Trash *in* Transit

An Ethnographic Elaboration on the Processing of Waste Transitions in Utrecht, the Netherlands

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Master's Thesis of 'Cultural Anthropology: Sustainable Citizenship'

August 15, 2018

Universiteit Utrecht

Abstract

Waste handling in the Netherlands has been subject to change due to the government's ambition to become a Circular Economy by 2050. This ethnography seeks to answer the question how transition(s) influence visions on domestic waste in the 21st century. Waste transitions are movements in the configurations of waste and how its dealt with within a society. The research, that is conducted in the province of Utrecht, narrates the entanglement along humans and domestic waste, and argues that they *are* relation, continuously in motion. Meanwhile, as various people try to consume less, changing waste handling challenges identity formation by materials within the consumer society.
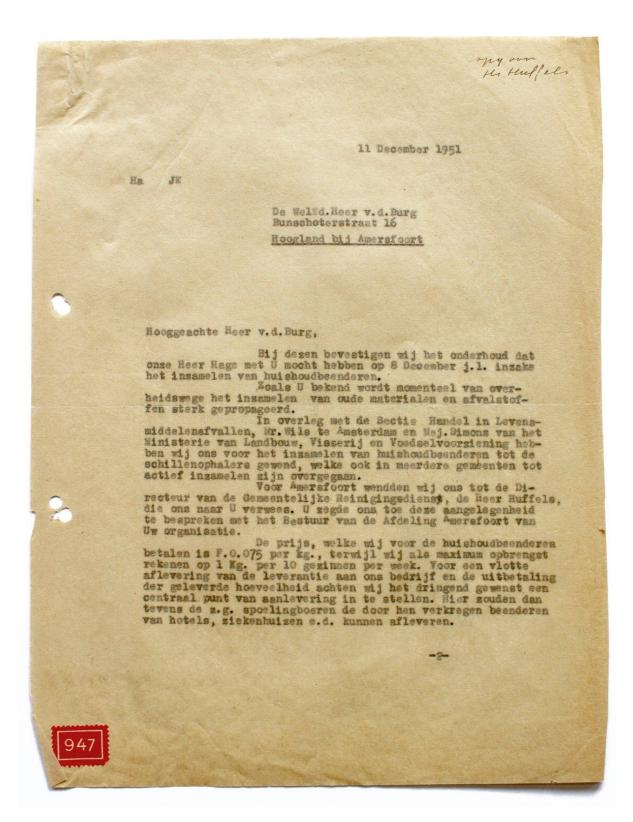
Keywords

Waste, Waste Transitions, Relations, Circular Economy, Transitions, Identity, Utrecht.

Acknowledgment

This thesis is about waste transitions in the Netherlands, but the layer underneath it is about relationships. Relations that initiate transition, that *are* change. On a personal record, this master changed me. As I change, my environment changes, and as my environment changes, so do I. People step into your life, and sometimes disappear in the background. That might happen gradually or sometimes abruptly. These processes continue in times of studying. One such an event that impacted me while doing field research was the passing of my grandfather. This thesis is dedicated to him, as I am grateful for the foundation he made for my family, my parents and me. He cared, so may I care now. His departure made me realize, certainly with the submission of this thesis, that I represent a new generation. A shift has taken place. Handing in this thesis is also part of a personal story that is not finished. As my environment keeps moving, so will I. With the knowledge of this particular moment, this thesis has come about. I therefore regard writing this thesis as a fragment, a piece in time. In the creation of this piece I would like to thank those who have contributed, who have supported me until this specific moment. First of all, my fiancé. Her encouragement gave me the strength to start this master. In addition, my housemates have been of great support, by listening to the daily stories I came home with. Through the accounts in which narratives are exchanged our friendship grew. The same gratitude also applies to contacts in a professional setting. I thank my supervisor of the course for your guidance. To persevere, despite the physical and emotional challenges you have entered into during the past year, testifies of character. I would also like to thank my colleagues for their support and the trust you gave me. Trust is one of the ingredient that contributes to the conclusion of this thesis. It is an ongoing interaction in which I need to have full confidence in myself, and which is fed in relation to all of the above mentioned.

Table of contents

11 December 1951

Ha   JR

De WelEd.Heer v.d.Burg
Bunschoterstraat 16
<u>Hoogland bij Amersfoort</u>

Hooggeachte Heer v.d.Burg,

Bij dezen bevestigen wij het onderhoud dat onze Heer Hage met U mocht hebben op 8 December j.l. inzake het inzamelen van huishoudbeenderen.

Zoals U bekend wordt momenteel van overheidswege het inzamelen van oude materialen en afvalstoffen sterk gepropageerd.

In overleg met de Sectie Handel in Levensmiddelenafvallen, Mr.Wils te Amsterdam en Mej.Simons van het Ministerie van Landbouw, Visserij en Voedselvoorziening hebben wij ons voor het inzamelen van huishoudbeenderen tot de schillenophalers gewend, welke ook in meerdere gemeenten tot actief inzamelen zijn overgegaan.

Voor Amersfoort wendden wij ons tot de Directeur van de Gemeentelijke Reinigingsdienst, de Heer Huffels, die ons naar U verwees. U zegde ons toe deze aangelegenheid te bespreken met het Bestuur van de Afdeling Amersfoort van Uw organisatie.

De prijs, welke wij voor de huishoudbeenderen betalen is F.0.075 per kg., terwijl wij als maximum opbrengst rekenen op 1 Kg. per 10 gezinnen per week. Voor een vlotte aflevering van de leverantie aan ons bedrijf en de uitbetaling der geleverde hoeveelheid achten wij het dringend gewenst een centraal punt van aanlevering in te stellen. Hier zouden dan tevens de z.g. spoelingboeren de door hen verkregen beenderen van hotels, ziekenhuizen e.d. kunnen afleveren.

-2-

947

(Archief Eemland 1951-1952, 1)

Introduction

It is winter 1951, when mister v.d Burg receives a letter from the 'Municipal Cleaning, Disinfection and Sickness Service'[1]: "In consultation with the 'Section on Trade in Food Waste', Mr. Wils in Amsterdam and Maj. Simons from the 'Ministry of Agriculture, Fisheries and Food' have become accustomed to peelers and collectors of household bones, which has been actively collected in several municipalities." (Archief Eemland 1951-1952, 1). This letter takes us back to a time with waste-streams, separately collected in the Netherlands six years after a period of scarcity caused by the Second World War. The collecting of waste was organized in such a way that the 'peeling collector' came to pick up the peels of vegetables and fruits. Another collector picked up the remains of diner with meat: the household bones. Each stream had its own application, and its economic value. Bones were increasingly needed for their classical use for the manufacture of objects, grease, and glue. Since the average of waste per week was 10 kilogram per family, the letter urges to set up a central point of delivery for the various waste streams to ensure the constant collection and processing of the waste. Now, more than sixty years later, there are as much as 93 (partial) flows of waste in the Netherlands (IenM 2017, 4).

There has been an explosive rise in the demand for raw materials during last centuries growth of Earth's population. This has its environmental impact, as this demands involves increasing damage to and exhaustion of natural capital, a loss of biodiversity, a risk of exhausting the supply of raw materials, and climate change (IenM 2016, 11). A further increase in the demand for raw materials will thus exacerbate environmental, climate-related, and other sustainability issues. In order to continue feeding humanity, provide it with the necessary goods and to guarantee people a decent existence, a fundamental change in how we use raw materials is necessary. To do so, waste has become subject to a series of actions by done the Dutch Cabinet

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[1] Later its name is the Municipal Cleaning and Disinfection Service and, this will change after another subsequent change of name in Municipal Cleaning and Transport Service. In Dutch these names are 'Gemeentelijke Reinigingsdienst- en Ontsmetting Dient en ziekenbarak', later 'Gemeentelijke Reinigings en ontsmettingsdienst' and finally the 'Gemeentelijke Reinigings en Vervoersdienst'

and the wishes of the House of Representatives achieve alteration. With the aim to use raw materials in a more sustainable manner the initiative From Waste to Resources VANG (Van Afval Naar Grondstof) has been started, to focus on the transition from fossil-based raw materials to biomass as a raw material (IenM 2016, 8). This thesis is about how this shift is processed, focussing on domestic waste and those who are involved in this transition.

Transitions are processes that unfold over time, involving structural change and non-linearities (Grin 2010, 99). As transitions are about movement in time, the first chapter elaborates on the developing relations with waste in the past. Each shift in waste managements over the last few hundred years relates to issues of that time, they reflect motivations such as the example of the peeling collector tells us behind actions of recycling and reusing of materials. Such transitions are inextricably linked with cultural change, developed in specific contexts of practical engagement with its surroundings.

By narrating various changes in society and its waste, the first chapter answers the question what *waste transitions* are. Meanwhile various parties that where and are concerned about our waste are introduced, and placed within the context of their foundations. A major conversion that leaded to increasing waste streams with artificial materials originated in that of the industrial revolution developing a consumer society.

As the hunger for raw materials increases, the quantity of raw materials decreases. By using raw materials in a smarter way, it might be possible to continue to prosper on a healthy planet in the future with a sustainable and strong economy. In order to realize such a rosy picture of the future, a new system is being developed to deal with waste, to see it as a resource for consecutive material streams. The second chapter is about this vision for sustainable waste management in the Netherlands. While unraveling in which waste transition we are at the moment, it is impossible to escape the concept of circular economy, as the whole VANG-objective is part of government-wide program 'The Netherlands Circular in 2050'. The circular economy relies on system-wide innovation, which entails gradually decoupling economic activity from the consumption of finite resources, and designing waste out of the system while focusing on positive society-wide benefits (MacArthur 2013, 7). This chapter investigates who is involved in the transition to circularity and how each individual relationship

with waste develops. However, a circular system requires consensus between the actors involved, the ability to understand how parts influence one another within a whole, and visa versa, the relationship of the whole influences the parts. So, the next question is how are the correlations between companies, governments and citizens in the current waste transition.

If we want to develop into a circular economy, there is a necessity to look at relationships in the material chain in which waste is produced, consumed and processed. In the third chapter, a number of relationships are examined. As during the unfoldment of the new circular system friction takes place between consumer, (local) government waste processors and collection services, which demonstrates divergent experiences of waste. On the basis of waste myths is examined how the waste transition is interpreted (Rijkswaterstaat 2018), which reflect this friction between the various parties involved. The collection of stories in this thesis together narrates what is meant by waste transitions, they *are relations*. This process of movement is part of life developed in specific contexts of practical engagement with its surroundings, the very existence of being (Ingold 2011, 70).

What happens on a individual scale along the developing relation with waste is abbreviated in the last chapter. In this fourth chapter we investigate the reversed argument: instead of narrating how people determine what waste is (through relations), it is shown how waste affects us. This is done by following individuals that try to consume less and separate their packaging. Such behaviour is part of a way of living where materials are reused, a way of living that by which consciousness is questioned by the one who tries to consume less, and those who have a different attitudes in the transition of waste reduction. Such internal conflicts, that can lead to cognitive dissonance, show that waste not only forms relations. Our waste handling also forms our identities.

This master thesis concludes with a reflection of the arguments on how waste mirrors the society that produced it. It shows the relationship with the environment and the resources they mobilize as well as the relation between citizens, government, business and between the creation, collecting and processing of materials considered as waste.

Halfway through the four chapters is an intermezzo by which other relations are described, namely those by which this thesis came about. During the description of the

methodology, the ethical questions in the research, and the manners in which the data was triangulated, it is also explained why most of the interviews and observations took place in the province of Utrecht. This thesis is a result of three months of fieldwork in the Netherlands, containing stories that have emerged from interviews with employees within governments, both locally and nationally. In addition, it includes observations that people shared with me during interviews on how they produce waste. All this data has been traced by searching for sources in the literature and data from policy documents. The piece is written in such a way that vignettes alternate with policy and theory from social sciences. Ultimately, all these sources contains arguments, and relate to each other in the narrative of waste transitions in the Netherlands.

Prologue: Words on waste

'Let's talk rubbish', a saying that is just one example of the many in language about waste. To not waste your time with aphorisms, this prologue just focuses primarily on the most common words to describe garbage. This is done by isolating these words, by looking at their origin to see how a word has arisen and how its meaning continually develops. Each word in itself illustrates transition, because a language or a word is not just something given once for all. They are a result of previous development and at the same time a the starting-point for subsequent development (Jespersen 2013,10). Five words that are commonly used in our current waste transitions are explained. I conclude that the meaning of the words will vary per context as a starting point for the ethnographic research to follow.

