Metro barriers in the making: the political and sociotechnical milieu of public transport in Stockholm

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Abstract

This thesis examines processes through which the barriers in the Stockholm metro are continuously rearranged. The barriers are in place with the purpose of securing income, while simultaneously enabling the flow of passengers into the metro. First, I examine the technical components and capacities of the barriers. Second, I outline a variety of actors involved with planning, manufacturing, and maintaining them, and analytically link these actors as comprising an 'apparatus of public transport'. More specifically, this study focuses on how metro users' practices are both influenced by, and influence how the barriers are rearranged. I show how this dynamic is enacted in the barrier milieu in metro stations, where also the tension between the purposes of securing income and allowing mobility is negotiated. The ethnographic material includes encounters with metro users, technicians, officials, and politicians in metro stations and other settings, as well as written documentations.

In public discussions, the barriers are commonly at issue in relation to fare evasion. From a standpoint where technical, social, and political dimensions are understood as intermeshed, this study casts attention to a variety of practices occurring in the barrier milieu. By exploring how a technical arrangement influences social relations, I aim to raise questions of responsibility with regards to technology.

Keywords: metro barriers, Stockholm, mobility, security, milieu.

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Introduction

> "We are responsible for the world within which we live not because it is an arbitrary construction of our choosing, but because it is sedimented out of particular practices that we have a role in shaping" – Karen Barad (1998: 102).

A man walks from the platform into the entrance hall at Telefonplan metro station. Seemingly well familiar with the station, he navigates his steps straight forward toward the line of barriers, while apparently caught up in his own thoughts. He takes one step into a ticket gate before noticing the plastic stripe blocking the walkway near his stomach. As he backs out, the doors of the gate open up. While he exits through the adjacent gate, the doors at the first gate close. Before closing completely, they open up again, then close, and open up. People arriving into the entrance hall cast a glance at the gate whose doors keep opening and closing. It creates a repetitive sound which echoes in the hall. The gate seemingly lives its own life. A minute later, the doors close and leave behind a silence. The ticket collector seated in the booth next to the line of barriers informs that the gate has been broken since yesterday. I tell him about my interest in the interplay between humans and technology and he laughingly states that there is no interplay. "You see, my colleague put up the scotch tape there to signal that it is broken but people enter into the walkway anyway". An hour later, a technician arrives. He places a laptop on the barrier pillar and connects it to the inside of the pillar which he opens up with a key. He explains the reason behind the behavior of the gate. "It's the photocells here", he says and points along the inside of the glass doors, "which reads off the photocells here", he points to the opposite side. Because the photocells mistook the opposite door for a body, the gates kept opening up to prevent jamming the assumed passenger in between, and kept closing again to not leave the walkway open for other passengers to enter. The ticket collector thus has a point; the interplay between the passenger and technology was not successful at this instance.

However, the presupposition for this study is that technical and social dimensions are intermeshed. The technician points to why that can be said; the photocells which steer the movements of the doors are programmed in relation to how metro users are estimated to move through the gate. The function of the gate is embedded in conceptions of passengers' behavior. The gates function as a walkway in the middle of which there are two glass doors.

These doors retract into the pillars on each side of the walkway when a ticket is validated by the ticket reader, which is placed on top of the pillar to the right. In place in metro stations, the purposes of the gates are to allow entrance for passengers who validate a ticket, and to prevent any non-paying ones from entering. The components of them, such as the photocells, are invested with capacities to attain these purposes. There is in that sense a continuous interplay among humans and technology taking place beyond the immediate encounter between a metro user and a ticket gate. While daily encounters with the gates receive little attention when all goes well, the introducing vignette shows that it does not always go so smoothly. The malfunctioning doors, allowing no person to exit nor enter, highlight how the gates intervene in the 'mobility' of passengers by interrupting motions, and potentially the 'security' of passengers, since there is a risk of getting squeezed between them. Those two terms – mobility and security – will reappear throughout this thesis, which also deals with another aspect of what the incident in Telefonplan indicates, namely that a variety of actors are involved in working with the gates, of which technicians are but one example. This study is located in the interplay between humans and technology, which, I argue, is a matter of politics since it influences urban life at large. By discussing various outcomes of the gates' presence in metro stations, I evoke the question of responsibility regarding the technological arrangement that residents in the city make use of daily.

The metro is integrated in the urban topography of Stockholm and provides a means of transport upon which many residents rely in their everyday life. Its 100 metro stations constitute a heterogeneous set of spaces with particular characteristics influenced by their geographical location, the social composition of passengers passing through, and the time of day. This thesis will however be less attentive to the difference between stations and instead focus on their commonalities – the gates. Most residents in Stockholm are familiar with these gates, which compose a barrier line that has to be passed through to reach the metro trains. This is also how they are commonly referred to among residents, namely, the 'barriers' (spärrarna). Throughout the thesis, I will alternate between referring to them as 'barriers', in a general way designating their assignment in metro stations of controlling entrances, and as 'gates', which designates the gates currently in place with their particular features.

