogbloshie, the Kumasi settlement is smaller, it brings into close proximity scrap operations and kiosks built to house migrant families and scrap operations. Similarly to Agbogbloshie, the Dagomba Line, where scrap activities take place, crams into an extremely limited space between the gutter, more formal neighbourhoods with people living in houses, and migrant families living in sheds. Indeed, many of its activities take place in front of the windows and balconies of their wealthier neighbours. The Dagomba Line is not a separate world to that of Agbogbloshie in Accra. Many men have worked in both places at some point in their lives. Others occasionally travel to Agbogbloshie to visit their family members or to sell goods. The Dagomba Line brings into sharp focus the tense negotiations between economic gain from scrap and the toxic burden associated with it.

In 2016, the Dagomba Line was a site of a heated contestation between the scrap dealers and surrounding communities that came together to call for the end of burning activities in the area. One of the activities associated with scrap dealing is the burning of cables to retrieve metals from under their plastic coating. It releases a toxic smoke into the air that immediately disperses horizontally and vertically enveloping those in greater and lesser proximity. Closer to its origin, the smoke is heavy and fills peoples' lungs immediately. People liken it to heat entering inside their bodies. From personal experience, the smoke spreads inside the respiratory tracts, from the nostrils to the bronchioles, creating a heightened awareness of one's own anatomical constitution.

As toddlers played and women cooked next door to such recycling activities, local entrepreneurs built some 7-metre high chimneys to decrease the horizontal diffusion of the toxic fumes and to channel the smoke upwards. These chimneys were made from rusty steel drums piled one on top of another. And the owners charge up to 1 cedi for use depending on the amount of goods to be burnt. The navigation of smoke created a business niche in its own right. To preserve their business, the owners have started policing open-air burning, but were not able to stifle it completely. Rebel burners descended down the open water drain that runs through the scrapyard and used its architecture as a smoke channel in its own right.

I did a series of interviews with people in the Dagomba Line about these chimneys and the proximity of the smoke. While no one denied the dangers or the difficulties of having to breathe in the air, almost without fail people voiced a sombre assessment, perhaps most clearly expressed by one of the Dagomba Line's inhabitants, Razak, a man who assembles computers from electronic waste: 'This is our business, without this business we couldn't be in the city. We all work here, we all understand it, we are all part of it'. Yacubu Seidu, who acts as the secretary of the Dagomba Line Scrap Dealers Association, mentioned that 'what is happening here is no different to Agbogbloshie. This is our Dagomba work in the city. This is how we survive'.

Already in 2016, the chimneys in Kumasi were stirring a controversy, not from the community that lives off recycling, but from the neighbours. The bulk of the contestation at the time came from Hausa-speaking artisanal leather tanners, who sat in the way of the smoke not far from the Dagomba Line and from a health clinic that was operating in the community's vicinity. Bawa, a leader of the outcry, a University of Ghana Business School alumnus and an artisanal leather tanner, observed a pattern in which the members of his community were told not to smoke cigarettes during their visits to the doctor, despite not smoking. He thence inferred that their lungs must be affected by the nearby scrap activities. During our interview, Bawa understood that the Dagombas economic survival was at stake, and he emphasised that he was afforded a critical position as a consequence of having his own stakes in a different economy that does not rely on burning. As we talked in the mosque that serves the tanners and their neighbours, he was striking a conciliatory tone of someone that obscured instances of confrontation. To speed it up, some men associated with Bawa began destroying the drums during the night. They feared that unless the latter was done, there would not be any real change. The entrepreneurs erected them back during the day and the situation persisted. I was assisted during the interviews by my friend Abdallah, who worked as a scrap dealer in Agbogbloshie and lived in its vicinity. When we finished the interview, he remembered that before his own admission to the University of Ghana, he too had to undergo a medical examination after which he was recommended not to smoke - a warning that at the time he dismissed as a sign of the doctor's lack of expertise but in the light of the interview he re-assessed as linked to his own work and exposures.

By 2019, the concerted efforts of neighbouring communities, the Asante king's emissaries,[39] and municipal actors have managed to bring results: the drums were gone and burning decreased. Some men waited until night to do the burning, while others travelled to less-sparsely inhabited areas outside Kumasi to burn. The solution was not ideal for business. It did not diminish the toxicity that the inhabitants of the Dagomba Line deal with on a daily basis - mothers still find their toddlers playing with the chips of scrap, unless supervised closely; men continue performing recycling at night or 'in the bush' - but it did diminish the influence of those activities on the nearby communities.

[39] The Ashante King (Ashantehene) is perceived to wield power over Kumasi's territory.

In Agbogbloshie, burning activities define the place in the glare of the media and the municipality. The media and academic analysis read the burning as the materialities of unique global inequalities, while the municipality and wider public are angered by the pollution. Within Agbogbloshie, burning is embedded in communal life. Scrap economies are so intimately interwoven with the communal fabric that burning is seen as work that represents people's skills and characteristics. Unlike in the Dagomba Line where burning is an activity performed by all sorts of people, in Agbogbloshie, the burning is an area of a narrow speciality. On the one hand, the burning is defended as a livelihood. On the other, it is perceived as a livelihood appropriate for some people more than others. Thus burners would be seen as those who are not skilled enough to do other tasks or who are otherwise too short-willed or dependent on drugs to perform more strenuous activities in the scrapyard.

The burners tend to be younger men, whose work on a daily basis puts into perspective the contradictions of the different forms of globalisation that intersect in scrapyards: on the one hand, they burn to extract metals and are in the first wave of the dangerous fumes; on the other hand, the publicity around Ghana's toxic plumes means that their work is also to assist international photographers, journalists, and artists. They straddle two forms of burning: the burning that is their daily work that exposes them to toxins and occasional conflicts - for example with representatives of a nearby church who protest burning whenever their congregation members want to play at the church's football pitch; and the spectacular burning ensured by pouring extra gasoline for photographs and videos.

Within the scrap community itself, a certain tolerance was extended to the legitimacy of the burners' work with occasional stealing that the boys would do to sustain otherwise meagre fees for the burning (e.g. leaving some of the burnt copper for their own sale at the end of the day). When I asked Mallam Yusif, a former executive member of the Greater Accra Scrap Dealers Association, an elder in the scrapyard, about the attempts to stop burning that were championed by the NGO Green Advocacy who channelled international funds to buy wire-strippers, he was wary of mechanised solutions to the burning. 'By all means, we need to consider others and their situation. We can't take away their work', he contended. The same sentiment was voiced by others inducing the emissary of the National Youth Association (NYA), an institution that owns the land under Agbogbloshie. In one of our conversations, Mr Lamprey explained, 'NYA officials or I, so far as I'm in charge, I haven't said that they should stop [burning]. They should continue to do their work! Their health is important. Nobody asked them to stop.'

Burning enters into strategies of cheating that allow scrap dealers to earn more money vis-a-vis Nigerian buyers in the scrapyards. The skill here is to burn just enough for the metal to reveal itself from under the plastic coating, but still leave some plastic coating on to increase the weight. Another strategy is to smother burnt cables in dust, where some particles attach to the remains of the gasoline.

Burning is also an occasional response to the exhaustion of energies in Agbogbloshie, where men occasionally simply lacked the physical energies to perform the more meticulous work of dividing metals from plastic. One of such occasional burners was Bashiru. He came to Accra from the North in 2016, where he worked as a farmer. A political die-heart and a foot soldier for the political party in power since 2016 (New Patriotic Party), Bashiru's political leanings were being announced from afar with political flags and posters plastered all around his workshop. He lived a life on the edge - chain smoked marihuana and slept little. During the nights, Bashiru worked as a security guard at a government institution - a position that he got through his political affiliation. His business depended on his political membership - he occasionally extorted money from others using his party affiliation as a threat. He was also getting 'computer bodies' for free. 'Computer bodies' are computer casings that under a plastic coating hold very light iron. For a long time, these 'computer bodies' had no market in Ghana, but recently a Chinese smelting company in Tema, Sentuo Steel, has began purchasing them. The profit margins on the casings are slim, but Bashiru's costs are low. After all, he demands that Nigerian traders bring them in exchange for their peace of mind. Bashiru often engaged me in conversation. It was evident that his mental and physical energies were reaching a point of exhaustion from the busy schedule of hustling and political work. Bashiru was known to occasionally resort to burning. The computer casings piled up, but Bashiru was often too fatigued to divide the plastic from the iron. Occasionally Sentuo rejected his goods, citing the excess plastic as a reason. Upon his return, Bashiru incinerated the excess plastic to be able to quickly take it back and get his money.

Scrapping and squatting

The scrapyards cum living spaces created hierarchies that are mapped onto each other. Scrap dealers with more substantial amounts of money tend to be landlords in the nearby settlements and are also political party members. They invest in three forms of capital that are valorised across these spaces. Their status as landlords brings a steady stream of cash, which fuels scrap business and vice-versa. The ability to rent rooms and incorporate newcomers to scrap collection networks forges social capital as newcomers owe their urban fortunes to specific individuals. The political membership translates into opportunities to buy government scrap and plead with local politicians to keep the communities in place.

The people in positions of power are those who have multiple forms of capital (as seen in Chapter 1). They partake in bankrolling the economy, organising scrap collection networks and contacts with the companies. Others rely on small increments of profit that are crucial to carrying on in place. All services in the area function on a pay-as-you-go basis. Landlords letting rooms charge their rents on a weekly or monthly basis, which is unlike lettings in the rest of Accra where a year or two year advance is necessary to rent a room. Such pay-as-you-go services attuned to how people earn money at lower ends of scrap economies (and urban economies more generally). In absolute numbers, residents might be spending more money on basic services and housing than their counterparts in the more liveable parts of the city, but they are prevented from accumulating capital in order to move elsewhere.

Scrapping and squatting as sensory regimes

As I became familiar with scrap dealers, one of our recurrent topics of conversations would be body ailments. Scrapping and squatting is a 24h-long assault on people's bodies. Squatting an unwelcoming land creates a sensorial experience of multiple bodily and mental pressures that are accentuated and amalgamated with the labour process. Sensory regimes are an interpretation of tactical methodologies of engaging with the unexpected sites of past and present inequities that Catherine Fennell interprets as being 'alive to the sensory regimes through which social and historical actors register the cumulative damages of (post)colonialism' (Fennell 2018: 523). In her discussion, Fennell notes that sensory regimes, revealed through metaphors and descriptions, might strike as imprecise heuristics, yet they give witness to the pronouncement made by interlocutors about the contexts of their life and their impact. Rosalind Fredericks (forthcoming) observes that infrastructural labours in dumps breed biochemical intimacies 'as pickers' bodies absorb the matter being transformed and specific labours concentrate exposure' (forthcoming). Such intimacies require perseverance or creativity to continue and thrive.

Squatting an unwelcoming land creates a sensorial experience of multiple bodily and mental pressures. In the context of squatting, the lack of infrastructure conveys that the migrants are not regarded as part of the city. Indeed, the squatting place is explicitly produced to prevent them from thriving.

As people try to lead their lives in Agbogbloshie and its vicinity, they stumble upon discomforts. These are crystallised in the daily lives of women, who are usually the ones to maintain households in these unwelcoming surroundings. My assistant Kubura's sister, Memuna lived in Agbogbloshie. Whenever we went to visit her, we had to take many unexpected turns, weaving our path between kiosks and defunct freezers used to store tools and scrap overnight. Memuna's shed was adjacent to a typical scrapyard workshop, where a group of men were busily dismantling fridge motors, causing occasional chips to project towards a blackened soil. Memuna shared the shed with her husband, their two-year old and four-year old sons. She struggled to keep the little boy within the safe perimeter of the shed. He wriggled himself free and inevitably rushed to either dive his hands into the soil, curiously putting bits of it in his mouth, or to pick up occasional scraps to show to his mother. Memuna stared at the boy, from time to time remembering that her child's activities would be considered normal in another context, but in Agbogbloshie, they signified potential dangers of cuts. She would gently slap the boy's hands away to make him stop.

Kubura and her sister did not grow up in the same environment. According to a Dagbani custom, Memuna as the firstborn daughter, was given to the most senior of her paternal aunts. Memuna's childhood consisted of her partaking in household chores at her auntie's house in the village, which denied her an education as the adoptive family lacked resources to spare on her. She was later married off at an early age. These traditions are often perceived by many Dagombas as ones to blame for marring Dagbani women's prospects in an ever-changing Ghana. The surrounding Lagoon is clogged with standing waters, which in turn create the breeding ground for mosquitos. Memuna and her son's legs bore witness to these daily onslaughts. Work in the scrapyard begins at dawn, which means the steady drum of metals assists their daily life. Her shed is located at the back of the scrapyard close to the burning site. Whenever there is a gust of wind that blows in the shed's direction, the area is inevitably enveloped in smoke that renders breathing difficult, while the smut gathers on bodies and clothes. Memuna's son's feet and hands are often darkened by the soil, and since there is no running water, only a bucket brought from a public toilet located some 200 meters away, the smut is inevitable and Memuna says that at some point she stopped noticing, otherwise she would 'just worry too much' ('*muh'sugu pam*'). Memuna occasionally resorted to buying food rather than cooking it herself - there is more work in the adjacent scrap businesses, she doesn't have space for her cooking pots.

Amid my writing about Memuna in 2020, Kubura sent me a message that Memuna's slightly older son died. I immediately assumed that this was related to the proximity to work activities - maybe he had stomach problems from the proximity of the activities. The cause of death - as I later learnt - represented rather the immense strains placed on people by the continuum of scrapping and squatting. Memuna, who occasionally dealt in car battery scrap had to walk to buy a scrapped car battery and left her son alone at home. She left the five year-old with some money in case he needed to buy water or go to the toilet. The boy wandered off as his father was immersed in work. For reasons not fully clear, the boy ended up drowning in the nearby lagoon waters.

Squatting: being made to feel temporary in urban Ghana

The migration towards urban centres in the south of the country fits into longer histories of labour migration. While in the past mining and agriculture were primary destinations, urban scrap economies have emerged in the 1990s and afford new opportunities in urban centres. Like other sub-Saharan cities, Accra's population grew exponentially in the 1980s until now, making the land ever scarcer and the housing stock falling short of the demand - most of the housing stock is single storey. Meanwhile, northern migrants come from subsistence agriculture contexts, where cash is difficult to come by, and their biographies are coloured by having been cut from education opportunities. Agbogbloshie, Mortuary Road and Old Fadama are all located on the banks of the Korle Lagoon in Accra, while the Dagomba Line is located on the banks of the Subin drain in Kumasi. All share two features: they are representative of the fissures of urban fabric - environments layered with diffuse forms of duress that were previously judged uninhabitable by others - and the migrants are squatters without a formal hold on land - making them vulnerable to threats of eviction and whims of patrimonial relations.

The Korle Lagoon and other locations in Accra

Accra became part of the British Colony of the Gold Coast in 1874. At the time, the Korle Lagoon marked the western edge of the city's territory, and came to feature in the Colony's municipal designs but never as a place for settlement. Rather Roberts' (2010) archival research reveals the Lagoon was a target of colonial intervention. After the First World War, the British planned to dredge the Lagoon in order to transform it into a deep-water harbour, but contestations from Ga authorities eventually sunk the plan in a judicial dispute (Dickson, 1965). During the Second World War, the Lagoon was identified as a breeding ground for mosquitos, which led in 1942 to the established a Malarial Control Area around the Korle Lagoon. This was a study meant to estimate the level of mosquito prevalence. The study hired 19 migrant workers from the Northern Territories to work as human baits in sheds built on the banks of the Lagoon. Such reliance on cheap labour from the colony's Northern Territories was in tune with the wider colonial policy. Every morning, experts counted the bites on the bodies of the workers, sprayed the shed with pesticide and counted the dead mosquitos. The workers were subject to harsh living conditions with limited household supplies, they were instructed not to kill the mosquitos, and had to rotate houses to meet the study's methodological designs.

After Ghana gained Independence from Britain, the new government adopted the Master Plan of Accra in 1958, setting the Korle Lagoon as an open space, planning to dredge the area in the future and keep it in 'a clean state fit for boating and swimming' (28), which echoed previous colonial designs. Independent Ghana's Constitution establishes traditional landholding and gives the state the right to expropriate lands for development. It is within this framework that the Municipality expropriated some of the lands from the Ga chiefs for the purpose specified in the Master Plan. Since the works never took place, the land is the subject of ongoing restitution claims. The Master Plan also identifies a fraction of the area as a 'slum for remedial treatment' (*ibid,* 52). Other sources also mention limited settlements and dumpsites amid a bush (Acquah, 1958). Although there are accounts that portray the place as a natural environment (Little and Akese, 2019), such claims are occasionally made to emphasise - directly or tacitly - that the northern migrants who inhabit the Lagoon presently are solely to blame for its current degradation. For example, there is a persistent trope in the media to blame inhabitants of the Korle Lagoon for clogging surrounding waters with wastes, despite the fact that their settlement is where the water from further upstream gather, or perpetuating cholera outbreaks due to unsanitary methods in cooking, despite the fact that cholera is often linked with poor sanitation and thus a failure of the municipal authorities to provide for their populations (Rams, 2015).

In the 1990s, the smaller squatter settlements around the Lagoon grew in number which was in tune with the general rise in urban population numbers. The new arrivals had to wrestle the land from bush and unregulated dumpsites. Their actions met with concessions from the municipal authorities, but these were only temporary. Old Fadama's population boomed in the mid-1990s after refugees of Northern conflicts began migrating to the city. The then-Mayor of Accra Nat Nunoo Amarteifio remembered the time in the following words:

> 'My first year in office coincided with the resurgence of the low-level civil wars in Northern Ghana. All of this was far from my concerns in Accra. I was then approached by an MP from the area, who asked me if I could allow her constituencies, who have been victims of this war to settle temporarily on the piece of land in Old Fadama. They were coming to Accra anyway. The MP assured me that they were convinced that the war wouldn't last for more than a couple of months. After which the people could go back to where they had come from. It didn't seem like such an outrageous request under the circumstances, so we agreed. And the settlement would begin. We didn't realise the problem we had begun. Until the numbers started increasing. At the first hints of trouble, the Ga people who were the original owners and settlers of the land, complained, 'why is the city allowing strangers to come in?' (…) We hadn't realised that they could leave for the simple reason that we have given them a prime living space, right next to the only jobs they could get in Accra, given their lack of skills and capital. They started portering, carrying things from the market [and working with the waste]. They had to simply walk out of their house and they were in their office (…) There is not a place other than Old Fadama for people who have no education, who simply have their youth as their selling point. And who are willing to carry anything, for anyone, the most difficult distance (…) Old Fadama didn't result from budget constraints. It was deliberately marginalised. Yes, we didn't want to encourage people to settle there by providing infrastructure. And the thinking was that once you provide infrastructure - like electricity, water, schools - more people will come. So we didn't want to do it.'

Similar words are echoed in statements about Agbogbloshie from civil servants of the National Youth Authority, the current owner of part of the land around the Lagoon after acquiring it from the autochthonous population of Ga people to implement the Master Plan. The following sentiment was voiced by a civil servant, the aforementioned Mr Lamptey, who is the Authority's representative in Agbogbloshie:

> 'Those people you see they are squatters. Once they are squatters, they are just earning a living. So importantly, their living can't stop the future. It can't stop the future project that I, you, or our children, grandchildren and great grandchildren will come to appreciate as the transformation of this place. Their [the squatters'] activities can't stop the projects ahead.'

Similarly, difficult contexts define other scrapyards' locations. Dzworulu, where many of the wealthiest scrap dealers work, is located on a property that belongs to the Electricity Company of Ghana (ECG) and the scrap dealers sit under an electric highway that is deemed unsuitable for formal housing, making it a central location that is nonetheless available for squatting. The scrapyard in Ashaiman is also under the electric highway as well. The men, who sit in these scrapyards timidly wonder if the location does not expose them to harm. Alhaji Karim, Dzowrulu's prominent scrap dealer, mentioned that he fears getting 'cancer from the cables'.

The Dagomba Line

The Dagomba Line in Kumasi is located on the banks of the Subin drain. To find one's way to the settlement cum scrapyard, one has to stray off formal roads, wander behind people's houses and shops and find unbeaten paths. The area is central but hidden and unconnected to urban infrastructures. It consists of paths along the drain - a proximity that influences the odours that surround the area and combine with the smells of recycling. The location on a floodplain - like in Agbogbloshie - means an onslaught of mosquitos and thus a heightened risk of malaria. The land formally belongs to the Kumasi Municipal Authority and the community was able to broker a personal relationship with a representative of the Assembly, who would occasionally come in to the place and collect money from people. As the activities are located in other people's backyards, the migrants experience a palette of reactions - some understand their strife and allow them to continue, while others were noted for destroying properties during the night to vent their dissatisfaction with neighbours, who are deemed cumbersome.

Evictions

One of the crucial contexts in which Northern migrants are made to feel temporary is through the persistent threat of evictions that, whilst materialising only occasionally, leaves an imprint on people's psychic and material well-being. The biographies of my respondents were coloured by the experience of evictions - marked by facing bulldozers, being teargassed, seeing one's own possessions destroyed - and through the aftermath of those events.

My friend Abdallah's biography and career are tied to the communities around the Korle Lagoon. We have known each other for more than five years and I have been a witness to Abdallah's tortuous biography that over the course of five years has entailed scrap labour in Agbogbloshie, graduating from the University of Ghana Business School with a Diploma in Accounting, forming an NGO to improve the lives of children in the nearby community of Old Fadama, working in an NGO that distributes imported secondhand bikes across the country, launching a scrap dealing business in Agbogbloshie, and solidifying a political career by winning an election to the executive board of a political party (specifically into the ranks of the National Democratic Congress).

Abdallah's urban life was defined by different degrees of proximity to scrapping and squatting: the communities around the Korle Lagoon provided him a footing in the city from which he pursued educational and political projects, often receiving financial aid from scrap dealer friends; the networks that allowed him to move to other employments were also forged here. His work in Agbogbloshie at the age of 17 required him to cut car batteries open with a machete, pour out the acid they contained onto the ground, and put the batteries onto a pile, until enough were gathered for his 'master' to sell to a company. These days, Abdallah rarely makes his appearance in Agbogbloshie, but he owns a scale and hires a 'boy', who buys scrap metals with his capital. Abdallah takes a cut of the profits and spends the rest of the days pursuing political projects. His biography and his more recent political life mean he has experienced the stresses of squatting as a personal challenge and a communal trauma.

In 2015, using the contacts he had established while helping in the making of two documentary films on e-waste in Agbogbloshie, he gathered enough funds to build a children's centre in Old Fadama. His wish was to provide a place where children can do homework, without their parents' needing to pay fees: all schools and nurseries in Old Fadama required a daily fee and were over-subscribed. By mobilising his networks, Abdallah was able to raise some 4000 USD. Part of this was spent on buying a former chop bar on the bank of the Lagoon. The windows gave view to Agbogbloshie's burning site. He never received formal titles to the property, but various community leaders - the chairman of the National Democratic Congress for Old Fadama and traditional chiefs - recognised him as the new owner. Straight after the purchase, he managed busy renovations of the chop bar to adapt it to its new purpose. The opening of the centre was scheduled for June 2015, a beginning of the rainy season that spelt heavy floods in Accra's central districts, which killed 25 people and were an indirect cause for an explosion at a petrol station that killed a further 250 people. The public outcry in the aftermath of these events was enormous - it was the deadliest single incident in the country's 21st century history.

The then Mayor of Accra, Alfred Oko Vanderpuije was under pressure to show that his government was preventing further floods. He announced the need to dredge the Korle Lagoon, and cast the residents as encroachers preventing the machinery's access to the lagoon's riverbed, while simultaneously clogging the Lagoon with waste and adding to the problems. He ordered an eviction of the outer edges of the settlements. The area to be affected was announced with a one-week notice, but the exact perimeter changed widely during the eviction process. Abdallah's newly refurbished centre was bulldozed to the ground; his neighbours also found that their businesses and homes were destroyed. A rough estimate by local leaders suggested that some 1,000 people were rendered homeless, but the figure is likely to be much greater, as people dispersed across the city.

In the process of the eviction, Abdallah took a series of photos showing people moving hurriedly, while carrying rapidly-packed belongings and posted them to his Twitter with captions: 'displaced people running nowhere' and 'people are carrying their things again because of the rain. To where? I can't tell'. When the bulldozing was followed by the military's use of teargas and the deployment of helicopters to stifle protests, he added: 'we are feeling the full force of our own country'. Together with others, Abdallah ended up in the few open spaces around the road adjacent to the community. On regular days, the place is taken over by naming ceremonies, funerals, and performances of Old Fadama's theatre groups. They all worried about the night and the forecasted rains. Some days after the eviction, Ghana's Presidential office sought to redress the resultant homelessness by organising buses to the North and giving people pocket money to leave Accra. Six buses were announced and transported residents to Tamale, the biggest city in the Northern Region. According to Abdallah and his friends, the eviction and the buses were a clear suggestion to the migrants that their welcome in Accra was tenuous.

The 2015 eviction was one in a longer series of similar events. In the 2000s, such partial demolitions in the Korle Lagoon area took place five times, namely in 2002, 2013, 2015, 2018 and most recently in May 2020. Each time they affected the outer edges of the settlements along the Lagoon's waters. In addition, the perception that the entire wealth of social and economic life that takes place in the Korle Lagoon is a temporary aberration, is firmly solidified in discourse and practice. The National Slum Upgrading Strategy from 2013 refers to Old Fadama as a migrant slum, which stabilises it as a transitory settlement, as 'a creation of economic migrants whose original intention is to transit for economic benefits'. The demolitions are brutal and poorly planned, all demolitions (except for one that was a self-demolition in 2012 organised by seniors of Old Fadama to secure the community against police and military violence) were carried out without sufficient notice, without clear demarcation of affected perimeter, and without regard for the belongings of the migrants.

Abdallah's centre was a source of angst. For months, he blamed himself for having chosen the wrong location. He also felt that he had lost all credibility vis-a-vis the people who paid him money for the centre. He judged that a partial eviction that unfortunately affected his property sounded like a too-nuanced story to transmit to audiences afar. He also felt shame about having to rely on spaces so tenuous, where he was perceived to be a temporary resident, who should eventually move elsewhere. Abdallah admitted that he occasionally heeded to the state's discourse and believed that remaining in

Old Fadama was a failure on his part and an imposition (showcasing that the 'right to the city' (Harvey, 2008) is contextual, while its assumption, a form of privilege). It is in the aftermath of his project's demolition that Abdallah turned to politics in earnest. He also came to rely on a forward-looking strategy that he referred to as having 'eyes that are constantly scanning the environment for opportunities', rather than being affixed to a single place.