The first word associated with the themes of loss and uselessness is that of *garbage*, in Dutch the word would be translated as *afval*. The word origins from *déchet* in French from the verb *choir* meaning to fall, to *refuse*. The word used to primarily refers to animal offal, *rifiuti* in Italian, *residuo* in Spanish (Barles 2014, 2).

Another word is *dirt*, emphasizing the dirty or repulsive nature of these particular materials. In Dutch the word is *vuil*, which arrives from the german word *fúinn*, meaning *spoiled* or rotten. There is a despicable character contained in the use of the derived word of *vuilnis* (Barles 2014, 2).

A third word to describe the materials that make up the waste is *boues* in French, *spazzatura* in Italian, *Müll* and *Schmutz* in German and *rubbish* in English which derived from *rubble*. The Dutch word would be *puin.* It refers to rough fragments of stone, brick, concrete, especially the debris what arises from the demolition of buildings.

The word *waste* comes from the old French *vastum*, which means empty or desolate. At first it was used to depict a desolate, ruined or neglected region. Later, the term was used to describe a wasteful expenditure. In this sense, it had the same meaning as *déchet* in French. It acquired its current meaning in the 15th century. The original meaning of *waste* has a spatial dimension in that it described a place. The issue of waste and its vocabulary has long been

closely linked to and even confused with both the issue of salubrity and sanitizing of urban space and the management of urban excrement (Barles 2014, 2).

Within the Netherlands new words are used, or more precisely abbreviations are used, to determine specific waste streams. Biodegradable waste became *GFT* (Groente- Fruit- en Tuinafval) and 'Plastic, Metal and Beverage boxes' is nowadays often called *PMD* (Plastic, Metaal en Drankverpakkingen) are examples of relatively new words related to waste within the Dutch vocabulary. From the 1990s onwards originally 'GFT' was written with capitals expressly indicate that it is a new abbreviation that is composed of different known terms: Vegetable, Fruit, Garden waste (Outvorst 1996). It does not seem unreasonable to assume that during the introduction of 'GFT' it was of great importance that everyone was aware of the different 'ingredients' in the term: because the name serves at the same time an instruction, as a memory support for separating waste. It seems to be that as soon as an acronym or initial word becomes established, the capital letters disappear, and then an acronym is included in a composition or derivation without a hyphen or apostrophe. An alphabetic character with one or more capital letters retains the hyphen and apostrophe, as do initial words. Now that everyone is gradually getting acquainted with organic waste of this kind, it seems that the capital letters are indeed starting to wear off. At the moment some municipalities, companies and organizations are starting to use 'gft', but 'GFT' is still very common. In this way the spelling of a word can be an illustration of the phase in a transition, whether or not reflecting the matter of course in the use of the word.

This thesis will continue providing definitions on garbage which can diver from something dirty that should be taken away and dealt with until defining it as something valuable, a raw material. Such differences can be understood by taking in the encompassing system of classification in account that give language meaning. The famous Anthropologist Clifford Geertz (1973, 312) argues to do so: to study the hybridized meaning of culture by making a *thick description.* Context here is key in the conception of shifting culture(s) of waste. This thesis endeavor to do so by an investigating into the semiotic system of waste, showing rituals of people's interactions with it.

Chapter 1: Bygone

Waste has been around for a while, and there has been various paradigm shift of what is considered to be waste. For a while it has been seen as something organic, that solves itself. Now there is a transition going on in which we see waste as a valuable raw material, by searching for ways to upcycle waste, into a circular system. These complex revolution in a social system can not be fully understood, analyzed and steered, because they transcend spatiality and locality, substance. These changes do not stand alone, but are embedded in a cultural context in which even more transitions take place. "*Transitions* are processes that unfold over time which involve structural change and nonlinearities." as argued by professor of system innovation John Grin (2010, 99). Transition can also be defined as fundamental processes that irreversible change society's culture, (institutional) structures and practices. An example of such paradigm shift is a development in waste management that does not focus upon the management of waste but upon the management of production to prevent waste (Loorbach 2010, 6). Generally it takes between 25 to 50 years for a transition to fully materialize (van Raak 2014).

Investigations of transitions phenomenon require a research method that is rich in context and tracks complex developments over time. Case studies are seen to provide such a method because they allow detailed process tracing by the study of event sequences, exploration of patterns and verifying rival theories (Grin 2010, 99). There are various ways to study historical processes more generally. There could be a focus on stochastic realizations and aims to find causes, or there is a focus on narratives and aims to find typical patterns (Dayan and Abbott 2001, 164). This thesis will do the latter. This first chapter does not just contain a sequence of events of paradigm shifts, they are tied together by the central theme of waste transitions within a continually unfolding field of relationships. Such a process of growth, is tantamount to a movement along a way of life (Ingold 2011, xii).

This chapter builds up to the paradigm shift where we are in at the moment, starting from seeing waste as something to be disposed of as hygienically and definitively as possible to waste as valuable raw material now. Such a complex revolution in a social system are far-reaching, uncertain and long-term plays a role. A contextual framework serves here as a theoretical and

explanatory theme that endures throughout the analysis in ways that discipline the narrative (Pedriana 2005, 357). Part of this contextual framework is given by the introducing of the main parties involved in transition(s), and placing them in a historical overview. In this first chapter you will be taken into various paradigm shifts leading to seeing waste as valuable raw material within the ambition to become a circular economy, which is further explained in chapter two. This chapter serves as a brief historical outline of transitions in waste-handling, and will give an introduction of waste-regimes in the Netherlands.

From nature to settlement

The kind of waste in ancient times was very different from our society now. It was organic and consisted mainly of products that were discarded by the workshops and kitchens, human and animal waste, carcasses and their remains (McPhail 2012, 2). Most of the waste had the possibility of decaying through the action of living organisms, still archaeologists have found the remains of meals, the bones of the prey people hunted, together with small tools and earthenware. Here we see that the first humans who thought of waste disposal by burying waste underground near their prehistoric settlements. Alternatively waste was burnt or buried underground outside the inhabited centres, thus giving rise to the first waste dumps (McPhail 2012, 2).

The amount of biodegradable waste increased with urbanization. For a long time people simply had to relieve themselves outdoors, which could happen without a problem. The Greeks seem to be the first to feel the need to manage a public town-cleaning service. In cities men relieving themselves in alleys, behind statues, behind bushes and in public fountains. Therefore a group of sweepers were appointed to clean the city of Athens. But sweepers alone were not enough to deal with constant supply of human excrement. The human waste generated from this practice would seep into the soil when liquid, while solids were left for decomposition, picked up by those responsible for cleaning the streets or eaten by insects and other creatures. It was during the Roman Empire, that the first public service for waste collection and disposal, and sanitation were developed. A model which was exported all over the Roman Empire (Taylor 2008, 56).

In the Middle Ages the situation worsened remarkably, partly due to changing religious views. Citizens considered the road a privileged place where to get rid of their waste. Only the highest nobility and the richest merchants washed themselves with some regularity; the rest of the population staggered for an hour. Feces and other waste were turned in canals, rivers or else on the street. During that time Europe lost one third of its population to the plague. The cause of illness was at that time assigned to pure acts of God, that he is the one that contributes to social, economic and substantial change (Herlihy 1997, 84).

The production of non biodegradable waste

Grand transitions in what was considered garbage started with the *industrial revolution*, in the late 1700s. The shift from hand production methods to manufacturing processes increased the production speed drastically. Huge machines produced large amounts of textiles in a much faster and cheaper way. The machines were put into factories where thousands of people would come to work. Factory workers lived in poor conditions, with little pay and few benefits. At first the machines were water-powered, but this was later replaced by fossil fuel driven machine, which became less environmental and started puffing out huge amounts of toxins into the air. Along with the pollution of the air, came the production of synthetic materials. These newly produced materials were artificial and could not be decomposed (Indiana 1990).

The industrial revolution was accompanied by an explosion of population growth. The sewer network did not yet exist in new erupting districts and if it was present, it could not handle the increasing use of the sewerage network. Full pots of feces where emptied on the street or in open water. Cities had problems with open sewers that were clogged with human waste, garbage, and dead animals. Disease was rampant. Tenements and slums were breeding grounds for Cholera, TB, influenza, Yellow Fever, Malaria, etc. A lack of ventilation combined with diseases led urbanites to cough away their lives (Labor 1990, 4). So it is clear that during the nineteenth century public *hygiene* was miserable. If waste was already collected, it went directly to stinking landfills. The first cars provided a lot of dust on the mostly unpaved roads, which were filled with horse feces. Indeed, it was a mess. The public space was definitely not clean and tidy, therefore it was bad with the hygiene. Gradually, the realization came that there is a relationship

between regularly recurring epidemics such as cholera and typhus, the pollution of public spaces and contaminated waters (Wassink 2007, 67).

Besides the ignorance on hygiene, many people were unaware of the material properties of the new products made during the industrial revolution. Whenever something better came out, the old products were simply thrown out. People had no idea that these materials could not be *decomposed* by itself. They thought the trash was like an apple, which could be thrown out because it was biodegradable, unlike the synthetic products (Wassink 2007, 69). People were surprised about how much disease was spread, and how garbage was not degradable like organic waste. The amount of vermin increased because of all the garbage they could eat. These vermin carried diseases that caused more illness. It was only during the 20th century that people realized there was a problem of too much garbage. Until that time, not much had been done to stop problems related to garbage. Some places were overflowing with garbage and reeked of the rotten stench. Something had to be done, or everybody would wallop in garbage houses with diseases being rampant (Wassink 2007, 21).

In this context, the first legislation concerning waste has been constructed, in order to protect people from waste for health- and safety reasons. The Nuisance Act, adopted on 7 January 1875, was the first Dutch environmental act. Other scholars state that the first legal regulation can be traced back to the beginning of the 19th century when the imperial directive concerning odour nuisance was adopted (Beenakkers, 1991, 12). These beginnings of *waste legislation*, indicates a long history of environmental concern. Even though laws were made, they were not directly implemented. The Nuisance Act has been particularly inactive for a long time (Aalders 1984).

Organising waste by municipalities

Until the beginning of the second half of the 19th century waste was normally collected by private companies. The collection of refuse and hearth, and the cleaning of cesspits is leased to private individuals. However, in the period 1870-1880 many municipalities did not renew their contracts with private companies (Groen 1966, 3). Here we see a shift in waste regimes with alterations in social systems, certain dominant ways of thinking, organizing and working. This

becomes visible when several municipalities decided to carry out the work in-house, because there was a lot of criticism on leasing (Hendriks 2017, 1). Moreover, there came an interesting alternative: compost production. Groningen has been collecting faeces separately wich they processed into compost together with the house and street waste. A process that turned out to be very successful. From 1860 onwards the Groninger compost name became a very suitable fertilizer and the revenues of the cleaning service in Groningen went up sharply. A good example follows and several large cities decided to also use compost production in-house (Hendriks 2017, 2).

From then on, most of the municipalities had their own organizations to collect the waste. On the 4th of September 1907, nineteen distinguished directors of municipal cleaning services met at the café called 'Zuid-Hollandsche Koffiehuis', in The Hague. While enjoying a cigar, they discussed the important matters in the field of cleaning. The Dutch Association of Cleaning Directors came into being, abbreviated as NVRD (Koninklijke Nederlandse Vereniging voor Afval- en Reinigingsmanagement). Their aim was to promote knowledge in the field of cleaning and disinfection, by holding meetings and publishing a trade journal. They were engaged in the working conditions of garbage collectors, something that nobody worried about until that time. By exchanging knowledge, learning from each other and working together for the common interest, more could achieve together in waste management. That was necessary because the streets where still suffocated from the lice, fleas and rats (Hendriks 2017, 1). In their congregation they made a framework for what they see as waste, which comes close to the widely used definition within cultural anthropology that "dirt is matter out of place" by Mary Douglas (2003, 36). What was regarded as dirt in society was described as something that needed to be dealt with, through order and surveillance.

In the collection of waste and managing the disposal of household waste, municipalities were responsible. Besides the collective of municipal cleaning, the municipalities started to unite themselves. In 1912, the Association of Dutch Municipalities (VNG) was founded. The VNG is a private-law legal entity with full legal capacity. They supported, and still support, municipalities in translating national policy into municipal policy, by sharing knowledge about the implementation practice and promotes the interests of all municipalities at various parties. In

addition to the collection of waste, other parties were also needed for the processing. Some cities like Rotterdam and Amsterdam built incineration facilities. Other municipalities tried to transport their waste to the East of the Netherlands, where it could be composted. The Hague started a negotiation with the national government regarding this transport, which led to the foundation of The Waste Removal Society in 1929. This co-operation resulted in two big composting facilities in Wijster and Mierlo, which were founded respectively in 1932 and 1955 (Buclet 2013, 3).