The gates are in place due to a decision made by the Stockholm County Council (*Stockholms Läns Landsting)*, henceforth abbreviated 'SLL', which is responsible for providing the region's residents with public transport. The previous barriers, which were turnstiles with rotating tripods in the middle of the walkway, were deemed unsuccessful in hindering non-paying entrances. Therefore, in the beginning of ´00s, the SLL decided to replace the turnstiles with new gates to increase the income from ticket fares, simultaneous with a decrease in public financing for public transport. The installation of new gates was executed by the public company Greater Stockholm public transport *(AB Storstockholms Lokaltrafik),* henceforth abbreviated 'SL', which is managing the transport system. The gates are part of an ongoing project by SL classified as 'securing of income' *(intäktssäkring).* While the decrease of tax financing has been less publicly debated, the gates have been at the center of much attention during the last decade. Initially, they caused queues slowing down the flow of people. As more stations became equipped with the new gates, reports on injuries caused by them increased, and later other kinds of conflicts occurred that led to court. These are all events that I will discuss in the following chapters. Public discussions about the gates, besides these events, are commonly about fare evasion, or 'fare-dodging' *(plankning).* The gates are proposed as a technical solution to the 'social' problem of people avoiding purchasing tickets when using the metro. Instead of considering them merely as technical devices, I will consider how technical, social, and political dimensions are intermeshed at the site constituted by the barriers.

Although mundane and public, the gates can be understood as what Latour (1987: 130-131) calls "black boxes", since their internal complexity is disguised when they are at work in metro stations. Their internal complexity is based on both the technical components and the various actors involved with planning and producing them, who are little visible in everyday encounters with the gates. What metro users perceive is mainly to what extent the input – a ticket validation – equals the intended output – to reach the metro. To consider the complexity of technological devices Latour (1987) argues that one should study the processes through which they become the black boxes they appear as once at work. Following this suggestion, I intend to open up the metro gates "so that outsiders may have a glimpse" of their internal components (ibid: 15). I do this in two interrelated ways. First, I look at the components, both material and discursive, which decide how they are operationalizing control of passengers' entrances. To take the introducing vignette as an example, these components are, among

others, the photocells and the purposes they are supposed to serve. Using Star and Griesemer's (1989) concept of "boundary object", which refers to material objects that manage to mediate between various actors involved with them, I unpack the multiple and sometimes conflicting values that the gates encapsulate. In addition to the making of the gates in technological terms, I consider how also social relations and politics are in the making through them. Therefore, the second way of opening the gates is made by tracing links to actors involved with them. Analytically, I approach these actors as comprising an 'apparatus of public transport'. This approach is derived from Foucault's (2007[1978]: 55) description of security apparatuses which designates heterogeneous grouping of actors who "work, fabricate, organize, and plan a milieu" to manage the circulation of people. The site constituted of barriers in metro stations is the milieu that I deal with here. It is in this milieu where both the mobility of residents and the securing of income from ticket fares are to be ensured. While acknowledging that the barriers place constraints on how people circulate, I turn to Barad (1998: 112) to consider how practices of passing the barriers enfold through "the dynamics of intra-activity" in encounters among metro users and material and discursive dimensions of the apparatus. '*Intra*-actions' is meant to emphasize that agency in this view emerges in encounters rather than stemming from within actors, and serves my intention to understand how technical, social and political dimensions are intermeshed. The title of the thesis paraphrases the methodological intervention proposed by Latour (1987) to look at science and technology "in action". Looking at barriers in the making allow to also consider how social relations and politics are 'made' in processes revolving around a technical device.

In a book describing the development of the metro in Stockholm throughout the second half of the 20th century, the authors claim that "the metro is in many ways a reflection of the society in which it works" (Alfredsson, Berndt, Harlén 2000: 216). My study leans toward an understanding of the metro as not merely being a reflection of, but more so actively shaping the society in which it works. Cities are made up of circulations and movements and access to mobility is a prerequisite for every residents' equal participation in urban life. Henri Lefebvre (1968) has brought attention to the issue of access to urban services as being a matter of the right to the city. He argues that cities are settings for struggle, and also the stakes of these struggles (Lefebvre 1991: 386). While this study examines the particular case of metro barriers in Stockholm, it can be read as an attempt to consider processes ongoing in many

cities where access to urban services, fundamental for life in the city, are conditioned by technological means.

Aim and research questions

In this thesis, I examine how metro barriers are 'in the making' through an intersection of technical, social, and political dimensions. I do this by opening up the gates currently in place in metro stations in Stockholm and directing attention to aspects of their working which are less visible in everyday practice. I will demonstrate how the gates become materialized in an oscillation where, on the one hand, an apparatus of public transport aims at controlling circulation of residents in the city, and, on the other, these residents negotiate their way through the gates and bypass their supposed functioning. This oscillation takes place in the barrier milieu, which is the site where the tension between mobility and security is played out in various ways. By looking at processes through which the gates are rearranged, I aim to discuss implications of their workings.