As I assisted Abdallah in his political bid in 2018 on his visits to constituents from whom he sought to gather votes, we would collect the stories of how squatting and evictions have influenced people's lives in the long-term. On a single day in August 2018, we began by visiting the scrapyard of Mortuary Road, settled after Ga chiefs agreed to lease land to scrap dealers affected by an internal conflict in Agbogbloshie, and where the Mayor of Accra created various hurdles for access. In December 2017, he ordered machines to dig out access routes to the scrapyards, thus making it difficult for scrap to be transported in and out of the place - something that infringed the scrapyard's economy in the long-term. Then, Abdallah would hop on his motorbike to visit the family of a deceased woman in Old Fadama to find that the five-member family had been living inside a small van that was propped on a slope at an angle that meant the family had not enjoyed a night's sleep on a level surface since 2015, when the previous shelter was bulldozed down together with the woman's shop that stocked second-hand garments. Was the stress of such living circumstances something that contributed to the woman's heart condition? - Abdallah wondered as we stepped out of the van. The stories of people's hard-won capital being destroyed within a matter of hours form a backbone of the Lagoon communities' shared and circulating traumas. They send a message that peoples' stories of the eviction were the result of authorities' unwillingness to learn about their situation and their readiness to scapegoat them for urban problems.

Being afforded comparative scales: what is the city supposed to be like?

Kore Lagoon's residents had a bittersweet relationship to their districts in urban Ghana - places that gave them a footing in the city, where all depended on what kind of people one surrounds oneself with, and that one without fail sees the place in a new light, when one has the benefit of moving elsewhere. Abdallah and his friends often repeated: 'Most of us who come from the north, we don't know what the city should be like. We assume that Old Fadama and Agbogbloshie are the city and this is just how it must be'. Since the entire Korle Lagoon (and the Dagomba Line) is a hub of markets - both men and women - often spend their days within its perimeter, confusing the distinction between the Kore Lagoon and Accra. 'This is where everyone you know is. It makes you happy to hear your own language, go to the mosque with your brothers, but it also means you are only here', Abdallah emphasised in one of our conversations. While male and the few female scrap dealers have to learn the city in order to be able to collect scrap, Northern women who pursue other activities often spend all their time around the Korle Lagoon - lacking time or resources to leave and explore the city beyond.

When Kubura came to Accra, the bus that brought her from Bimbila, a small town in the north in which Kubura's grandmother lives, came directly to 'Bimbila station' located in Old Fadama. There, she joined her other sister, who lived in Old Fadama and worked nearby in Agbogbloshie as an egg seller. She was thus one among many other women, who make a living out of selling foods and refreshments in scrapyards. Since the place is defined by continuous exchanges and conversions between scrap and cash, the sellers are able to build incremental incomes on selling products such as hard-boiled eggs, toffees, biscuits, and other refreshments. As most of the capital is invested back into their business, the women rely on their customer base and any form of venturing out to new geographic contexts is entwined with a potential risk. Would they find the same number of customers? If they don't, how many eggs would go to waste? Will this amount effectively vanquish their capital? These forms of dependence on economies, communities, and living spaces create entanglements with the contexts of scrapping and squatting, and their toxic and body burdens.

Conclusion

This chapter showed the extent to which scrapyards are enmeshed in larger urban processes in Ghana. It is a context of encounters where communal expertise clusters around specific metals and work processes. These are mostly masculine contexts (except for the Frafra market in Kumasi). The entanglements between ethnicity and position in scrap economy organise recycling processes, infrastructures of capital, and communal care.

Every object that comes into scrapyards is distributed across communal specialisations. Most recycling processes are in the hands of Dagomba migrants, whose bodies are thus especially exposed to the scrapyards' dangers. Some perceive themselves to be immune to such exposures, but such statements might be read also within the context of other people's dismissal of their livelihoods (cf. Roberts, 2014). Thus to claim immunity is equivalent to attempt to preserve and defend an economy that is central to urban life. Meanwhile, the urban of squatting creates multiple assaults that makes disentangling recycling from lack of access to toilets, lack of safe cooking spaces, over-crowding a difficult task for those involved. This perhaps is where the squatting-scrapping creates a continuum that represents a specific body burden that translates to metabolic problems, irritations of the body, stress, chest pains. Urban mining creates both a strain as a form of work and as an urban context where the work takes place.

The specialisations in metals and work processes are also not innocent. The inequality of different groups makes the economy rather than represents its outcome. On numerous occasions, scrap dealers who were not northern migrants decried that the Dagombas have decreased the earning potential, because they do not have the same living standards as others. I argued that these are reflections of longer histories of discrimination that mean northern migrants in particular feel that they are ill-equipped to progress in cities vis-a-vis other people they encounter in the cosmopolitan space.

At the same time as it ossifies discriminations, scrap economy brings profits that are capable of sustaining migrants and their families. One of the founders of Agbogbloshie is remembered by his daughter to have prophesied that 'one day illiterates will have more money than literates' when referring to the economy's prospects. The reason why thence Dagomba migrants perceive their urban condition as toil and yet take often pride in their work is explored further in Chapter 3.

Chapter 3 - Circular livelihoods: intimate portrait of Agbogbloshie

Agbogbloshie has been coded in the international media as a 'hellscape': a place that represents the dangers of toxicity and e-waste work. This chapter offers an intimate biography of this scrapyard and shines a light on why migrants from the country's north see in it rather as an expression of development, of self-progress, and sometimes even liken it to a 'university'. Simultaneously, for many, it is the setting for their collective traumas linked to an intra-ethnic conflict and a legacy of poverty in their region of origin. Recent academic studies of waste work and waste-sites reframe the immediate correlation of places like Agbogbloshie with abjection. They instead show that such sites are important for the livelihoods of marginalised urban populations (Samson, 2015; Millar, 2018; Chalfin, 2019; Butt, 2020; Fredericks, forthcoming). I show that such marginalised sites are also meaningful for migrant life worlds and projects. Over the years, Agbogbloshie has allowed for invention and maintenance of circular livelihoods between Ghana's savannah north and Accra. Such livelihoods share commonalities with patterns of connection to rural place of origin that scholars of African contexts have found to have a continued relevance for urbanites (Gugler, 1997; Geschiere and Gugler, 1998; Lentz, 1995; Pellow, 2011). At the same time, in the context of Agbogbloshie, the connection combines with the specificity of scrap economy and plasticity of marginal sites to reflect communal needs but also reflect communal hierarchies.

Agbogbloshie was established in the mid-1990s through the entrepreneurial weaving of a subaltern topography of opportunity - built from the bottom-up, in spite of the various forms of impediment delineated in Chapter 2. Gaining a footing in this corner of Accra has been crucial for migrants from the north to partake in scrap economy. Agbogbloshie progressively grew outside its bounds and gave rise to other scrapyards in the country. The place has, however, remained vital in terms of the number of workers, its centrality in the training of new migrants in scrap skills (who then might move elsewhere), and its importance as a first footing of one particular group of migrants - the Dagomba ethnic minority - in Accra. As such, drawing on the work of Deborah Pellow (2002), I argue that strangers in the city create a socially meaningful world and nurture a cohesive and familiar community in the city through 'the social production of the spatial environment' (2002, 2). Such an environment is a terrain of exchange between the space that comes to embody society and vice-versa.

The previous chapter painted a picture of the social worlds of scrap. This chapter focuses on Dagombas, who have established and shaped Agbogbloshie and founded the Greater Accra Scrap Dealers Association (GASDA) that governs the scrapyard. Over the years, the GASDA has been comprised solely of Dagomba men as executives and members, with various calls to include Nigerian traders, being repeatedly rejected. Agbogbloshie is thus an expression of the Dagombas' strength in numbers and the political influence of its leaders over this corner of Accra. In that sense, Agbogbloshie is imprinted with communal biographies, with the influence of individual actors over space and the ability to realise shared values and interests by pursuing a shared livelihood. In consequence, the scrapyard allows for the incorporation of new migrants and a pursuit of social, moral, communal, and political life between the north and urban Ghana. At the same time, the scrapyard has been shaped by the recent history and conflict within the Dagomba Kingdom in the north of the country. Long after the dust settled between conflicted parties, Agbogbloshie still experiences outbursts of violence around the time of elections with ramifications for the time in-between elections. Agbogbloshie's emplacement on government land is both a reason for a persistent threat of evictions and its correlation with state and ethnic politics, where landholding is tied to patrimonial politics and alignments with sides of the Dagomba conflict.

This chapter shows that a shared communal origin translates into a complicated but mutually understood set of responsibilities across migratory spaces of scrapyards and subsistence agriculture, city and village, family and community. Scrap dealers render scrapyards inter-dependent with the needs of migrating back and forth between home and Accra. As such, scrapyards are social fora that are designed to sustain livelihoods, communities, ethics and communal tensions that unravel between the savannah and urban scrap economies. Migrants in Agbogbloshie invent circular livelihoods between economic logics, space, and regional divides. They are circular in different senses. The wealth assembled in scrap feeds into agricultural activities and family needs in the north, which in turn create their own safety nets against risks of urban life. They are circular in terms of the sheer mobility that takes place between Accra and the north - a mobility that is facilitated by infrastructures of connection such as mobile banking and travel routes operated by migrant businesses. The livelihoods are also circular as metaphors and cosmologies of the savannah feed into evaluations of urban life. The rural and urban contexts create comparative scales and the translations of agricultural idioms into the everyday realities of the scrapyard which help to inform understandings of the challenges of urban life. Agbogbloshie's work is arranged so as to enable going back and forth, adding a new workforce, and responsiveness to the rhythms and needs of the savannah North. The circular livelihoods act as remedies of the north's burdens related to over-reliance on substance agriculture and the dearth of economic opportunities. However, they are also a source of specific types of stress and constraint that relate to the unique attempt to meet obligations across space, economic logics, and forms of sociality.

In the first part, the distinct experience of life between two places comes to light. It traces the transition between the whims of subsistence agriculture and scrap work - where the particularities of scrap work and the erratic nature of earnings complicate the realisation of scrap dealers' moral obligations towards home. I show Agbogbloshie as a site where the invention and pursuit of circular livelihoods takes place. In the second part, I show how the centrality of Agbogbloshie for migrant projects is manifested and foregrounded during moments of conflict.

Rhythms, idioms and praxis: between the agricultural north and urban scrap

During my fieldwork, I spent some of my Sundays visiting a regular theatre performance organised by one of the Dagomba theatre associations that worked in Agbogbloshie and the neighbouring residential settlement of Old Fadama. There were nine theatre groups in the communities and one filmmaker's association. The latter made around three films during the period of my fieldwork despite persistent problems with funding. Some of the workers in Agbogbloshie were actors, writers, cameramen and directors or held other positions in the associations. One of the most common themes in both the film and the plays were pressures of combining life between the village and the city. These pressures would underpin stories of love, money, and generational conflict, while various Dagomba wisdoms would occasionally act as inspirations: ‘if you call your child an Asante chief, you will be the one to carry it’ (‘*Ayi zaŋ a bii'lebi Kambon'naa, nyini nʒiri o*’)[40] or ‘a shrub today makes tomorrow a big tree’ (‘*zuŋɔ tituɣu, sahinsheli tia*’) or ‘if someone’s sitting on an elephant, you cannot pull his legs’ (‘*niri yi ba wobgu, ami chebsi o naba daribu*’).

Figure 3.1 A performance of a play on Saturday, 7th of February, 2016.

One of the first plays I watched covered many of the central aspects of circular livelihoods that would later be apparent during fieldwork: the need to be present in two places at the same time, to keep financial obligations to elders in the north and resist urban temptations that can lead to alienation from the community. The main character in the play was a scrap dealer, who comes to

[40] The Asante chiefdom is considered powerful and has conquered the Dagomba Kingdom in the past. The idiom is to suggest that lack of correcting the child will lead to their superior attitude.

Agbogbloshie as a young man. He initially struggles to make money and becomes enchanted with the freedoms of urban life signified by smoking marihuana and getting dreadlocks - two persistent signifiers of masculine unreliability in Agbogbloshie, especially among senior scrap dealers. When he finally musters the strength to visit the North, his father does not recognise him and begrudges him for failing to send him money. Back in Accra, the boy grows obsessed with the pursuit of money and performs a ritual that consists of hiding money inside an old television frame with the hope of multiplying it. His dark magic turns, however, against him and the powers he unleashed kill him. The final moments of the play show a group of people celebrating at his funeral, whilst his spirit is suffering in the background (Figure 3.1 *Theatre performance*). Despite its dramatic themes, the piece was generally taken in light spirits both by the audience and by the actors, who reverted to hyperbole and caricature.

The main character's background as a migrant made him relatable for most of the audience - male and female. Like them, he originates from a village in the north and migrates to urban Accra. He comes from a place where his father (*m'ba*) or elder uncle (*m'ba kpema*) has all the power of decision-making, and the scrapyard gives him access to individual mobility. The seeds of the generational divide portrayed in the play stem from the father's lack of cash-based employment due to his reliance on subsistence agriculture and the child's participation in cash-generating activities away from the household. The new urban autonomy threatens the legitimacy of the father's knowledge and authority, while placing new obligations on the young member of the family. It is a context - like others in African anthropological literature - where 'sons' and 'daughters' are in the city and shape village life from afar and vice-versa.[41] Many in the audience related to this migrational tension and empathised with both sides of the equation - the father, who requires his son to nurture the familiar bond by his visits and remittances; and the son, who feels under pressure and loses his mind to an obsession of *sakawa* before he eventually dies.

[41] The literature on the patterns of such generational mobility and interdependency includes Aronson (1978); Gugler (1971); Hart (1971) and more recently Potts (1995; 2010).

The history of migration especially of men between North and South Ghana has a long genealogy that stems from the seasonality of savannah agriculture that puts a break on its commercialisation or expansion. For a long time the seasonality meant men migrated South that has two farming seasons to earn money - a work known a *pakobo*, which is when one is farming for gain rather than as part of familiar pursuit. Northern Ghana is a changing region with pockets of growing urbanisation around the towns of Tamale, Savelugu and Yendi, but its landscape is defined by interspersed villages that largely live from subsistence agriculture. Many of the inhabitants of the three principal cities rely on small-holder farming in the outside perimeter of the city. 'In the North, we are suffering' ('*ti muh'sugu pam*'), the men I work with tend to conclude. The arid savannah translates into a single rainy season per year that make agriculture an intermittent pursuit. Increasingly, the rains do not come leading to an extensive period referred to as *sanzali*, which is when the rains are expected but have not arrived yet. References to temperature are parts of Dagomba greeting routines. The morning salutation is *ti'massim* (which translates to 'our cold') to celebrate the morning cool. *Di miyya* ('it's hot') stands for difficult times. After a rain, the greeting is a cheerful *net a mahle* ('how is the humidity?'). The evocativeness of the language related to climate and season is also registered in Ann Cassiman's (2006) ethnography of the Kasena, who live further up north in Ghana. She notes that the time immediately after the harvest is denoted as 'time when everyone is your child', registering in idiom the increased potential for generosity.

Many in Agbogbloshie say that demands of work and cash have cast the dry season in a new light. While previously it was a time of calm after the labours of farming spent on social activities such as collective house construction, visiting families in other villages, gardening, and preparing for dancing competitions, now it is associated with unproductiveness and unmet individual and collective potential. Bawa, a middle-aged scrap dealer, talked about his extended stint in the North after a bad scrap deal which lost him all his capital. Whilst at first, he found the trip recuperative, soon he was anxious to return to Accra. 'How to say it to you? The family stares at you', he explained. We talked inside a workshop and the metaphor of 'staring' seemed evocative enough as when he said it, another man present immediately nodded. The metaphor was not meant to invoke a tacit judgement on the side of the family, as I read it at first. According to Bawa, it was rather to emphasise the discomfort of seeing the family 'suffering too much' and the stare is one of witnessing the hardship without having the means to address it. The resultant urgency of migration is not only the individual experience of Bawa but also a statistical reality. A 1999 survey in the Northern region found that there was at least 1 migrant per household (Overseas Development Institute, 1999). Similar condition was observed by Keith Hart (1971) among the Frafra in Accra, when he noted that 'migration has become built into the economy of each household' (Hart, 1971: 25). Ghana's Population Survey lists migration shaped by seasonality of agriculture in the North as one of the country's main migration trends (Ghana Statistical Service, 2014). The environmental setbacks come into focus as migration creates new comparative scales, which reveal the North as bestowed with legacies of differentiated political economies, histories, and environments.

Agbogbloshie as a place to be

While there are other urban opportunities that some Dagomba men and women search for in Accra, the scrapyard of Agbogbloshie and the neighbouring community of Old Fadama often act as the first ports of call and the destination for many. The centrality of this place remains despite their undeniably difficult environmental contexts of floodplain and political turmoil. To an outsider, Agbogbloshie is a desolate landscape defined by a waterway that smells of gutter, plumes of smoke coming from the burning of cables, and a sway of self-built rickety houses, but to many newcomers from the North, it is equally an open book, where one understands the parameters of daily life: the language, the social relations, the social drama, and where inevitably one stumbles into friends of friends or a distant relative of distant relatives. When I tried to probe further this enchantment of the known with my friend Abdallah, he pointed to a group of three girls serendipitously strolling past us, holding aluminium bowls, 'I am sure that is the youngest sister carrying them to show appreciation for the older sister and I can imagine the conversation they had before going to work'.

This shared social world means that inevitably Abdallah and many others around him treat the scrapyard of Agbogbloshie not only within the strict confines of work for gain, but also - quite immediately upon arrival - pursue a range of other social roles that go beyond economic profit, and fulfil communal roles and projects of self-growth or self-fashioning. Rather than a romantic picture of social life, my emphasis on various social activities is important to go against the persistent reading of the place through abjections, as perpetuated in national and international media. For example, Abdallah aside from scrap dealing, political life, university studies, also worked as a variant of an informal social worker. He accompanied people into their institutional and doctor appointments to help in translations, helped with school homework of neighbourhood kids, and acted as an advocate for women. Together with friends, he launched an Agbogbloshie News Network on social media, which reported on conflicts in the community and took the sides of victims of various 'big men'. The community thus provided him with opportunities that allowed him to pursue a more expansive life project than strictly work. Abdallah's is not a singular biography. Many others lead similar lifestyles. Agbogbloshie is a site of numerous cosmopolitan activities: associations that represented specific workers, shared groups of interest (theatre, film, and sports), political associations, religious communities or savings groups. Over the weekends the area is abuzz with naming ceremonies for children, funerals and other social gatherings. Local imams make pronouncements that consolidate the communal fabric: during a naming ceremony, they might emphasise to their parents 'the child does not belong to you but to the entire community' or - in the case of funerals – they raise funds to repatriate bodies to villages. Such events are attended by Dagomba drum historians, who continue the drumming tradition to Accra. They are able to trace lineages of individuals related to chiefs, which given the number of villages and their fragmentations to chiefdoms and sub-chiefdoms means quite a lot of men end up in that category. The drum historians' performance consists of approaching such individuals bowing down in front of them and reciting their lineage for the appreciation of all those gathered around. The effect is that individuals are perceived not only through their individual urban life but also read within the context of their home kinship.

In the morning, women who sell food in scrapyards use the menu that responds to northern tastes: bambara beans, *tuo zaafi* - a cooked maize and millet flour stirred (*tuo*) with hot (*zaafi*) water - in ayoyo soup, a soup *bra* from cow's organs. In between scrap, one sees strolling chickens that belong to individual scrap dealers and that are butchered and grilled to celebrate important events. The chickens are dubbed as future gifts 'from the heart'. They are cooked to celebrate events (such as a fortunate sale). People snap the chickens from each other's hands, laugh, and thank the donors - all representing the joys of sharing. Individual food sellers remember the names of their customers and dietary preferences. The food is brought directly to the workplace and represents daily forms of homemaking.

Scrapyards are places to be. As one of my friends, Lukman, retorted, at any point in time, there is some sixty percent of people who are just there to socialise and the rest are there to work. People would come to scrapyards on their days-off or when there was little else to do. Some explained that they kept coming here, because there were not many other places they could 'sit' - some lived in over-populated rooms and sometimes they sought to escape their neighbours. The men wanted to be in a Dagomba space next to other Dagomba men. This was an expression of affinity but also of an insurance. The place allows to re-live Dagomba issues on a daily basis, thus men who had nothing to do with scrap business come to scrapyards to get an infusion of home. Among Agbogbloshie's regulars that I would occasionally bump into were an Army sergeant, who comes here in between UN peacekeeping mission deployments to the Lebanese-Israeli border (Ghana represents one of the more numerous contingents), who comes here, as he explained to me, 'to rest his mind'; a PhD candidate in Linguistics, who at one point hired a bus for his scrap dealing friends to come to his defence at the University of Ghana, and a range of politicians who are building their following with constituents in Accra and likewise their families in the North.[42]

Networks between Agbogbloshie and the north

The migrant in the theatre piece I described transitioned smoothly into his scrap work right after arrival. Individual scrap dealers have developed an infrastructure of connection between the North and Agbogbloshie. There are three trans-regional stations that are located in the area - Bimibila station, Konkomba Station and Imperial Express. They operate bus routes between Accra and regions cities in

[42] Paller (2019) describes the importance of migrant communities for broadcasting the political message at home that is more difficult to reach by politicians.

the North. These expedite traffic, allow for an easy connection that by-passes Northern Region's biggest cities and connects the area around to even the smallest towns in the savannah. Iddrisu Sumani, a scrap dealer, who began the route between Accra and Nanton, a district in the Northern region, keeps a busy service that brings a bus load of 30 people every other day back and forth. Most of the transport links established by Northerners do not charge money for sending packages, as such as migrants can still send smaller consumer gifts (buckets, flip-flops, hair extensions) that would otherwise require the family in the villages to travel to the market. As a result, Accra and its migrant kinsmen become their relatives' access to the market, creating a connection that skips the regional centres of the North.

Once in Accra, people find their extended family members or friends from the north. These individuals usually help a newly arrived migrant to 'set up', which means introducing them to the cartography of local communities and the ways to 'move' around them, which work one can engage in and how to negotiate the new demands of cash-based life, that many of my interlocutors said they were unfamiliar with, prior to their urban life (or specifically prior to their life in Agbogbloshie or Old Fadama, where everything from showers, to toilets and drinking water costs money, creating the necessity for careful accounting).

Locations in Agbogbloshie are marked using one of the following as landmarks: the nicknames of the more famous scrap dealers who operate from a given location, a meagre but resistant mango trees, or a few mosques sponsored by communal funds. There are also spots in Agbogbloshie that are named after villages in the north or evocative names which make the scrapyard's fabric laden with personal meaning (Al-Jazeera, Gaza, Iron University, Uganda or Kilimanjaro). Those who arrive in the scrapyard have different paths towards joining the labour force. They can choose between affiliations that are based on village of origin, kinship, values, elective friendships, or generation. For example, the districts of Tolon-Kumbungu, Savelugu-Nanton or Zabzugu are, where newcomers from these districts can find their 'brothers' from the North. This is similar to other examples in urban West Africa in which the urban space holds informal 'embassies' for incoming migrants (Stasik, 2016; Pellow, 2008). For example, 'Nanton' is a spot that associates boys from the same village, who all work under different masters in workshops spread throughout the scrapyard. On a few occasions, however, when they faced problems in their workplaces, they would appeal to a son of the chief of Nanton, who acted as the place's informal leader who takes their side - be it when it came to accidents or when there was a need for supporting their negotiations. 'Uganda' in turn associated peers with longer experience in Agbogbloshie, all of whom worked with their own capital and would occasionally enter deals together. Members of 'Al-Jazeera' claimed to have taken inspiration from the eponymous media company. During our conversations, they laughed that like Al-Jazeera, 'everything we dey see, we go publish', which was a reference to their attitude towards the local politics of Agbogbloshie. The men were friends and a shared enjoyment of marihuana brought them together. These are just a few examples of the ties that bind individuals together in the scrapyard, and some descriptions of the way place-making holds them together and creates the conditions for interactions between shared values, shared place, and communal solidarities.

The name, 'Iron University', one of the spots, used the name to emphasise that the spot's members deal with all types of iron scrap. The word 'university' puts front and centre one of the important roles of this place, namely, that those with longer experience teach newcomers how to value scrap and how to dissemble it into metals. The length of these courses depends on workloads and members' specialisations. Newcomers often call friends in their sitting spot to find out the price of specific goods (e.g. different types of car batteries). A lack of such a community of support can lead to financial loss - two scrap dealing women I knew, who struggled to get a footing in the male-dominated world, were cheated on numerous occasions about prices as at first they lacked trusted friends with whom they could confer.

The experience of the city beyond Agbogbloshie is also one of a network of brothers who keep up-to-date with each other. As they circulate from one place to another, they also circulate information. This is a crucial daily ritual as it allows Dagomba scrap dealers across Accra to be aware of scrap deal opportunities. For example, someone might hear about a car for sale or a government auction under way. The circulation of information is thus crucial in the context of a fragmented market. The unit of work - a plot of land shared with 'brothers', the independence that the work affords, and the fact that people share an understanding of 'what we are here for' means that moving in between the north and Accra can pass without interruption other than in case of a shortage of money. In addition, the shared place of origin acts as a form of contract in a business that heavily relies on the borrowing and sharing of capital. The fact that men know where to find each other in the North, creates a confidence for entering into business deals with one another. Thus, sitting together in the Dagomba Wide Web (DWW) – as my friend Faidal once jokingly called it while emphasising that the DWW had 'many content editors' – is tantamount to acquiring the status of a reliable person in spite of leading a trans-local life that might otherwise seem like a constant state of flight.

Stresses of remitting

'*N'chang muane'* or 'I am going to the bush' is a sentence in Dagbani to describe the daily activity of walking around the city in search of scrap. The phrase has a double significance. It harks to the metaphorical repertoire of hunting, and likens the city to the bush. Mortuary Road is a nearby scrapyard which hosts the refugees from a political conflict in Agbogbloshie. Arriving there early one morning in July 2018, I encountered a group of men amid a debate. They were preparing to leave the scrapyard 'to go to the bush', but they reported lacking the energies to make the first steps. The sun was already high and the further they postponed the collection, the more difficult it would be to arrive back in the scrapyard in time for the afternoon prayer.

'Going to the bush' applies to the first two activities and requires long hours of often inconclusive searching for goods. To collect is to take multiple risks: the expenditure of bodily energies and fuel to no apparent end; the choice of routes that may not coincide with available scrap (only to learn later, when back in the scrapyard, that a colleague was successful going in a different direction); the failure to bargain a price that will bring a big enough profit margin to justify the effort. Bearing all this in mind, Mohammed, one of the men engaged in the debate noted that, 'we come here to the south and we get this laziness'. Musah interjected immediately, 'it is stressful here', a statement that was met with repeated nods. The men drew parallels with hunting: 'in the dry season in the North, you can spend hours hunting with a bow and arrow for rabbits or grass-cutters. The activity doesn't exhaust you'. Yet, the experience is not free of danger, as I came to learn. The bush represents a potentially dangerous place, abounding with spirits, snakes and scorpions. Walking in the bush exposes people to sicknesses. These include *sankpana* (scabies), *zuhusaanima* (madness that can be contracted from wandering spirits), *binwola* (boils), *jogu* (swelling of the head transmitted from bush animals). The hunt for scrap in Accra also occasionally ends with boils between the thighs after long hours of walking and sore muscles from pushing piles of scrap long distances.

On this hot July day, however, the recollections focused on the joys of hunting. The men recognised that it is their skill at hunting that explains their brothers' ability to spend hours walking around the city to find scrap, but they emphasised that hunting and collecting scrap are substantially different. Mohammed continued, 'In the North, if you have to do something, people from the surrounding houses will come and help you, but here it is not like that. Here, in Accra, your problem is your problem only, and everything is money'. 'Everything is money', Musah amplified the final message, again drawing nods from his interlocutors. Migration attunes migrants' attention to differences between the place of origin and destination especially in relation to economies and social and cultural lives. On other occasions, I heard scrap plots likened to 'farms' (*puu*) in which scrap is put down to grow before it is sent to metal buying companies. The men's conversation was coding in shared idioms; a shared experience of scrap economies and the North.