Under Dutch law municipalities, national and provincial governments are central actors in the in handling with waste. The municipalities are both responsible for the collection of waste and also managed the disposal of household waste. The cooperation between governments and intermediary organizations is typically Dutch, because as a society, the Netherlands is characterized by a consensus-driven way of policy making. At that time, the society was divided into several religious groups, such as Protestants and Roman Catholic, which had to deliberate frequently in order to make policy work (Kalders 2000, 64). In general the Dutch transition approach was and is innovation-oriented and very much bottom-up with long-term visions guiding societal experiments. To avoid lock- in adherence to certain paths, various paths are explored simultaneously. This makes sense given the uncertainty about the best option. In doing so, Dutch authorities rely on the wisdom of variation and selection processes rather than on the 'intelligence' of planning.

Profit models

At the end of the 19th century it was normal for household waste and cesspool substances to be collected and composted. In this way a product in high demand was produced. At the time developments such as urbanization and the introduction of artificial fertilizer, reduced the use of compost which caused disruption of the system. For entrepreneurs, there was no money left in the collection of discarded material and the local government assumed responsibility: a new system of centralized, uniform and public waste processing was about to be born (van Raak 2014, 8). As a result most municipalities decided to switch to landfilling. Due to costs and available space, the waste was mainly deposited. Landfill was done in marshes, among other things, with the idea that to kill two birds with one stone. Waste was disposed and land was

created. However, at that time there was not much knowledge of the downsides yet, downsides like soil pollution. A shortage of landfills and social pressure to deal with waste differently forced the authorities to come up with new solutions. These new solutions were found in an increase of incinerations, of which the first was opened in 1912. From that moment on deposit and incineration became the two leading processes to process waste. Here, too, there have been turbulent times where, after fluctuations, the system adjusted and regained a new balance.

Several of the bigger cities built an incineration facility: Rotterdam in 1912 and Amsterdam in 1918 (Groen 1966, 4). Other municipalities that did not had large budgets, had to keep landfilling their waste. Consequently, in 1960, the Netherlands had several incineration facilities and about 1100 landfill sites. These developments in technology of waste treatment during the period 1870-1970 confronted the Nuisance Act with its limitations. The Nuisance Act regulated disposal sites (landfilling and incineration), but as a consequence of the use of new technologies the situation changed. Because of the change in waste technology in the second half of the 20th century, other laws became related to the waste problem, particularly the 'Surface Water Pollution Act' and the 'Air Pollution Act'(Groen 1966, 4). Another development at the end of the 1960s was that the constellation of actors changed: environmental NGOs entered the waste sector.

At first the limitations in the Nuisance Act to deal with new technologies of waste treatment and the start of environmental concern did not lead to a radical change in the dumping of waste (Kalders 2000, 64). Several shifting conditions in the second half of the 20th century provided the setting for a more radical change in the waste sector. This change in setting consisted of an increase in the scale of waste sources and corresponding effects on the environment. Several problems contributed to the general impression that a modification of the waste sector had to be made.

In abundance

Problems arose with both a quantity and quality nature of garbage. The problems arose as a result of the increasing level and changing pattern of *production* and *consumption* (Eberg 1997, 3), as further explained in chapter four. The quantity aspect of the problems caused by waste

consisted of an increase in the volume of waste that resulted from population and economic growth, and a higher standard of living. Population growth may also have been at least a cause, if not *the* cause, of the transition (Layton 1991, 265). The quality aspect of waste arose as a result of new materials that need special treatment and careful disposal. Particularly in the late 1960s and early 1970s, rising economic activity was conceived as having negative side-effects on the life of the Dutch population. For example, people became aware that industrial activity led to pollution in some places. In that time there is an accelerated process from single collection and deposit towards separate collection and diversity in processing.

Meanwhile, the developments in the chemical industry and the economic prosperity of the 1960s led to an explosive increase in plastic articles and packaging materials. In the 1970s there was an increasing awareness of the environmental pressure that waste dumping entailed.

The large quantities of waste were now also seen as a negative by-product of the consumption- driven economy with its disposable items. In response to this, more and more regulations arose. In 1979 a new Waste Act came into force. In dealing with this law, the member of parliament Lansink launched his so-called 'Ladder van Lansink'. It is a preferred order for waste disposal. In this respect, waste prevention comes first, then re-use, and recovery of waste, after that waste incineration with energy recovery and finally the dumping of waste. There are many experiments with separation at the source (Wassink 2007, 104). The pressure from the government and society ensured that waste processors in the seventies, albeit reluctantly, went to work with separate waste collection. However, it was only after the scandals like Vogelmeerpolder, with its violent soil pollution among residential area (Eijndhoven 1985, 26-32), that the 1980s that the Lansink ladder gained more support. The government was under pressure to prevent such pollution through illegal waste dumping. The pressure from the government and society ensured that waste processors were built (van Raak 2014, 8).

Shared responsibility for a clean country

With increasing knowledge of waste contamination for the environment from 1980 onward, people continued to complain that the Netherlands was not clean enough, and public services were seriously displeased with the increasing pollution. It became clear that a long-term vision

was needed. With the setting of the first National Environmental Policy Plan the government took a professionalization step to do so by formulating 15-year targets for, among other things, waste were formulated (Raven 2007). One instrument of this plan was to measure the environmental impact with the so-called 'Milieu Effect Rapportages'. These were supplemented with even stricter regulation. The Lickebaert dioxin scandal, were harmful dose of dioxin was found in cheese, gained much publicity and it led to growing concerns by citizens about contaminations caused by waste (Schoevers 2004, 4).

There was as well dissatisfaction about litter on the street. In response to increasing street pollution the General Dutch Association for Alien traffic starts together with the Stichting Recreatie and the ANWB in the action 'Clean and tidy' (Opgeruimd staat netjes), to bring the pollutants to the attention of the public (Wassink 2007, 74). The packaging industry becomes involved in the contribution to the fight against pollution, against the disease phenomenon caused by prosperity. Scandals about the pollution on the street and in the food results in a call for *producer responsibility* (Raven 2014), which I further explained in chapter two.

To conclude

As a result of all sorts of choices and actions that people made, a way of doing that we find 'normal' arises. In a transition the views on that norm change in a period of time. In a waste transition, therefore, change starts in those dominant ways of thinking, and sometimes changes in who is responsible, so called waste regimes. During the last hundred years there has been various in alterations in the way people dealt with garbage with shifts in waste-regimes changes in dominant ways of thinking, organizing and dealing with waste. Starting with waste that was organic and consisted mainly out of human and animal waste, carcasses and their remains, it eventually led to the industrial revolution which was accompanied with urbanization, and so an explosion in the quantity of waste production. The local government assumed responsibility in the collecting of garbage, and public waste processing was born. The waste system had thus found a new balance. Technology puts new materials into circulation, with shifting property of waste with the introduction of synthetic materials thus ensuring new waste streams (Labor 1990, 3). The processing of these materials asked for new ways of organizing the remains. At the same

time, the miserable hygiene became a danger to public health. The realization of the regular recurring epidemics and, the pollution of public spaces and contaminated waters are reasons for regulation. At this point in time, the government indentises with regulations.

But legislation alone did not solve the problems of the increasement of waste, as a result of the increasing level and changing pattern of production and consumption (Eberg 1997, 3). During an iterative process associations fare formed between municipalities, waste collection services, and processing services. Because waste processing originated from a city, municipalities take here the lead, and make arrangements with companies on their own in waste handling. Despite these collaborations, the problems with waste continue to arose as a result of the increasing level and changing pattern of production and consumption (Eberg 1997, 3). At the same time, there is an increasing knowledge of waste and the environment, and the realization that raw materials are not always in stock. Social debate on environmental change and environmental organization, co-founded by scandals on pollution, makes extends the focus of waste handling from that of a hygienic focus.

Government en municipalities start to put their emphasis on to prevention, the reuse of materials, and recovery of waste. Transition management is iterative and adaptive. A mechanism of self-correction based on policy learning and social learning are part of it. Through various elements such as programmes for system innovation, as transition agendas allows cooperation between ministries, producers, local governments and waste collectors (Kemp 2007, 3). Such framework for politics on waste leads to goals for the waste transition of the Netherlands to become fully circular by 2050. The next chapter is about this movement, that is going on at this very moment.

Chapter 2: Towards Circularity

We are driving around in a by the local government rented two-seater. "You're lucky my colleague is free today, so you can have this spot" says Josh. On a regular day he works in close cooperation with a Extraordinary Investigating Officer for Garbage (Buitengewoon OpsporingsAmbtenaar, speciaal voor afval). Together they search and respond to incorrect waste dumping. Josh's main focus is on prevention. The BOA is qualified to give a fine "but we prefer starting with a warning" he said. During our round through the small town we see bags placed near the underground container, that's two days earlier than regulated. Josh parks the car, puts on his gloves and gathers his courage together. It is freezing outside. In a straight line he opens the underground container electronically with his badge. Than he grabs the black garbage bag, and places it strategically on top of the opening of the underground container. Nimble-fingered he searches the bag for an address. This back doesn't contain only plastic, there is dust, candy packaging and paper with biblical texts. Yes, we are in the Bible belt. "Here it is". With a sweep Josh takes the envelope out of the bag, and stated "Tomorrow he will get a visit".

Both municipalities and its citizens wish for a clean and tidy neighbourhood. In order to get there, targets are made about the separation of waste, with the underlying objectives to make the Netherlands circular and waste-free: "a society in which ecology and economy go hand in hand in a social way that allows the generations that come after us to share in prosperity. A clean environment for the inhabitants, a society that sustainably deals with the raw materials that the earth offers. Where the back of each chain will immediately become the front again because of the circular ambitions." (NVRD 2017, 5). To support citizens in their daily life with the transition towards circularity there are coaches to help residents with the handling of their waste.

The Dutch government has chosen a clear course in achieving a circular society, namely that of separating the waste. The third chapter will focus on implementing this course, but first we continue on the path of waste transitions, as defined in the previous chapter. Which current waste transition are we in at the Netherlands? This question is elaborated by one of the ambitions in the transition, namely becoming a circular economy. How did the motivation come about, and what does it means to be circulair? I will argue that it necessary to research who is related to

waste, in order to come to an understanding of the scope of a circular economy. A number of parties are explained on the basis of their responsibilities within the Dutch waste system such as the government, municipalities, designers, consumers and the business community who are being held accountable for their responsibilities in becoming circular. Even though there is consensus within the waste world that the future lies in closed material cycles, during the unfoldment of this new circulair system friction takes place. This contestation of circular economy is occasionally touched on, chapter three goes deeper into questioning the course of circularity by looking not only at who is involved in the chain, but unraveling some mutual relationships between actors in movement. But first, what transition are we in now?

Developing ideas towards circularity

Not so long ago our society was mainly based on closed cycles. Re-attempting to close cycles after the consumption and production growth of the post-war decades has also been a social and policy theme since the 1970s, but until recently it only achieved marginal effects and hardly led to the prevention of waste. Gradually, the movement begins to close recycling cycles, use of other materials, reuse of raw materials and products, however, to gain substance. Nowadays, under the denominator of 'circular economy', these types of concepts and initiatives are part of a wider turnaround that seeks an economy that operates within ecological boundaries, in which streams of raw materials retain their value and in a broader sense positive economic, ecological and social value is produced (van Raak 2004, 18).

As a precursor to circular concepts, policy principles have been formulated at the international level about preferential treatment of waste since the 1980s. The *Lansink Ladder* is the best known in the Netherlands: 'prevention, reuse, recycling, incineration, landfilling' (Wassink 2007, 104). Other similar sequences are: 'reduce, reuse, recycle', or the EU waste hierarchy: 'prevention, reuse, recycle, recovery, disposal'. These concepts give a clear preference for closed material cycles, but do not have the inherent aim to eventually reuse or recycle all material. For example, in the Netherlands under the Lansink Ladder for two decades, there has been the transition from throwing waste in landfills into burning waste, a process that is used for the generation of energy.