My central research questions are:

1) What can be revealed about the apparatus of public transport by opening the black box of metro barriers?

2) How are the purposes of mobility and security, encapsulated by the gates as boundary objects, continuously negotiated in the barrier milieu?

My core interest is in better understanding how public transport systems, on which many residents rely and mingle, shape everyday life in the city. I derive this interest from the anthropological quest to examine how people make sense of the world we inhabit. This world is for urban residents partly constituted of the spaces in the metro which are managed by technical arrangements. Negotiations taking place in these spaces have, as Butcher (2011: 551) writes, "implications on daily life, expectations, imaginations of the future and an individual's place in the city". The barriers I deal with similarly have implications for individuals' everyday life, the way they intervene with, and arrange, our movements throughout the city. Instead of focusing on individuals I examine how they influence

negotiations among residents of the city as a population. By doing this, I aim to raise questions of responsibility, along the lines of the introducing quote by Barad (1998), with regards to how these technical arrangements participate in shaping struggles through which the city is potentially at stake (Lefebvre 1991).

Organization of thesis

The following **Background** begins with the development of the metro and the arrangement of its stations in Stockholm. It serves to situate the metro barriers in an historical context. I describe how means to control residents' access to public transports have been modified along the years in an interplay between the apparatus of public transport and passenger practices. This leads up to the last decade, during which the gates dealt with in the ethnographic chapters started to be implemented in stations. I describe the roles played by a variety of actors in the installation of the new gates until the last metro station was completed in the end of 2014. Thereafter I discuss anthropologists' engagement with public transport systems which by the end of the '70s became appeared as a field of human relations to be studied. I introduce some studies of metro networks and relate them to this account about metro barriers. In the last part of the background I describe the methodological approach and theoretical framework that have guided me through the fieldwork and organized my analysis of the ethnographic material. I intertwine a description of places and people which were part of the field. Here I also discuss ethical considerations that were evoked during the fieldwork.

'Chapter One: Technology in the making', focus on the development of the technology that is consolidated in metro stations through the work of several actors in different ways. The first section takes place at a trade fair for passenger transport held in Stockholm. I trace links to the manufacturer of the metro gates and discuss how the technology inhabits intersecting social worlds. Present at the trade fair were also technicians who maintain the barriers at the metro stations. The second section takes place mainly in a laboratory of barriers where attempts to optimize the technology are carried out in order to advance the twofold objective to facilitate and hinder passages into one barrier. Two events that occurred in metro stations when the gates were installed will be discussed and I demonstrate how the technology has

been modified in response to these events. This chapter ends with an encounter with technicians in a metro station.

'Chapter Two: Social relations in the making' moves from the utility discourse to residents' use of the barriers, and is ethnographically situated in a number of metro stations. I show how technical components of the gates, and their purpose, mediate encounters among metro users. Moral negotiations emerge through these encounters in the barrier milieu where technical capacities intersect with discourses indicating how the metro should be used, and who is to be accounted for its well-functioning. I demonstrate how passenger manipulate the gates to make their doors more open than supposed to, and how passengers enact the supposed functioning of the barriers by hindering other passengers from entering. Negotiations of the doors openness among residents are located within the tension of mobility, as some emphasize helping fellow passengers, and security, as others enact the aim of the gates to secure income.

'Chapter Three: Politics in the making' takes place in a courtroom and demonstrates how politics are embedded within the encounters among passengers and gates in the barrier milieu. The specific dispute covered in this ethnography involves a passenger refusing to pay the penalty fine she had been issued for not having a valid ticket upon a ticket control. The plaintiff – the public company in charge of the metro – claims that the responsibility to have a valid ticket lies with the passenger, who in turn claims that she validated her ticket and was let through by the gate. The court case demonstrates that all passengers, regardless of their intent, are affected by the barriers presence.

The three ethnographic chapters each focus on one dimension of the barriers – technical, social and political – and are situated in different settings. This organization is chosen for analytical and clarity purposes rather than empirical ones, and the recurring notion of 'milieu' indicates that what is presented in each chapter is intermeshed in metro stations where the barriers are at work.

In the **Conclusion**, I recapitulate the main points from each chapter and relate these to the two research questions. The organization of the thesis is partly chronologically ordered. The Background section begin with the development of the metro and situate metro barriers in a historical context. The ethnographic chapters deal with them in their current configuration. In the conclusion, I bring up upcoming modifications of the gates which were announced when I was writing up this thesis. My account can be read as what Fortun (2003) terms an "ethnography of in/of/as open systems", which I interpret as being an ethnography that recognizes the object in focus as situated within complex webs of continuously changing relations.