There are numerous reasons for the pressure to earn money. Remittances and kinship obligations are among the most often cited. The families in the north need support throughout the year, but one of the most common moments, when the entire scrapyard is scrambling for money is around the end of February and March. This is when one of the rainy seasons is approaching and the men divide into groups of those who have gathered enough money to abandon scrap temporarily and cultivate the land, those who are waiting to see where their luck takes them, and those who stay on the urban side of the telephone line ready to transmit money for their farming kinsmen. Family members call with an increased intensity as stocks from the previous season run low and food needs to be bought on the market. Those, who have managed to gather enough money, transfer it to the north. A number of money transfer points operate throughout the scrapyard - around ten in Agbogbloshie alone. The pace of transfers at these places is breathtaking and most recorded between 20 and 50 transactions a day. Some of these transactions were related to the cash-intensive nature of scrap work, but up to half (depending on time) of these transfers would be destined for the north (based on a sample of the days I observed).

A recurrent conversation in the scrapyards is that 'land does not support people', as it is remembered to have done once. Farming used to be a straightforward activity of tending the land, but now requires finding the money to purchase fertilisers and herbicides. I heard numerous conversations, in which the plastic in the soil, over-dependence on fertilisers, laziness to work, and decreasing rainfall were singled out as potential reason for why the reliance on chemical additives has grown over the years. Afa Hardi is a traditional healer who lives between the North and Accra and travels to the city whenever invited by individual scrap businessmen to 'heal their business'. During an extended interview about his healing powers, he concluded that he has more power over the fortunes of the scrap business than the prospects of agricultural yields: 'God knows that we are increasing that's why he's filling things with the Sun, so that we cannot fill his land with ourselves'.

The pressures from the North and the obligation to constantly provide collide with the unpredictable flows of scrap that depend on the whimsical currents of infrastructural disrepair and renovation and consumer discarding. There has been a persistent struggle in scrapyards, including Agbogbloshie, to synchronise the profits from scrap with the seasonal needs of their family and friends. I first understood this was happening, when I persistently tried to reach Abdallah but kept failing to get through. When we finally met, he elucidated: 'They are calling me too much from the village. My father [who is a village chief] is already afraid of the rumours spreading that the village is buying food on the market. His authority is being questioned. They need fertilisers to increase the yield, but they don't understand how money is made in Accra'. After this insight, I started noticing the pattern. Some people would become visibly sad when looking at the caller ID on their phones. Once, whilst talking to Musah, his phone rang on and off over the course of several hours. Each time, Musah stared pensively at the number and avoided my questioning stare. He finally explained, visibly ashamed of his failure to respond to the call: 'It's my uncle. I know he wants some money for the farming, but I have nothing to send to him. I don't want to tell him the truth. Maybe, tomorrow or next week, I get some business'. One man I knew was so saddened by failing his family due to his lack of money that he spent most of March dozing off on a mattress in his workshop until a friend took pity on him and hired him to do some dismantling. Kapito, a former chairman of Agbogbloshie and a big man of car battery scrap, explained that he had three phones, each containing a different contact list depending on the level of urgency and obligation when it comes to the need to pick up calls and remit.

How to manage money vis-a-vis the pressing need of families who experience poverty in the North is thus a source of persistent stress and moral dilemma. To gain money in scrap, one has to have money that allows the pursuit of exchange between cash and scrap to generate profits. Therefore, not all the money can be sent back to the North, not only because scrap is unpredictable, and thus the amount of money one is able to make fluctuates, but also because the amount of capital one keeps, converts into an earning potential. This creates a situation that many scrap dealers see as paradoxical in the context of reciprocal social obligations, namely one has money but cannot share it outside scrap trade lest one loses their standing in the trade. 'Eating into one's capital' - an expression that captures such a danger - is tantamount to social degradation. Like an omen of the unfortunate results of eating into one's capital, especially as one reaches an older age and thus is less able to perform dismantling for hire, former scrap dealers who lost all their money after succumbing to pressures to convert their capital into cash to sustain rural livelihoods (or less noble goals), have become scrapyard fixtures. They circulate between their friends and ask for donations to sustain themselves.

Obligations towards subsistence farming consistently test the relations of trust and the dedication to preserving one's capital. Throughout the rainy season, I would hear frequent charges that a scrap collector ran out with another person's money to the North. During my fieldwork, some men would disappear to the North for months and come back to their scrap 'farms' in Accra when the need for cash appeared. Admittedly, they went to the North not only to do farming or rest from exhausting pace of scarp work, but also to lead a cashless life for a while - e.g. after a motor accident or when experiencing an episode of the blues - or to visit families and eat the food that one does not need to buy and as such is experienced as so much more pleasant ('eating it' rather than '*chopping* it', where the word for 'chop' means to earn and to eat). In their absence, others occasionally buy and sell scrap on the absent person's behalf and use mobile money (money transfer system) - that is a remote form of transfer - to send this money. One does not have to physically be present in order to reap the fruits of the work in scrap. This was especially true for established scrap dealers running on higher capital, who could leave their money with trusted 'brothers'. Those down the social ladder relied on being 'dashed' money by their masters or their stays in the North were strictly timed according to the amount of money they had. This meant that they would come back to Accra when they were running out of money. Or - if they were not careful - could get stuck in the North as they spent so much that they no longer had the money to come back. Throughout my research, I met many men who were stuck in their villages for this reason. For them, opportunities such as elections, when big men paid for transport to ensure votes, were ways to get 'unstuck'.

At the same time, dedication to subsistence economies was crucial to the realisation of scrap as an economic opportunity. Paradoxically, the reason that people cited for investing in subsistence farming was to perpetuate a life that allowed for a subtraction from the market and reproduction of social bonds. Here profit margins in the urban centres converted into social reproduction. Having cultivated food for grandparents is tantamount to providing for them. Having enough food in the village to organise festivals and life cycle ceremonies is in turn tantamount to creating social bonds. Scrap economies and urban life are prone to injuries. In addition, scrap recycling as it is done in Ghana's scrapyards (Agbogbloshie being the most well-known among them) exposes people to pollution, as well as the mental and physical burdens of scrapping and squatting (as recounted in the previous chapter). This recasts the North as a place, where people can go to regain vital strengths - thus almost everyone claimed to feel physically better after a trip.

'We developed the place'

It is in this context of obligations, regional divides, and constraints on mobility that scrapyards appear space-making achievements for communal progress. Back in June 2018, some seven months into my fieldwork, I met Mohammed Ali, the secretary and the spokesperson for the Greater Accra Scrap Dealers Association (GASDA). GASDA that is recognised as the main association representing Agbogbloshie to the outside, while acting as the self-government for the market. Mohammed Ali came to Accra from the Upper West region in Ghana near the border with Burkina Faso. He is from the Mossi people, unlike the majority of scrap dealers in the scrapyard, who are Dagomba. He used to be a successful scrap exporter with contacts in Malaysia but lost most of his money in the late 1990s. These days he focuses on other business ventures and comes to Agbogbloshie around once a week for the Friday prayer at the mosque, or whenever his sage presence and impeccable English are needed. During our longer sit down, Mohammed Ali said about Agbogbloshie with a certain pride: 'People come here from the North to make money. It is a place that allows us all to progress'. Mohammed Ali sighed with a certain pride: 'we developed this place'. By 'we' he meant the scrap dealers who have been trickling in here since the mid-1990s and slowly establishing the scrapyard that Agbogbloshie has become and an economy that soon spread across the country creating a number of other, smaller scrapyards.

Mohammed Ali was not the only person I met, who voiced such a sentiments. Many of the men, who were the first comers, would marvel at a similar sense of achievement. 'All of this was a bush and no one was a landlord', recounted to me another early settler, Alhaji Tolon 'Element' - the pseudonym signifies that there is no element of the scrap that he does not know, and the prefix Alhaji that he has completed the Haj. 'It is so much better here now', he emphasised, as the previous bush meant mosquitos and hiding snakes. He appreciated that back in the days we could not have been sitting in the afternoon chatting as, 'The mosquitos would bite us too hard. We'd have to burn fire in order to keep them away and we wouldn't be able to have a conversation like we have now'. Other scrapyards such as Dagomba Line in the country's second biggest city of Kumasi is a testament to the same feat of claiming a bush next to an open-gutter, a place that was not deemed as a suitable for habitation by other people in Kumasi.

Among migrants from the north, Agbogbloshie is occasionally referred to as 'Azanda's place', after one of the scrapyard's pioneers and the first chairman of the Greater Accra Scrap Dealers Association (GASDA) that serves as the representative body of the scrap dealers and their self-government. Azanda left a complicated legacy - some remember him as a visionary figure, a person who infused the work with a moral message of self-reliance in the development of the North, while others focus on his conflicts with the GASDA executives, something that still define existing cleavages.

Azanda's daughter, Azara still works in Agbogbloshie. She sells *bambara* beans and fried yam, the staples of northern cuisine, by the roadside. Her father gave her the plot of land to establish the kiosk and introduced her to the 'side hustle' of buying and selling discarded car rims. Azara supported her father in the early days of the business. She came to Accra in the late 1990s as a 16 year old to help out. Her father was a determined man: 'My father started the scrap business. People thought that my father had gone mad, but he ignored everybody. He would just go around collect the scrap. You see, what the "Azanda" means is that he can carry heavy loads on one side of his body. They would tell him to carry it evenly on his head, but he would choose to carry it on one side'. At first, Azanda put his goods around the paint company of Sikkens in a small place by the roadside some few steps from Agbogbloshie, while the current Agbogbloshie was mostly an unruly bush dotted with illegal waste dumps from private businesses around the town. In the words of Azara:

> 'Agbogbloshie was bushy, nobody was there… the inside was also bushy and it harboured people smoking weed. Nobody could pass through that place apart from the weed smokers, my father knew that, and they also knew about my father. When the scrap began, it didn't start with money, the people over there liked how my father lived, so he told them what he wanted to do and they agreed for him to put his scrap there.'

The credo of 'not starting with money' was an important constitutive act element in the establishment of Agbogbloshie. The men who followed in Azanda's footsteps, all remembered grazing the bush, which was interspersed by illegal dumpsites, in order to find a place for their scrap. When Azanda and others started scrap activities in the area, they soon found out that the National Youth Authority would come to check on them. Alhaji 'Element' remembers how initially they would avoid a confrontation with the Authority; they would hide in the bush or even climb the few mango trees to disguise themselves among the branches. The men eventually negotiated. Alhaji Omar, an elder who later became the first secretary of the GASDA remembers this initial encounter as follows:

> 'When we were there on some 3 months, the National Youth [the National Youth Authority - a formal owner of the land] came and they asked, who allowed us to be there and do our scrap businesses. As this is a government land, we are also here, we are also enjoying the place, but then we said we developed the place, but they said that we should go. Mr Lamptey came and said that his boss said that everyone should quit from here. How should we quit here? If you have an Association, he knows who the elders are. As for, the way you are sitting, he told us, you can run away at any time or do something bad. Mr Lamptey helped us form the Association. He brought us the form. People signed the form. Our former chairman, Azanda, he was the eldest among us and those of us who were a bit educated… we were four… so naturally I became a secretary… this is how the Association started… later people came to join'.

The Authority has installed their representative, Joseph Lamptey, who has been coming to Agbogbloshie from the early 2000s. Lamptey sees his work as one of 'ensuring peace in this community and developing youth employment'. Many of Agbogbloshie's scrap dealers had little knowledge of Lamptey's purpose but understood him to be a representative of the government. Sometimes he received small sums of money that were interpreted as gifts to the government – banalised by their everyday nature, - to ensure the staving off of evictions or to him personally. Whether Lamptey's mandate was an individually invented position that sought to make private gain out of governmental affiliation, or a deep-felt commitment is hard to judge. Nonetheless, it strengthened Mohammed Ali's estimation that Agbogbloshie was a place allowing all sorts of people to progress.

The GASDA was born in this context of relationship with the state, but soon came to assume importance as the body representing the scrapyard to actors outside it and as the scrapyard's governing body. According to those who knew Azanda, he was a person that repeated the key tenets of Northern migrants' credo when in urban Ghana: to never get lazy and always search for scrap, to restrain from spending money in the south, and to never forget to transmit money to the North. He saw his position as that of providing lessons to the newcomers. In numerous interviews, he appeared as a figure that would not allow other scrap dealers rest - he would visit them and shout that they should constantly search for scrap. One person who later became an imam in a scrapyard mosque and a diligent scrap dealer remembered him saying: '"No sitting on your buttocks and saying that you are searching for the money! You will not get money!", that is what that man said to me, I cannot forget it!'. He was also known to give newcomers land without requesting money in return: 'we are all here to progress our communities', a few people remembered him saying.

The specificity of the GASDA of his time was that it did not depend on contributions from scrap dealers - anyone could start a workshop or shop in Agbogbloshie for free, after a conversation with the Chairman. The Association's money came exclusively from a concession that the Association received from two steel mills in Tema, where scrap dealers supplied iron scrap. At the end of the month, the companies would pay the Association an amount based on their performance. This cut from profits was displayed in a glass jar and sponsored funerals and naming ceremonies. These forms of collective use of money bound the scrap dealers together. The Association also required that all trading scraps be registered with the Association. This was crucial for solidarities and a sense of belonging to the newly-formed place. It also gave the Association control over the economic activities, which converted into an ability to pursue collective bargaining.

In its initial stages, the GASDA helped to organise the fundraising for the first mosque located next to its offices. Dubbed 'Central mosque', it is the only one to broadcast *Jumu'ah* - special congregational - prayers on Fridays. Such collective efforts have led to the building of nine other mosques.

'University'

It is in this context of North-South divide that the experience of urban Ghana and the distinctiveness of its scrap economies is manifest. There is no consensus among individual scrap dealers as to whether urban Accra exposes them to discrimination. Some see the city as cosmopolitan, pointing to examples of positive cooperation with authorities and Ga chiefs to preserve the - precarious but existing - hold on land. Others point to casual forms of discrimination in which they are presumed to be thieves by others, as well as to harsh municipal policies manifest in evictions (as discussed in the previous chapter). At the same time, the North-South divide explains structural constraints that influence the migrants' position in urban Accra. The Dagomba scrap dealers often emphasise that they struggle, specifically because of educational disadvantage and lack of capital. They frame the scrap economy as an expression of autonomous pursuit that relieves the government from its obligation vis-a-vis the citizens, where the Dagomba emphasise they have created their own jobs. Many community leaders voice a strong belief that as Ghana is changing there still should remain opportunities for those previously marginalised by a lack of access to education. Scrap dealers invest in the education of their children, explicitly referencing their own experience of shame in urban Ghana. These shared burdens invoke Michael Herzfeld's definition of 'cultural intimacy' as 'those aspects of an officially shared identity that are considered a source of external embarrassment but that nevertheless provide insiders with their assurance of common sociality' and erupts into 'collective self-representation' (2016 [1997]: 7).[43] According to Herzfeld, cultural intimacy has the effect of creating a 'defiant pride' with regards to hegemonic values and approved behaviours.

'Education' comes to assume different things: the knowledge of English or Akan Twi (the principal language of southern Ghana); the ability to operate in a cash economy; the ability to use mathematical skills and thus not be cheated by companies that buy metals or people who sell goods; or the focus on iron because of the ease of calculating profit margins and the fact that it is straightforward. It is in this context that 'we developed the scrap economy' has a particular resonance. Scrap economies are

[43] Waqas Butt's (2020) article on waste intimacies led me to Herzfeld's work on cultural intimacy.

communal endeavours in informal learning but the brunt and success of that experimentation often falls on individual shoulders.

The Dagomba migrants have introduced two innovations to the economy of scrap in the 1990s: they have increased collection efforts to reach homes and businesses by introducing horse-drawn-cart collection ('truck pushing' in Ghana's scrap parlance) and they have monetised scrap throughout the economy. The importance of collection as an extensive infrastructure means that the economy has been able to support an ever-growing number of migrants to urban centres for whom truck pushing has become an entry level position. The search for scrap in Accra is a rite of passage for most scrap dealers and it is key to one's urban identity. This entry-level position was initiated by Alhaji Abdulai 'Member' and Azanda as scrap accumulating in landfills became scarce. Every day, men either pick their own trucks or borrow them from owners to begin the search at dawn after the first prayers of the day. The trucks are adorned with Koranic and other messages to increase fortunes.

A number of early controversies that have rocked the scrapyard are invoked when describing the difficulties of developing an economy against the odds. According to the pioneers of the scrap economy, the adoption of scales as a means for measurement caused many initial controversies. Olu 'Old Man', a scrap dealer who began working in Agbogbloshie in 1996, explains: 'much money initially was lost because people were concerned about the scales. You see, it is because of our lack of education. You come from the north and here in Accra everything is different. You use cash. You need to know how to use cash. There were some who claimed there were bad demons in the scales. If we use it, it will lead us to lose money'. In consequence, some would refuse to use the scale, instead relying solely on their 'eye' to estimate the value of scrap. Alhaji Omar, the first secretary of the GASDA, was also the first to use the scale:

> 'By then many people were still bargaining. I realised that this bargaining issue is not proper. People are losing so much money, because they just worry about getting the scrap and not about the profit. I started with the scale. Later people realised that I was far ahead of them.

> They would get the scale and ask me about how to use it. That's how it all began. I myself learnt how to do it by going to a buying company. I hang out there around the scale to understand how they calculate the kilos.'

The slow adoption of scale was also related to a lack of money – for many scrap dealers, it took years to gather an adequate amount to be able to buy this crucial means of taking measurement. The reliance on 'by eye' to estimate scrap's value is a risky undertaking and explains a specialisation in iron, as it is heavier and thus provides more buffer should an estimate be wrong. For example, at the time of writing, copper was bought for 11 GHS per 1 pound. A pound is too light to perceive with strength alone and it is difficult to estimate measure through estimations. If one were to buy solely using one's 'eye', the smallest error would convert into a loss of upward of 11 GHS (in the context, where a typical earning at the end of the day for many beginners in the economy is around 30 GHS). By comparison, iron cost 1 cedi per 1 kilogram. Kilograms are much heavier than pounds and thus can be compared to human weight for a reference that does not use a scale. For a mistake to cost 11 GHS, one would have to under- or over- estimate by 11 kilograms.

At the same time, the over-reliance on iron meant that Dagoma scrap dealers struggled to diversify their business portfolios. The Dagomba scrap dealers would often say that they prefer iron precisely because of its heaviness. As there is equally more iron to collect in Ghana, a focus on the metal allowed more migrants coming from the north to be added to the economy as collectors.

The 'lack of education' and obligations in the North are the main hurdle to achieve mobility, which means an inability of distinguishing a profit from a loss. A persistent worry in the scrapyard is that one 'eats into one's capital', because of not knowing much about bookkeeping (eating into one's own capital is also the consequence of the constant pressing need to remit money to the North). As one looks at the first executive body of the GASDA - the seven men who were among the pioneers of the trade and who were positioned to make benefits out of it: three have managed to stay afloat and four lost everything at some point of the trade and became dependent on other family members or occasional gifts of kindness from 'brothers', precisely because at some point they 'ate into their capital'. Mallam Yusif, former organiser, is among these early pioneers. Alhaji Tolon 'Element' also lost much of his capital and now he is busy and sells enough to survive. Both lost everything due to problems with accounting. In a poignant interview, Mallam Yusif stated that he felt himself to be a reminder for others about how the lack of education can make one suffer. Indeed, he currently steered clear of engaging in scrap, partly because his experience of falling into debt had brought him much self-reported shame, and instead he began to focus his energies on giving advice to others and engaging in politics. These forms of everyday mentorship translate into small cash gifts that have sustained Mallam in Accra. Still, the scrap work itself gives a sense of fulfilment and accomplishment. When reflecting back on his time pursuing scrap work, Afa Suley, a scrap dealer in his 50s, said 'it's like we [Dagomba scrap dealers] have come to the university'. As Koowa put it: 'truck pushing is our primary school, dismantling is middle school, motor is high school, and when you just sit and buy, you graduated'. The subtraction from the perpetual need to move within Accra and in between is tantamount to a privilege that scrap workers aim to achieve in the future.

Agbogbloshie and Entanglements with conflict

Agbogbloshie's centrality for Dagomba social life at large is reflected in the extent to which the Dagomba conflict in the North has shaped the community and reappears to structure its life around election time. The community has been a site of an ongoing conflict among Dagomba migrants that leads to occasional rearrangements of scrapyards' demographic composition, political positions, and broader landscapes. They show the centrality of scrapyards for achieving social mobility through organising a communal hold on land. The conflict also explains the Northern migrants' sense of identity in Ghana. The conflict represents a source of communal shame, a sense that the politics is 'eating into people', and an opportunity for some of the younger Dagomba men to experience a rapid social mobility.

Over the span of my research between 2015-2019, between my first visit to Agbogbloshie and my longer stretch of fieldwork in 2018, the scrapyard of Agbogbloshie changed substantially. In 2016, Ghana went through an election that shifted the power from the National Democratic Congress (NDC) to the New Patriotic Party (NPP). As I walked into the area in 2018, I saw most of my old friends gone. The former President of the GASDA, Kapito, with whom I had spent time establishing a relationship of trust, had been replaced by a new chairman, Zuure, who was quickly informed that I associated in the past with Kapito and hence regarded me with some suspicion.

I quickly learnt that many of the men and some women that I knew in the past had now 'ran away' meaning that they did not show up to the scrapyard after the election was announced. Others were beaten up and their possessions seized by representatives of the other party. Thus, some of the former leaders and prominent individuals within the scrapyard were no longer there. This is not a phenomenon that takes place in Agbogbloshie alone. Many small-scale public services are taken over by the grassroots of the party in power. Around the same time that the properties of NDC members were taken, in nearby Jamestown, people who worked in the public toilets were replaced by the grassroots supporters of the new party in power. The same happened for the government security positions across town. The specificity of Agbogbloshie is that it is the private possession of individual Northern migrants that was taken over alongside access to public land that is held communally. These are radical forms of class demoting that affect all sorts of active members of the NDC. Some senior scrap dealers saw their younger apprentices take over their business, others found their friends take over their sitting spots, whilst hurling threats in their direction. Men experienced evictions by party opponents. The electoral shift was also manifest in the landscape of Agbogbloshie as the flags of NPP appeared across the Korle Lagoon's workplaces and living areas.

The outbursts of violence came to the area on a previous occasion, when there was a change of government from the NDC to the NPP in 2015. As my fieldwork developed between 2015 and 2019, I saw the people I worked with dispersed or hard to find. A new office for the NPP was installed next to the Lagoon's waters on the Old Fadama side of the Lagoon. It came entirely from the funds of one of the scrap dealers and was meant to re-insert the NPP on the cartography of the Korle Lagoon. The NPP members would occasionally hide inside to watch television or enjoy the cool wind of the newly installed air-conditioners. Another new feature of the landscape is the nearby scrapyard of Mortuary Road, which unified people from the NDC. These two camps were experienced as platforms through which people come to experience and share their traumas of conflict in the North and through which they mobilise along party lines. The market-cum-social-space meant that people come to viscerally experience the change of government as a very immediate change of their own fortunes.

The background for the scrapyards' entanglement in conflict is the trajectories of Dagomba politics. In March 2002, the North was shaken by the killing of Ya-Na Yacubu Abdulai, the King of Dagbon. Although the exact details of the killing were subject of multiple commissions - the main effect of the killing was a division among the Dagomba between two groups: those who trace their lineage to Ya-Na Yacubu Abdulai and perceived him as the rightful King (this lineage is referred to as Andanis), and those who trace their lineage to his opponents (called Abudus). The conflict was the time when many report having become aware for the first time of their own identity vis-a-vis the distinction, usually by learning about their own political positioning from seniors of households. The conflict began in the early 1900s, after two sons - Abdulai and Andani - succeeded their father to the throne, thus opening two routes to the throne. The conflict played out in various contexts in the Northern region: marriages between Abudus and Andanis, the lease on land, social tension, and the collapse of Yendi, the Dagomba Kingdom's capita, as a regional market town. The conflict contributed to stunting economic opportunities in the North and solidified subsistence agriculture as the dominant livelihood. Such a development was not without precedent - succession fights had broken in the past. What was exceptional about this one was the larger political climate, in which each clan was able to build alliances with bigger - colonial and later national - powers. During the early colonial period, the Dagomba Kingdom was split in half into a German and a British side. Abudus were the proteges of the Germans, and the Andanis sided with the British. The capacity to mobilise political divisions carried on into the Independence-era. In independent Ghana, the Andanis sided with the Nkrumahist line of party politics of which the NDC is an inheritor and the Abudus with the anti-Nkrumahist that is presently represented by the National Patriotic Party. The Abudus have thus been clients of the NPP and the Andanis of the NDC. The intra-ethnic Abudu/Andani conflict was dormant or mostly experienced as limited to the Palace, but soon spread to the wider population in March 2003, following the killing of Ya-Na Yakubu. The ripples of the conflict were first felt in Agbogbloshie during the 2008 change of government from the NPP to the NDC.

These periodic occurrences mean that parts of Agbogbloshie are made and remade around elections. New sitting spots appear. New people join the workforce. And new traumas circulate as hushed stories. Some men have to build and rebuild their workshops as they are caught between opponent parties.

In tune with these larger shifts in Agbogbloshie, the GASDA's executive body changes together with the government and since 2008 has been composed of members of the political party in power. This means that the Association stopped representing scrap dealers, but rather now represents the interests of a specific political faction. Those who are members of an opponent party are evicted. Scrap dealers who are neutral are harassed to pay fees to operate inside the scrapyard. Party foot soldiers meanwhile use the situation to extract money for their personal projects. As they are backed by politicians higher up the party chains, they do not fear police persecution and are free to operate as they please. This affects communal, political and spatial proportions. Some men avoid conflict at all cost. There is one scrap dealer I have known for many years, who refuses to speak so as not to be identified by accident with either side of the conflict. People express fear about the status of 'truth' and communal bonds as they see them tested around election times and the economy suffers from an occasional diminishment of capital as big men tend to be political allies and their evictions subtract from the quantity of cash circulating in Agbogbloshie.

Conclusion

The scrapyards are entwined with livelihoods that go beyond work. Similar to Waqaas Butt's (2019) discussion of non-caste groups in Pakistan's waste economy, this chapter shows that communities organise themselves 'around' scrap. Scrap work and scrapyards thus become entangled with other aspirations, moral obligations, and trans-local attachments. The chapter shows how Northerners circulate between urban centres where they pursue scrap economies and rural areas where they support small-scale farming and keep attachment to the life worlds of home. Agbogbloshie is an urban base for the Dagomba ethnic group, as well as the source of economic mobility for individuals and of development banks for the North, especially in the context of failures to re-insert savannah economies into the national agenda in Ghana (also in Chalfin, 2004). Agbogbloshie assumes twofold importance for the Dagombas – it is a source of cash for subsistence agriculture, as well as a central setting for the livelihoods that sustain individuals and their families in the North. However, their communal dependency on scrap and scrapyards might also lead to communal vulnerability as seen around the time of conflict. The chapters shows that migrant experience communal urban life and 'home' not as a 'stable point of anchorage' (Chu, 2006: 399) but rather the two are unsettled - be it due to changes of how far scrap is able to support agriculture or how much more agriculture depends on cash.