Subsequently, chemist Braungart and architect McDonough (2010) developed the philosophy 'Waste is food': all materials are and remain nutrients, either technical which circulate in the technosphere or biological which circulate in the biosphere. With the publication of their book '*Cradle to cradle*' they putted the idea of the 'positive footprint' on the agenda: beyond minimizing the environmental impact in the cycle and allowing every product and every cycle to make a positive contribution. For example, 'upcycling', which means improving products during recycling in quality and purity, or buildings that add natural habitat and flora through their facades and roofs. Cradle to cradle is a design and certification process that fundamentally reconsiders products, starting with the molecular composition of materials and ending with the disassembly and reprocessing of products. Certain materials are carefully designed for reuse, so different materials are not mixed. It is therefore in this philosophy that the producer of a products often takes back products, instead of the public waste organization. The concept of cradle to cradle is supplemented with that of industrial ecology. Here the focus is strongly on the exchange of flows between industrial systems in 'industrial ecosystems' (McDonough and Braungart 2010, 154). The by-products and waste products from one industrial process form the input for an industrial process elsewhere closed cycles. As a design philosophy it has been applied much broader than industrial exchanges alone.

A successor to the practice of old school "reduce, reuse, recycle" is the the much-hyped circular economy, a more ambitious, and more marketing-friendly, rethinking of how product materials and packaging can be cycled back into supply chains. It is developed as a concept by MacArthur foundation (2013). The circular economy builds strongly on the concepts mentioned above. Circularity implies the capacity to retain resources used throughout value chains while causing zero impact on the environment, so the aim of a circular economy is to "limit the flows of materials and energy into and out of the economic system at levels that in principle can be tolerated and sustained indefinitely by nature, whilst protecting the capacity of the economic system to create wealth" (MacArthur 2013, 7). In a circular economy, the economic and environmental value of materials is preserved by keeping them in the economic system for as long as possible, preferably by lengthening the useful lifetimes of products formed from them and, when lifetime extension at product level is no longer possible for environmental or

economic reasons, by looping products back into the manufacturing process so their constituent materials can be reused.

The notion of waste no longer exists in a circular economy because products and materials are, in principle, reused and recycled indefinitely. In that sense the circular model looks beyond the current "take, make and dispose" extractive industrial model. It follows that product lifetime extension, not instead of but in addition to materials recycling, and the ability to create, deliver and capture economic value from long or extended product lifetimes are essential to a circular economy (Hollander 2018, 3). To keep things simple the concept of circularity is often simplified to that of recycling, but recycling is not enough to create to a circular system. In itself recycling standards disregard resources lost in supply-chain operations. Due to this focus, you lose sight of the waste that has been created in the production process (Mos 2018). In a circular economy waste is completely designed out, the whole system should be restorative and regenerative. All consumed materials are nutrients in an interlinked cycle of both production and use (Schulte 2013, 2). Recycling in itself disregards the impact of materials used, as within a circular economy is strived to keep scarce resources available to future generations (Mos 2018). Here the quantity of materials recycled is not just at stake, but foremost the the possibility of reuse of *each* raw material, as for example especially the little and scarce golden bits inside a smartphone. Circular economy is in that sense based on an infinite use of materials (Blonk 2018).

There are numerous models online of the explanation of the concept through beautifully drawn cicli. But real examples of circular economy, designed by man, are hard to find, because an absolute circular economy is not yet a reality (Hollander 2018, 214). It requires quite some energy and to down-cycle and recycle is more easier than to up-cycle. Nowadays down-cycling takes place more often, for example with plastic that cannot be used again for food packaging due strict regulations, and quality los in the use. The more often a material is reused, the fewer opportunities there are to give it a new function, until a material becomes obsolete. This is in contrast with how nature deals with circularity. Within the concept of circular economy there is no such thing as a byproduct, of a manufacturing process that goes to landfill. Everything is used by someone or something else. At the end of a products life it should be used as something else,

which is called *upcycling*. Eco-systems upcycle all the time. You got a log on a forest floor, and those materials move up into the body of the fungus, those materials move up into a mouse, and that mouse material moves up into a hawk. So, when we want to upcycling materials in our cities nature provides us with great examples of circularity.

Circular economy has become the buzzword used by government, companies, as an alternative for expressing ambitions to become sustainable. This concept is motivation, or a dot on the horizon in the government-wide program 'The Netherlands Circular in 2050'. As part of this the VANG objective has been initiated to reduce the residual waste per inhabitant (Potting 2017, 14). Together The Ministry of Infrastructure and the Environment, the VNG, the NVRD, and Rijkswaterstaat made targets to move from 250 kg to 100 kg residual waste per inhabitant per year and 75% separation of household waste in 2020 (Framework Agreement Packaging 2013-2022 2013). Behind these goals are the ambition to reduced consumption of natural resources, sustainable resource extraction, and security of supply of resources; to create less waste, less emissions, more natural capital; and to create more earning power, more jobs (IenM 2013). As is hidden in the word 'ambition' we are not there yet in getting circular, waste is not yet a resource that is constantly upcycled. It requires effort and close collaboration between different parties to become circular, in a way that different parties can flourish in an ecosystem. Various organisations and people concerned with the ambition of turning our economy into a sustainable, fully circular economy a route mapped out to a society that exists without waste.

The larger story about a circular economy may be far away for many municipalities. At the same time, this transition also requires smart interventions in the short term and the use of opportunities to achieve a desired acceleration. An intervention in this context can for example be the introduction of new legislation, as by making the producer responsible for the waste processing. Another interventions is about directing the behavior of citizens in their material use. Various behaviour interventions are introduced to reduce the amount of waste per residence and/or to improve the quality of waste separation. In the movement towards a circular economy different parties take responsibility such as the consumer, the producer of waste as designers, sometimes directed by the government. In what follows, I will outline a few situations that can be considered as examples that illustrate the relations between these parties and waste.

Responsibility of the producer

Achieving a circular economy strongly depends on the duty of the business community (MacArthur 2013, 7). One way to address this group is through legislation, as laid down in producers responsible. The 'producer responsibility' is the idea that a producer is responsible for the entire cycle of a product, not just the production of the product (van Raak 2014, 11). Although this is mainly seen as an economic and moral obligation because the producer also gets the profit that arises in the production, in principle it causes price incentives for the producer to design for the waste phase where he also carries the costs. In the practical elaboration, this means a legal obligation for a number of material flows to either organize the recycling and reuse itself or to bear the costs for the public implementation, and of course combinations can be envisaged (van Raak 2014, 19). Both at European and national level, legislation stipulates that the producers of packaging materials are responsible for the collection and recycling of packaging waste.

The producers must ensure both financially and organisationally that a fixed percentage of the quantity of packaging placed on the market per type of material is recycled. The Packaging Waste Fund (Afvalfonds Verpakkingen) acts on behalf of the packaging industry and has various tasks. These tasks are financed from the waste management contribution paid by packaging companies. This also reimburses the costs for the collection and recycling of packaging to the municipalities. Due to the legal obligations, there are high recycling percentages realized in the Netherlands in packaging chains (Rouw 2011, 1), and in this sense actively contributes in steps to become a circular Dutch economy. The exact obligations of the packaging industry are stated in the Packaging Management Decree 2013 (Besluit beheer verpakkingen 2013). The agreements between business community, municipalities and government, and the goals that result from this, are laid down in the Framework Agreement (Raamovereenkomst Verpakkingen 2015). The tasks and goals of the Packaging Waste Fund also arise from the Framework Agreement.

At the moment, the packaging industry pays a levy per tonne of packaging put on the market to the new Waste Fund. In addition to a general amount of 2 cents per kilogram per

packaging material for, among other things, device costs, litter control, every type of material costs a surcharge for specific costs (van Raak 2014, 35). For plastic this is 37 cents per kg. The Waste Fund finances the transshipment, sorting and marketing of plastic and the compensation for collection from municipalities. Not all tasks and goals are carried out by the Waste Fund itself. Activities, such as the separation, collection, reuse, prevention and registration of packaging waste, are assigned to other organizations, such as as Nedvang and Nederland Schoon. For the sustainability of packaging, an independent foundation has been set up: the Knowledge Institute for Sustainable Packaging (Kennisinstituut Duurzaam Verpakken). With post-separators, people pay for the sorted product actually delivered to customers. In this situation municipalities will bear the costs for sorting, and possibly costs/benefits for further processing, and will be reimbursed for doing so by the Waste Fund via Nedvang, who supports municipalities and companies in the process of separation, collection, reuse, prevention and registration of packaging waste. (van Raak 2014, 19).

Even though rules and regulations are made to stimulate the recycling of materials, that is not enough to achieve the desired circular economy. As described earlier recycling in itself is not enough in becoming circular. Besides that recycled materials compete with alternative materials streams. When the oil price is low, it is cheaper to make new plastics, called *virgin-materials*, then to enter into the process of recycling. While recycled materials have a reputation of being cheap, the process of recycling can cost a lot of energy and thus money to realize. A higher level of circularity of materials in product chains means that there smaller amounts of natural resources are needed for the production of virgin materials, so the avoided material production benefits the environment. In practice another challenge is that increasing the circularly of one product chain may lead to *less* circularity in another (Potting 2017, 2). Here we see an interwovenness between different material streams that work together or counter to a circular economy

Various reasons makes it challenging at the moment to recycle plastic. Even though companies like to brand their packaging as sustainable, this is not (yet) always the case. For example a popular soda-company merchandise their bottles as 100% degradable. Even though it is possible to recycle the bottle, it does not mean that the company actually does it. At the

moment only 40% of the plastic used in the bottle is recycled (Hopewell 2009, 2119). In order to be able to completely switch to a system in which the bottles are recycled, it is necessary for the producer of the bottles to have a constant supply of used bottles. Unfortunately those flows are not (yet) as constant as those of the supply of oil, it takes a transition into a system where different parties provide for the transmission of raw materials. In order to create a system where such a flow yields profit, investments are at first made in behavioral change among consumers in the field, as with the separation of waste. As soon as enough flow of material are in place to actually make a profit with it, investments are made to realize the recycling of the material. The perception of this system by consumers is dealt with in chapter three.

The agreements between business community, municipalities and government about packaging is now focussed on the quantity of the material, and not yet on what kind of material it is. For example chips bags and most coffee bags have an aluminum coating on the inside. Such bags are easy to separate for recycling machines, but can not be processed. These bags crackle after use in the fire, in order to generate energy. The aluminum can not be separated from the plastic due the too thin layer of materials. During an interview with an employee of Rijkswaterstaat, he told me that there are laws coming up to make the producer responsible also for design of the packaging. Not just by taxing the amount of packing, but also the amount of materials used. When a product is designed in only one material or in such a way that the various materials can be separated easily that will influence the price paid for the packing. Similar agreements or regulations are examples of how the government is taking care of the circular economy through different measures. This way, rules and laws are changed in favor of the circular economy and entrepreneurs who saving raw materials. The measures are focused on laws and regulations, smart market incentives, financing, knowledge and innovation and international cooperation that stimulate a circular economy (IenM 2016, 3).

Responsibility of the consumer

Not just the producer are taken responsible for the reduction of waste, also the consumers. In the next chapter I will focus how citizens are held accountable through the expansion of the waste separation system. Another example can be found in the introduction of DIFTAR, an

intervention to stimulate citizens to offer less waste. DIFTAR, meaning 'differentiated waste tarifs' (GeDIFferentieerde afvalTARieven) is introduced in various municipalities, like recently done in the municipality of the clean neighborhood coach used in the introduction of this chapter. DIFTAR stands for differentiated rates, where per household the amount of waste is being offered and the more waste a citizen offers, the higher the waste tax will be. Conversely, better waste separation and the offering of less waste results in a lower variable waste tax, but the standing right remains the same. In 2006, 17,4 percent of the Dutch live in a DIFTAR-municipality. In 2000 that was still 9,7 percent (van Raak 2014, 17). Experience shows that citizens offer their waste better separated, and the lower supply of residual waste makes it possible for the municipality to recoup the costs incurred for the introduction of the DIFTAR. However, the amount of household waste left on the street and other places increases. Nowadays DIFTAR applied about one third of the municipalities in various forms, these are more often rural communities outside the Randstad; but medium-sized municipalities also achieve good recycling and financial results with DIFTAR. The number of DIFTAR municipalities is rising slowly, and conversely there are hardly any municipalities that abandon DIFTAR (Hoeben 2009, 8) 5. DIFTAR improves the ratio between residual waste and separate collection: both because citizens separate better an effect that is very strong visible for plastics. Also because the total quantity of waste offered decreases, especially the vegetable waste componen). Where the waste remains is unclear, but factors are home composting, changed purchasing behavior citizens, rejecting industrial waste or household residual waste that flows with business flows, and waste tourism (van Raak 2014, 26). DIFTAR is not undisputed, precisely because of the fear that waste ends up in undesirable places van (Raak 2014, 18). The question is here who is responsible for throwing waste on the street, is that no the consumer? And what if we could reduce the amount of waste, for example by reducing packaging that would ask a radical shift in the supply chain as a redesign of various products by designers.