Background

The Stockholm metro and its barriers

In the first half of the 20th century, public transportation in Stockholm was mainly made up of tramways, while trolley services and regular buses served the suburbs. The tramways, operated by the municipally owned company Stockholm Tramways (*AB Stockholms Spårvägar)*, shared the streets with buses, bicycles, pedestrians, and ever more cars which during these decades became more common as a means of transport within the daily traffic circulation. To ameliorate the traffic congestion, the municipality decided to relocate traffic into tunnels; the first tunnel for tramways being inaugurated in 1933. The tunnel was dug underneath Södermalm, one of the several islands on which Stockholm is located, and the tramway running through it became known as the 'tunnel line' (*tunnelbanan)* (Alfredsson, Berndt, Harlén 2000: 129).

The underground tramway required stations different from those on street level. Figure 1 shows a drawing of the first underground station. The two arrows to the right mark out that passengers should enter on each side of the ticket booth placed in the middle, where ticket collectors are seated. At the end of the booth is a gate and opposite it are railings limiting the possibility to by-pass the ticket collectors. On the upper side of the drawing is an arrow showing where people are to exit. The two gates, marked as A and B, open up only from the exiting direction. Figure 2 shows an image from a station built according to the drawing. The

departure platform is located behind the area for ticket controls. Ticket control of passengers entering the tramway from stations on street level was carried out by conductors moving through the carriages[1]. Stockholm grew rapidly during these decades, which resulted in more passengers on the tramways, thus increasing the difficulty for the conductor to control every passenger's ticket. In the beginning of the '40s, 'regulated passenger circulation' (*reglerad trafikantcirkulation*) was introduced to decrease the number of 'free-riders' (*gratisåkare)*[2]. The new regulations required passengers to enter through the back door of the tramway, where a conductor controlling tickets was seated[3].
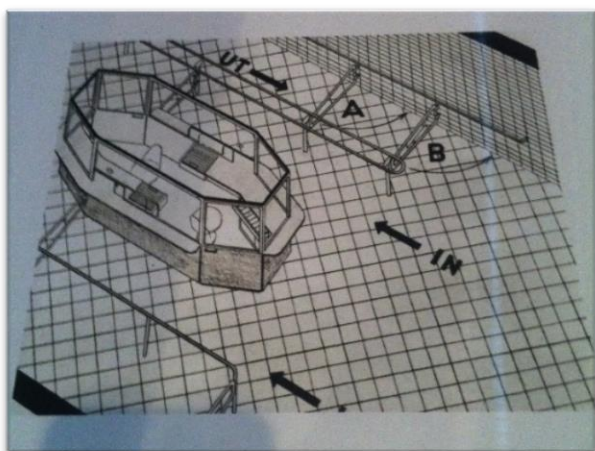

Figure 1. Drawing of the first metro station. Architect: Holger Blom. Photo: Statens centrum för arkitektur och designs samlingar.

Figure 2. Södra Station Södra Bantorget, built according to the drawing. Source: Stockholmskällan. Photo: Unkown.

Plans for a metro network had been in the pipeline since the '30s. The traffic commissioner Yngve Larsson, from the liberal party Folkpartiet, took the leading role as a proponent of a new transport system. The plans for the new system were embedded in solutions to the shortage of housing, and particularly sanitary housing, in the city center. Public housing companies were charged with constructing apartment blocks in the existing suburbs, as well

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[1] A similar solution for ticket controls is currently used on Tvärbanan, a light rail line, in Stockholm.
[2] The information in this sentence is derived from the permanent exhibition at the 'Stockholm Transport Museum*'* (*Spårvägsmuseet)* about the history of public transport in Stockholm. The museum is owned by the Stockholm County Council.
[3] A similar solution for ticket controls is currently used in the public buses in Stockholm. Passengers are required to enter at the front door and validate tickets on machines placed before the driver.