Agbogbloshie like dumpsites at margins elsewhere is responsive to communal innovation and intimate entanglements between work and life. Such studies often differentiate between hegemonic interests and communal potential. It is precisely when hegemonic interests set their eyes on these sites, that the communal fervour and an intimate relation between place and people is disrupted in favour of disciplines and standardisation (Samson, 2015; Miller, 2018). Kathleen Millar (2018) argues that Rio de Janeiro's dumpsite of Jardim Gramacho, itself a subject of mediatisation and discourses of despair, permits 'relational autonomy', when understood together with David Graeber's notion of autonomy as the 'ability to create new communities and ties of mutual dependence (Graeber 2009: 266). According to Millar, the dump's ability to promote autonomy is an outcome of waste's abundance, rhythms of salvage, and the site's distinct de-centralised organisation, which disappears when projects of formalisation set in and conscript workers as hired labour. In Fredericks' account, Mbeubeuss in Dakar is a shared resource and a shared history - in particularly stark exchange, a former president of the association in Mbeubeuss that represents the dump emphasised: 'We are the dump. There is no infrastructure here but us'. In this case, hegemonic projects from international donors threaten to disrupt the mutuality that people feel with the dump – its ecosystem, spirits and space.

This chapter shows how the particularities of scrap metals – their material value, need for accounting skills, versatility, and the unpredictability of scrap collection, influence the organisation of scrapyards. The scrap economy is different to other opportunities that northern migrants previously relied on to obtain cash, such as travelling to work in gold mines or agricultural farms further south. Scrap is an urban economy that requires participation in urban life. It is an economy based on an exchange between money and scrap. Finally, it is an economy based on skills that are external to the skills of agriculture - elementary algebra is necessary to perform basic accounting; an ability to differentiate between goods and their separate markets is necessary to know how to value scrap and successfully categorise materials; and an ability to negotiate and interact with people from different linguistic backgrounds is also an important skill necessary in the scrap economy (also in Sanchez, 2020). All of these features are what make scrap distinct from agriculture and inform both evaluations and the practice of circular livelihoods.

Chapter 4 - Connecting scrapyards to demand: business partnerships and labour organising

This chapter follows the relationships that emerge between scrap dealers in Ghana's scrapyards, and national and international actors that buy scrap. Everyday scrap dealers across the country bulk up their finds and transport them in small KIA motors or tonnage-bearing trucks to various companies. Some of them are located in the port city of Tema, the country's industrial hub since colonial times. Others are in Accra's district of North Industrial Area and Kumasi's industrial district around the city's airport. There are also much smaller operations, corporate branches and one-off ventures that are dotted across the country. These companies either use the scrap as raw material for industrial output or export it abroad. They represent a fairly dynamic world of comings and goings. My fieldwork notebooks from 2017 refer to actors who, in 2019, were no longer in existence. 'Who is the Lebanese man, Baba, to whom you sell mobile phone boards?', I asked a Nigerian scrap dealer in Agbogbloshie as I flicked through the notes from our last interview two years earlier. Baba scratched his forehead and said – 'oh yes, he was here, but he's gone now'. In the 2019 interviews in scrapyards, when asking for the names of companies that buy iron scrap, respondents mentioned 'Wahome', 'Wahome' (pronouncing it instead as 'Wahoom', 'Wahoom'). 'Wahome' was the name of a company owned by a Taiwanese businessman before its closure in 2015.It has since been bought by Sentuo, a joint venture between the Fujian Chinese Overseas Industrial Group and a branch of the Ghanaian government. To add to the constantly changing environment between my two visits, a further two smelting industries folded in the 2010s.[44] For most of her life, Duεεtε, the scrap dealer introduced in Chapter 1, sold scrap to Boniface Amandi, who exported it abroad. Duεεtε had such high esteem for Boniface, that she ended up naming her son 'Amandi' after him. When Amandi (the son) gave me directions to Amandi (the businessman), I visited the latter's office expecting to find a busy scrap operation but instead I discovered Ghana's

[44] Special Steels and Western Castings.

former 'leading businessman' as per the country's old enterprise map in a mournful state, reflecting on his past success (Sutton and Kpentey, 2012: 144)

In the midst of all this change, a few companies managed a steadier presence and portfolio that spans a little over two decades. The companies in question are mostly owned by Asian, Middle Eastern, and European investors and hire foreign managers to run their ventures. It is because of these foreign-run companies that Ghanaian-run enterprises like Amandi's are no longer in existence as they have been wiped out by the competition. As such the foreign companies' emergence on the map is not without consciousness of the fragility of the sector and actors within it. This is why most assessments of Ghana's scrap economies that focus on lists of actors give only a snapshot of it rather than an exhaustive panorama.

These various actors channel scrap metals in Ghana to their geographies of demand. As mentioned in the introduction, due to a scrap ban in place since 2014, all iron scrap stays in the country, while other metals are mostly destined for export. According to Joshua Lepawsky's (2018) analysis of COMTRADE data for 2012, African territories export their waste first to Asia, then to the Middle East and finally to Europe. While Nigeria, Angola, and Congo represent high contributions to these exports, the author concludes that 'the single largest African source of e-waste[45] imported by Asia is Ghana' (Lepawsky, 2018: 76). In Europe, most African exports go to Belgium, which is the host country for e-waste refining industries such as Umicore (*ibid*). The globalisation of Ghana's scrap-worlds is a story of changing actors, multi-directional global flows of metal and cycles of boom and bust associated with new legislations. A similar state of flux exists at the level of scrapyards. New scrapyards appear on the map. Individuals change business portfolios and new scrap dealers join the work.

[45] The author's methodology uses an expansive notion of 'e-waste' that includes lead from car batteries and copper. These have been consistently referred to as scrap metals in this thesis in order to emphasise their competitiveness with primary scrap markets rather than debunking the myth of e-waste dumping as is the purpose of Lepawsky's text.

This is why to follow the relationships between different actors in the supply chain, one has to focus not only on the actors involved, but also on routinised *modus operandi.* In this chapter, I argue that the key *modus operandi* for companies has been tapping into collection networks and forging business partnerships with individual scrap dealers. The partnerships between the companies and individual scrap dealers facilitate the conversions between the networks and the companies. All of the companies depend on West African scrap dealers for their operations - iron smelting companies source all their raw material from scrapyards, exporters of non-ferrous metals such as aluminium, copper and lead also rely on mostly Nigerian traders, and the same applies to companies that buy precious metals from electronic waste. Some attempts by the companies to by-pass scrap dealers and obtain scrap via collection points, government auctions and direct purchases from businesses discarding their scrap, have not been able to ensure sufficient supply (see Oteng-Ababio and Grant, 2021). West African labour and its contribution to metal extraction, combined with the toil that the workers take on their bodies and psyches, and their environment means that the relationship between scrap dealers and companies is based on an unequal sharing of burden but also scrap dealers' ability to retain some control due to their longer history of communal hold on the supply of metallic waste.

I show that in consequence the relationships between companies and scrap dealers are muddled. The companies rely on networks of scrap dealers and on scrap dealers' services, entering into a 'business partnerships' with them. The scrap dealers then convert the commodity from networks to the companies.[46] As explored in Chapter 1, the networks are communal efforts organised around a shared ethnic belonging. But the relationship the scrap dealers' hold with the companies has an influence on how they operate. The partnerships are relationships that are personalised, cultivated, multiple, aspirational, and fleeting. In this context, the references to 'informal workers' as a cohesive interest group, neglect the decades-long struggles to create a labour movement in such a dynamic world of networks and partnerships. They create challenges for making sense of scrap dealers' positioning within its multi-directional and changing processes of globalisation of scrap metal flows.

[46] I use the term 'translate' with reference to Anna Tsing's work on the importance of translation in the making of global supply chain capitalism. Tsing (2015) writes about translators of value 'through which capitalism comes to cohabit with other ways of making people and things' (126).

This chapter is divided into three parts. The first part focuses on the emergence of networks and how they have changed vis-a-vis the changing strategies of the companies. The section shows the importance of the network as a crucial dimension of scrap worlds - the network is what allows companies to make a profit out of the ubiquity of scrap.

The second part shows the 'business partnership' between scrap dealers and companies as an idiom, a value, and a language of interaction in which actors negotiate and test their relative positions. The idiom of business partnership expresses an aspiration to be treated as valuable for the companies. Scrap dealers engage in relationship-making — be it by practicing competitiveness, by selling to companies sometimes regardless of the price 'to keep a relationship', and by attaching sentimental value to relationships with specific employees that come to represent the company. Scrap dealers actively partake in the fragmentation and flexibility of the market and are not solely caught up in its schema. As one of my interlocutors in Agbogbloshie said, 'those companies, they should study us (…) they should treat people with respect as business partners, it's not all about price'. I show how values other than 'good price' come to play in these relationships - these include sustaining relationships by allowing conversions across value regimes, extending lines of credit and occasionally writing off debts and announcing prices in advance as a sign of respect. The companies themselves also make an occasional show of writing off debts, foregoing profits, and allowing to be cheated in order to show that they too are invested in cultivating relationships as well as making profits. I emphasise the companies' keenness of 'showing' that they are invested in cultivating relationships, despite their primary concern with profits.

The third part of the chapter follows the decades-long attempts to organise a labour movement of scrap dealers across Accra and Kumasi, and the failures and difficulties entailed in the process. The inability to create sustainable labour politics makes this into a 'late capitalist' context (Harvey, 1990; Comaroff and Comaroff, 2000; Tsing, 2009; Appel, 2020). While defined by inequalities of power and wealth between representatives of different geographies, racial identities and institutional contexts, the labour movement also operates in ways that are non-transparent, confusing and based on an unequal access to information. The attempts to organise the movement have in consequence faced numerous problems. This is because the fragmentation of the market means that people experience the business as a series of relationships which vary according to the actors involved. Given the distinctness of experience between individual partnerships, scrap dealers struggle to perceive a shared predicament of exploitation. Neoliberal contexts are characterised by the emergence of entrepreneurship, self-empowerment, and aspirations for individual advancement. Business partnerships in the scrap world create proximities between individual scrap dealers with the companies in question; this can sometimes give a sense that financial risks are shared by partners rather than borne individually.

Globalisation of scrap-worlds: Ubiquity, networks and middlemen

Ubiquity versus profit

Conversations with companies and their employees made the lack of fixity of scrap-worlds abundantly clear, especially when it comes to the companies that were buying only for export. Older employees inevitably had years of international experience under their belt. Cameroon, Nigeria, Lebanon, Oman, Singapore, Brazil, Dubai, Iraq, India, Pakistan – are just some of the locations that employees worked in before. One such employee, after my gasp of admiration at his multiple and distant voyages, shrugged his shoulders as if there was nothing special about it – 'I am just a simple international scrap man', he said to emphasise the routine nature of his life. The companies that were in Ghana during my fieldwork were also present in different locations. Blancomet, a Lithuanian company based in North Industrial Area in Accra since 2008 has its branches in Guinea-Conakry, Togo, Ivory Coast, Rwanda, and Tanzania, as well as in Europe. In each of these locations, the company focuses on a different part of the economy. In Ghana, the company mostly buys cables, while military scrap and tyre scrap are its main targets in the Ivory Coast, Sierra Leone and Liberia. N.Nest Metals is a Lebanese company with branches in West Africa and Lebanon. Finally Non-Ferrous Metals is a company headquartered in Dubai with branches in Brazil, in various countries in the Middle East and in Nigeria. These branches might appear under different names depending on their location.

Ghana's scrap-worlds are bifurcated: ferrous metals (iron) is metabolised within the borders of the country by five iron smelting companies; and non-ferrous metals (copper, aluminium, lead, precious metals, etc.) is mostly exported out of the country to refineries around the world with a limited volume circulated regionally for artisanal production of utensils and bowls. The former companies had been lobbying the Parliament for the ban since the 2000s, citing shortages that endangered their continued existence, but they faced a counter-lobby of exporters. Eventually, the government took the side of the industries by banning export and criminalising errant companies. Ghana's iron scrap volumes are enough to make local smelting possible and the growing construction boom in the region creates a consumer market for iron rods, the industry's primary product.

Non-ferrous worlds meanwhile are made up of a few recognisable companies such as the aforementioned Blancomet, NonFerrous Metals and N.Nest Metals. Since the few recognisable non-ferrous companies trade in metals that are rarer 'in the system', they spread their branches and agents across the region to make volumes that permit profit margins so they can invest in diversified portfolios of metals. There is also a cornucopia of erratic export operations that come and go. A former scrap exporter, Thomas Buxton, referred to the latter as 'skirmishes' to emphasise that their goal is not to create a durable commodity chain but rather to turn a one-off profit — 'We have these dealers, who want a trick. If somebody comes to the country and decides that they are leaving, how does the person [in question] take his money back? Through the banking system might be difficult, but he gets himself a boy in a scrapyard, packs a container of [computer] motherboards, ships it, and off he goes with the money'.

Unlike in other commodity chains, where specific geographies offer access to unique commodities, there is nothing specifically extraordinary about Ghana's scrap. In fact, there was not a single interview in which the various international employees of the companies would not begrudge the material that was coming from scrapyards – 'when I was in Iraq during the invasion, bombs were around but people still sold clean copper (…) what we get here is so dirty!', said one scrap dealer commenting on the burnt copper cables smothered in oil (to increase its weight) that the company would routinely get from scrapyards. The car radiators were packed with sand there were many ways to cheat on iron scrap, the weight of motherboards was increased by keeping some of the plastic parts stuck in - the list of complaints was endless. Not only was the commodity flawed, but there was equally not one conversation in which the companies' employees would not bemoan the lack of craftsmanship on the part of local scrap dealers. One such employee, originally from India, with an experience in 'the Gulf' (Dubai and Oman), claimed that there was much greater appreciation for metals 'in the Gulf' - 'people understood when you rejected metals for low quality. They understand what quality is. Here they just fight with you'. The businesses experienced recurrent losses due to being cheated. Their melting machines were occasionally breaking from plastic and dust that were getting inside and the resultant quality of metals was spoiled.

Yet they were in Ghana because collection networks kept bringing scrap and demand came from all places. In other words, the supply of scrap was there to tap into by anyone willing, and demand was coming from everywhere. They were buying the metal for rates not much lower than those on the London Metal Exchange (LME) (as described in Chapter 1). According to my interviews, there were three sources of profit in Ghana - some intrinsic to Ghana, and others that were characteristic of scrap markets as such. The refineries around the world buy for prices higher than the LME or they buy for prices fixed at the Shanghai Metal Market. Thus, when scrap dealers aggressively demanded prices close to the LME, which is a routine part of the negotiations at the companies, they were still leaving a margin for profit. Two reasons for profits related to the specificity of Ghana's scrap markets - the extensive networks of scrap collectors favoured stable prices over responsiveness to international prices, as they were able to fix their profit margins. Ghana's prices changed between three and four times a year (rather than daily) which meant there was more variation in prices in international markets than in local markets. In addition, the companies had a habit of giving 'grace periods' to scrap dealers whenever LME was down, during such periods they bought for the old (better) price, at the same time LME's rebound caught up with scrapyards with a similar (if not greater) delay. This meant periods of increased profits. The companies could also underpay their formal labour inside warehouses, compared to the higher rates they paid to foreign staff and management.

Networks and middlemen

All companies relied on the regional collection networks organised by West African scrap dealers. The common perception - represented in the media - is that Ghana's scrap-worlds are the result of 'electronic waste dumping'. Ghana's scrap worlds are an effect of economic developments at the grassroots that, since the 1990s, have progressively been 'extroverted' by international companies, and that over the course of time came to include e-waste to its worlds. The current divide between West African scrap dealers and international companies is also a relatively recent phenomenon, as prior to this, the sector was predominantly West African.

The first scrap dealers in the early twentieth century would focus on aluminium and copper that they would move from Ghana's port cities up to the North of the country and beyond its borders. In Ghana, the early circulation of scrap is linked to Muslim networks that extended the artisanal technologies across geographies and traded in scrap aluminium. The shared Muslim background was crucial to relations of trust. As some of the actors of these earlier circulations remember, this was a time when Burkinabe, Malian and all sorts of other 'brothers in faith' came to Ghana with 'a stack of CFA wrapped in a bag buried under their clothing' to buy scrap for their artisanal networks further up north, where aluminium and copper were rarer. Male and often senior urban migrants of Northern origin, who knew about the value of scrap and the networks that needed it, collected it and would get 'small coins' in exchange that were tantamount to building a communal pension.

The transition into scrap economy of scale in Ghana is a result of individual efforts to tap into new waste streams and connect them to a growing international demand. Most prominent among the early entrepreneurs was Boniface Amandi, who increased and diversified the collection of metals across the country. His 'desire' led him to the Kaiser Industries (later VALCO) in the mid-1970s. He soon entered a deal with the company to become its official scrap buyer. In Amandi's account, the employee was interested to learn more about Amandi's business. Kaiser executives even went so far as to draft a letter of support to obtain a plot in Tema's Industrial Area. Following this incident, the company then sponsored his trips to Birmingham to learn about aluminium smelting technologies.

Amandi's fondness of the business partnership with Kaiser is represented by a photo with the executive who discovered him in the company's dumpsite stealing dross. The photograph takes central stage behind his office desk amid religious iconography. When I asked about the photograph's significance, Amandi reflected about the relationship:

> 'that time I was a small boy. They [the executives] said among themselves that I must be an honest man. When the Kaiser officials asked me if I had a yard, I said yes. There was a man close to my yard, who had a telephone. I gave them his telephone. One day he told me that the officials are coming to see my yard. Then all of the sudden ten pickups and they are there. I showed them my stores. They were happy. They said 'the man is enterprising'. I heard them say 'the man is enterprising''.

His early singular export efforts increased the demand and opened the opportunity up to all sorts of people, men and women. By the late 1970s, Amandi opened an industrial scale smelter that was selling across West Africa. He employed five-hundred people, and, according to his own estimation, was buying ninety percent of scrap aluminium in Ghana and was its sole regional industrial-scale smelter. Amandi says that his own transition from a scrap picker to an industrialist made him aware of the backgrounds of the collectors - he learnt their names, extended credit to keep them in business, and brought in many people to the profession, including Nigerian scrap dealers from his father's home state.

Boniface Amandi faced competition from only one other exporter, Nana Frimpong. Their work had two effects: they introduced all sorts of people to scrap collection, bulking, and recycling, and they became role models for other Ghanaians who entered the international export later on in the 1990s. The turning point of the scrap markets was in the mid-1990s when Tema Steel was bought by Indian

Figure 4.1 Amandi together with a Kaiser executive.

investors, who received iron scrap on credit from Amandi and other Ghanaian scrap dealers - kick-starting the industry's operations in Ghana. They updated industrial technologies to allow the processing of iron scrap - the most abundant metal 'in the system'. Soon after this, other smelters opened (or re-opened). Further down the line in 2000s, Ghanaian exporters entered business partnerships with international companies like the aforementioned N.Nest Metals and Non-Ferrous Metals, introducing them to the networks and local specificities. The Ghanaian business collapsed soon after, not able to withstand their competition. As one early Ghanaian scrap exporter, Thomas Buxom, explained in an interview: 'when the Lebanese came, I gave them one of my plots of land [which is now the company's current location] to do business. They had so much money they were able to raise prices in the local markets and get all the scrap. It's like I invited a lion and the lion turned around and said "hey, man! you are ready for consumption"'.

The scrap worlds became an especially busy scene in the 2000s, when John Kufuor's government worked to pitch the country to foreign investors. John Kufuor's election in 2001 marked the country's first peaceful transition of power since independence; his presidency, which lasted until 2008, was associated with the steepest rise in foreign direct investment in Ghana (this has since registered gradual growth and occasional drops).[47] Soon, all sorts of actors vied for the country's scrap. Scrapyards experienced their own variation of 'Kufuor, thank you' - a phrase that signified a flood of import and export opportunities from the open borders that undermined local industries but strengthened the position of markets. When before prices of copper, aluminium and steel were static for years as the export was in the hands of few, they increased up to tenfold as competing foreign exporters sought to pack their containers.[48]

The economic crunch in 2007-8 was the first blow that this newly fragmented and extroverted world experienced. The next blow came in 2014, when the Ghanaian government decided to ban exports of iron scrap. The non-ferrous metals (copper, aluminium, precious metals) that can still be exported are not as numerous as iron scrap. In addition, their supply is not enough to sustain numerous exporters and its steep prices require higher capital. Hence, the exporters that remain either have enough capital to buy the more expensive aluminium and copper in quantities that permit international exports or they trade on a one-off basis.

These rearrangements were not only tapping into extant networks of scrap collection, but they were equally changing those networks. In the 1990s, iron smelting companies and Ghanaian exporters worked closely with elders in scrapyards in Accra and Kumasi; scrap dealers associations had their

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[47] As per World Bank data on Foreign direct investment, net flows.

[48] This was not necessarily an exploitative arrangement *per se*, but one that allowed Ghanaian exporters overcome disadvantages of partaking in international markets such as unfavourable currency exchange and high interest on loans from local banks.

'agents' in Tema, who kept track of their contributions and, at the end of the month, companies paid commission to associations to sponsor their activities. Such commissions were used for communal events and the purchase of trucks, solidifying the power these associations held to control the market. On two occasions in the early 2000s the associations organised collective bargaining to ensure better prices for their goods in Tema.

The opening up of Ghana to foreign investment in the 2000s meant that the multitude of exporters started sponsoring individual scrap dealers - young as well as senior, men as well as women. There is not a scrap dealer with over a decade of scrap experience, who does not remember this particular time as a time of unexpected encounters - with Indian, Middle Eastern, European or diaspora businessmen ready to front their business with capital. Most scrap dealers who had a scale in a scrapyard and enough capital to load a KIA or a truck-full of scrap, have had an experience of having a particularly direct relationship with an exporter. These relationships were direct based on exchanges of credit and goods. The exporters were approachable, shared their telephone numbers and addresses, and financed scrap dealers whenever they needed money. The same accounts were told to me in countless interviews when scrap dealers were questioned of their relationship with exporters: 'They came to me', 'they would support me', 'we made direct relations', they helped me very well' – are all phrases that reappeared.

One of the veterans of Agbogbloshie, Afa Suley explained the resultant blossoming of business partnerships inside scrapyards in the following words: 'so when [the exporters came], they rather engaged the [small] boys, when you are working with somebody as an apprentice and an opportunity comes for you to work as a master, in that case as you know *milk has poured into the calf's mouth* (Dagbani: *bihim kpai'lu naɣbil' nolini*), so the boys diverted to the side of the exporters, also the coming of the exporters shot up the prices. The coming of the exporters gave us a higher value for the scraps, but it also made us lose the compensation that we were enjoying earlier.with Tema Steel (…) but now the exporters were adding money to the individuals, everybody that was loading scraps was now leaning towards exporters, so the Tema Steel was no longer getting merchandise from us'. Those recruited in the markets were, as emphasised by Afa Suley, 'boys'. The exporters brought a disruption of hierarchies and individualised the pursuit of economic gain. The deep-felt credo of communal betterment smoothed resentment, as Afa Suley mentioned: 'You know, when your kinsman is going to benefit, there is no way you will prevent that'. The influx of capital that export companies would bring to the scrap markets increased the speed of the operations, raised prices, and disrupted existing hierarchies.

Simultaneously, the exporters' hunger for scrap and willingness to take risk on individual partnerships meant that some scrap dealers took upon themselves additional financial risk without having enough capital of their own to shoulder it. Over the course of my research, I met scrap dealers whose business was decimated following the economic crush of 2008. Each of their stories shared the same inflection points: they received loans of up to and above 10,000 GHS from exporters; they began buying scrap based on prices prior to the economic crush and the goods lost all their value in the aftermath. As they had no other capital to weather the difficult days and wait for an upturn, they fell into substantial debt vis-a-vis the companies and scrapyard. Mallam Yusif, one of those affected, explained to me that: 'after I lost money, I could not give it back. This was so difficult. I felt ashamed and I stopped. Meanwhile, the exporters… it's like the Dagomba saying goes… 'he who is riding a horse doesn't know the ground is hot ('*ŋun'ʒi wauhu zuɣu biome ni tiŋ'tula*')'. The proverb meant to emphasise that Mallam's own capital was not the same as that of exporters, which is why the crush was such a devastating blow.

The companies that remained after the 2014 ban as well as the one-off containers are all pursuing the same *modus operandi* as exporters - they seek to sponsor individual scrap dealers to collect scrap on the company's behalf. In Ghana's scrap-worlds, there are two types of middlemen and their schema cohere with the bi-furcation of the non-ferrous and ferrous worlds delineated earlier. In ferrous worlds, there are individual scrap dealers inside scrapyards who 'pack trucks' to Tema, where they pass through West African 'company agents' before selling their finds to companies. In non-ferrous worlds, Nigerians and some Northern migrants position themselves as non-ferrous metals brokers between the scrapyards and the companies. At any point in time, there are many men and women, who are in such in-between positions. Some operate with their own capital, while many others rely on credit that comes from companies. To be in the position of having business partnerships with companies is one of the aspirations of mobility within scrapyards that is equivalent to climbing up their ladder.

Consequently, those scrap dealers, who work as middlemen preserve their position inside scrapyards by keeping newcomers and people lower down the supply chain in the dark about the different companies, their locations and their modes of exchange. This way they individualise the relationships between scrapyards and international metal buyers. The justification is not only to preserve hierarchies of capital but also to ensure a higher price by not 'spoiling the market' with unseasoned scrap dealers selling goods below market prices. In his account of international scrap economy that weaves in biographical detail of growing up in a scrap dealing family, Adam Minter (2013: 117) recalls his father's business colleague in the American city of Minneapolis, who would always place his 'ample cigar' atop one of the scales , while distracting customers, to tip the weight in his favour. In Accra too, should a new person come from the street, he would be inevitably treated as a novice to exploit either through subtle forms of manipulation of the scales or through an unnecessary mathematical calculations while reaching the price. The buy and sell that takes place at companies are elaborate performances through which actors negotiate and test their relative position. The masters are cautious about introducing their boys to companies. If a master is generous, such a promotion coincides with their workers' marriages and the resultant augmentation of responsibilities. The companies too prefer to deal with "business partners" over a multitude of sellers as this allows them to keep track of the credit that they distribute through the markets.

<u>'It's about relationships'</u>

Scrapyards bear subtle reminders of the extent to which their workers depend on the relationships they form. In Agbogbloshie, an office of the Greater Accra Scrap Dealers Association (GASDA) was built around 2005 thanks to funding from the Ghana Scrap Exporters Association - an association that united some fourteen exporters. The building of the office was their gesture towards bringing the scrap dealers to the exporters' side against local smelting companies. In the offices of the Progressive Scrap Dealers Association in Kumasi, among photos with MPs and Ministers of Trade, one finds photos with the exporters too. These artefacts demonstrate the value placed on the relationship. The following sections explore the different types of relationship: direct, negotiations of trust and power, and 'brotherhoods' with smelting companies' agents. The 'urbanity' of the mining is seen here though the busy scene of multiple relationships and the easy flow of information between parties of information on the Internet such as prices at the LME (c.f. Smith, 2015). The scrap dealers are shown to understand the relationship as personal and they invest in a multiplicity of relationships at any given time.