Responsibility of the designer

"Waste is design gone wrong", as stated by a student of the Royal Academy of Arts Andre Fischer (2015, 1). Design has the potential to contribute significantly to achieving the goals of a

circular economy because the design of a product directly affects the characteristics of the physical product as well as the structure of the entire value chain (Moreno 2016, 11). Design is a professional practice that exist between crafts and engineering, a practice that enrichiches the weaves that bind people and their environments (Anusas and Ingold 2013, 58). Over 10,000 years humans have been remarkably successful at envisioning and instigating change in attempts to improve the human condition. That makes design *future oriented,* which that process of design decisions are made that deliberately as undeliberately effects life after use. In order to increase the likelihood that product lifetime extension in a circular economy will be successful from both an environmental and an economic perspective, people who design needs to be able to control both the temporal dimension, related to the number and duration of product use cycles, as the duration of the total product lifetime. In designing a circular system there is a segment of industrial design in the creation of products and systems intentionally of additional responsibility of balancing economic, environmental and social aspects, with the goal of fostering and safeguarding lasting human well-being (Tischner 2001, 121). To do so design requires an added value for economics, therefore, a circular economy requires a strong degree of coordination across the cycle through integral design, chain management and coordination between market parties. It is precisely this integration over the cycle that differs from earlier policy to close loops mainly by 'end-of-pipe' solutions where the recycling was mainly achieved by the waste chain. Better closing of cycles requires an ever-increasing integral design and system innovations over the cycle and thus the organization of production and waste processing. So it is not an easy job for people who have to design a circular system. The more ambitious the goals, the higher the level of integration needed; and the more and faster the focus on high-quality recycling comes, the higher the level of integration (van Raak 2014, 12). It is quite a challenge to design a circular system within many partners in society that are responsible and material flow.

Together towards circularity
It requires tuning between different links in order to achieve a circular economy, with a responsibility for designers, as government local as national, company's as citizen. Even though concrete examples of circularity are hard to find, the steps to achieve a circular economy have

been set with goals with intermediate steps that often focus on recycling. As recycling in itself does not close the circle, the use of recycling can be seen as an iterative process towards circularity. The same iterative process applies to the introduction of the concept of circular economy. This chapter shows that it is built on developing ideas about how to deal with the environment and with waste. As also described in chapter one, certain scandals, or example about soil contamination, cause to ensure that views on the environment become widely supported in a society. As a result, concepts such as sustainability, recycling and cradle to cradle could emerge, all of which contributed to the widely supported vision of realizing a circular economy in the Netherlands.

Within a circular economy there is close collaboration essential with all partners in a chain, to really close loops. These relationships are needed so all can gain by each other's actions, as the material or behavior produced by the other. Therefore, in order to understand how the waste transition is going, it is important to look not only at the different parties involved, but also at their mutual relationships, and that with materials considered waste. In the past two chapters, a large number of parties, their responsibility and ambitions have been mentioned from the perspective that each them is in a transition. We know where we came from in our waste management and it is described which direction the waste transition wants to move. The question now is how the relationships are between the various parties, connections that ultimately determine whether waste dissolves in (raw) materials for the next user within a closed circle: a circular economy. But first we look at these relationships, there is an intermezzo on some other relations, namely by which this document came about. This will be done by substantiating how I arrived at the information obtained and explaining the methods, it will become more clear why the specific role of design has been described, but also what information the following chapters are based on.

In accordance

In the moment you start researching garbage you become aware that it is widely represented. You do not need to travel far to research waste, since household waste has to be put on the road regularly, to prevent the fruit flies from taking over the house. Waste, it is at home, it is on the street and it is a subject that everybody has something to say about, because everybody prodocus it too. However, there is relatively little anthropological research into waste in the Netherlands. A reason for this is given by the Anthropologist Laura Nader (1980, 303) that within the traditions of Anthropology there has been an emphasis on researching minorities, and exceptions as described by the Anthropologist Laura Nader: "Anthropologist have favored studying non-Western cultures as a way of fulfilling their mission to study the diverse ways of mankind". I share that fascination for the exception, which will come back in chapter four through interviews with the front-runners in the waste transition. However, I think there is also great beauty in what seems so obvious, that waste is put on the street and picked up without any surprise. So, to study the sociocultural complexity by which waste is constituted can be initatatly be done by without leaving your street, it can be done at home.

The word *'home'* can incorporate many meanings. The Anthropologist Jackson (2000) gives in each chapter of the book *At home in the world* variations on the definition of home, as the experience of what is considered home develop and vary per person. Such variations can also be found in the definition 'anthropology at home'. 'Anthropology at home' generally means that anthropology is done in the social context that produced it, according to Anthropologist Marilyn Strathern (1987, 1). So the question here what is the home of the researcher? That is an open door to allow for something more personal where I have done my research, and which has influenced my research. For me Anthropology at home means doing research in my country of birth, which is a place where I speak the native language and have direct access to the field of garbage, already by making a cup of tea. At this very moment my home lies in the province of Utrecht, located in the middle of the Netherlands, where the research took place within this provision. But home is also about the people and the ideas you surround yourself with. That is what this intermediate chapter discusses, together with an amenability of the methods used.

Before I started the Master's 'Cultural Anthropology: Sustainable Citizenship', I obtained a bachelor's degree in design. My background surely determined a bias in naming design as a solution (and problem) towards a circular economy, as described in chapter two. After graduating I started studying in social sciences, partly driven by the work I did as a design researcher. The company I worked for has carried out research into waste separation for various clients over the past three years. During my fieldwork, I continued to work there 1,5 days a week, on projects that are related to transition, but not specifically to waste.

So fieldwork started, and information had to be gathered. What better to start at a place with direct access to people who are in the topic? So, as part of the research I interviewed my colleagues and observed what is being discussed about waste and how waste was dealt with. My colleagues where informants who introduced me to their network of people in government working on waste policies. This method – when a researcher gets accesses to informants through contact information that is provided by other informants – is the so called 'snowball sampling'. The process is by necessity, repetitive: "informants refer the researcher to other informants, who are contacted by the researcher and then refer her or him to yet other informants, and so on. Hence the evolving snowball effect, captured in a metaphor that touches on the central quality of this sampling procedure: its accumulative (diachronic and dynamic) dimension" (Noy 2008, 330). At this company I have been able to conduct various interviews and observations as well gained access in the network of the design agencies. But to look broader than that, I also approached other parties on my own initiative, whose involvement in the waste transition intrigued me. During fieldwork I conducted various interviews, did participant observations to the point that I could no longer leave the house without being constantly aware of all the waste around me, and I followed the news about waste in the past six months. All this information together has led to this thesis.

At first I aimed to research the so called 'diagonal slice' (Nader 1972), to link the micro- and macro-politics and see how they relate to each other in the handling of waste, mapping out the different parties involved in waste. During this investigation it quickly became apparent that too many parties, persons and organizations were involved to investigate the entire waste chain in three months and to make a accurate horizontal slice. I could have opted for a demarcation

here, by focusing in my research on a certain type of waste. I have chosen not to do that, because the delineation for me was dependent on a search for the normative in waste, who determines what is seen as waste and what determines this? As I argue in this thesis, the answer lies in the width of relationships, and this is precisely expressed in micro-moments. In order to gain a better understanding of the many connections. The research has shifted to the identification of the waste transition that we are currently in, therefore I was able to use a lot of the interviews and observations. I have verified and checked statements in interviews and websites, and in order to guarantee the anonymity of the informants, and to triangulate the data, I have often referred to literature that confirms their statements, instead of quoting them. The vignettes that contain stories of the relationship between people and waste are all anonymized. Each story contains their bias, personal opinions on waste, which touches on the main argument in the core, that waste is relational. I informed my informants that I was conducting research, both at the beginning of my research, as well as during interviews, but in a conversation with a colleague I was asked if this was sufficient:

"So are you also doing research on us? Or on me, at this very moment?", my colleague asks. I explain to him that I indeed write down all the information I hear which could possibly be useful. I keep my ears and eyes wide open, as soon as anything on waste is discussed. However, the colleague is not very amused with my reply, as he would rather give his explicit agreement instead of not knowing that his conversations are being tapped. In other words, he wants me to inform everyone that he or she could possibly be quoted in my thesis. Although I agree with my colleague, this raises the questions: how, and when?

I explained to my colleague that, at the beginning of my fieldwork, I informed everyone during a meeting that I was conducting fieldwork, but my colleague responded with saying that he was not attending that specific meeting, so how could he know? I explained that I prefer to ask people permission on the moment I am sure that I refer to a specific situation or conversation in my thesis. At that point in time I can also ask whether or not I interpreted their words correctly.

We did not agreed yet, and he advised me to record written consent within a working setting. The conversation ended there, and I thought of it many times, surprised by how ethics is woven into everyday life. In the conversation I had with my colleague we both had good

arguments on how to deal with consent. But in the rough practice of everyday life it is a search on how to apply these arguments. Now, a few months later I asked my colleague permission to use this conversation in my thesis, to illustrate the challenge, but also to create transparency in the relation I have with the persons in the field, and how that affects my data and analysis as well.

To conclude, doing research at home has certain benefits, you speak the language and there is direct access to the field, which makes it accessible to gather information. At the same time, anthropology at home brings challenges. There are certain things that easily are considered as matter of course, because of this already acquired (relevant) knowledge can easily be overlooked. Understandable, I have not been very aware of this myself. But to prevent me from overseeing the obvious, I interviewing various people and asking open questions as checking my interpretations of data. That still resulted in regular moments of wonder, accompanied by the feeling of not getting grip on the Dutch waste system which seems to be expanding in terms of involvement. A greater challenge in doing research at home is the ambiguous division between doing research and your daily existence. An example has been described in the questions about ethics. But also in emotional overload of information can be challenges. Because you do research at home, the flow of information does not stop at the writing stage, after the fieldwork, it keeps on going. There is so much more to write and research about waste, but everything in its time. These follow-up directions are mentioned in the conclusion. First the research is continued in a discussion about waste separation: what does this discussion tells us about the waste transition we are in? Lets unravel starting with a conversation that took place at home, which literally means here, the place where I live, my student house.

Chapter 3: Relate and separate

It is four o'clock in the afternoon and I am drinking coffee in the living room with my housemates, with a view on the backyard garden. The colors of the various trees in bloom indicate the time of the year. Blossom drifting, leaves, and ideas are popping in the air. It is quite an extraordinary view, considering the location of the city-center environment, just a few minutes from the train station.

Hanging on the coach, staring outside, Linda puts out the question. "Ruben, you have done all these interviews about waste, right? So, what happens with it it after collecting?".

In a sip, my coffee was gone, when I felt that an appeal was made to an anthropological analysis. *Crap*, I thought, how to answer this question in a one-liner? "So, what makes you wonder"' I replied, to win time to formulate my answer.

"Well, we collect so much waste in our house, that I was thinking to arrange the separation of plastic, and green-waste. But there are all these stories going around that it doesn't make sense to collect separately, which made me wonder whether or not we should keep set apart various waste streams."

I explained that it is not easy to answer this question, it varies by the type of waste and municipality. "What happens with our garbage is arranged locally. So, I can not tell you exactly what happens in our town, as it depends on the contracts the local government made with collecting-services and incinerators. The intention is to recycle and to get a circular system by 2050, but we are not there yet. The way our collecting system is organized is changing. And we are not even speaking about how either the collective or separate collection of the waste can vary per district".

"Those variations I noticed", Linda explains, while pointing to the garden: "we have to put all our different types of waste in one underground container, while the people around the corner place various garbage containers at the street, once a week." She continuous with saying that it is of course very easy to put all our waste together: "but I do not mind bringing a container once a week from our garden, if we can do good for the earth, but only if it is really meaningful".

As described above, there is haziness about the separation of waste. In the last few years there has been changes in what is asked from citizens concerning the separation of waste. Media is popping up questions: Does it all make sense to separate waste? Does it not all get burned up in a heap? Is it more effective to separate the waste after the collection? There is a 'seperation war' going on, according to one of my interviewee. Meanwhile there is a lobby for different ways of dealing with waste: pre- and post-separations.