as establishing new satellite cities along the proposed metro lines. The construction of the Stockholm metro began in 1944. The railways of Södertunneln were converted into electric railways, and the new transport network kept the name of the tramway line operating the tunnel. The tramway, until then the most prioritized passenger transport means, lost ground to the metro, buses and car traffic. Tram rails on street level were removed or covered with asphalt to make space on street level for the growing motor traffic.
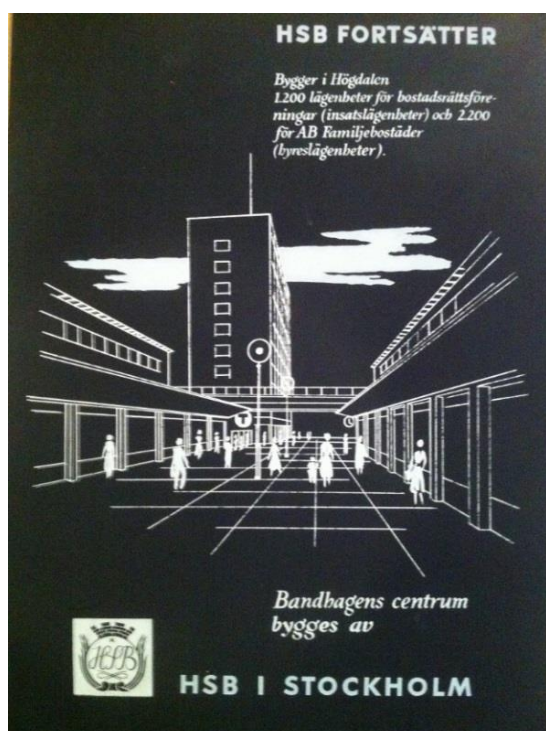
Figure 3. Advertising poster from the housing company HSB. Source: Spårvägsmuseet, Stockholms Läns Landsting.

Figure 4. Stureby metro station in 1957. Source: Stockholmskällan. Photo: Unkown.

The first metro line opened in 1950. The central role of the metro in the expansion of the city is seen in a poster by a housing company announcing its construction of Bandhagen centrum (figure 3). In the center of the image is a 'T', short for the tunnel line. This symbol is still today seen on an inward bent, three-sided poster sign placed outside all entrances to metro stations. At times, the construction of the metro was slower than that of the new housing facilities and the lack of connection to the metro resulted in some areas being characterized as

'dormitory suburbs', which points to the importance of the metro to make the neighborhoods livable *(sovstäder).* The first metro stations resembled the first underground stations (figure 1 and 2), with railings leading passengers before the ticket booths to get their tickets stamped by the ticket collectors. The thinner railings of the first stations were later replaced with thicker railings with a triangular metal plate through which exiting passengers passed (figure 4).

Automated ticket gates were introduced in 1980 (AB Storstockholms Lokaltrafik 2005: 52). By then, Stockholm Tramways had been turned into SL, the public company managing the public transport system on behalf of the County Council. The ticket gates were turnstiles made up of two pillars creating a walkway blocked by a rotating tripod (figure 5). Tickets with magnetic stripes were to be swiped through the barrier pillar, which de-blocked the rotating arms. When a passenger entered into the gap between two of the arms of the tripod and walked forward, the arms rotated one step along with the movement of the passenger. From the exiting side, the arms would rotate when a passenger pushed it forward, with no ticket validation required. The ticket gates were arranged across entrance halls from their ticket booths to the other side of the hall, and made up a line through which passengers had to move in order to access the platform. Each metro entrance remained manned by one ticket collector, instead of at least two as earlier. The current gates are arranged according to the same principle, and ticket booths are manned by a ticket collector day and night.

Figure 5. Turnstiles in Hässelby Strand metro station. Photo: by the author.

The arrival of automated gates sparked attention in newspapers who reported from metro stations in the period of transition, before the new system was up and running. A representative of the public transport company stated in a news article that passengers would "have to learn a completely new technique" to enter the metro, compared to when tickets were to be stamped by ticket collectors (Sjöberg 1980). Passengers are asked about their experiences with the new gates in the same article, and one states that "you have to get used to them, this one time it didn't work, but other times it has worked alright". The installation of automated ticket gates was referred to as a rationalization project, aimed at decreasing the number of ticket collectors and improving the flow of passengers (ibid).

The turnstiles were modified over the years. Passengers discovered the possibility to drag the rotating arms slightly backwards, which created space enough to squeeze through between the arms and the barrier pillar. In order to prevent this practice, photocells were added at foot-level on the exit side so that the tripod from the exiting direction would be activated when the leg of a passenger passed by. Needless to say, passengers soon managed to evade also this control mechanism. By stretching out a leg over the walkway and reach the photocell it was still possible to drag the tripod backwards and pass through. This is an example of how means to control entrances have been modified in response to passengers' practices emerging in relation to the technological solution.

The last metro station to be built, Skarpnäck, was finalized in 1995. The network of the Stockholm metro is made up of three main lines which branch off to several terminal stations (figure 6). The 'green line' *(gröna linjen)* stretches out from the southeast to the west of the city, the 'red line' *(röda linjen)* provides a mobile vein from the southwest to the northeast, while the 'blue line' *(blåa linjen)* begins in the northeast and runs to T-Centralen metro station that is located in the city center and where all three intersect. On the metro network map these lines are coded by both numbers and colors, while in daily speech among Stockholm residents they are commonly referred to by their color, with the terminal station added when necessary to distinguish between different lines of the same color. The archipelago stretches out toward the east which is currently not served by any metro line.

Figure 6. Map of the Stockholm metro. In brackets are the number of minutes it take to arrive at T-Centralen. Source: SL.