Middlemen, intermediaries or brokers are thought of as translators between cultural, political and economic contexts. Their translations help connect disparate worlds. Anthropological and historical works of various kinds seek to theorise the reasons for their emergence, their identities, and the particular, contextually variable labours that set them apart. There has recently been scholarly interest in 'the return of the broker'. Deborah James (2011) argues that following the nineteen-seventies' ideological concern with the structural determinants of power, the broker was seen as a figure who takes advantage of hierarchies rather than one who seeks to eliminate them. However, as a sign of changing times, James argues that brokers are producers and products of a new kind of society, where they create links, where relations between state and markets, people and land, identities and place are destabilised.

In debates about markets, brokers or middlemen are seen as symptoms of permutations of global capitalism, urbanism or symptoms of the level of market development and change. Historians like Francesca Trivellato (2009) are part of a scholarship that seeks to understand reasons for the emergence of cross-cultural brokerage as related to the emergence of routines that generated expectations about behaviour. Rather than an outcome of state and legal institutions, ties of trust were related to progressive familiarity between strangers. Economic scholars in turn write about brokers as auxiliaries for institutional voids of contract law and information (Khanna in Bjorkman, 2021).

Recent anthropological scholarship locates middlemen in the context of transformations of capitalism along supply and commodity chains. Tsing (2015) writes about middlemen as translators of value 'through which capitalism comes to cohabit with other ways of making people and things' (126). Their specific position becomes basis for a new form of accumulation - 'salvage accumulation' - whereby capitalist value is made from non-capitalist value regimes. In Ghanaian scholarship, middlemen are seen as figures that have been persistent part of the economy since colonial times (and - a subject of greater dispute - since pre-colonial times) (see Murillo, 2017). These were figures present in different areas of the economy, who mediated between the social world and the international firms, be it in the gold, shea or consumer goods sectors.

As Chalfin (2004) showed with respect to the shea commodity chain that connects shea markets in the north to port cities and beyond, shea markets had different levels of openness to export initiatives - while in some cases private company buyers were able to enter markets, in other cases they met with resistance or received inferior products compared to local customers. In Ghana's scrap economy, the companies struggled to enter the markets by setting up their own buying points inside scrapyards (which some of them tried to do). The only way to penetrate the market is by buying from scrap dealers or giving money to individual scrap dealers, who then proceed to buy on the company's behalf. There were, however, different grammars for these kind of interactions depending on the type of metal. This meant that a single market abounded in multiple types of commercial relationships differing in accordance with the specific metals they were dealing in.

Precious worlds of direct relationships

Printed circuit boards shipped to Europe are one such example of goods that are subject to direct penetration by exporters. Part of this can be explained by the material - the circuit boards are modular: once removed from computers and laptops, they can be assembled and put in a container. Unlike in the case of other metals, where different metals have qualities, and as such require much more supervision of the exchange (as will be seen later), this one can be sold and bought by the kilogram fairly easily.

My friend Muntari's experience of a direct relationship with an exporter is a good example of what such relationships entail. Muntari is a grassroots member of a political party, an elder, and a son of a village chief. His movements around Accra are fairly expansive - he sometimes pursues scrap across its geographies, he also worked as an occasional driver for politicians when his party was in power. In between these assignments, he could be found in Agbogbloshie. On a fairly unexceptional day amid unrelated conversation, Munatri let me in on a secret that he was visibly happy about, 'I collect motherboards for a 'Russian man''. He made sure no one heard him. I assumed 'Russian man' was someone at Blancomet, a Lithuanian recycling company, where the majority of men in positions of power come from either Central or Eastern European countries. As these are often exotic locations from the point of view of Ghana - Montenegro, Lithuania or Latvia - the employees are associated with their former imperial power in the scrapyard parlance. Muntari explained this business partnership had nothing to do with the companies; the Russian man sponsored a container that was placed in Agbogbloshie and that was over the course of a month being filled with motherboards. He only let two Nigerian men in on the secret, who were thereafter supplying him.

Muntari wanted to keep people out of the loop, so as not to 'spoil the business'. This meant two things: he was able to have exclusive access to the man who was giving money to collect e-waste and together with the two Nigerians they were able to get a better profit margin without having to share it with others. Muntari was paying the two Nigerian men between one and two cedis more per kilogram than other companies at the time. To my surprise, one of the Nigerians, Oliver, continued supplying two other companies with his finds. 'It's for the relationship', he explained after asked why he is willing to forgo profits each week. Both of the other companies sponsored Oliver in the past with advance credit, which ensured his loyalty.

The 'Russian man' represented a fleeting presence in the scrapyard. Muntari did not know the man's name and his money went through a representative in Accra, who would occasionally check on Muntari. Who the local representative was or how he knew him? - Muntari made it sound as if the connection was accidental. He talked to the man during the latter's visit to Agbogbloshie. A single photo with the 'Russian' man on Muntari's smartphone and the money in his bank account were the connection's proofs. Muntari had sent two containers and was packing up a third one, but did not know how much longer this exchange would last. He knew of others, who were lucky to find similar business partners, but such deals were fleeting or concluded on a one-off basis. 'All is good as long as it lasts', was Muntari's opinion, one that firmly cohered with his history of pursuing different projects, encounters, and possibilities.

Muntari's tangible connection shed a new light on a range of encounters I had in scrapyards, especially at the beginning of my research. They constituted their own 'economy of appearances' (as Tsing, 2000), where individuals made a show of what they could do in order to convince me that they could handle such bulking of scrap if I were to sponsor them. Michael, a Nigerian buyer of electronic waste assured me that his operation was to pack up containers of motherboards to sell to Umicore in Belgium.

According to Michael, his father worked in this European company with Michael, sending the e-waste to Antwerp, where it would be claimed by his father and sold to Umicore. The proceeds were remitted back to Michael to sponsor his business. What was the detail of that connection between the father, the son, and the company? Michael presented it as a direct line but was reticent about sharing details. His phone held stores of photographs of Umicore's headquarters - taken by his father on the way to work or once inside the offices. The day Michael added me on Facebook, his profile picture was a selfie in front of a container packed tightly with motherboards - a common choice of a profile picture to emphasise readiness and past experience that I encountered with other men. Whether or not, Michael's business was exactly as he described, or whether it was similar to Muntari's was beside the point. It suggested a readiness to pursue more business partnerships and a responsiveness to opportunities.

Such readiness to form partnerships was also an entrepreneurial response to the 'e-waste dumping' narrative that brings international aid, journalists, NGOs, and also individual investors magnetised by a promise of packing containers. During my research, I met some of these opportunistic individuals looking to enter partnerships. On one occasion, I even encountered a fellow countrywoman - a Polish businesswoman whose Polish company advertised 'ten years of experience in global trade and sourcing in origin'. She was looking to export computer motherboards and catalytic converters for recycling from Ghana to Europe. She too was hoping to establish a container somewhere, pack it up, and sell it to European recycling industries. Many phone-calls later, she was slowly learning that 'when push comes to shove, it doesn't seem like there is much of anything'. Reflecting on this encounter with another scrap dealer: 'you see, it's like that - the demand for the precious metals is huge, we keep hearing from Europe people wanting to buy, but it is difficult to find enough e-waste. There is not much [of it] in the system'.

Non-Ferrous Worlds of Negotiations

Trying to see what scrap worlds from the perspective of the people who buy scrap I sought to do fieldwork in companies. Only one granted me the possibility. In 2018, the company had recently opened a warehouse in Accra's North Industrial Area; its four employees were from different parts of India and Pakistan. Nasim was previously in Nigeria, Oman, and Iraq. He worked in Iraq after the American invasion of the country which made it into an open scrap mine of infrastructure and war machines ('there was no government, so we could do whatever we can with the prices … aside from the transport there were no costs… just after the invasion, people would steal everything they could, dismantle and send it to us… but some powerful imams put a stop on the practice which was bad for our business and as the bombings increased I had to leave… a bomb is made of brass metals, so just at the beginning of the bombings the business was good').

After Iraq, he moved to Jordan and relied on Iraqis to bring the goods. The business stopped once the situation in Iraq stabilised and direct exports to China and India were established without needing to pass by middlemen in Jordan. Then, he worked in Dubai before going to Oman, where he bought scrap that came *inter alia* from war-torn Yemen. In Nigeria, he worked until the country instituted its own scrap export ban in 2011. This is when his career took him to Accra. Another one of the international scrap dealers, Navin worked across West Africa - in Cameroon and in the Ivory Coast, until more recently he settled in Accra. Baqar, the director of the group comes from a Pakistani scrap family, his father specialises in the recycling of water dispensers and coffee makers in Lahore's scrap market of

Misir Shah. Despite being only my age, he had already worked in three countries in the Middle East and two in Asia. Maqboob came straight from India. The men shared a love for metals and a fascination with their properties. As Nasim said, 'metal is like a university, you can always learn something new'.

When I asked about the reasons for the company's presence in Accra, they cited the ease of doing business in Ghana ('you can walk around with money peacefully') and cheap labour in their warehouse. The company treats Accra as a hub - they buy goods from Ghana but also from the country's near and distant neighbours such as Mali, Burkina Faso and Togo. The company had been in Ghana for some 10 years. It has headquarters in Dubai, where it has smelting plants, and branches in Iran, Oman and Pakistan. In Ghana, they focused on buying lead and acid batteries, as well as scrap copper and brass, which they would melt before transporting abroad to refineries.

Each of the men had a different position in the company. Baqar was a purchase manager responsible for setting prices and organising the logistics of export. To emphasise his position in the company, he showed me his screen-saver that featured direct prices from London Metal Exchange. He knew how to buy, he knew where to sell , and he knew how often the containers were leaving the port. Needless to say, he was willing to share only some of that information with me and whenever he let something slip, he would ask me not to pass it on to the others. Our conversations were always interjected by Baqar's frantic reading of incoming messages: photos of metal piles with straightforward captions of '%???'. On other occasions, he would receive phone calls about price negotiations: 'I am not changing the price… Tell him not to make a fool out of me!'. Nasim was responsible for keeping track of quantities of goods coming in and the amounts of money paid out. He sat by the desk, engaged clients in casual conversations, made tea for the others, and wrote receipts. Navin's position in the company was unclear; he seemed to be friends with the others, but not yet formally hired. He occasionally helped Maqboob, who was responsible for checking the quality of incoming metals. Maqboob went around with a telescopic magnetic pickup to ensure that the goods were indeed non-ferrous. This was an enormously responsible position - he had to make sure that the company would not lose money by buying wrong metals (e.g. aluminium for the much higher price of copper) or cheated quantities (e.g.

scrap dealers would try to cheat the scales by adding oil). He supervised the work of three Ghanaian workers, who hid magnets inside their gloves to 'feel' iron and separate it out. Maqboob's stress was perceptible. To quell his emotions, every now and then he rushed to his 'secret drawer', where he hid tobacco and Indian cardamom. He would mix the two ingredients and place them inside his mouth to relax. Occasionally when there was nothing to do, he watched American female wrestling, which his friends claimed he was now addicted to.

The stress factors that weighed on Maqboob were many. On some occasions he began the day by learning that the car batteries he had bought the day before were filled with water rather than acid to increase their weight. 'They [scrap dealers] know we can't pour out the batteries here to check what is inside on the spot, because of the environmental reasons', Maqboob explained. This immediately made him fear Baqar. 'I hope he trusts me', 'I hope he knows there was no way for me to tell', he defended himself in front of the others.

The list of ways to cheat was long. Maqboob had not spoken English until coming to Ghana. Now, some three years later, he spoke the language with Ghanaian inflections: addressed the men who brought goods as 'boss' (a frequently used form of address to people in positions of power over you, e.g. whilst bargaining with taxi drivers), veered towards Pidgin from time to time, and inserted an elongated 'too' ahead of adjectives ('they cheat us too much'; 'the cables are too dirty').

The arrival of scrap dealers at the company was always associated with elaborate negotiations and tests of relative power. These were invariably theoretical and the men almost seemed to outperform each other in devising ever more cunning ways to get under each other's skin, whilst preserving the relationship. Almost everyday, the copper brought from Agbogbloshie and other scrapyards would take between 2 and 5 hours to verify. The bundles of cable had to be disentangled. The bundles would hide all sorts of weight additions: iron, bits of plastic. They were smothered in oil and occasionally in sand to increase their weight. This why the copper weight is said to disappear over the course of the days: as the oil dried up or trickled down onto the ground precious pounds disappeared. Other interviewed companies agreed that they too experienced similar problems and needed to equip themselves with blowers to get rid of the dirt and sand. Alas, Maqboob's team was without a blower. In scrapyards too, I observed procedures for cheating. For example, the packing of iron-bearing trucks to Tema was an art - scrap dealers pack the goods in such ways as to hide the lower quality iron inside while placing harder iron on the outside. Sand was also added to weigh down the car.

These checks at the company were vocally opposed by scrap dealers who brought goods. In one particularly poignant moment, the scrap dealer shouted at Maqboob (whom he kept calling 'Bombay'): 'If you check like this when we buy in the scrapyards, they slap you! If you check like this, I no come again!'. The man claimed they are not responsible for the low quality of the goods. The problem starts at an earlier stage in the supply chain, they themselves are being cheated and the social ties inside the scrapyard are preventing them from exacting higher standards. In the long hours of verification, Maqboob kept bringing examples of cheated metals to others as trophies of his own diligence. To perform the surveillance, Maqboob put his chair in between the workers. He occasionally exclaimed: 'Crazy Ghana' or alternatively 'Ghana is cool'. On various days, between 60 and 100 kilograms would get rejected. They would pick up the goods from the floor and occasionally bring them back the next day inside new bundles. Nasim was sure that sometimes he saw the scrap dealers leave the warehouse happy: 'In their mind, they think we fool the white man.' The men's conversations dwelt on cheating on a daily basis. 'In their blood they want to cheat… without cheating, they don't digest their food'. The topic would be brought up in the least expected circumstances. For example, sharing a papaya, Nasim would say 'the fruit is good for the liver' to which Maqboob immediately volunteer as a response, 'these people don't have hearts, why would they have livers?'.

When discussing the cheating, Baqar claimed that the company was able to break even when up to forty percent of goods were cheated. Although such a calculation was not neat and they had to occasionally deduct prices from the next purchases coming from the same scrap dealer, they were careful not to overstep the mark when fighting for their own interests.

In as much as the company employees would pass racist judgements in private conversations, overtly they remained courteous and only used teasing to clear the atmosphere. The men bought small cables of low value to 'create a relationship' with the scrap dealers. And they would be conscious of when to stop verifications and just buy the goods together with the excess weight. This was usually the job of Nasim, who watched the tense exchanges between Maqboob and the scrap dealers and stepped in to conclude them. The men ended up agreeing that the secret of success in scrap business was not to argue over every single purchase but to ensure that the relationships lasted. 'We don't want to lose a customer. We might be making less profit with this person but at least he brings in business everyday', was their repeated conclusion.

Figure 4.2 Sorting of scrap at a non-ferrous export company.

The cheating begins lower down the supply chain, as the belligerent scrap dealers shouted at Maqboob. On other occasions, the scrap dealers would argue, 'we bought this [aluminium] for the price of copper. Now, you have to buy it for the price of copper too!'. Such mistakes were possible as sometimes cables were copper-clad aluminium wires. They spoke in this way in order to emphasise that the risks and burdens need to be shared between the dealers and the companies. Occasional concessions to such demands were taken as proofs that the companies 'consider' (a Ghanaian shorthand for 'consider my situation' or 'see things from my perspective').

Incidences like this of a shared premise between the interested parties were solidified further by credits extended to the dealers. Numerous scrap dealers at one point or another received a credit at no interest. George, a Nigerian scrap dealer in Agbogbloshie, was sponsored by Blancomet almost on a monthly basis during my fieldwork. The company also phoned him to inform him, when the prices were about to go down. He was not the only person to receive such favours. According to George, the company preferred to work with Nigerians, because they know that in the end the police would not side with them over the company. Or they understood that the credit was not substantial enough to convert into Nigerian realities as a capital for a new business. George's estimate might have been reflection of his own situation, but both of us knew of few Nigerians who took the credit and 'ran away'.

The fragmentation of the market meant that the companies competed with each other and entered into such individual partnerships. This meant that the evaluation of one's position in the scrap-worlds was always expressed as an evaluation of a specific relationship. Thus in George's eyes, 'Blancomet, they consider when the price drops… the other companies don't tell you!' - an assessment that was not true for other scrap dealers, who had better relations with other companies. There were some scrap dealers who stopped trading with specific companies or who would pass exclusively through middlemen in scrapyards, because they believed that they had been mistreated. The fragmentation of the market fragmented opinions, created sense of mutual trickery between the companies and the markets, and intimacy between the employees and the scrap dealers as expressed in references to specific employees - 'Vivek', 'Nidal', 'Nasim'.

Iron worlds of agents, brothers and 'mulafichis'

Iron smelting companies - similar to non-ferrous companies - are also situated at a distance from the scrapyards. The layer that divides them from the scrapyards is the agents. All companies have closed their doors to scrap dealers and ask them to go through agents in order to sell goods. Scrap trade existed prior to the arrival of iron smelting companies in the country and the agents were recruited from among scrap dealers. They had knowledge of local networks, which was an asset that the company management lacked. Much like the men who specialise in iron, the agents tend to be migrants from the North.

Figure 4.3 Two steel companies in Tema's Industrial Area.

There is confusion about whether agents are allies or *mulafichis* (Dagomba term for 'hypocrites'). Mallam Mutala and Olu, two older scrap dealers in Agbogbloshie were firmly in favour of agents or specifically their own agent - Baba, who works at Chinese Sentuo Steel and previously in Wahome. Their continuous work with the same agent meant that Mallam Mutala and Olu did not register the change of the company's name and ownership as relevant to their own situation.

When I met Baba later, he assured me that he was an honest man, who did not charge anything for his services, other than whatever came from goodwill. Mallam Mutala agreed: 'Baba is a respectable man. I send my goods in a truck. I pick up the phone and dial his number. He knows that my truck is coming. I give him the number plates. Sometimes I tell him that "Baba, I didn't earn enough money" and sometimes I give him some money from my passion'. Baba sometimes (but not always) shared receipts with Mutala. These were written selectively in Chinese: the price per ton was using Chinese numbers, the tonnage of received goods in Arabic notation, and the amount paid out was in English, all in a very dim ink that faded rapidly with time and exposure to the climate's usual humidity (Figure 4.4). Although it is possible to calculate the price per ton working from the other information without having to revert to a Chinese dictionary, the receipt hinted at a certain unease to reveal the price per ton. Were I to pick up a phone and call any of the companies in Tema about their prices, I would either get a price that was below the one that agents were giving to their customers or I would not receive a reply at all.


SENTUO STEEL LTD.

SCRAPS PAYMENT VOUCHER

№ 0019687

Date: 01.08.2019

Name of Scraps Owner	Vehicle No.	Quantity (Tonnes)	Price / tonne	Total Amount
[illegible]	[illegible]	20.71	一千二百九十	二六七一五
			Total	二六七一五

Amount in words: twenty six thousand seven hundred and fifteen Ghana cedis only

Cashier: ______ Drawer: ______

Date: 01.08.2019 Receive by scrap owner: ______

Figure 4.4 An example of a receipt from Sentuo Steel.

Other scrap dealers were occasionally suspicious of their agents. Part of the reason was receipts. The receipts that Baba gives to Mutala were far more transparent than those of other smelting companies located in Tema - some companies (or their agents) only gave a hand-written paper to the scrap dealers or the receipts mentioned only the amount that was paid out (without making any referent to the price per ton or the weight of goods). The latter receipts also listed agents as owners of the goods. These seemingly small moves kept the prices of iron secret and increased the power of agents as the sole communicators of the prices. Were they citing lower prices than the companies? Were they undercounting kilograms in order to steal from scrap dealers? These are the occasional conspiracies that circulate in the scrapyards concerning the agents and their status.

When one talked to the agents in Tema, they painted a different picture of their relations with the scrap dealers. Some, like Baba, are intent on claiming that they live off handouts, others say that they receive a percentage for whatever they bring to the company in exchange for gatekeeping. According to those agents, the percentage is necessary vis-a-vis what they lose and the stress that they are under. The cut that the agents get from the companies is used to suffuse the informal market with capital and thus mobilise scrap dealers to hunt for scrap and buy it from businesses and households. In effect, the agents together with the scrap dealers organise a transfer of money from the smelting companies to the households and businesses that do the selling-on.

The agents shoulder the risks associated with the uncertainties of the social worlds that they mobilise. Shaffiu, an agent, a 'Dagomba by tribe', as he introduced himself, began as a scrap dealer in Agbogbloshie. Later he worked with an exporting company and thereafter he was hired by one of the smelting companies. His association with Agbogbloshie, not only through his previous career but also thanks to his belonging to the same 'brotherhood', has been an important consideration in his work. When I met him for the first time, he walked Kubura (my assistant) and me into the smelting company, as if he owned the place: we signed no books to indicate our entrance, some of the Indian men looked at us quizzically but no questions were asked, and he showed us around the warehouse. We eventually ended up in an impersonal room marked by a single desk and couches. 'The Indian man doesn't want any pressure. They don't want risk', was how Shaffiu explained his *raison d'être* in the company. Shaffiu was under pressure to bring specific amounts of scrap that would meet the production goals.

The amounts he was distributing were not always coming back to him. Some were 'locked' with scrap dealers for months and in other cases people just 'ran away' with the money. When asked whether he minds the losses, Shaffiu assured me that it all balances itself out. Similar to stories recounted about capital sharing in Agbogbloshie, here too the loss of money is off-set by the gains in terms of investment in people: those men who took his money, still feel a sense of obligation towards Shaffiu and he claimed that he ran into them during funerals and naming ceremonies. Although it is difficult to determine earnings with precision, Shaffiu is an actor in a multifarious sphere of exchange where money debits can be repaid with social capital.

Another agent, Mohammed had never worked in Agbogbloshie before and instead learnt his trade as a scrap dealer walking door to door in Tema to collect non-ferrous scrap in the 1980s. Mohammed claimed that agents earn from their work, but they face pressure from the side of the company and the markets. They are pushed to bring scrap to meet production quotas. Yet sometimes the scrap dealers 'take money but supply the competition'. To meet the pressure from the company, Mohammed set up his own scrap collection business that he uses to stockpile scrap to fill the quotas. Still, Mohammed's making of money on the back of what others bring to the company chimes with the occasional suspicion that agents are effectively living off the sweat of others.

The companies are deliberately vague about their use of agents. Thomas Buxom, a former exporter of metals, believes that the reticence is due to accounting. He has made the study of the receipts - the very cryptic pieces of exchange documentation mentioned earlier - his area of expertise in order to see whether together with other former associates of the Ghana Exporters Association, they could launch an offensive against the companies. When we sit in his office, he shows me various receipts that he received: 'They are using agents to cook books. The fact of the matter is that I sell to you, then you don't allow me to negotiate the price, then the agent gets the money and gives to me whatever he wants to give to me. Now, how much will you state in your books. Let's say you give me 1000 GHS and you state 2000 GHS. Definitely you are reducing your profits! And in the end it's Ghana that loses.'

Rather than appropriating a product for a market in order to benefit customers, the agents recruited by the smelting company were blurring the lines of dependence between the scrap dealers and the companies. The agents are seen as ambivalent. They are potentially allowing the companies to cook the books and avoid tax; at the same time they are conduits for the transfer of capital from the companies to the scrap dealer and by extension to the discarding public. They make smelting companies approachable, but at the same time they create barriers to contact and in effect to bargaining. The agents create a sense of choice and with a sense of choice a belief that rather than the system being problematic there are just a few 'bad apples'. According to Marina Welker (2009) this is one of the standard analytics of corporate behaviour that perpetuates corporate capitalism. Here, the fact that some agents cheat overlooks the fact that structurally they might be compelled to cheat as companies off-load financial risk onto them or the fact that the non-transparent forms of operation make it easier to cheat.

The difficulties of labour organising

In the last two decades, scrap dealers have struggled to organise politically, but they have struggled to speak in a single voice. At the time of my fieldwork, there were four associations in Accra and Kumasi that sought to represent professional interests. In Accra, there was the Greater Accra Scrap Dealers Association (GASDA) that nominally represented the scrap dealers in Agbogbloshie. The political organising in Kumasi was more fragmented. The Dagomba Line scrapyard had its own association that was formed in cooperation with Switch Africa, an NGO based in Cape Coast that campaigned for the scrap dealers to improve their environments and livelihoods. The association's novelty meant its membership did not include all scrap dealers and its formation meant that it was promoting the agenda of the NGO - it mobilised people for workshops organised by Switch Africa and worked to eliminate burning (with moderate success). Meanwhile, the Frafra Market had two organisations - the Progressive Scrap Dealers Association that united scrap dealers with enough capital to send their goods to companies and '*Naayin Gaad Tuon Ka Ti Dol*' ('May God Lead Us'), an association that united the small-scale female scrap workers who worked under the members of the PROSDAG. The splintering of labour organisation into two camps in the context of the gender and ethnic divide of the Frafra market - while Frafra women were small-scale scrap dealers, it was mostly men of Akan and Hausa backgrounds who were scrap dealers with the companies. The same distinction did not exist in Dagomba scrapyards.

The associations have struggled to define their politics. Over the course of the years, GASDA has become an organisation that acted as a representative of the scrapyard to would be participants who came to Agbogbloshie from elsewhere, whilst its leadership was also resolving internal conflicts and disputes between scrap dealers. The last time it organised a political demonstration was in 2014 to protest the ban on scrap exports. Its executives took part in negotiations at the Ministry of Trade, where they stood together with exporters.

During my fieldwork in 2019, the PROSDAG decided to organise in response to the lowering of the prices in Tema. Such reductions occurred from time to time during the year. In general, price meanders down around three times a year and picks up thereafter. This time, however, the reduction was sudden and significant (equal to 400GHS=80USD per ton which in the context of a typical truck-load of 22 tons would result in a significant loss). The key problem with price reduction is that it takes time to adjust profit margins across the supply chain as there are two types of temporal lags: people who collect scrap buy it from businesses and households with reference to prices in the scrapyards and scrap dealers stockpile the scrap until there is enough to load it to Tema, which can take between one and three weeks. A change in price can thus affect the collectors and those who stand by the scale. The companies were definitely creating fears of sudden drops in prices that would be borne individually.

In August, scrap dealers in Kumasi went on strike under the banner of the PROSDAG demanding in the words of their spokesman, Nasiru Mohammed, that they be ‘respected in mutual trade relations’. This was an uncommon sight. The country’s scrap dealers had not organised a protest before. Even as their colleagues were on the streets in Kumasi, the Greater Accra Scrap Dealers (GASDA) was silent. In the country’s capital of Accra, this and previous reductions were the subject of individual complaints but scrap dealers have struggled to wield a collective bargaining power. In the words of its former Secretary, Alhaji Omar, 'it is impossible to organise, because people are working with the company's monies' - they entered individual contracts that they wanted or had to honour and as such collective bargaining through withholding goods in the scrapyards was difficult to organise. Alternatively, the work in Accra is diffused across scrapyards affected by the Dagomba conflict, which puts an obstacle in the way of their collective organisation.