In this chapter various arguments are set out for both methods. But not only the separation of waste is here at stake. Also the separation of facts from fables about waste is interwoven into this chapter. This chapter starts with describing various ideas about what happens to waste, the so-called waste myths. The design company I am working for have mapped these myths in collaboration with the Ministry of Rijkswaterstaat. Rijkswaterstaat is the executive organization of the Ministry of Infrastructure and Water Management that works on a safe, livable and accessible Netherlands. These myths are placed into context, by adding stories on how garbage is dealt with in the Utrecht. By connecting these myths to the interviews I held and my observations on the street, I confirm that they indeed are myths on one hand, and on the other hand I question whether there might be a truth in it, reflecting various movements of the current transition in which our waste management is reconsidered.

In this whole waste transition are many people involved, who all determine what waste is and how it is handled, both now and in the future. The way such dialectics are going within a transition seems to be determined by the relations between different parties and the materials which both can be considered as waste as a valuable raw material. After discussing the myths, which uncover some of these relationships between government, citizen and waste collection system, and after describing the division in waste management, this rapture will be used to describe relations. I argue that relations determine how our current transition looks like. This is deepened by entering into a dialogue with the Anthropologist Tim Ingold (2011, 69-70), whom stated that "things are their relations". Likewise I will argue that waste is relation; that waste transitions are relations. By comparing how both of us came about this conclusion, we will also discover nuance differences what we see as a relation. He describes life as as *meshwork,* a relational field of interwoven lines; in defence of the description of life as a network with

interconnected points by Latour (2005). But first we look at how the waste system is organised in Utrecht and what myths around waste separation have arisen.

Variating waste streams and systems

An orange bag with the logo of 'Plastic Heroes', filled with cans and yoghurt packaging is planted by the tree next to the road, waiting to be picked up, together with of the waste of the neighbours of last week. Their yellow closure ribbons up like the ears of a hare. Now that the bag is outside, the job is done for this week: the various materials are as good as possible separated. Regularly it is a consideration in the kitchen in front of the rubbish bin with the various compartments: where does it belong? Does it belongs to the residual waste, or to the bag of Plastic- Metal- and Beverage Packaging (PMD)?

Most plastics can be placed in the orange bag, especially those of foodpacking. This specific separated waste stream is paid by the companies that have produced the plastic packaging, and thus by the consumer who buys the products. In addition, companies that make plastic packaging from products made from the bathroom do not pay for this collection form, and so this packaging is not allowed to participate in this waste stream (TNS Nipo 2015, 3). To figure out how to separate in your own municipality, the website Afvalscheidingswijzer.nl can be consulted, which shows what the intention of the waste separation industry is. Some municipalities deposit clicks with the residents and the different waste streams are collected in a bin. In other municipalities the PMD has to be in a purple bag, sometimes in the before-mentioned Plastic Heroes bag or green bags with yellow ears. In some cities you need to pay taxes through the high rates for these bags, and in other cities available free of charge. "My mother distributes these Plastic Heroes-bags at family gatherings" as one of my colleagues shared. As such, whole networks erupts (within families) to distribute free trash bags for plastic from a municipality where they are free to paid municipalities.

Collecting waste in a municipal manner has its advantages, but also has one major disadvantage: national communication about separating dirt has limited usefulness. To find out exactly what you need to do, you have to read the municipal leaflets and websites. The garbage men appears to get rid of the waste with more ease. Hop, a swing and there it goes on the

garbage truck. From there it seems to be unclear what happens to the waste. Where does that garbage truck go with that bag, after disappearing around the corner? What happens to the waste after collecting? Will it, as you often hear, end up in the furnaces of waste incinerators? And if it is already being processed, what is then made of waste? These questions lead to various stories about waste, some might be rubbish while others sounds very convincing.

I. Waste of money

Until a few years ago, waste separation was a matter of keeping paper separate, bringing bottles to the bottle bank, bringing batteries to the bin in the electrical store, and throwing green waste into the right click. Plastic and drink suits ended up in the residual waste. But since a few years, that has also been collected separately. As described above the separation of waste can happen in various ways.Between the variety of waste collection methods a counter-sound is heard: waste collection does not make any sense and it is a waste of money.

As described in the first chapter of this thesis, waste collection started as a prevention to health and environmental problems: the waste had to be removed from the street. The collection of waste also entails the necessary costs. Solutions to earn money through the separation of waste were already found in the past. As for example bones were collected to produce glue. Residual waste was made into compost, which also generated money. In our current transition circularity has become an important motive in separating waste (IenM 2016, 3). By separating our waste precisely, and recycling all useful materials, responsible is taken to extend the use of scarce raw materials, with environmental benefits. Separated materials such as paper, textiles, glass and metal all have an economical value. Compost is made from vegetable-, fruit- and garden- waste and it produces biogas and heat. This is therefore less expensive than when GFT is incinerated. With plastic, it is a challenge to further improve the quality of the collected plastic so that it becomes more valuable after recycling.

Many waste streams, especially plastics, have a negative value at the moment. Burning it currently provide the most economical profit. Energy is generated through the incineration of waste. At the same time, the raw materials are lost, which on a long-term can be a waste of money, and is far removed from the circular economy as aimed for by the government. "We are

working hard on that", argues Rijkswaterstaat (2018, 1) on the waste myth cards '*The sense of waste separation (... and the nonsense you sometimes hear)*'[2]. Consensus based this is done with the business community and municipalities to discuss to finances the recycling of plastic, among other things. When the quality of the collected materials is as high as possible, the value increases. If the waste is placed in the right container, it increases the quality of the collected materials. So, one waste stream yields more than the other, but municipalities where residents best separate their waste pay the lowest waste tax (Rijkswaterstaat 2018, 1).

An example of a waste stream that is not yet profitable is the one of diaper recycling. Currently, most diaper- and incontinence material is burned. Nonetheless, in the transition to circular material flows, diapers are collected separately in some municipalities. Diapers consist for the most part of SAPs (Super Absorbing Polyacrylate) and fluff pulp (including paper and plastic components). These substances are valuable because of their material properties. However, diapers can also contain a large number of additives used in the production of the SAPs or other raw materials. SAPs are poorly broken down when fermenting or composting or when they end up in the environment. Although SAP is not directly toxic, little is known about the impact of this in the soil. Also medicine residues in the diapers can not be excluded. Because of the competition and the not yet profitable recycling chain, there are still no machines to convert used diapers into raw materials (Spijer 2016). So in the case of the diapers, money is not yet the motivation for waste processing, but objectives towards a circular society.

While Rijkswaterstaat on one hand labeled the idea that waste separation costs money as a myth, it also confirms that this is true. The answer seems to lie in the variety of waste streams, where one stream is currently more valuable than the other. The system that the municipality offers in waste collection, as well as the consistent separation of citizens, as the demand for the materials in the business sector, they are all related to the value of garbage.

II. Post-separation is the solution to the waste problem

A question that generally arises is "Why can I not just put all my waste together in one bag? And that machines then disassemble everything and recycle it?". This question is accompanied by the

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[2] In Dutch: 'De zin van afvalscheiden (en de onzin die u wel eens hoort)'

myth that post-separation would be a upshot in the collection of waste. Whether or not it is a solution is more easy to interpreted by looking to what happens to all that waste that is so diligently separating, as described by Gerard Reijns (2018), a journalist at the Volkskrant:

Hysterically it snaps into the mountain. Bags tear and fly around. Occasionally, the machine picks up a tarpaulin from the waste mountain, as if that gripper had become a pair of tweezers. Or a meter-long barrier tape. A raincoat. A crate. All objects that, when the rubbish goes into the maze of conveyor belts, can cause disruptions. Then the excavator throws its arm deep into the stinking mountain, and throws a grab full of garbage in the bunker that does the supply to the first of a series of dozens of conveyor belts. A machine cuts the bags open, and there goes the stream of red, blue, colorless, black, green and white, from tin, from plastic in a hundred varieties and from yoghurt and milk packs, all of them now, the roller coaster of the sorting system. The first machine sorts the whole stream to size, so that the whole big pieces are out. Then on to the magnet that the steel cans fish out. A little later the aluminum cans and the same foil are the leap: with an electromagnetic field they are removed from the stream. Within an hour the mass is broken down into seven mountains of tin, cartons, four kinds of plastic and a mountain 'mix', or mixed plastic. In the press, steel wire around it, and the stuff goes seven ways, to be processed into real products (Reijn 2018, 1).

Both post-separated waste as source separated can be put in to process of the described machines. Post-separation technology can extract a number of materials from residual waste, such as metals and plastics for recycling or GFT for energy recovery. One argument for post-separation is found in the quantitative potential of this option. The amount of recoverable plastic are access to the amount of plastic in the waste increases by machines. As with source separation only part of the plastic is separated by citizens' behavior (Wassink 2004, 21).

An issue could be the quality of the source separated PMD. That appears to contain more and more "disturbances": other plastic and other waste. This causes problems for the sorters. When a 'fault' is stagnated in the separation process it takes time. As described in an interview with a manager Steeghs of SUEZ: "This only concerns packaging plastic, but people throw everything in." Toys, tarpaulins and barrier ribbons regularly cause congestion. Old video- and sound tapes are hanging from all conveyor belts, making the appearance of a long beard, and

nothing can be done with them. It takes at least ten minutes before a man in orange suit unhooks the tray, and the rollercoaster restarts (Reijn 2018, 1).

Proponents of separation at the source often also mention the quality aspect. Pre-separation produces slightly cleaner and therefore better recyclable materials than post-separation (Rijksoverheid 2018, 10. The valuation of post-separation depends strongly on how one appreciates source separation as an alternative; how important one finds high-quality recycling, and how one defines 'high-quality' and the expectation that one has about the technological development of this way of handling with waste. For the highest possible recycling paper, glass, textile and vegetable, fruit and garden waste (GFT) must be separated at the source (in the house, on the road, in the canteen, etc.).

Because municipalities each have their own context (as varies in high and low-rise buildings), and therefore have their own reference point in achievable source separation performances, the comparison between source and post-separation for different municipalities can vary (van Raak 2014, 71). Looking to the future, it is difficult to predict whether post-separation will improve technological in such a way that it performs better than source separation, or that the increase in the response to source separation will ensure that source separation surpasses the quantitative performance of post-separation. Here too, the differences between municipalities will be an important factor in determining the preferable system (van Raak, 29)

So, the type of home and the location determine whether it is accessible to separate waste at home or afterwards with a waste processor. Poorly separated waste has an impact on the quality of the material, but also on the quality of life of the employees at the separation plant. As fellow laborers prick an average of once every two weeks to a hypodermic needle between the separated plastic, partly due to the increasing care at home (Reijn 2018). From this whole discussion you can see how an entire system is connected to each other in determining the value of the materials in the waste

III. Let no company join together, what has been separated by man

Another idea circling around is that at the end everything is going together on a big pile of waste. Rijkswaterstaat (2018, 2) argues otherwise: "Separated waste remains separated". They state that anything that is handed in separately and collected by the municipality will remain separate. The collected materials are reused where possible because that provides a lot of benefit for the environment. An addition argument they give that is mentioned before is that recycling reduces the costs of waste collection and processing. As so, it would be crazy to put precious resources together again instead of reusing them. That would be expensive - for the municipality, and therefore also for the citizen (Rijkswaterstaat 2018, 2).

So, where does the waste-myth that everything goes in one heap comes from? If collected materials are badly separated, it can not always be suitable for recycling. For example, if there is a lot of residual waste mixed with vegetables, fruit and garden waste, or plastic, then the whole is unfortunately going to the residual waste.

The confusion that garbage is thrown together after seperating can originate from the modern garbage trucks. In a conversation someone said: "I saw all those different garbage bags thrown together in one garbage truck". That, of course, feels like you are being fooled, if you do your best at home to separate, and then you see that it is thrown together again. It then seems like different types of waste in one car get together, but from the street you can not see that there are separation walls within the container. However, thanks to handy separation walls, different types of waste can be transported separately in one car.

Waste collection services and government indicate that each waste stream remains separate and, are if possible, recycled. At the same time, some municipalities (and companies) communicate that, despite the separate collection, some streams still directly enter the incinerators. In the town Veenendaal you can deposit diapers and diaper bags at various locations in designated containers. A transparent bag is made for this, so that the waste processor can see that it contains diapers. A clean neighborhood coach showed me (and unfortunately let me smell) such a container, and said that the diapers are not yet being recycled. His municipality has opted for separate diaper collection at the time because of the environmental aspect (reuse) and as an extra service possible stench and space in the container. But at the moment, the diapers are not

recycled but are processed with the residual waste due to capacity problems in the market (ACV 2018, 1). It is expected that recycling will be possible in some time, for waste as the diapers, and therefore maintain the collection facilities. Despite the fact that recycling is not yet possible, people are working on an optimal compaction of the network of logistical hubs in the removal chain for diapers and incontinence materials (Aalders 2018, 1).