The installation of new metro gates

In 2004, SL concluded that about 200 million kronor (equivalent to about 20 million Euro[4]) were lost in the public transport system every year due to "insufficient securing of income and insufficient moral of payment" (AB Storstockholm Lokaltrafik 2004). Some years earlier, an electronic gate with sliding glass doors produced by Gunnebo Nordic AB had been installed in Gullmarsplan metro station (Gunnebo 2000: 25). Because this new type of gate, called 'Gate 2000', was successful in preventing unpaid entrances, it was decided to let it replace the tripod turnstiles (figure 7).

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[4] Based on conversion rate 10 Swedish kronor =1 Euro. I will hereafter mention all sums in Swedish 'kronor'.

The replacement happened at a slow pace over the subsequent years. The board of SL is constituted of politicians from the 'Traffic Commission' *(Trafiknämnden)* of SLL, which was led by a coalition of parties on the left-wing bloc between 2002 and 2006. Parallel to the replacement of turnstiles with electronic gates at some stations, the board decided to experiment with an open line of barriers in 2004 and turnstiles were removed for a period of time from one entrance into Slussen metro station. This experiment was, unsurprisingly, judged unsuccessful in preventing non-paying passages and the suggestion of having open access to the metro was removed from the agenda. From 2006, a coalition of right-wing parties gained a majority in SLL, and thus also the chair of SL's board. In 2008 it was decided to intensify the replacement of turnstiles and introduce a new kind of electronic gates produced by the Belgium-based company Automatic Systems (figure 8). These gates, equipped with glass doors half a meter higher than those from Gunnebo, were to better obstruct those with intent to leap over the gates (Trafiknämnden 2011). SL visited the metro in Lyon where Automatic Systems showcased their gates at work before the purchase was decided upon in 2007[5]. The Swedish free fare organization 'fare-dodge.now' (*planka.nu*) also went to Lyon and recorded a film in which they demonstrate how the new barriers can be bypassed without a valid ticket. The organization argues that the public transport should be collectively financed through taxes and by showing how the gates would not necessarily prevent fare-dodging questioned the efficacy of the investment. Images from this film were broadcasted in a news clip reporting about the purchase of the new gates (TV4 Lokala Nyheter Stockholm 2008).

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[5] 'Metro of Stockholm: here we are!' Info sheet by Automatic Systems. In authors possession.
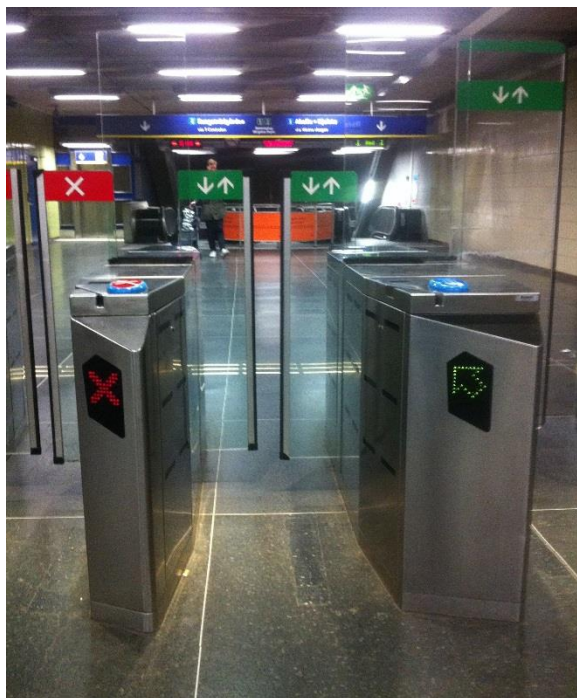
Figure 7. Gate from Gunnebo. Photo: by the author.
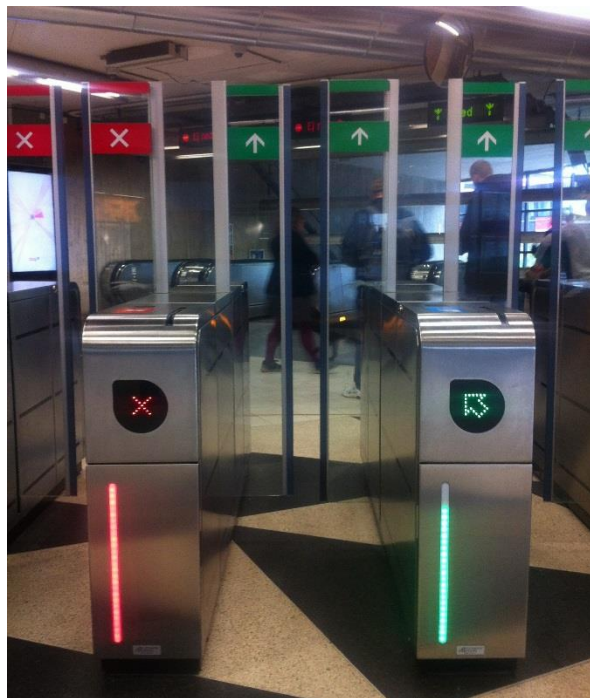
Figure 8. Gate from Automatic Systems. Photo: by the author.