Prior to their singular effort, the PROSDAG dealers met in their minute office. The meeting was full of scrap dealers located in and operating from the Frafra Market, although two representatives from the Dagomba Line's Scrap Dealers Association were also present. There were two women in the room and the rest of those gathered were men. Some thirty members of the Association were present as the Chairman explicitly called for their participation in the deliberation process over what should be the course of action ('we are in the era of democracy (…) we are not autocratic leaders that will make the decision for you'). The Chairman Ibrahim Aquah urged everyone to leave their mobile phones in the corner by the entrance: 'no information can get out before the meeting is over'. At the time of the meeting, to protest the prices in Tema, the scrap dealers had already kept their scrap in Kumasi for the past two weeks, but the prices did not go up and no one from the companies reached out to them. In consequence, they wondered if the companies in Tema even noticed. The Chairman explained that they should not be like the hen in the Akan proverb: 'the hen knows it is the morning, but she keeps watching the mouth of the rooster' ('*akoko bedeɛ nim adekyeeɛ nano ɔhwɛ akokɔnini ano*'). In other words, they should stop waiting for the companies to react and take harder measures. The meeting was to decide what those measures might be.

Since the smelting companies never met the scrap dealers to discuss the reduction, gave very little time to adjusting to the changing prices, and only communicated through *agents* that the reduction was to balance out the raising electricity costs, suspicions about the companies' ulterior motives were running rampant throughout the meeting. 'They [the companies] always decrease the prices around the time of *Salah* [Islamic festival]! They know we will sell anyway [because we need the money for festivities]', argued one of the dealers. Some argued that such timing might be the result of correlation rather than causation: the imminence of *salah* means that people sell more, hence the prices go down. Another member pointed out to general applause that the iron rods that are produced by the Tema companies from the scrap are sold with the same price tag, thus the rising electricity costs are not passed down to the construction sector that uses rods for building, but rather to the scrap markets. The emerging consensus was that the companies were not treating scrap dealers as business partners to engage with or respect. They were instead keeping them at arm's length, while exploiting their constrained livelihood options. One of the members, judged that the current price was not favourable to scrap dealers, because: 'the secret is that we, the Black people, have told the white man [*obroni* or White man - the words in Twi and English were used interchangeably during the meeting] not to mind the people. It's the agents that told them that we will supply'. Others present picked up the narrative: 'They have been masters over us for some time now. We can't continue to be the slaves!'.

The diagnosis of the problem was rapid, but choosing a course of action turned out to be much more of a challenge. One by one options were discussed and deemed insufficient. To hold scrap in Kumasi would make a statement, but the Association was not sure that they had enough money to balance out the losses. The idea was put forward of taking down the names of all those who needed money to survive, but there were not enough dealers able to afford to help other members to survive the time. Some members doubted whether the withholding of scrap in Kumasi led to the companies' 'suffering' - after all, other scrap dealers in Ghana were still sending their goods to companies. All members decided that sending goods after weeks of 'going hungry' and 'crying' - two vivid metaphors that were chosen to describe the breadth of the sacrifice - would undermine their efforts so far. The members were aghast at the idea of their collective sacrifice being undermined.

Pressed for other solutions, the group eventually focused on *agents*. During the meeting, one of the people, who sparked a widespread concurrence argued: 'Sometimes the agents can give us information [on prices]. They say this and that. But you haven't met the White man. Then, you fall prey to the situation. You can be given any price [by the agent] (…) When we take a step to meet the White man, we will know our fate (…) Let's go and let them understand that we have some sense'. As people were sharing their experience of dealing with companies, it was becoming apparent that a handful of scrap dealers received a 'secret price' from *their* agents that was higher than the price communicated to others. They noticed how the companies in Tema 'never put the price on the document', which creates secrets in individual relationships and increases the power of the agents. The agents emerged as communication barriers - obstructing the flow of information between the scrap dealers and the companies as well as being the middlemen who made it possible for the companies to hide their prices.

The meeting was a stark reminder of the information gaps between the companies and the scrapyards: the members of the PROSDAG were not certain about what affects prices and their fluctuation (was it the simple laws of demand and supply? or were sneaky exploitative politics of smelting industries playing their part in the fluctuation?), they were not sure of the relative power of the different smelting companies (were they working as a cartel?), and they were not sure whether the agents were to blame for the weakening of the collective negotiating powers. The scrap dealers judged it significant that the owners were 'White men' or *obroni* - Senuto is owned by Chinese entrepreneurs, Tema Steel and Ferrofabrik by Indian and Chinese interests, and United Steel and Raider Steel have Lebanese and Syrian owners.

Their meeting reached two conclusions. Firstly, they would all sell their goods to the agent who gave the 'secret price' that was the highest. Secondly, they staged an initial protest in Kumasi and then travelled to Tema to demand meetings with the companies. The scrap dealers also reached an agreement that in order to shoulder the decrease of prices in Tema, they would need to decrease prices inside the scrapyard. When the meeting finished, the mostly male scrap dealers went to the market to talk to Adowa Tuzua, the president of '*Naayin Gaad Tuon Ka Ti Dol*' ('God Lead Us'), who represents some one hundred and fifty women. When the dealers announced the reduction of prices to Tuzua - from 1.2 Ghana cedi to 1 Ghana cedi per kilogram, she started arguing that such a reduction is unconscionable - the women had hitherto been buying scrap for the higher price and thus would consequently incur loss. Tuzua argued that the reduction was too swift. In the end, they agreed that the reduction would happen in phases: each day, the price would go down slightly until it reached 1 cedi in the next three days.

When the scrap dealers went onto the streets some week and a half after the meeting, the association decided to protest against the scrap export ban that had been in place since 2014. The slogan of stopping the ban brought together the PROSDAG as well as the women led by Adowa Tuzua. The protestors argued that increasing the competition between the companies and exporters would improve their own situation. For the scrap dealers, who dealt with the agents of scrap companies, the aim was an equalisation of relations. Sudden price fluctuations were seen as signs of lack of respect and aroused suspicions. More market competition would improve appreciation of scrap dealers' efforts. They reckoned that their scrap was in demand and that the competition could only to their benefit. Nasiru Mohammed, the secretary of PROSDAG, argued: 'We are serving notice to all stakeholders, particularly government, to mediate to ensure that scrap dealers are respected in mutual trade relations with steel companies and as a matter of urgency lift the ban on scraps export to make the industry competitive. While the steel industry in Ghana, which is fed with materials by the scrap industry, is globally competitive in terms of pricing regime and export, pricing of scraps and the decision to buy or withhold purchase of scraps and payments, is solely the decision of the steel companies. Any imposition of taxes on the steel industry by government is virtually offloaded to the tottering scrap industry by consistently reducing prices from which they purchase scraps whilst steel products are well priced'.

The strike brought no tangible effect as far as the respondents could tell. Perhaps because the cause of opening borders to exporters rang hollow with the government that has been consistently on the side of the smelting companies.

Part of the reason was that when Kumasi's PROSDAG came out in protest, their colleagues in the Greater Accra Scrap Dealers Association (GASDA) were carrying on with business without a communal stir. They called no meetings. Scrap iron exited the market of Agbogbloshie smoothly. For some this was yet another proof that GASDA was no longer an association that represented scrap dealers in their dealings with companies but rather functioned as the overlord of Ghana's biggest scrap market. There were indicators that it was becoming a sovereign of the street (Humphrey, 2004; Chalfin, 2017). Embroiled in political party clientship cum intra-ethnic conflict, GASDA's politics were directed inwards to divide and rule Agbogbloshie. GASDA would collect fees from people in the market and redistribute the funds among loyalists. Its raison d'être came from the persistent need for conflict resolution and adjudication between the many people who pass through Agbogbloshie.

Both Agbogbloshie and the Frafra market are defined by ethnic diversity and social inequality. In Agbogbloshie, as in Kumasi, scrap dealers would complain about the smelting companies in Tema. The litany was long: complaints related to confusion around prices, problems with agents, and problems with rejected materials. The list consisted of particular narratives involving random examples and individuals, which when brought together, made it impossible to give the arguments a structural framework. In consequence, there was a persistent lack of clarity, where to locate the blame for all these shortcomings - whether on the side of the companies or scrap dealers themselves; a sense of confusion and suspicion prevailed. The collective action that took the Progressive Scrap Dealers to the streets was not replicated in Agbogbloshie.

Attempts to trace structural frameworks refer to the perception that since people are taking money from all sorts of agents collective bargaining is no longer possible: 'To put pressure to the company, but later some people say, you are the one… you don't give me money, so you can't tell me how you want…. i will load my goods, this one too says I want money, I can't wait for the time that you say we should wait because my money finish, so I will load my goods, so we … that meeting again, so…'.

Such conversion of complex positions in commodity chains into tangible relations means that there is a sense of a tit-for-tat. Together with the rise of the agents and the expansion of the business, it has become easier to disappear with an agent's money and as such individual dissatisfactions with the system could translate into such forms of transgression. The variety of firms meanwhile and different degrees of engagement in the economy made it possible to reappear again or enter new relationships.

Conclusion

Urban mines are actualised by arrangements between parties who represent supply and demand. The key players who tie supply to demand in Ghana are collecting networks, middlemen between scrapyards and companies, and companies. The history of Ghana's scrap worlds is one of the progressive opening up of the collection networks to international demand, which changed local prices to international ones and made local scrap worlds responsive to their variations. The numerous companies and other interested parties who represent the demand have been dynamic and have come from different international geographies of smelting technologies and associated scrap demand. Competition in this context is identified by scrap dealers as crucial to the profit - there is a demand for their goods and the less there is coordination between the different companies that vie for their goods, the more they can get in result. This is why the scrap ban of 2014 was recognised as one of the key problems for the work of the scrapyard - the prices went down after its institutionalisation.

At the same time, scrapyards are fractured between those who enjoy business partnerships and those who are part of the other work activities. Such internal hierarchies have had the effect of sealing off different worlds of scrap from each other. Each sphere offers a 'parallax view' (Moore, 2012) of scrap labour in Ghana. In scrapyards it is both a business that propels class formation and a communal endeavour based on trust. The comings and goings of the companies reflect the availability of labour in the emergent international scrap metal markets.

Specific scrap worlds enlist scrap dealers in different ways. The ferrous worlds of smelting companies seem to both rely on scrap dealers as central to their material inputs but also seek to increase their power by threatening price reductions. The smelting companies also have acted as unified interest group vis-à-vis the government and sought to increase their leverage – be it by entering direct partnerships (as in the case of Sentuo) or by pressuring to preserve their interests.

By comparison, nonferrous worlds are particularly dynamic and able to tap in and out of Ghana's scrap worlds. This is reminiscent of Freyja Knapp's (2016) proposed category of 'flexible mining'. In seeking to explain the dynamism of the companies and their supply chains, Freyja Knapp (2017) proposes the term 'flexible mining' to foreground processes of new mining from the perspective of the refineries. She argues that in recent years, metal refineries have been extending their supply chains to include scrap metals. This allows them to follow flexibility of three kinds: spatial, temporal and interpretational.

The flexible mine avoids geophysical fixity that characterises traditional mines. It is not dependent on temporal pace of exploration and extraction. Compared to traditional mining contexts, there is no intrinsic dependency between a geography and a metal. The temporal flexibility comes from the fact that the processes of 'buy and sell' are responsive to changing market prices. The companies can buy more or less depending on the demand. This is different to traditional mining contexts whereby work is organised ahead of time and mining processes might take days to catch up with the changing prices of metals. Finally, flexible mining is interpreted as at times a hazard, a promise, an opportunity or a resource due to its emergent nature and confusions of different evaluation scales (compared to traditional mining, it is better for the environment; but taking into consideration the permissible heavy metal exposures for workers, it is worse than other urban livelihoods). Freya Knapp's term explains these dynamic worlds in Ghana. Any country (including Ghana) that produces waste could attract such a cornucopia of companies within its borders that it would create demand for its scrap. Unlike in traditional mining, these companies do not need to go through lengthy phases of explorations, state-corporate negotiations, and landscape transformation that tie them down to a specific context for decade. Chapter 4 shows that scrap dealers partake in these forms of flexibility by supporting multiple companies, selling to different actors at the same time, and encouraging more exports.

Arguably, it is both the internal hierarchies of scrap dealers with respect to the companies and the multiplicity of grammars of interactions that make scrap worlds politically confusing as seen in the Kumasi scrap dealers attempts to organise a generalised process that fell on deaf ears in Accra.

Chapter 5 - Politics of e-waste: dumping and strategic metals

This chapter focuses on electronic waste through which Ghana's scrapyards have come to be known around the world. Recent scholarship has focused on the politics of electronic waste's designation as either a hazard – in that it produces toxins – or a resource – in that it contains valuable metals (e.g. Lepawsky, 2018; Karg, 2015). This chapter argues that the politics of electronic waste are and should be coloured by e-waste's 'developmental' associations, that is, by the acknowledgement that electronics are not consumer goods like any other, but that they are bestowed with 'techno-optimist' qualities linked to state development and to individual learning or comforts. Such qualities take two manifestations: genealogies of e-waste in Ghana (and other contexts) can be linked to the country's policy of increasing access to technologies, and e-waste itself can be useful for reverse engineering, tinkering and repair.[49] This chapter therefore argues that the 'developmental' or learning aspect of electronic waste is just as important to consider as its associations with being either a hazard or a resource. I argue that such aspect is being foreclosed by technological change that seeks to increase corporate ownership of how people engage with electronics.

The chapter considers four chronological interventions by international and national development actors that are associated with different types of problematisation of technological access. These interventions focus on: 'bridging the digital divide river', 'e-waste dumping', 'strategic metals', and circular economies. They are expressive of specific imaginations surrounding information and communication technology (ICT), waste management, and resource scarcity that are coming to the fore in Europe and North America and that have their relevance in Ghana due to the country's reliance on international donors. The three events that the chapter's discussion will develop on are a 2003 African Information Society Initiative, a 2008 *National Geographic* photo reportage that placed a Ghanaian e-waste dumping site in international imaginations with an article entitled 'High-tech trash: will your discarded TV end up in a ditch in Ghana?', and that in turn led to various international interventions,

[49] This chapter comes in the footsteps of enormous repair literature that looks at e-waste as important for mining and value-adding through repair (e.g. Reddy, 2015; Daum, Stoler, Grant, 2017; Corwin, 2019).

and a 2019 conference organised by the World Resources Forum in Geneva and attended by representatives of the Ghanaian government, where Ghana was named one of the most promising 'seed countries' for pushing for a circular economy agenda of electronic waste.

These interventions have had relevance for Agbogbloshie in particular. The place has been framed in international media, reports and interventions as an allegorical space that represents externalities of electronic revolution across global geographies. Its allegoric qualities – achieved through the aesthetics of photojournalism and the repetition of the same narrative across numerous publications – meant that the site has been used to examine, reflect on, and despair at practices of international dumping of electronic waste. Over time, many outsider interested parties were drawn to this site in response to images of Agbogbloshie and narratives surrounding it. Some responses worked within the linear imaginary of preventing the migration of e-waste. To counter this, they focused on bolstering efforts to tighten the borders against the movement of electronic waste. With time, a cornucopia of international, state, and private parties re-inscribed electronic waste dumping in Ghana as part of a new promise of circular economies of strategic metals, while smaller interventions sought to instate the place as a possible hub of innovation.

The chapter is divided into three parts. I first rewind the narrative to the early 2000s, when 'techno-optimist' interventions began shaping narratives of future development of countries such as Ghana. I then examine international and national awakenings to the hazardous footprint of the technological revolution. I show the instrumentality of narratives of 'e-waste dumping' in Ghana and of images of Agbogbloshie. These consistently questioned the ability of scrapyards in Ghana to partake in metal recycling given workers' limited capital, lack of access to recycling technologies, or their embrace of profit over toxicity. Agbogbloshie has been studied as a paradigmatic site of e-waste dumping, which has meant that academic articles and research have tended to treat this site as an expression of processes happening elsewhere. I subsequently consider international organisations and development agencies which have been searching for solutions to 'e-waste dumping' ever since the issue was brought to media and activist attention. The recently emerging consensus is that sites like Agbogbloshie should become parts of circular economies of strategic metals, which would reduce them to the collection of electronic waste. Such a reduction has been dubbed 'Best of 2 Worlds' (Bo2W): a programme supported by pyrometallurgical industries in Europe such as Umicore as well as by technological companies in North America. Finally, I examine how technological design started changing in recent years to increase the power of companies to turn consumers into users of services. Such a transformation effectively forecloses the role of non-corporate recyclers.

The digital revolution and its materialities

Sunrise and the 'digital divide river'

The materiality of the digital revolution has been a consistent blind spot in the early 2000s digital policies labelled ICT4D, which stand for 'information and communication technology for development'. In 2003, the United Nations Economic Commission for Africa (UNECA) and its African Information Society Initiative – an initiative aimed at spearheading the ICT policy in the continent – requested a report on Ghana's future ICT paths. The resultant document, entitled in a rather dry tone 'An integrated ICT-led socio-economic development policy and plan development framework for Ghana', hides inside a passionate call for Ghana to bridge the 'digital divide river' by embracing the 'technological revolution', eschewing the danger of becoming a 'new loser' in the era of computers, machines, phones, and associated economic opportunities. The report was written by the National ICT Policy and Plan Development Committee and remains an artefact of 'techno-optimism'. It is interspersed with citations that emphasise the importance of ICT in every home for the well-being of the nation as a whole. One of the pages cites the words of Prime Minister Mohammed of Malaysia: 'It can be no accident that there is no wealthy, developed nation that is information poor and for that matter no information rich nation that is poor and underdeveloped.'[50] The report recommended a special initiative optimistically labelled 'SUNRISE', implemented the same year, which included the lowering of import duties on electronics.

[50] p. 61, United Nations. Economic Commission for Africa; European Union (2003). An integrated ICT-led socio-economic development policy and plan development framework for Ghana. [Addis Ababa] ECA, Available at: http://hdl.handle.net/10855/5457 (accessed on 7th May 2020).

At around the same time, other countries too started adopting similar policies, including for example Uruguay's 'one child, one computer policy'.[51] This was also the context for initiatives such as the One Laptop Per Child (OLPC), launched by the MIT Media Lab's then director Nicholas Negroponte in 2005, who stated on the day of its launch: 'I don't want to place too much on OLPC, but if I really had to look at how to eliminate poverty, create peace, and work on the environment, I can't think of a better way to do it.'[52] Ghana under the John Mahama government adopted an explicit programme of handing out laptops to school pupils. In 2013, his administration distributed 40,000 laptops that were branded with the President's photograph.

Figure 5.1. The Mountain of the Challenges of a Modern Nation as per 'An integrated ICT-led socio-economic development policy…'.

[51] Adopted in October 13, 2009, the policy was called the *Plan Ceibal.* Available at: https://web.archive.org/web/20070929005438/http://www.latu.org.uy/doc/ceibal/Pliego_faseICEIBAL.pdf (accessed on 7th May 2020).

[52] As cited in David Souter (2021) 'Inside the digital society: lessons from little laptops', *LSE Blog,* January 13th. Available at: https://blogs.lse.ac.uk/parenting4digitalfuture/2021/01/13/one-laptop-per-child/ (accessed on 25th March 2021).

The techno-optimism of such policies around the world consistently set ICT technologies apart from other consumer goods. The very policy paper that proposed cutting importation duties in 2003 placed computers and mobile phones on a par with access to drinking water and food (See Figure 5.1). The perceived 'charisma' of the narrative of 'e-waste dumping' is precisely due to this prior assumption associating such objects with uniquely positive outcomes. It is notable that precisely computers and burning cables were the most often portrayed representations of the e-waste problem (rather than kettles, air-conditioners or fridges). It is this background that makes photos of children staring into a discarded laptop – like the one that accompanied one of the first articles about Agbogbloshie in the British media – so resounding (See Figure 5.2).


'This is not a good place to live': inside Ghana's dump for electronic waste

At Agbogbloshie, young people scavenge for scrap metal amid the smoke from plastics fires. The health risks are obvious - but the money is too good to ignore

Figure 5.2. Photograph by Andrew McCollonnell, reprinted in The Observer, 14 December 2013.

Everyday bridging of the 'digital divide river'

In Ghana, as elsewhere, the question of e-waste usually invokes passionate responses. This is precisely because of the technology's entanglements with learning. Importers of electronics in Accra's computer market of Lapaz and in Kumasi's market of Bantama consistently decried Ghana's associations with 'e-waste' because they feared their business would be put in danger: it was not only the economic risk that concerned people, but equally a potential threat to access. The likelihood that Ghana might ban imports of second-hand electronics is not some dark scenario: Uganda famously introduced such a ban in 2009. Emmanuel, an importer of electronics from the US to Ghana, who brings over a container every couple of months, took the threat of a ban personally: 'If it wasn't for second-hand technologies I wouldn't be who I am!' Emmanuel was referring to his primary occupation in the technology sector in the US, which built on his self-taught skills from Ghana. Like others I spoke to, he underlined that the narrative had negative effects on his business: 'Demonizing, intimidating, and jailing African importers will lead to increased unemployment, migration, and slow down development on the continent'. Such was the conclusion he would end on for a presentation he had put together and had wished to show me in defence of second-hand electronics.

Throughout my research in Ghana's scrapyards, the appeal of learning that came from electronic waste was undeniable. Agbogbloshie had numerous shops that specialised in the repair of computers, laptops, air-conditioners and cars. All these places were run by people with some general education and no special background in technologies. In scrapyards I was able to observe and register different patterns of learning about electronics. Similar to Andrew Sanchez's (2020) observation that scrap work can bring satisfaction because of forms of craftsmanship and the pleasure of making things, learning about electronics exerted a similar charm on a number of people, and partook in their identity making.

During the early steps in the business, motherboards and other computer parts are treated as pieces of a 3D-puzzle that can be detached, taken in a backpack and presented to various dealers. Thus, a person who is learning the trade slowly assembles the vocabulary and an understanding of the uses of different parts. People come to Agbogbloshie with RAMs, processors, motherboards and learn from others what these are and how to repair them. With time the computers become viewed as three-dimensional puzzles and more as a connected network. The more advanced repairers study the flow of electricity in the motherboard in order to see at which point it breaks. They can re-solder motherboards and bring back to life computers that others had condemned as being beyond repair.

Such stories are fairly universal. At the beginning of my research, I interviewed Professor Paolo Ienne, a computer hardware engineer and architect from my university's neighbouring polytechnic in Lausanne, Switzerland (EPFL). To my great surprise, he found my references to Ghana immediately nostalgic, as my interlocutors' approaches resembled closely the ways in which he had learnt about computers as a kid, that is, by taking things apart and studying the functions of different modal elements: 'I often think that digital electronics, as a hobby as I knew it as a kid, is gone for good'. To explain what he meant he took me on a tour of the EPFL's computer archive on display. We looked at first motherboards from the 1980s and 1990s, they comprised of detachable elements that each had a serial number, and relevant books could be referred to so as to study the modal functions. Should any of the components break, one could order their replacement. Recent changes in technologies mean that different components are 'packaged together' – as many as 95% of electronics are in a single package (as per Ienne's estimation).[53] These tweaks of design are crucial for changing processor speed and are inextricably linked with modern design. These are not always explicitly done so as to prevent repair. As I review in the next sections, some of these changes have as their purpose increasing the control of companies on how their products are used.

Bearing Witness and the Aestheticisation of Waste

In her study of the 'natural history' of electronic waste, Jennifer Gabrys (2013) writes: 'electronics involve an elaborate process of waste-making', where 'processes of pollution, remainder, and decay reveal other orders of materiality that have *yet* to enter the sense of the digital' (vi). Her own research and those that followed have consistently worked to render the digital material. In the case of Gabrys, she draws attention to the toxic footprint of technological development in people's bodies and environment around the Silicon Valley. Others, such as Joshua Lepawsky and his co-authors, focus on

[53] E.g. Apt et al. (2011) 'Advanced Chip Packaging Satisfies Smartphone Needs: Clever chip packaging means mobile devices can be smaller and smaller', *IEEE Spectrum,* February, 28. Available at: https://spectrum.ieee.org/semiconductors/design/advanced-chip-packaging-satisfies-smartphone-needs (accessed 1 March, 2021).

the processes of waste-making: 'urban enclaves of finance, insurance and real estate (...), which in some urban studies stand in for the rise of a new type of city (i.e. world or globe cities) and its attendant economy, are also industrial waste producers and thus belie their common representation as flagships of a dematerialized or virtual information or knowledge economy' (2014: 187). Together they show that waste-making is not only a consequence of consumption but is rather a wired-in component of the design, production, and afterlife of all economic sectors.

The emergence of an 'e-waste problem', according Joshua Lepawsky (2018), whose research mapped the controversy, is the consequence of the publication of the report *Exporting Harm* by American non-governmental organisation Basel Action Network (BAN). The report was published in 2002 and was shortly followed by another, *The Digital Dump: Exporting Re-use and Abuse to Africa* in 2005. The former report focuses on Asian countries such as China, India and Pakistan as destinations of dumping, while the latter – despite the invocation of entire African continent in the title – focused on Nigeria. Both reports identified the United States as the main culprit. The first report writes: the 'United States and other rich economies that use most of the world's electronic products and generate most of the e-waste, have made use of a convenient, and until now, hidden escape valve – exporting the e-waste crisis to the developing countries of Asia' (Puckett, 2002: 1). It argues that the situation in which people make livelihoods out of such waste is a consequence of corporate callousness and state failure that together mean that 'a free trade in hazardous wastes leaves the poorer peoples of the world with an untenable choice between poverty and poison – a choice that nobody should have to make.' (2002: 2) In the end, this is all 'brute global economics' that seeks cheap labour and lax regulations. The next report focuses on Lagos as a 'new hotbed' – after Asia – of the trade. Here, the bridging of the 'digital divide' – a phrase coined by international organisations to draw attention to the fact that some parts of the world are cut off from digital technologies – is recast as a 'toxic waste pipeline' (2005: 2).

These early reports made no reference to Ghana, but they did identify a new form of location characteristic of the digital revolution in the global South, namely that of an 'e-waste dump'. In the ensuing years, ever more locations were found to be such 'e-waste dumps', although never reaching the same levels of mediatisation as Agbogbloshie. Thus the media and international organisations started writing about the Dandora landfill outside of Nairobi as an e-waste dump,[54] as well as sites in Uganda and Tanzania, on top of numerous other sites in Asia.[55]

It was Greenpeace that put Ghana on the map of international electronic dumping sites in 2008 after publishing a report about chemical contamination at two electronic waste sites in Ghana: Agbogbloshie in Accra and individual workshops in the town of Koforidua, some eighty kilometres from Accra (Brigden et al., 2008). The choice of Koforidua was not entirely random – it is the location of three universities and numerous high schools that create a steady demand for electronics and thus become sites for discarding. Similar to the BAN reports earlier, the Greenpeace report called on tighter border controls to halt the movement of electronic waste and advocated for the improvement of recycling practices. It also recognised the importance of the producers' extended responsibility (EPR) to take control for the entire life-cycle of their products, suggesting they develop take-back and recycling schemes as solutions that are easily available to anyone who might need them. The report thus made a similar argument to the BAN reports: there is a need to control the circulation of discards, increase the responsibility of producers, and prevent the emergence of e-waste dumpsites in places like Ghana.