So, the intention is to remain materials separated, and to recycle them, and even to upcycle in the long run. However, in the practice of a transition, this is not yet realised. Stagnations, such as the joint burning of already separated diapers, can be observed in the movement towards closed cycle. This is a tension between the *now* and the *not yet*. It seems that waste collection and processing services are first stake for introducing the habit of waste separation for citizens. This creates the impression that these separate waste streams also remain separated and are processed separately. Of course that is the ambition to do so, but only after high-quality waste flows from are collected by which profit can be made, then investments are made to recycle the materials. Here we see that the intentions are there to become circular, but there is still a way to go in the implementation of the whole system. In chapter four we will go deeper into how this system of the now and not yet, is experienced by people that walk ahead in the current waste transition.

IV. A drop in the ocean

Another myth going around is that the little bit of waste seperated at home does not matter. When such a argument erupts, the question of course is for whom or what it matters? Such a statement requires context. In response to the argument, Rijkswaterstaat (2018, 2) provides for this by putting the household waste in perspective with other waste streams to argues that the separation of waste makes a difference. In a year time people throw away a lot of waste at home: an average of almost 500 kilograms per person per year. All households together account for around 8.4 billion annually kilograms of waste, of which more than half have of the waste has been handed in various waste streams. Not only at home, but also at the office, station or sport clubs people produce a lot of waste. Separating this waste also provides environmental gain through the possibility of recycling. Myths, like this one, are feeded through the comparison with

the wastestream of big companies: "I can do my best now, but the 'big boys' have a lot more waste than I do, and if they make a mess of it, then separating my waste will hardly make any sense". But, apart from the transition in household waste, there are changes in other sectors. In some sectors already 92% of the waste is recycled, for example in construction, 80% in the industry and 93% in agriculture. With only about 50% of recycled materials in households, this is a waste stream that may follow the example of the other sectors (Rijkswaterstaat 2018, 6) .

This myth is strongly interwoven with *motivation*. What motivates someone to separate waste, are this circular ambitions? Or is there something else? Who cares about waste separation and why? A strong example of this came to light in a gossip that someone told about a director of some of the aforementioned organizations. After a divorce, this man had a new wife, including a second round of children, as described in Dutch de *tweede leg*. The director's wife mentioned the multiple use of diapers and questioned if it was not possibility to do something with that to the director. This made it an agenda item, which turned into an ambitions for municipalities to collect the diapers separately from the rest of the waste. Whether or not the gossip is true is not relevant. It is a story that conceals personal relationships behind ambitions and legislation, precisely that motivate transition. As the diaper phase is a temporary phase in a transition from a baby to an adult, the urge of doing something with the diapers shifts out of sight as soon as the diapers are no longer used. The interviewee mentioned the significance of the coming together of this sense of responsibility with the position of power of the director at that time. This allowed him to easily address that what was experienced at home. While generally the diaper phase coincides at the beginning of a career, where there is less trade corrective to be able to directly address this for a wide audience who can anticipate.

So, relations with people around us motivate us. The story of the laundering is not isolated. Several examples of illness and scandals have been mentioned that motivate legislations on waste in chapter one. One layer behind this is that people are personally touched by the illness of a loved one. Here it is not the disease that is the motivator for legislation, but the *disturbed relationship* due to the disease (caused by environmental pollution). The significance of relations is further explained.

Relations

We have discussed four myths about waste, during the current waste transition. A recurring word, in how each myth is perceived is the word *relation*. By this specific word every chapter is linked, starting from the prologue, building to the argument that waste transition is relation. In the meantime the narrives found in the ethnographic data, on waste in transition change speak for themselves to indicate the meaning of the word. Still, I will summarize its definition here, and then enter into the debate with the Anthropologist Ingold, who also wrote about relations.

A *relation* is generally seen as an existing connection, a significant association between or among things. There is A and B and in the act of connecting they are joined together. In contemporary Anthropology, a popular concept of researching this connection is through mobility. Mobility is the movements of people (and things) all over the world and at all scale are, that are after all, full of meaning, products and producers of power (Cresswell 2010, 3). If you look at transitions from this mobility view on the word relation, point A would be the situation for the transposition and point B the end of the waste transition in which society have become completely circular. In our language we are used to describing transitions based on starting points and results, with fixed entities. But I argue that relation is a process of growth, developed in specific contexts of practical engagement with its surroundings. I argue that transition is the very existence of being, that constantly reshapes its relations. Until now my argument comes very close to that of Ingold. However, when we look at the context in which he describes relationships, we discover that there is some nuance difference which can be found in the connection between the word relationship and narrative.

When I argue that waste (transitions) *are* their relations, then I take the same position as Ingold, as he stated that "things are their relation" (2011, 70). We agree in the following that many relationships are intertwined. Ingold comes to this statement in a discussion in which he takes a stand against Latour, who describes life a network through the Actor Network Theory (2005). Ingold argues that life is a relational field not of interconnected points but of interwoven lines. He describes life as woven together by a web of movements, so *to be* is not to be in place but to be along paths "the path is the primary condition of being, or rather becoming" (Ingold

2011, 12). This constant movement of weaving is also visible in this thesis, as for example through the developing view on hygiene and how to deal with our environment that continuously (re)determines our waste. But that does not stand alone. Multiple movements are simultaneously taking place, in which life with people and waste continually develops in time in relation to the earth and to each other. This interwoven texture of threads is described by Ingold (2011, 69-70) as a meshwork, as part of his discussion in defense against the theory of a network.

This thesis is not a defense against networks, or a discussion about Ingold's meshwork. This thesis contains ethnographic narratives of waste transitions in the Netherlands, it is a search for how this transition takes place. Precisely this form is an argument that waste is relation, due the very word of 'relations' as the word relation also has the meaning of 'narrating something', through the act of relating (Oxford English dictionary). That act is performed through this thesis. As this thesis is written by a social scientist, it is to be expected that most of the relations are here described about people. Nevertheless, many of these relationships can be traced back to people and their actions, because waste is something that is created by ourselves. The waste transition is a constance correspondence between the various actors like citizens, (local) government, waste collectors, producers, designers by which they determine within their specific context how our waste management should look like, how transition towards circularity develops. The waste myths show the interconnectedness of each of them. Precisely because each myth can either be true or false because the myths are both debunked and confirmed, as the non determinable basis of the discussion about before and after separation show us. These parallel truths show that there is movement in how waste is dealt with, a movement that is not (yet) uniform: trash in transit.

Chapter 4: Being altered

It is Monday morning, during the office clean up, that Maaike comes in with her purchases from an office retailer. Ilse reclaims: "A new teapot! And finally, a new tea-box", and takes the box out of the package while mumbling: "plasssstics… this is just very sad. A box filled with tea bags, all separated packed in plastic. And, the compartments of the tea box are divergent of regular tea bags, so that we cannot use the box afterwards." "What's wrong with the box?" Maaike ask. "We are a consultancy firm, concerned about reducing packaging." Ilse responded "And then we buy such a tea box filled with useless plastic. It is just evil!"

As illustrated above, our consumption-behaviour is on the shovel. There is a growing awareness that we damage the climate by eating meat, buying luxury goods and by flying for city trips. Transiting to a circular economy is accompanied by behavioral change into a new lifestyle, but how should this new way of living look like? How to live without a loss of comfort, and what is gained by doing so? The previous chapter ended with the argument that waste is relation. So far, this thesis argued that as relations change, our waste transits simultaneously. This chapter is an exploration on the *reversion of this argument*. As relation within this thesis mostly is described as the narrative between people and materials, this chapter researches how waste influences us. What happens with the *relations* when you have less or no waste? During fieldwork someone said: "We buy our garbage everyday". Some people have the same realization as my interviewee, and want to reduce the amount of waste produced; they want to consume less. As so, this chapter is a brief start with unravelling the relationship between waste, consuming less and identity formation from front-runners in the transition, by looking at their daily dilemmas and headaches dealing with waste. But first some brief some discussions about consumption and waste are introduced.

Consuming, waste and identity
A system of waste is traditionally perceived as something that happens at the end of a rather linear process: that of production, exchange and consumption. The waste processing system as it is now in the Netherlands, seems to start from an opposite movement. A production change ends

with consumption, while the identification of waste has an important starting point in the moment of consumption. From there on, the journey is influenced by the government into the separation of waste, what is generally perceived as a step towards circularity. From there, it is investigated how these materials can be exchanged, taking into account long-term contracts between waste processing companies and collection services, and the limitation of existing legislation. Both linear systems are about movement, of materials, garbage, but in opposite directions.

During our current waste transition it investigated how to reuse, remanufacture, and recycle end-of-life products, using the wastes of one production process as inputs to another, and redesigning products, processes (Jackson 2005, 19) and supply chains with the hope to break with the linear systems, and move to a circular economy, as described in chapter two. This thesis narrated various relations that are the process, relations along continuously is constituted what is considered waste. Waste is a process of modern society that produces and consumes, rather than that what is left after production or consumption (O'Brien 2007, 10). To ask which comes first, production or consumption, is to pose a chicken-or-the-egg question, according to Ingold (2011,5): *"Producing things gives us objects to consume, consuming things gives us ideas of what to produce. The result is a closed circuit, of production and consumption, the one converting pre-existing images into final objects, the other converting objects into images."*

The produced and consumed objects are a major contributor to and reflection of our identities (Belk 1988, 139). Some scholars argue that the western society presents itself through consumption, which is called the *consumer society* (Bauman 1998). Individuals presents themselves through signs of consuming, displaying their identity to demonstrate belonging and inclusion, or consume to manifest their exclusion, their flawed character. There is a drive or compulsion, an obligation to consume, bound up with production the ordening of signs and the integration of the group according to the sociologist and philosopher Jean Baudrillard (2016, 78). He argues that wasteful, superfluous consumption allows people and society to feel that they exist, that they are truly alive. In this sense, wasteful consumption is functional for the formation of identities. However, consumption here has the implicit assumption that the planet offers infinite resources in order to facilitate this.

To conclude, consumption is essential for today's society, determining economic growth and prosperity, our culture is to a large extent a consumer culture. What and where we consume determines our (desired) identity, our self-image and can determine happiness in life. It is seen as an important indicator for social status. Then there is the idea of a circular economy, a concept that questions our production and consumption behaviour, with an emphasis on the refuse of raw materials, reuse and repair of products. The question is therefore: How does this new circular system influence our identity formation?

'Consuminderen'

During this research I encountered various people who consciously change their lifestyle into consuming less. There is even a Dutch word to express the attitude called *consuminderen*, which as a verb, making it clear that it requires action. People who *consuminderen*, as well as those who try to consume nothing at all (called non consumers), primarily choose their lifestyle due to environmental concerns (Johansson 2014, 3). It involves a change in your relationship with raw materials and waste, accompanied by different behavior than that of consuming. But how does this work in a society where not everyone shares the same value to separate waste, to produce less waste? How does the voluntary non-consumers experience this other lifestyle? Could it be possible to take some things away from today's way of living, would we then be able to maintain our lifestyle when it comes to work, social interactions, dwellings, health and leisure time activities, even if we chose to consume less? An example could be found in Sia, who tries to live minimalistic, by reducing the packaging that she purchased by doing her shopping at a packaging-low store.

Sia and I start our Monday morning, at the fourth of February, with a cup of tea and coffee, sitting at the big wooden table in front of the window - overlooking the medieval street situated in the old city center of Amersfoort. We keep our jackets on, because the heating is off: "to safe the environment" explained the owner of the store of the packaging-low shop. Sia places her bag next to her, opens the zipper and starts explaining: "These necessities I always take along". Within a few minutes the table is filled with napkins made of fabric, linen bags, a travel mug, aluminum straws, bamboo sporks and manny pots.