SL has since 2009 published yearly reports about the estimated loss of income due to what is termed 'cheating and loss' *(fusk och svinn)* (AB Storstockholm Lokaltrafik 2010). While 'loss' accounts for situations where passengers have not been able to purchase a ticket, for example due to the absence of a ticket collector or ticket machines out of order, 'cheating' considers passengers' deliberate use of the metro without a ticket. What in the '40s was referred to as 'free'-riding is in these documents termed 'cheating'. In 2010, the total loss was estimated to be 351 million kronor, while in 2014 it was estimated to be 250 million (AB Storstockholm Lokaltrafik 2010, Trafikförvaltningen 2015). It is stated in the latest report that the estimation announced in 2014 is not immediately comparable to earlier years because the method to account for the loss of income has changed. However, estimations of lost income remain estimations independently of methods used, since unpaid travels are not registered and therefore difficult to determine. The accountancies of SLL published a report last year in which they questioned SL's measures to secure income (Landstingsrevisorerna 2014: 21). They state that the two categories, loss and cheating, are insufficiently specified and that they require different methods of approach.

The investment in new gates was expected to cost 140 million kronor between 2011 and 2015 (Trafiknämnden 2011). The total cost of the purchase and the running costs of the barriers are difficult to ascertain, though a SL official I interviewed estimated the figure at 300 million kronor, exclusive of 30 million kronor running costs per annum. Besides the investment in new barriers, other measures have been taken to increase income. The penalty fare issued passengers traveling without valid tickets has increased from 600 kronor in 2003 to 1200 kronor today. Ticket controls are accomplished in front of the line of barriers from the exiting direction, as passengers arrive from the platform, as well as on board trains. They are carried out by ticket controllers employed by ISS Facility AB, a company contracted by SL. The law regarding ticket requirements stated earlier that a *passenger* must possess a valid ticket, which resulted in cases where it was questioned if a person can be considered a passenger when not inside a train. A 2015 amendment clarified the requirement to possess a valid ticket in designated metro station areas (SFS 1977:67). In practice, this means that the barriers constitute the line behind which the metro begins, and where one is considered a passenger. The amendment specifies that ticket controllers can require help from the police to remove passengers without a valid ticket from the metro. Entrances through ticket gates are also regulated in the 'law on public order defense' (*Ordningslagen)* where it says that entering the area behind a metro gate without a valid ticket is illegal (SFS 1993:1617).

In 2013, SL launched the online-based 'shop of fines' *(botshop)* as a means to improve passengers' willingness to pay for metro tickets. The website functions as a shop and each visitor is entitled a vote equaling the sum of a penalty fare (Botshop). The visitor is encouraged to vote for a project they wish to see realized in the public transport system. There are a variety of projects to choose from, among others, new trains, new litterbins, and new information boards, though no ticket gates. SL realizes a project once the number of votes needed to cover its cost is reached. Both the cost of each project, and the number of votes it receives, are displayed. The website is accompanied with the slogan 'together it all works' (*tillsammans funkar alltsammans)* which appears in SL's campaigns, and on information boards placed on the platforms, since a few years.

The financing of public transport from tax income was 70 percent of the total cost during the early '90s. This level has since decreased to cover about half of its cost while the rest is

covered by ticket fares. SL states in their annual reports from the last decade that the decrease of financing by public means is due to an increased amount of income, together with a reduction of overall costs for the public transport system (AB Storstockholm Lokaltrafik 2013: 32). The reason for the decrease of public financing is also found in a standpoint expressed by politicians in SLL that the public transport system should be financed by ticket fares to a larger extent, rather than through taxes. SL managed the public transport system until 2013. The company has since been wound down, with its personnel transferred to the Traffic Administration *(Trafikförvaltningen)* which is tied to the SLL. The main tasks of the administration include planning and procurement of the public transport system, while the operative part and maintenance work is carried out by contractors. SL remains as a shell company with a number of contracts tied to it, among those the purchase of metro gates from Automatic Systems. The abbreviation 'SL' is currently described as "the collective name and brand for the procured general public transport" (AB Storstockholm Lokaltrafik 2013: 3). It has remained the term through which passengers are addressed, as well as to whom it is referred in public discourse regarding issues that have to do with public transport.