In the same year, *National Geographic* wrote the first international media report on Agbogbloshie, entitled 'High Tech Trash: Will your discarded TV end up in a ditch in Ghana?'. The article portrays Agbogbloshie as a dismal place of child labour and confusion: 'Each day scrap sellers bring loads of old electronics – from where he [an interviewed scrap dealer] doesn't know'. The article contained two framings that were later also present in numerous other articles: a tying of the site to individual consumer and disposal habits in the global North, and representing the victimhood of people in Ghana caught up in the resulting externality. The article contained photographs by Peter Essick, an

[54] Faustine Ngila (2020) 'Why electronic waste is Kenya's biggest headache?', *Business Daily,* October 15. Available at: https://www.businessdailyafrica.com/bd/corporate/technology/why-electronic-waste-is-kenyas-big-headache-2481294 (accessed 10 April 2021).

[55] Amy Yee (2019) 'Electornci marvels turn into dangerous trash in East Asia', *New York Times,* May 15. Available at: https://www.nytimes.com/2019/05/12/climate/electronic-marvels-turn-into-dangerous-trash-in-east-africa.html (accessed 10 April 2021).

environmental photographer that has documented contemporary environmental issues including climate change and nuclear waste. In this *National Geographic* issue, Essick's photography focused on the waste: computer cases floating in sewage waters. People feature here as labour that hauls waste, scavenges in the dump, or stands amid burning bundles of cables. The lens focuses on child labourers but is distant enough so as to keep their identities anonymous.

A year later, Agbogbloshie's fame was further solidified by an article in the *New York Times* entitled 'A Global Graveyard for Dead Computers in Ghana'. This time the article featured photographs by Pieter Hugo, who initiated an important aesthetic shift. The photographs are principally portraits of waste workers depicted staring sombrely into the camera. Unlike in Essick's photographs, wider social worlds are included: a girl selling water, cows with wounds on their bodies. Most portraits bear the names of their subjects. This time the waste takes the backstage. Blackened soil and plumes of smoke are the referents for electronic waste. The aesthetic value of these photographs is solidified by their appearance in auction houses as part of a collection named 'Permanent Error Series'. The auction house Sotheby's sold some of the photos – entitled 'Aissah Salifu, Agbogbloshie Market, Accra', 'Yacubu Alhasan' and 'Alhasan' – for a starting price of 6,000 - 8,000 GBP. The photograph of Abdulai Yahaya was estimated for double the price at 12,000 - 18,000 GBP (Photo 4; Source: Sotheby's). Each of these photographs has acquired value since their first auction. As recently as 2020, the portrait of Aissah Salifu traded for 16,250 USD in the Philips Auction House. According to a write-up of the exhibition, 'Hugo collapses our notions of time and progress in his photographs. There are elements in the images that fast-forward us to an apocalyptic end of the world as we know it, yet the alchemy on this site and the strolling cows recall a pastoral existence that rewinds our minds to a medieval setting.'[56]

In 2014, Agbogbloshie became the subject of another mass-mediated aesthetisation. This time Kevin McElvaney's photographs appear in the *Guardian* alongside an article entitled: 'Agbogbloshie: the world's largest e-waste dump'. McElveney's photographs are also portraits. This time his subjects are

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[56] Pieter Hugo, 'Permanent Error'. Available at: https://prixpictet.com/portfolios/disorder-shortlist/pieter-hugo/statement/ (accessed 10th April 2021).

made to stand on spent computer frames – as if the electronic waste was a pedestal and they were monuments. In the description of the photographic project, McElvaney notes: 'I spent 4 days in this area and met hundreds of young boys and girls.' The description that follows is filled with the author's impressions and sensations:

> 'All in all I left this place with mixed feelings… I feel sorry for what happens there, how they have to live and what terrible stories they have to tell. But somehow it feels wrong to walk around there with a sad face, because there are still kids playing and dancing around and tell you stories about their visions and plans in future (…) I had some facts in the back of my mind: Many of them can die from cancer in the next few years, because of the toxic environment and grow up without education. Instead of working here for a few weeks to earn some money and leave the place – as they expect – they often fall into this vicious circle of Agbogbloshie: At the point where they have enough money, they often get sick and have to spend it on medicine, sleeping pills, marihuana and food… Agbogbloshie is an ethical, social-economic and environmental disaster – produced by the developed countries.'[57]

The photographs of Pieter Hugo and Kevin McElvaney were so successful that they were also reproduced in Germany's main newspaper Die ZEIT, as well as in Al-Jazeera, the Daily Mail, Dazed and Confused, and in Wired.

The growing interest in this site generated a need for ever more images. On a weekly basis during my fieldwork, I would encounter new photographers and filmmakers who came here to make news reports about Agbogbloshie – be it to illustrate a new report by the World Bank or to create footage for Belgian television that wished to illustrate the problem of dumping. 'Why don't you just use the photos that are out there?', I'd ask befuddled. Most of the time I was told that copyright restrictions prevented the recycling of photographs, or that the reporters were actually fascinated to see the site with their own

[57] Kevin McElvaney, 'Agbogbloshie', Available at: http://kevin-mcelvaney.com/portfolio/agbogbloshie/ (accessed March 1, 2021).

bare eyes. Such allegorisations or aestheticisations of the site were creating local gatekeeping economies, since specific people began charging money to allow the photojournalists to operate. Meanwhile, the young boys who were performing open air burning learnt to increase the flames to make for more stunning pictures for global audiences. The generation of interest meant that Ghana's e-waste dumpsite of Agbogbloshie became a prism through which e-waste has been viewed and imagined globally.

The resulting media reports have created an intensified interest in electronic waste dumping and in Agbogbloshie as the exposition of the problem. These resulted in the tightening of borders and in a number of international studies into e-waste. All of the people that I interviewed over the course of this research in international organisations in Switzerland (International Labour Organisation[58], World Health Organisation[59] and UNEP[60]) cite that their wish to launch projects about e-waste dumping was inspired by these media reports and photographs. The most recent and consequential intervention in Ghana's scrap economies is a multi-million euro project by the German Development Agency (GIZ). The origin story of the project is telling. In 2014, the German Economic Cooperation and Development Minister Gerd Muller visited Accra during the Ebola outbreak in West Africa, the Ghanaian capital being the sub-regional Ebola headquarters at the time. As the German *Frankfurter Rundschau* reports, Minister Muller became interested in Agbogbloshie 'by chance' after reading a newspaper report about it on the plane. Soon, 'Muller ("Go where it hurts") strode through Agbogbloshie's glistening pools of car oil and was horrified'.[61] Deutsche Welt records Muller saying: 'most electrical appliances discarded illegally and legally in Europe end up here – including those from

[58] David Seligson, Head of Unit, Manufacturing, Mining and Energy, International Labour Organisation. Interview on 4th of January, 2017, Geneva. His unit was responsible for the ILO's report on "The global impact of e-waste: Addressing the challenge in 2012 and forged a Global Dialogue Forum on Decent Work in the Mangement of Electrical and Electronic Waste.

[59] Marie-Noel Bruné, Children's Environmental Health, Department of Public Health, Environmental and Social Determinants of Health, World Health Organization. Interview on the 8th of February, 2017, Geneva. Her unit was active in evaluating e-waste impact on children's health and partook in a cross-agency e-waste coalition.

[60] Francesca Ceni, Programme Officer, Secretariat of the Basel, Rotterdam and Stockholm Conventions, UNEP, Interview on 16th of December, 2016, Geneva.

[61] "Müller („Hingehen, wo es weh tut") stiefelte durch die Öllachen und war entsetzt." in Tim Szene-Ivanyi, 2016. "Hilfe für „Sodom und Gomorrha"" Frankfurter Rundshau, 16.12.16 (https://www.fr.de/wirtschaft/hilfe-sodom-gomorrha-11069238.html)

Germany.'[62] This initial spark translated into the launching of a German Development Agency (GIZ) project in 2016 aiming to create sustainable e-waste management in Ghana.

Tightening borders

The productive power of the 'dumping' narrative has been enormous and has managed to organise and narrow down much of the existing research into e-waste dumping in Ghana.

On the policy front in Ghana, the focus on dumping has meant that the country has adopted its own e-waste legislation that prohibits imports of e-waste and that some academics deem to be incompatible with the larger socio-economic context of the country (Oteng-Abagio et al., 2020). Personnel at Ghana's Customs Excise have been trained to police incoming containers. They work in conjunction with Interpol under the auspices of ominously named projects such as Eden, Enigma I and Enigma II, each of which aimed to make sure Ghana's badge as an 'e-waste dump' is revoked.

On the research front, authors worked to establish if Ghana is indeed an e-waste dump or whether such a characterisation is unsubstantiated. Ghanaian NGO Green Advocacy, for instance, located its studies in Ghana's ports and determined that the proportion of electronic waste in in-coming containers is small vis-a-vis overall electronics imports (Amoyaw-Osei et al., 2011). These operations were directed mostly at the narrowly defined notion of electronic waste as computers. Ghana has however also adopted two legislations explicitly preventing the import and sale of objects such as air conditioners and used refrigerators and freezers.[63] The Policy has been in place since 2008 and reissued in 2012. Ghana has been quite vocal in pursuing potential parties guilty of dumping. In 2013, the country accused UK's recycling giant Environcom of dumping illegal fridges in Ghana.

[62] Nicolas Martin, 2015. 'Report highlights growing global e-waste problem', Deutsche Welt, 13.05 (https://www.dw.com/en/report-highlights-growing-global-e-waste-problem/a-18448012)

[63] Energy Efficiency Regulations 2008 (LI 1932). Available at: http://www.ecowrex.org/sites/default/files/2008%20EE%20Regulation%20LI1932.pdf

Grace Akese's and Karoline Owusu-Sekyere's doctoral projects pick up this thread in Agbogbloshie, showing that it is not e-waste but car scrap that accounts for the majority of material flows to the scrapyard.[64] This research into inflows is an important effort, but brash readings of it might lead to a double-bind: either the West is responsible for dumping and hence obliged to pick up the environmental costs, or the dumping stems from local consumption and the wider, trans-continental responsibility is distributed, at best indirectly rather than directly.

<u>What to do about e-waste?</u>

Strategic metals

Prior to the German Development Agency intervention in Agbogbloshie in 2016, the German Oeko-Institute (Institute for Applied Ecology) was contracted by the German Federal Ministry of Education and Research to prepare a series of papers on the electronic waste sector in Ghana starting in 2010. The first report provided a panoramic picture of the sector and assessed its economic viability as well as seeking to estimate the compliance of markets of certain sites (for instance, Agbogbloshie) with international conventions such as the International Labour Organisation conventions on working hours. The report concluded that 'there are significant untapped economic, environmental and social improvement potentials' that can be 'realised by manual pre-treatment in Ghana and exporting the precious metals bearing fractions to one of the few pyrometallurgical refineries in Europe, Canada or Japan' (Prakash and Manhart, 2010: 5). The authors state that such an exchange is possible as the price of precious metals can cover the pre-treatment labour costs, logistics, transport, and refinery. The report emphasises that the best solution would be to leave the manual pre-processing operations such as collection and segregation of metals in the hands of 'medium and low-skilled workers', and thus the strategy would preserve existing opportunities while eliminating harmful recycling processes (*ibid*).

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[64] Owusu-Sekyere, Karoline (2019) "Orienting Process Analysis of relevant e-waste recycling processes at the Agbogbloshie/Old Fadama Scrapyard in Accra, Ghana." *Institut für Siedlungswasserbau, Wassergüte- und Abfallwirtschaft der Universität Stuttgart* (accessed thanks to the courtesy of the author) and Grace Abena Akese (2019) 'Electronic Waste Science and Advocacy at Agbogbloshie: The Making and Effects of 'The world's largest e-waste dump' (Dissertation), Memorial University of Newfoundland.

The report considered two models for the relationship between the workers and the refineries. The first is one of indirect relationship that installs intermediaries who ensure the contractual relationship and provide financial cushioning (as seen in Chapter 4, this is a model that already existed between Ghanaian scrapyards and companies). The authors, however, express fears that this model could end up leading to the cherry-picking of the best fractions, leaving remains in Ghana. The second model would establish direct cooperation between the collectors and the refineries. This would cut the risks associated with intermediaries while forging a cooperative and community-based approach.

This early report was followed over the next five years by the establishment of the 'Best of Two Worlds' (Bo2W) consortium hosted by the Institute and uniting powerful industry members such as the Belgian recycling giant Umicore, the German company Vacuumschmelze that produces magnetic metals for cars, and Johnson Control, an American company domiciled in Ireland for the purpose of tax avoidance (an example of one of the largest tax inversion projects in the recent history of the US) that focuses on the production of building technologies.[65] In addition, the consortium included two regional partners in Ghana and Egypt. The consortium explored the possibilities for a 'circular economy of strategic metals'. The very statistics that were at first produced to estimate the extent of electronic waste dumping in Ghana (such as Amoyaw-Osei et al., 2011) became the basis for estimating the tonnage of recoverable precious metals such as gold, silver, palladium and cobalt. Thus the statistics from the reports that investigated the 'dumping hypothesis' were now feeding data on the viability of strategic metal trade.

The notion of 'strategic' metals has been in circulation for a long time, as it is a concept born in the context of 20th-century wars, when demand for metals started growing at the same time as their supply chains became compromised by conflict. Since 2011, the European Commission has been publishing a list of critical raw materials that has gone through four updates thus far. These lists use changing methodologies, but usually metals find their ways into the list due to a combination of two factors:

[65] Rajyashree N. Reddy (2016) offers a genealogy of Bo2W that goes further back to 2007 Solving the E-Waste Problem (StEP) Initiative supported by the United Nations that has been rolled out in other parts of the world, notably Asia, and African countries are its recent instantiation.

economic importance – how far a given metal is implicated in the material inputs of European economies – and supply risk influenced by over-reliance on specific sources of the metal. The strategy calls for efforts to enhance the mining and recycling of 38 metals. Two of the metals that are identified in the study on Ghana's 'e-waste potential' — cobalt and palladium – are considered 'strategic' by the European Union. The scrap that can be found in Ghana's scrapyards also contains other examples of strategic metals that are currently being recycled or earmarked for further recycling efforts: tantalum, praseodymium, rhodium, platinum, magnesium, and bismuth. The Europe 2020 Strategy argues for a resource-efficient Europe that explores further capacities of recycling of metals (Europe Commission, 2011).

The earmarking of 'strategic' metals is tied to attempts to lower EU dependence on specific supply chains – currently Russia is the primary source for palladium, while China is the biggest producer for all the other metals listed above. The pressure on these 'strategic' metals is entwined with specific technological developments – energy efficiency and emission controls – and the lack of replacement metals that can be used as substitutions. One of the reports published by the Oko-Institute predicts that the cumulative content of palladium that can be found in Ghana's notebook e-waste is 0.16 tons in 2020. This is but a drop in an ocean of European demand that averaged around 56 tons per annum in the 2010s. However, the Bo2W approach predicts the emergent relationship between collectors and refineries to be mutually beneficial: the collectors need the income, the dumps in Ghana should not overflow with waste, and the refineries can benefit from the expansion of their ores. What is more, the current rates of e-waste in Ghana are reflective of present-day consumption patterns that are likely to grow with time.

This is some of the ideological scaffolding that together with the perception of the scandal of e-waste dumping translated into a multi-million-euro German development (GIZ) intervention in Agbogbloshie. The project began in 2016 and will run until 2023. The description of the project shows an understanding of e-waste as an after-effect of the country's increasing demand for consumer electronics that relies on second-hand imports from 'more developed countries'.[66] The project was commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ) headed by the aforementioned Minister Gerhard Muller. The program has three components: it will offer policy advice to develop national legislation on e-waste[67], it aims to strengthen recycling business interests (especially for a company that is co-owned by a former GIZ employee), and it will aid in transitioning Agbogbloshie into a 'sustainable recycling park' (*ibid).*

These efforts are under way, so rather than focus on their prospects or futures, I highlight here how the programme seeks to strengthen a circular economy of strategic metals as painted in the previous development papers of the Oko-Insittue and Bo2W consortium. Part of the GIZ's programme in the scrapyard is to work with KfW Development Bank, which is the national development bank of Germany. The involvement of the KfW and the BMZ signal that the intervention in Agbogbloshie has importance for Germany's domestic agenda. Indeed, part of the money that is dedicated for Agbogbloshie is being used to construct a collection point for electronic waste that, according to the goals of the project, will 'buy up at least 200 tonnes of cables and 2,000 tonnes of plastic casing and bring these to regulated recycling centres'. In addition, the project diverts other electronic scrap, such as motherboards from computers.[68] The collection point buys these for subsidised prices and diverts them to its national partner – City Waste Group – which trades with companies in Germany. The price subsidy is to 'support formal companies disposing and recycling materials adequately using sustainable practices', which without the developmental support 'would not be able to compete against the informal sector' (Hemkhaus et al., 2020: 47). In other words, the subsidy is meant to strengthen the foreign sector in the long-run and created supply chains between scrapyards and industries in Europe.

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[66] GIZ, 'Environmentally Sound Disposal and Recycling of E-waste in Ghana', Available at: https://www.giz.de/en/worldwide/63039.html (Accessed on March, 2 2021).

[67] In 2016, Ghana adopted the "Hazardous and Electronic Waste Control and Management Act 2016 (Act 917), which requires incoming electronics and tires to pay an eco-levy, which is to be used to develop sustainable and formal e-waste recycling in the country and counter-act 'unofficial recycling' (see Grant and Oteng-Ababio, 2019).

[68] KfW Development Bank (2017) 'Scrap recycling done right: innovative solutions for disposal of harmful electrical waste in Ghana', August 8th. Available at: https://www.kfw-entwicklungsbank.de/International-financing/KfW-Development-Bank/News/News-Details_402752.html (accessed on March 1, 2021).

The threat of 'open loops'

The current circular economic models essentially seek to forge an economy in which discards are fuelled back into production. The ability to channel one into the other is a context referred to by the term 'closing the loop'. The technology companies have increased their capacities of closing the loop by changing the role of customers from those who consume products to those who use a service, which they eventually re-channel back into the company. Amid the World Resource Forum in 2019 in Geneva, the question of re-channelling was high on the agenda.

The conference was organised by the World Resource Forum, a science-based platform for sharing knowledge about the economic, political, social and environment implications of global resource use. The Associate Partners of the platform include UN institutions that work on environmental sustainability and relevant ministries in Switzerland, the Netherlands and Germany. All the agencies work on sustainable recycling and its different legislative, technical and scientific components.

During my interviews at the conference with two advisors for corporate transitions into circular economies, who wanted to be anonymous due to their criticism of their employers, they argued that one of the key transitions for consumer electronics will be from 'modularity' to 'proprietary modularity'. In other words, it is a transition from the phase when electronics can be taken apart into their modular components and then tinkered with in favour of a system where electronic components are made to serve only specific editions of products. This otherwise technical description should be fairly straightforward as one thinks of Apple products – these are made so as to prevent unauthorised repair and re-use of components as spare parts.

Such a change of design effectively rules out unauthorised recycling. Thus while earlier Bo2W models sought to channel resources back into pyrometallurgical industries, the new technological interventions would lower the pressure on Bo2W systems. The term 'modularity' might strike as familiar to earlier models of innovation. Fro example, *Harvard Business Review* article from 1997 talked about 'modularity -

building a complex product or process from smaller subsystems that can be designed independently function together as a while' as the reason behind the computer industry's 'dramatically increased rate of innovation'.[69]Such an approach increased corporate flexibility and has allowed for 'different companies can take responsibility for separate modules'. Right now, the companies that are at the forefront of technological design invest in 'propriety modularity'.

Conclusion

This chapter built on a series of international documents, reports, and reportages engaging with the existence of Agbogbloshie to emphasise that electronic waste always encapsulates the potential for being a resource with three different natures: educational, hazardous, and valuable (c.f. Lepawsky, 2018; Reddy, 2016; Corwin, 2020). I argue, in line with Reddy (2016), that electronic waste is a terrain of struggle between different interests. I sought to paint some of the political and social arrangements, and corporate designs that centre its importance for being either one of these things.

The narrative rewinded to the early 2000s, when consumer electronics were imbued by international organisations and governments with the status of developmental goods. These indeed were not only mantras, but individual and collective responses to electronics in Agbogbloshie and beyond, where individual repairs engaged with scrap and learnt about its potential use values beyond the exchange value for metals. This conscription of electronics is based on their availability and affordance as technologies that can be taken apart and reassembled.

The scandal of 'e-waste' meanwhile unwittingly participated in increasing the pressure on producers and governments to foreclose such unexpected relationships between technology and people. Current products design and explicit development policies seek to eliminate unofficial repair and reuse in favour of strengthening the channelling of discards to corporate recyclers and producers.

[69] Carliss Y. Baldwin and Kim B. Clark (1997) 'Managing in an Age of Modularity', HBR, September-October. Available at: https://hbr.org/1997/09/managing-in-an-age-of-modularity (Accessed on 26 March, 2021).

The chapter uncovered the (possibly) unintentional alignments that exist between developmental discourses on circular economies and corporate interests of preserving rights over technologies. These can end up foreclosing future explorations of specific value creation pockets, and might impede the formation of risk-mitigation strategies and personal mobilities in scrapyards that rely on exploring scrap's use value (as was also seen in Chapter 1).

Conclusion

According to statements from Western media outlets and NGOs, Agbogbloshie is the world's most polluted place, a notorious e-waste dump that exposes overconsumption in the global North and its displaced externalities. Combined with potent images of burning cables, this narrative has been crucial for raising consumer awareness of the environmental consequences of electronic waste. It has also helped to bolster legislation that prevents dumping of electronic waste in Ghana and internationally. I therefore found it strange when I heard Mohammed Ali, Secretary of the Greater Accra Scrap Dealers' Association (GASDA), say this, which I first noted in Chapter 3: 'We have developed the place (…) It is a place that allows us all to progress'. These words suggested Agbogbloshie was not solely an effect of globalisation as dictated by those in position of power and privilege. Instead, it was in part a collective achievement and of a piece with communal history.

As this thesis has shown, the reason Agbogbloshie assumed this significance for Mohammed Ali was because he inscribed it into the longer history of scrap metal trade in West Africa – a history that is entangled with Muslim communities and migration from Ghana's north to urban centres. This was a stark reminder of Mamadou Diouf's observation that 'the process of globalisation' has 'a multiplicity of temporalities and local rationalities that are inserted into it' (Diouf, 2000: 679). Agbogbloshie and other scrapyards are a manifestation of a communal exploration of scrap metal's value and an establishment of a hub where that exploration can take place.

The dissertation does not dismiss that there electronic waste poses a very real problem tied to the toxic footprint of electronic discards and over-consumption (indeed Chapter 5 is dedicated to thinking about the problem's recent permutations and effects in places like Agbogbloshie). Nonetheless, I argued that to read scrapyards solely through the prism of electronic waste and dumping fails to think *with* the processes on the ground.

This is because scrapyards are places of assemblage of scrap metals and hubs for scrap collection and processing. Scrap's value is a dynamic field of entanglements with communal identities, life projects, and scrap affordances. And scrap-worlds, as I call them, are compositions that emerge around scrap metal's supply, demand, and shifting political economies. Together they constitute sites, actors and processes in the globalisation of scrap economy that sometimes work in parallel and sometimes compete directly with primary metal markets. The scrap dealers thus have a nuanced take on the question of what it means to shift from dependency on primary metals to reliance on secondary metals – as well as a sophisticated understanding of how to do it in ways that promotes inclusive and environmentally sound livelihoods and landscapes in the context of a consensus that it is better to recycle rather than mine.

The study draws two conclusions that can be used to explore inclusive scrap politics. Firstly, scrap dealers are unique compared to miners and other waste workers in that they face multiple risks, sources of competition, and changing interpretations of their work. Secondly, the fragmentation of scrap worlds is perceived by scrap dealers as a source of risk-mitigation and as offering the potential for social mobility. The fracturing of Ghana's scrap markets is shown to be the product of the deliberate strategies of scrap dealers. Making scrapyards into hubs for diverse metallic portfolios was crucial to exploring scrap's value and hedging risk associated with any particular metal. Scrap dealers actively participate in the fragmentation of the scrap worlds by entering multiple business partnerships, selling to different companies regardless of their prices, and encouraging opening Ghana's borders to more international actors. Paradoxically, these very strategies also threaten their abilities to organise collective bargaining and so scrapyards might be losing power to corporate and developmental visions of how they are to change (as described in Chapter 5).

Scrapyards

During the conference of the World Resource Forum in 2019 in Geneva that I discussed in Chapter 5, the panel entitled "E-waste to Waste" consisted of five interventions – amongst them a presentation about the practices of stockpiling electronic waste in Switzerland, followed by a presentation about

Agbogbloshie. The first presenter, Antoinette van der Merwe, reported that around seventy percent of households in Switzerland keep their electronics despite the fact that they know where they should take them for recycling. The presentation then shifted to Karoline Owusu-Sekyere, a consultant for the GIZ. She reported on her organisation's project in Agbogbloshie that sought to connect Ghana's e-waste workers to refineries in Germany. Her study sought to identify recycling processes that are harmful and to think of ways to eliminate them. The audience – academics and people who work in NGOs and corporate agencies charting the futures of urban mining and circular economies – were transfixed by the latter presentation. Four people in the room had visited Agbogbloshie as they saw it relevant to their work. They all said a variation of 'this is the problem that we seek to address'. The repeated question from the audience to Karoline was: 'how come collectors in Ghana are this impressive with getting the waste from people's homes and businesses?'

During the break the participants reminisced about their visits to Agbogbloshie. A manager of a Dutch supply chain transparency consultancy remembered that there a truck brought a number of computers from the port. Another man claimed one of the scrap dealers in Agbogbloshie told him that he brings electronic waste from Nigeria. Such anecdotes recounted as if to suggest that scrap is pouring into Agbogbloshie from all sides. They did not consider the way Agbogbloshie workers were tracking scarce opportunities against the odds and in the face of fierce competition. Nor did they reflect on how scrap dealers might be creating 'economies of appearance' (Tsing. 2002) in order to suggest their willingness to bring scrap from wherever it might be, and by extension to enter into partnership with the visitors.

The impressive feats of collection on display in Agbogbloshie are a result of a network that extends throughout Ghana and manages to capture all sorts of discarding practices within its web. Ghana's economies of scale in scrap collection began with people such as Boniface Amandi (as described in Chapter 1), who entered at the periphery of the country's biggest industry – Kaiser Industries (as Valco was called at a time) – and began stealing industrial waste under cover of night until he became an official purchaser. Thereafter all sorts of people who lacked opportunities elsewhere could make a living from scrap. From the 1990s onwards, mostly Dagomba migrants from the north patented a collection of scrap, which moved the collection to people's and businesses' doorsteps. Scrap dealers began patrolling the country for metallic waste. They came up with ever more ways to get it: register companies that participate in auctions, use party connections as leverage, leave their phones numbers with a number of businesses in the discarding public, do the same rounds of the city over and over again to be able to synchronise their presence with the whims of those discarding.