We collect three pots with lids and start by measuring their individual weight. Then we gather around the peanut butter machine and place the jar at the opening. 'Click', a large brown mass is moving and slides into the pot via a funnel. Meanwhile we place a pot underneath a big jar with chocolate sprinkles. After that is filled we move to the container with honey. There is no movement of honey, after opening the tap. "That is because of the cold, which made is solid. Let my help you", says an employee who comes to the rescue. The second pot is now being put in a peanut butter machine. The friendly staff member asks, did you weighed the pot for the honey? 'Yes!' "And what is the weight? Is that with, or without the lid?" 120 gram is filled to digital scale, together with the code for the honey to print down the price tag. Ten minutes passed before filling up four pots, with peanut butter, honey and chocolate sprinkles. "Let's continue with the olives, shall we?"

It took over an hour to do the groceries with Sia, but for her, this way of shopping was visibly satisfying, because her value to consume less were united in her actions. It took time, money and a behavioural change for Sia to develop such a lifestyle. In my conversation with her she refers to examples, via books and the internet, of families who produce less than one waste bin waste per year. Among these life stories she found examples of what things are necessary to have in order to replace the packaging materials that are now in the store. Here we see how her way of living is entangled with relations of those who consume less. New bonds between people are made. Such encounters happen as well in a repair cafe, where broken clothing can be disposes, toys and electrical appliances are to be repaired together with experts, sometimes even free of charge. Another new bond made is by recycle shops where discarded stuff can be brought after cleaning up, what maybe makes others happy. Here consumption and discarded objects are still part of human life, but the reuse of products prolonged the duration of the use of stuff.

When I was sitting at the table with Sia, she told something about the encounters she has with shopping at places where packaging is still standard for products:

"My boyfriend and I are notorious, because of those napkins", Sia says. "We like to go to the snackbar, for example, to order a hamburger. Then we place the napkin on the counter and order the burger on the napkin. *There they are again*, can be read from the vendor's face. You have to be a bit crazy to live like this, but it is so satisfying.".

The abandonment of the purchase of packaging requires a purchase of wraps, boxes and napkins as a replacement which lasts longer. It also requires courage to engage in conversations with people who are used to this way of consuming less. Withdrawing from the consumption cycle apparently also requires a profound revival of values, whereby material property used to be seen a as a benchmark of life fulfillment of the pedestal and other status symbols by which needs are cultivated. Therefore, changing consumption in the direction of more sustainable patterns by consuming less, has a difficult time in an environment where opposing norms and values often prevail. Personal, concrete and direct pleasure or profit are replaced by a collective, abstract and long-term goal. Even though generally our behavior is such that we have a tendency to let materialistic self-interest prevail over the future collective interest, even though we wish our (grand)children the very best (Schor 1999, 1). This does not detract from the fact that there are consumers who attempt to reduce their consumer drives with feelings of satisfaction, as Sia does.

After doing the grocery, I walked with Sia to her car, parked nearby. It takes a thirty minute drive to get home: "I know that this also costs fossil fuels, so I try to make this ride at most once a month. However, in sustainable living, you can not do everything at once." she explains. The owner of the store also runs into a similar conflict. In a conversation with her, she indicated that she preferred to keep the bananas out of the store and sell only local products. However, customers want bananas, and offering bananas in addition to the local assortment is a way to attract customers. Here you see that an economic interest enters into dialogue and gains the value of selling packaging lukewarm and locally. These various sociocultural expectations are part of a transition, and lead to so called eco-conflicts. Do different interests weigh in the unconscious choice of behavior, and which one wins: money, practicality, identity?

Conflicts

A colleague describes a dilemma to throw away a plastic salad bowl in the Council House:

"I come to a trash can, one with all these little boxes, with four holes for different waste streams, all very small. Then you're right about wow, okay, I'm going to make a choice here. I already know that. I had a salad bowl from the supermarket, which was empty. But unfortunately it did not fit in that plastic slot. So, I am standing there thinking, 'plastic plastic, what to do?'

Then I go for a walk. But where else can I find more trash bins? They are nowhere to be found. While walking I am still thinking about this dilemma. Then finally I folded the salad bowl and squeezed it in. But what would I have done if the box still would not fit, put it on top of the bin? Such a moment when you make a choice which does not go automatically confronts you with a dilemma."

Conflicts like this arise in transitions to a new lifestyle, they arise in the separation of waste, as people want to do good for the earth through waste-separation. But nobody wants to do the effort for nothing: "Dan ben je gekke henkie", as an interviewee explains that it makes you feel crazy, it feels like a betrayal. If the local governments makes a mess of the waste-separation system by burning it all in the end, it does not motivates to separate the waste. When, for whatever reason, you can not manage to join your behavior and values, this can lead to so called *cognitive dissonance.*

A dissonance occurs when new events may happen or new information may become known to a person, creating at least a momentary dissonance with existing knowledge, opinions, or cogninton concerning behaviour. The dilemma of my colleague, as described above, is a good example of how something seemingly small (a salad bowl that does not fit into the plastic bin), can lead to a dissonance. One becomes psychologically uncomfortable, because there is a pressure to reduce it, to answer the question in which the dissonance may be reduced (Festinger 1962, 5). But when change is not possible, this state of imbalance will produce tension. Cognitive dissonance is a consequence of a person performing an action that contradicts these personal beliefs, ideals, and values. To reduce this stressful moment people actively avoid social situations and contradictory information by making changes to justify the stressful behavior (Festinger 1962, 5).

Examples of this in the waste debate are searches for arguments and excuses to not separate waste, or not to consume less, despite having the value to live sustainable. The transition to more sustainable consumer lifestyles is anything but evident, even when there is the realization that a changeover to urgency and necessity is gaining. Research confirms the view that even people who are concerned about and involved in the environment only partially adjust their consumption behavior (Aarts 2000, 1). Despite that sustainability is one of the biggest

themes our society, it is accompanied by unclear information about how to turn this into a lifestyle. When you ask a random consumer if he or she considers sustainability to be important, then the answer is probably yes. But if you then ask questions what is actually done about sustainability, the chances are that you will not get any further than that he or she puts paper in the paper bin and puts vegetables and fruit in the green box.

The search for excuses and the detachment of behavior that can not be matched with values can be a way to find peace again, as described by the sociologist Quisumbing King (2016). In her research with students that strive to do what is good for the earth, good for their bodies, and good for their community, she recognises patterns of dissonance. The difficulties to live sustainable is remarkable illustrated in the consumption of bananas. Eating a banana is considered provane by students through the need for importation, but nevertheless sometimes students eat the bananas. Through confessing their struggles in living sustainable to each other, they align again their morals with their behaviour through the act articulation. Confessing is a way to achieve consonance between the two, to align practices. I recognised myself in similar billing sessions when I took a plastic cup instead of a self-taken mug and thus contributed to the amount of plastic waste.

Dissonance only takes place when new information is presented that does not fit with existing convictions. This new information is needed to make a well-considered decision. From these thoughts, many interviewees indicated that it is important to increase the knowledge around waste, that people grow in their awareness of the effects of consumer behavior. Personally, I find this 'awareness' argument impossible to make hard. Of what do I need to be aware? As can be seen in this thesis, the relationships are richly interwoven, and in constant movement.

So, what influences the behaviour of people in separation of waste, or even the prevention of making waste? The handling of waste does not only serve as a daily necessity, but as an expression of an identity, as a translated desire of a sustainable future. By dealing with packaging differently, some people feel their contribution to a sustainable world. This can also be done by separating waste, as described in the previous chapter, and/or by reducing the amount of waste, or even living without packaging. In opposition to consumption, other forms of life are embraced like consuming less, minimalism by reuse. In the transition it is questioned how we

make the green, 'good life' accessible to everyone? This chapter described the journey of people who are struggling to make the right choices in reducing their amount of packaging, or in the separation of their waste. It is not easy to reduce waste, for practical reasons, social reasons and internal conflicts leading to cognitive dissonance. Such a conflicts express that the way we deal with waste influences is not just a process within the waste transition, but also a personal process of identifications. Waste handling is something that one does within a system along which relations and identities continuously develop.

Conclusions

This thesis has been an ethnographic elaboration on the processing of the waste transition towards a Circular Economy in Utrecht, the Netherlands. The main concept by which this has been done is that of relations, as described by Ingold who argues that things *are* their relations (2011, 70). This thesis confirms his argument. However, there are nuance differences between how Ingold and I reach the conclusion. A 'relation' for both of us means movement, developed in specific contexts of engagement with its surroundings. While people and things move *along* trails, (waste) transitions take place. This is the very existence of being. To describe relations, the interwoven threats of flow in a storied word world Ingold introduces the concept of the meshwork (2011, 63-94). Another way in which the entanglement of being can be expressed is through narrating, by describing connections along people and waste in advancing of time. This thesis is a narration of waste transitions and its configurations on people and waste.

The first chapter took us along a path of waste transitions, shifts in waste (handling) through developing knowledge on hygiene, urbanization and increasing production and consumption. Waste transitions are the movement in the configurations of waste and how it is dealt with. Increasing environmental requirements, and interest in sustainability led to objectives to make the Netherlands Circular in 2050 (IenM 2016).

The second chapter narrated some relations who paraken in the challenge for the Netherlands go become a Circular Economy, by which waste is considered as a resource. Within a circular economy eco-effectiveness creates metabolisms where materials are used over and over again at a high level of quality, supported by a workable relationship between ecological systems and economic growth (MacArthur 2013, 23). Designers, producers, waste processors, citizens and (local) government all participate in attempt to turn waste into wealth. But that does not go without a struggle because of their interdependence, as the relation of the whole determines the behavior of the parts and vice versa.

Such interdependence are narrated in the waste myths (Rijkswaterstaat 2018). Whether they are true or not, these stories on waste are going around, they are an account between the old waste system and a new waste system that is gradually becoming. Chapter three exposes the

developing discussions in the separation of waste, which shows that goals alone are not enough to become circular, since each individual is related to each other along the transition. The very form of myths, as well as the ethnographic data in this thesis, are stated here as a form by which relations are given account for, as they express connections along waste and waste transitions are experienced by people. These stories reflect the society that produces them, with a dissonance between the waste system *now* and circular economy that is *not yet*.

The shift towards a circular economy is major one for the West, as it questions our consumer society. Consuming is a way of identity formation, as our possessions are a major contributor to and reflection of our identities (Baudrillard 2016, 78). The same also applies to the reduction of possessions by consuming less. In that sense the movement of producing less waste is a process by which identification take place. But in a transition, it is certainly not yet self-evident to separate waste (correctly), to buy less packaging, to consume less or even non, despite the desire to live sustainably, it requires society-wide system and behavioral change. In spite of the dissonance that can occur in the change of matter use and dealing with others, there are front-runners who reduce their consumption, who through the act of confessing, reunites their values to live sustainable with their action.

Because the circular economy is not yet in full effect, the latter argument is something that should be further investigated as soon as waste is a raw material, for government, waste collectors as well as citizens. An advice when examining waste transitions is specifying the research topic, that can be in the type of waste, the research group, or by a time space delimitation. Waste in itself is a big topic about which there is still a lot of uncertainty, as the waste myths show us. This thesis showed that trash is transit because it has a relational character, but it did not yet explained how these relations can cooperate and contribute toward the circulair system. I would therefore suggest to investigate how this should be done. It would be interesting to have citizens, scientists, civil servants and designers working together, jointly narrate a society in which waste is not only a raw material, but in which value is passed on.

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Abbreviations

Afval-Boa Buitengewoon Opsporings- *Investigation Officer for waste*
ambtenaar Afval

ANWB De Koninklijke Nederlandse *The Royal Dutch Tourist Association*
Toeristenbond

AOO Afval Overleg Orgaan *Waste Management Council*

DIFTAR GeDIFferentieerde afvalTARieven *Differentiated waste tarifs*

GFT Groente- Fruit en Tuinafval *Vegetable- Fruit and Garden-waste*

IenM Ministerie van Infrastructuur en *Dutch Ministry of Infrastructure and the*
Waterstaat *Environment*

NVRD Koninklijke Vereniging voor Afval- *NVRD is the Royal Dutch association for*
en Reinigingsmanagement *waste management and cleaning*

NS Nederlandse Spoorwegen *Dutch Railways*

IPO Interbestuurlijk Plattelandsoverleg *Inter-Provincial Consultation Body*

STUA Stuurgroep Afval *Steering Committee on Waste*

VAM Vuil Afvoer Maatschappij *Garbage disposal society*

VANG Van Afval Naar Grondstof *From Waste to Raw Material*

VNG Vereniging Nederlandse Gemeente Association of Dutch Municipalities

VROM Ministerie van Volkshuisvesting, *Directory of Waste, Ministry of Housing,*
DGM Ruimtelijke Ordening en Milieu *Physical Planning and Environment*