Contrary to narratives that cast scrapyards as centring on e-waste, I emphasise that they are in fact assembled around a variety of scrap metals. Scrap dealers bring metal-bearing finds to scrapyards, where no metal discard is too small to have its own niche. This process of assembling the scraps in one place makes the labourers into archivists of the country's infrastructural, industrial, and consumer fortunes. Rosalind Fredericks talks of waste labour as a 'sort of Anthropogenic work par excellence' and waste workers as Anthropocence archivists 'cataloguing, translating, and making valuable the afterlives of urban life' (Fredericks, forthcoming). This unification of scrap echoes a stock exchange in which people come together to invest in numerous portfolios, to share risk and to sponsor each other's ventures. As scrap prices in Ghana – like metal prices around the world – are partly informed by the dynamics of the London Metal Exchange (LME), the proximity of copper, iron, aluminium, lead, and spare parts allows for hedging and risk management strategies.

Scrapyards are places from which the ever more expensive scrap collection is organised. Part of the collection is sponsored by scrap dealers and part by the various actors who buy scrap for national industries and international markets. Scrap prices are surging, and the discarding public and businesses reap the profits. Chapter 1 told stories of scrap dealers who operate in the smallest villages in the North of Ghana, where they incentivise teenagers to bring scrap from their homes in exchange for coins. In cities, the prices of scrap is much more expensive. The dissertation opened with the story of Ibrahim and his purchase from a government institution that required organising thousands of dollars of capital. The stress of locating scrap and financing its collections falls partly on the shoulders of the country's scrap dealers. This is hardly a context invoked by a metaphor of 'dumping'. The 'try and luck' business of scrap livelihoods described in Chapter 1 means that scrap dealers are constantly trying to match their own capital with the discarding public's wish to sell their scrap. Such attempts to coordinate are rife with risks of over or under-estimation. The conversions are complicated, as scrap is treated like a form of a currency and is often stockpiled akin to savings in a bank.

The expensive nature of collection is a source of risk shared between scrap dealers. At the same time, the mounting prices are also an expression of the competition between them. In Chapter 1, I argued that the resultant competition, risk and fragmentation of portfolios between different metals makes scrapyards akin to the stock exchange (Zaloom, 2004; 2006). With scrap dealers working in an analogous way that produces liquidity, absorbs and hedges risk, and creates personal dispositions. "Try and luck" business creates an excess – a need to carry on despite luck or a need to account for luck vis-a-vis others who are also fighting for livelihoods. "Man has to focus" was a caption under a self-portrait sitting on a pile of scrap sent by one of my interlocutors after he disappeared into one of Ghana's regions for a month long search of scrap. The uncertainty is constantly testing community ties: wealthier scrap dealers have to "dash" money to those below them; scrapyards are places where older men (who lost all the money) pass in between workers to gather money to carry on, and there is a recurrent fear of being cheated. It is a context of "cultural intimacy" (Harzfeld, 2005 [1997]) – sources of embarrassment and sociality, shame and solidarity – in that people confront the likelihood that they will be cheated and appreciate that they never know what is the problem that their 'brothers' are trying to solve through the cheating.

Scrap worlds

Following Robyn d'Avignon's (2017) argument about the 'clash' between 'artisanal' and 'industrial' mines, this thesis argues that different parts of scrap worlds are 'interrelated components of a single extractive system' (387) – in this case, a single system of urban mining. The scrap worlds of Ghana evolved over time from being entirely in the hands of West African scrap dealers and exporters towards supply chains defined by a 'colour line' and attendant 'racial vernaculars' (Pierre, 2013; 2019) (as shown in Chapter 4). Scrap dealers are West African while the actors who buy scrap are Asian or Middle Eastern (when it comes to iron, copper, aluminium and lead) or European (when it comes to precious metals such as gold or palladium). One of the latter exporters, who sought to establish an export of motherboards from Ghana to Europe, explained to me with a certain pride: 'I don't want to deprive the people of Africa of aluminium, copper and lead. I am here for precious metals, as only Europe has technologies to recover them in a clean way'.

The statement above expresses global metallic divides that map onto ethnic and national divides. Different scrap metals partake in separate processes of globalisation. Iron stays within the country and is processed by smelters owned by Chinese, Middle Eastern and Indian capital. Brokers that work with European refineries of precious metals from electronic waste such as computer motherboards buy these goods either by working directly with scrap dealers in scrapyards or passing through established international companies. Meanwhile non-ferrous metals such as copper, aluminium and lead are exported by Asian and Middle Eastern companies to their regions of origin –- such workers together render Ghana the single biggest African exporter of second-hand metals to Asia (Lepawsky, 2019).

Each of these worlds enlists scrap dealers to sustain themselves, but those same actors participate in the fragmentation of these worlds. Worlds associated with iron see dealers as indispensable collectors of raw material, since all smelting companies rely on scrap dealers to meet their production quotas. At the same time, as seen in Chapter 4, this reliance is hidden from the scrap dealers themselves, who are unsure of how far the companies depend on them and therefore whether or not they have a bargaining power. They also feel exploited and threatened by the unexpected and poorly advertised price reductions. In 2019, the scrap dealers were organising not to be treated as an exploitable workforce by smelters. Meanwhile, these industries were able to unite and put pressure on the government to introduce a ban on iron scrap exports in 2014 and keep it in place despite scrap dealers' protests. Another tangle is introduced by the fact that smelters ask scrap dealers to pass through agents, who are often of the same religious background and ethnicity. Such agents further blur the interdependence of the industries and scrap dealers by introducing new actors. The agents meanwhile take on themselves the risk of translating the complicated social life of scrapyards into quantifiable production quotas. As

Shaffiu, an agent in Tema, mentioned in one of the many resonant exchanges we had concerning his work: 'the executives do not want to deal with people, they only want a number of goods'.

Worlds associated with non-ferrous and precious exports are dynamic and comprise of established companies and various brokers. This is a context of flexible mining (Knapp, 2016), where actors tap into Ghana's scrap collection and convey the scrap to the ever-hungry Asian metal markets and precious metals recyclers in Europe. These companies are flexible in that they buy according to market prices rather than prior commitments made to scrap dealers. Their spontaneous comings and goings are subject of conspiracy theories. Are one-off exporters of copper cables or spent motherboards using the trade as a form of capital flight? Are these companies laundering money? Scrap dealers appear here as expendable accomplices for any one of these ventures, but at the same time the continuing levels of scrap collection means that new companies can enter the market. Chapter 4 took the reader inside one such company, where we encountered 'international scrap dealers' – businessmen who hop between corporate branches that cover different countries and who venture into new markets to make profit out of scrap booms. We have encountered scrap dealers whose previous stints were in war-torn Iraq, in Oman or in Cameroon. Each time their self-described scrap bonanza was cut short by government legalisation that sought to regulate scrap market in favour of local recyclers. Such companies are aware that their stint in Ghana may not last or that they will have to shift their business portfolios.

Worlds associated with precious metals have also been changing in the midst of 'e-waste dumping' scandals. As described in Chapter 5, these days such worlds include international organisations such as UNEP, which has poured in money to investigate the extent of e-waste dumping and bolster efforts to prevent movements of e-waste between countries. More recently they include international development aid such as the German Development Agency (GIZ) who re-brand Ghana as a 'seed country' for the establishment of circular economies of strategic metals. Strategic metals are metals contained in electronic waste that have been identified by European Union as of utmost importance to its industrial drive and stock of new clean technologies. In the eyes of these worlds, scrap dealers are victims of dumping. They are seen through the prism of toxic practices such as burning that they engage in to retrieve metals. They are 'informal' and should be reduced to the role of collectors within the emergent Best of 2 Worlds Programs, healed by development agencies in partnership with precious metals refineries – allowing waste to be collected in Ghana and processed and value-added in Europe. Such interventions focus narrowly on toxicity and dismiss the importance of value, social mobility, and reverse engineering that are all crucial parts of scrapyards operations too.

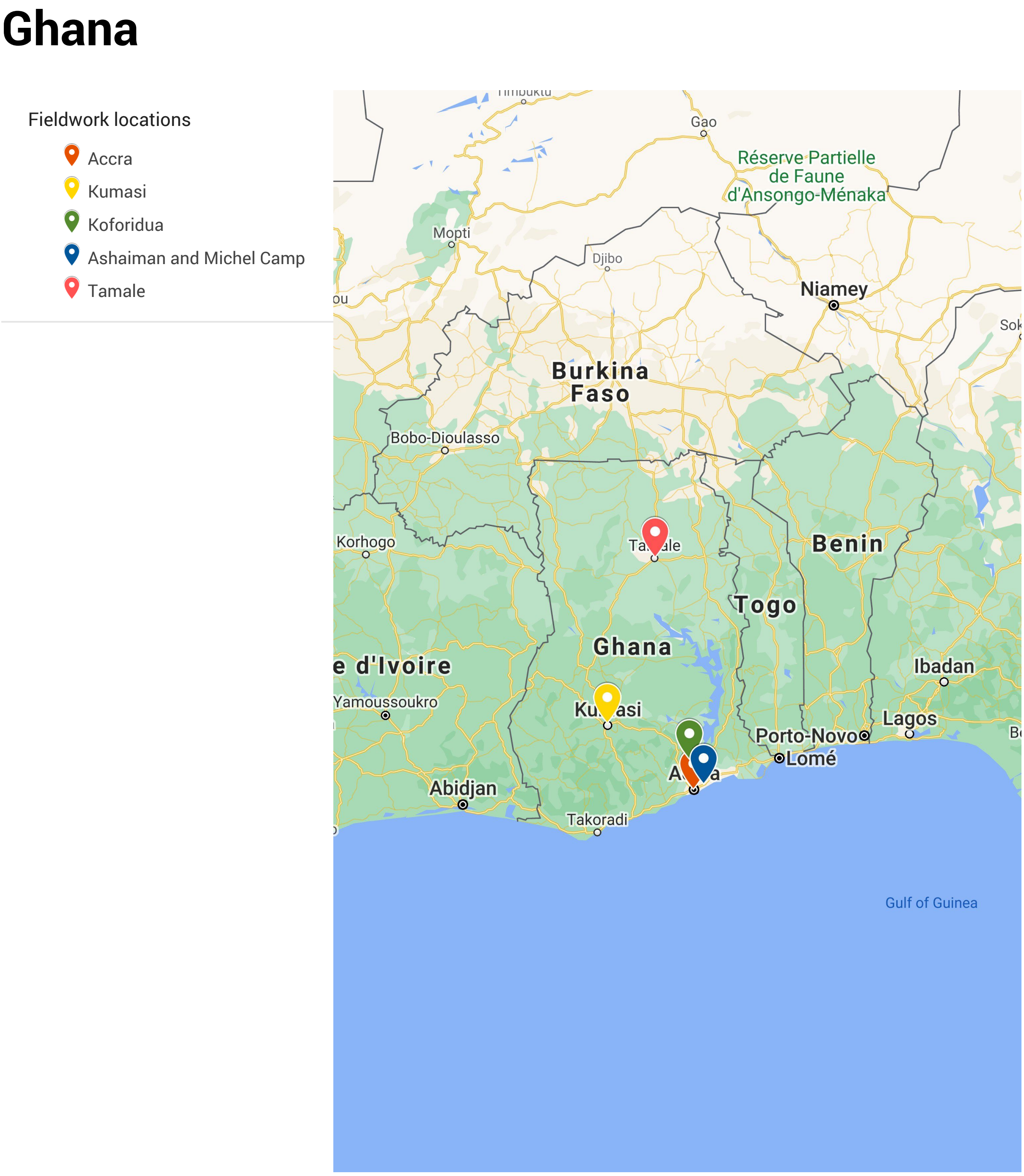
Competition

Scrap dealers work at the crossroads of four types of competition that create tension in their workplace. The first source of competition is the one they generate between themselves as they struggle to collect scrap and add value to it. The competition constantly raises prices and ratchets up intra-ethnic suspicion and inter-generational tension. Chapter 2 reviewed these tensions and suspicions and how they fracture the workplace, where different communities are thought to be spoiling the market, polluting the environment, while others are seen as immoral or always ready to cheat. At the same time, the risk associated with collection means that scrap dealers rely on scrapyards as hubs of metals and places of distribution of risk. Such reliance explains outburst of conflict in Agbogbloshie in particular (as seen in Chapter 3).

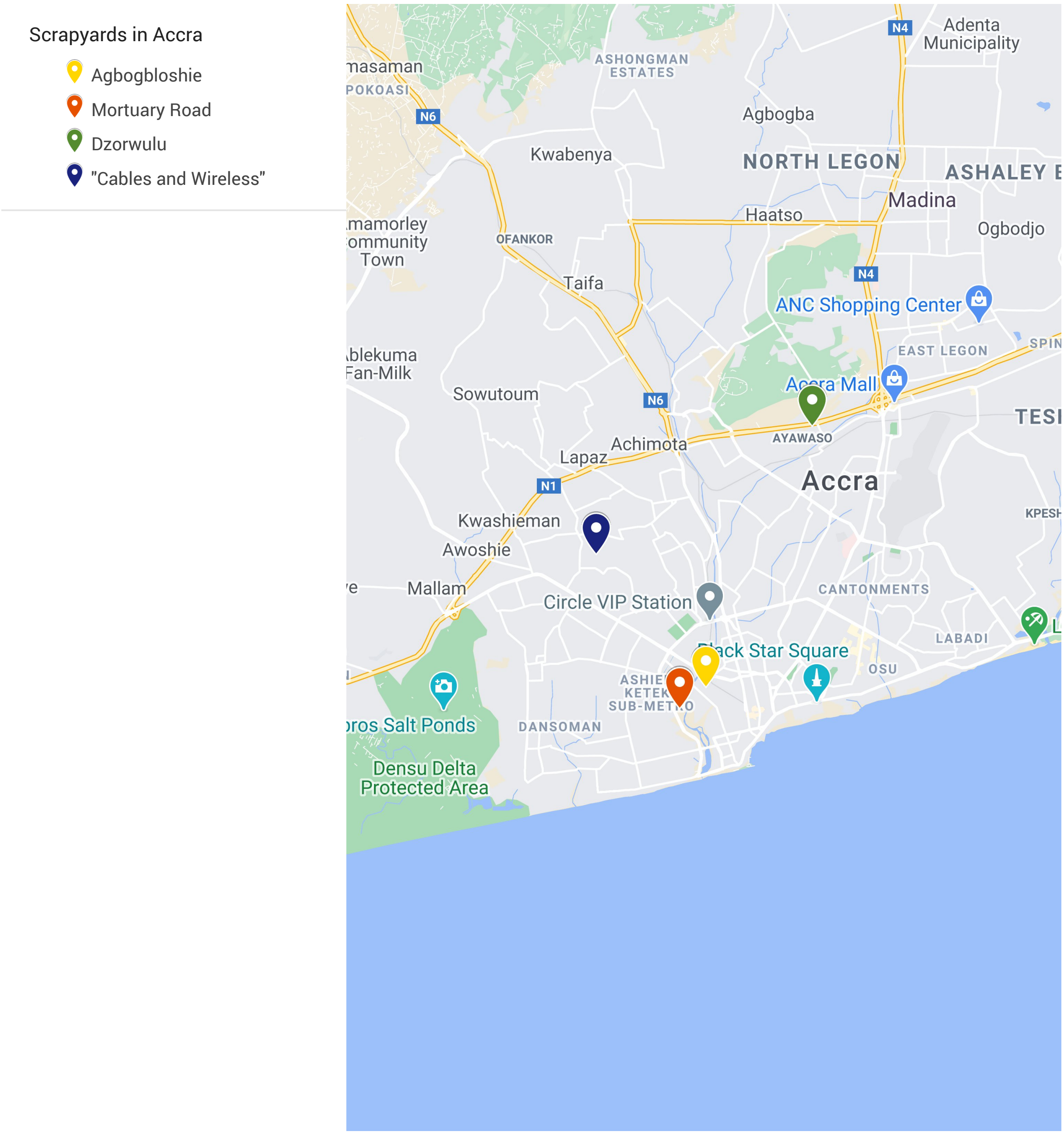
Secondly, scrap dealers face competition from primary metal markets. Scrap prices are set below primary metal prices. We have seen iron smelting companies decry the product that scrap dealers are bringing – be that it is not enough or its too dirty – and threatening to shift to primary metals in order not to depend on the whims of discarding and unorganised scrap labour. Scrap dealers are also poorly recognised as actors in the shift from dependence on mining to secondary metal markets. Within Ghana, the government threatens them with evictions and fails to extend legal protections. In scrapyards, I often heard my interlocutors voice pride that they have created an economy at the grassroots and effectively relieved the government of its duty to provide for its citizens. The fact that these scrapyards have acted as opportunities for urban 'surplus population' and hubs for collective learning (and mistake-making) about accounting, measuring, repair, and adding value to scrap (as seen in Chapter 3, where scrapyards were likened to a university). Prevailing narratives overlook this richness and dynamism.

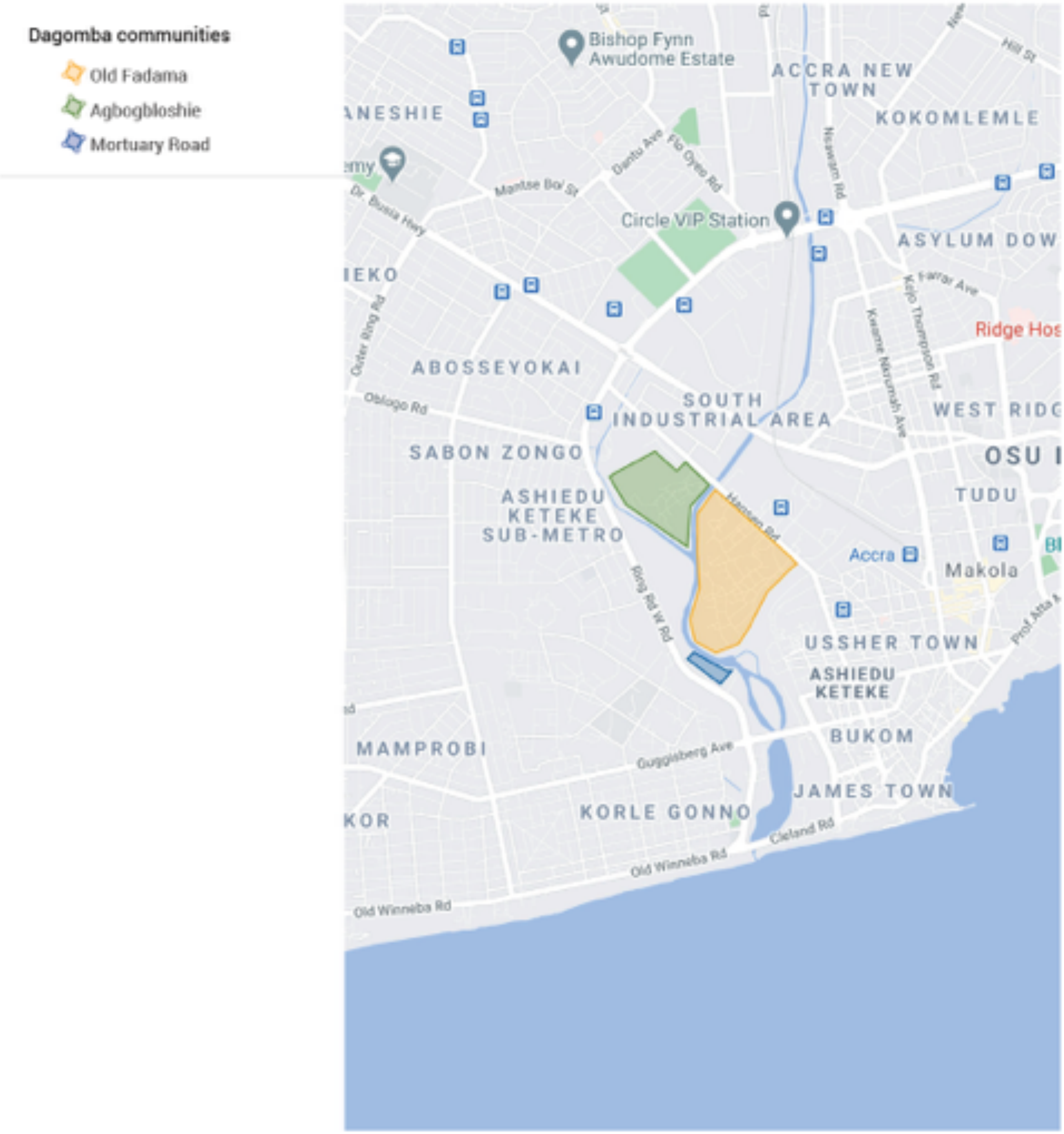
In the future, scrap dealers are also going to experience more and more competition from global recyclers. As Rajyashree Reddy (2015) argues, electronic waste is a valuable discard that represents a battle site between powerful interests, in which workers in the Global South risk losing out to corporate recyclers. As described in Chapter 5, electronic manufacturers are shifting towards ‘closed loop’ systems via product designs that prevent repair or unauthorised recycling. Some of the most techno-optimist companies of the global North such as Apple and Tesla are the most vocal advocates of such a shift. Their products are packed with propriety parts that cannot be used in other products or repaired without expert knowledge. These companies remake customers into service users and seek to retain control over their products. They effectively push scrap dealers in Ghana and beyond into the ranks of ‘invisible users’ (Burrell, 2012), a term originally coined by Jenna Burrell to describe the experience of marginality of youth who inhabited Accra’s internet cafes. Their invisibility follows from their ‘non-centrality’ for those in power – technology designers or network administrators. Here too, the importance of reverse engineering and the livelihoods of the collectors of discards are marginal to new designs or circular economic systems. The 'e-waste paradigm', whilst ostensibly about protecting and improving the lives of those working in scrap economies, can't be of much use when it has a patronising attitude that doesn't take account of the complex international, corporate, ethnic and other forces that sustain and give meaning and structure to scrap worlds. Scrap worlds meanwhile capture the fragmentations of globalisation, social opportunity, and communal importance that characterise such places.

Figure A Fieldwork location maps



Accra


Scrapyards in Accra
Agbogbloshie
Mortuary Road
Dzorwulu
"Cables and Wireless"
ASHONGMAN ESTATES
Adenta Municipality
POKOASI
Agbogba
Kwabenya
NORTH LEGON
Madina
Haatso
Ogbodjo
OFANKOR
Taifa
ANC Shopping Center
EAST LEGON
Accra Mall
Sowutoum
AYAWASO
Achimota
Lapaz
Accra
Kwashieman
Awoshie
Mallam
Circle VIP Station
CANTONMENTS
LABADI
Black Star Square
OSU
DANSOMAN
Densu Delta Protected Area
N4
N6
N1

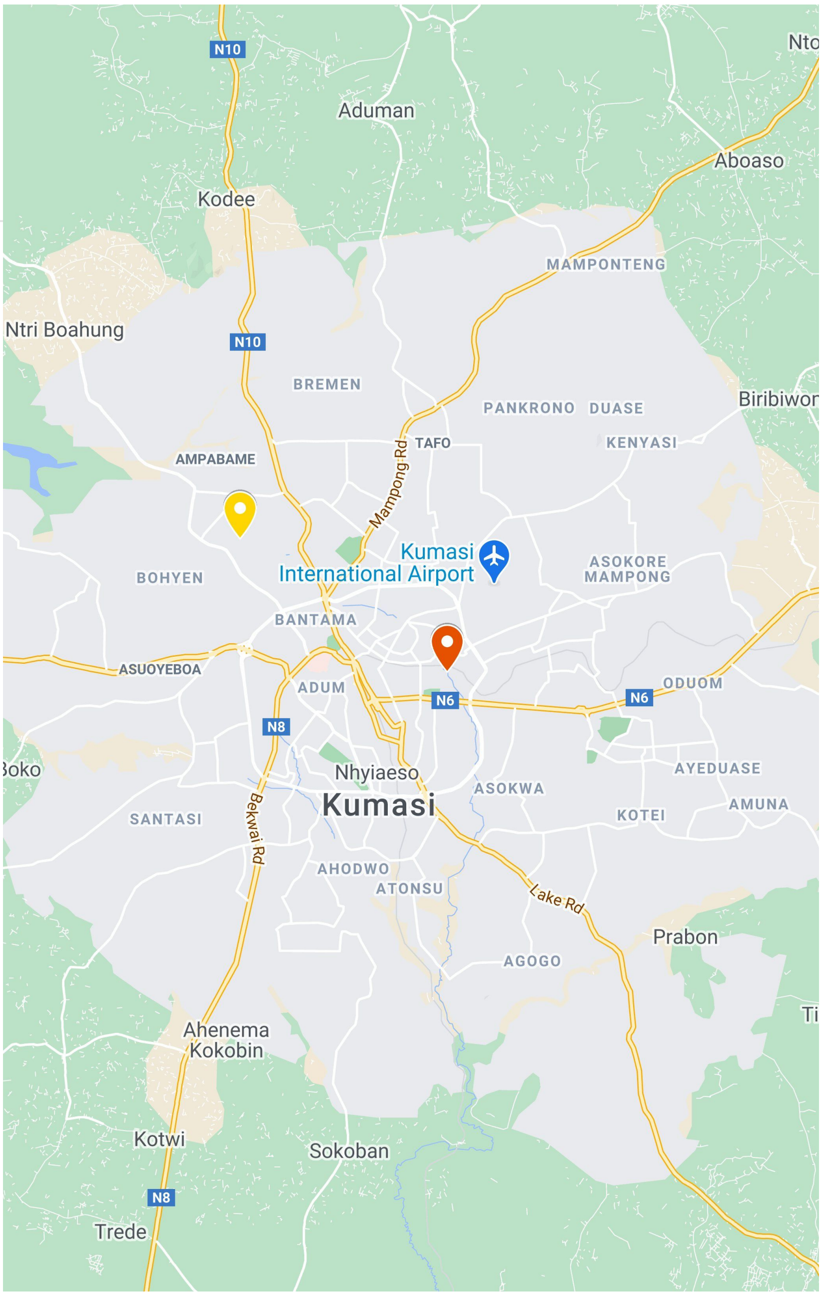

Dagomba communities
Old Fadama
Agbogbloshie
Mortuary Road
Bishop Fynn Awudome Estate
ACCRA NEW TOWN
KOKOMLEMLE
Circle VIP Station
ASYLUM DOW
Mantse Bo St
Dr. Busia Hwy
ABOSSEYOKAI
SOUTH INDUSTRIAL AREA
Kwame Nkrumah Ave
Ridge Hos
WEST RIDG
OSU
SABON ZONGO
ASHIEDU KETEKE SUB-METRO
Hansen Rd
Ring Rd W Rd
TUDU
Accra
Makola
USSHER TOWN
ASHIEDU KETEKE
BUKOM
MAMPROBI
Guggisberg Ave
JAMES TOWN
KORLE GONNO
Cleland Rd
Old Winneba Rd
Oblogo Rd
Outer Ring Rd

Kumasi

Scrapyards in Kumasi

Dagomba Line

Frafra Market inside Suame Magazine



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