The metro is run by MTR, a company based in Hong Kong, where it also runs the metro system. MTR employs the personnel of the metro, including ticket collectors, who are seated in ticket booths placed on one side of, or in close connection to, the line of barriers. They are often referred to among Stockholm residents as 'barrier guards' *(spärrvakter).*They guard the barriers by sight, but in few other ways, since they are not allowed to exit the ticket booth according to the agreement between MTR and SL which states that the booth must always be manned. The gate in front of the shutter, with one single glass door, is manually operated from the booth and used by passengers who buy tickets from the ticket collector, from ticket machines, which print tickets as a slip of paper, or by SMS. The ticket collector can also operate the one wider gate placed in each barrier line to make its doors remain open longer than the automatic settings allow. This gate is supposed to be used by passengers with baby strollers, kids, in wheelchair, or with luggage, to give some examples. Differently put, these wider gates are to be used by all passengers departing from the 'standard' passenger's movements that the gates are programmed to respond to. Tickets, either as monthly fares or credit validated upon each entrance, are charged on the smart cards 'SL Access', henceforth

referred to as 'ticket cards'. All but a few metro stations are today equipped with electronic gates from either Automatic systems or Gunnebo[6].

Anthropology and public transport

So, what can anthropology tell us about public transportation in general and metros specifically? J.P Kiernan's (1977) study of urban public transport in South Africa examines commuters' religious practices on a train between a township and their places of work. He emphasizes the relevance of his study by pointing to a lack of anthropological attention to social relations in transportation spaces. Later, in a partially auto-ethnographic essay about the Paris metro, Marc Augé (2002[1986]) made a similar point by calling for anthropology to consider the metro as a field of human relations where urban everyday life is lived. In his book Augé (ibid: 45) devotes a page to turnstiles and writes: "given the current system of control mechanisms, cheating presupposes youth (it is hard to imagine an elderly man or woman flying over the turnstiles in a graceful leap". The Parisian turnstiles resembled the previous ones in Stockholm. Augé remarks that control mechanisms are temporally and spatially situated, which will be shown in this account about gates that do not presupposes youth as the 'cheating' passenger.

Metro networks have gained attention by several anthropologists in recent years. Sadana (2010) studies the Delhi metro, which was inaugurated in 2002. She notes that while the metro offers new means of mobility and the freedom to move for many residents, its spatial arrangements subject passengers to new regulations and rules (ibid: 78). The spatial arrangements shaping the circulation of passengers in Delhi's metro stations are "electronic gates and doors, uniformed security guards, metal detectors, stairwells, potted plants, glass dividers, and metal handrails" (ibid: 81). The first two, as well as glass dividers, are common features in Stockholm's metro stations. Also this metro network, though many years older and well known to most of its users, should be understood as one where people are subjected to rules and regulations. Butcher (2011) examines young people's experiences of using the Delhi metro. The introduction of a new means of mobility has brought about interactions shaping

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[6] The few metro stations left with turnstiles did not meet the conditions required for the electronic ticket gates to be installed. Also the majority of commuter train systems are equipped with electronic gates. I will refer only to metro stations, since it is where my fieldwork has been carried.

subjectivities of young residents. While some of her informants felt empowered by having access to the metro, for other the negotiations of class, race and gender occurring in its spaces made the metro less accessible. Butcher (2011: 248) observes how "incompetence in using its [the metro] automatic turnstiles, for example, was, initially at least, classless, race-less, and gender-less" and connects this to the recent inauguration of the metro and that its technological interventions were new to many. This can be compared to when the first automatic turnstiles were introduced in the Stockholm metro, when the focus was directed toward the new skills needed to deploy the technology, as quotes from the news article mentioned earlier in the background exemplify. As Butcher's (2011) account shows, spatial negotiations are continuously shaping experiences and subjectivities of people, and these are embedded in particular settings.

From a technological standpoint, Fisch (2013) touches upon lived experiences of commuting in Tokyo by exploring how commuter suicides are dealt with. The commuter train operator has put in place an autonomous traffic diagram which anticipates the disorder caused by suicides by reorganizing the dynamic schema according to which the trains run. The dynamic traffic diagram functions to ensure that the running of trains is as little disturbed as possible in cases of suicides. Fisch (ibid: 323) argues that the traffic diagram, rather than dealing with suicides as an irregularity to be prevented, understands these events as a regularity to be dealt with within the system. The diagram as a technological assemblage organizes "heterogeneous realities—time, bodies, and machines—around a margin of indeterminacy constituting a second-nature techno-social environment that is experienced as the natural milieu" (ibid: 321). The 'natural milieu' is the environment of the commuter network where everyday life is lived in Tokyo, similar to in Stockholm for many residents. Fisch (ibid: 329) describes how notes in newspapers about commuter suicides previously included motives and personal trajectories behind the committed act. Today, commuter suicides are commonly referred to as "bodily accidents". The transformation, he suggests, can be understood in relation to how technology "constitutes a machine assemblage organizing material and immaterial flows meshing with the structure of human thought and experience" (ibid: 321-2). The metro gates in Stockholm operate far less autonomously than the traffic diagram of the Tokyo commuter train network. However, in line with Fisch, I consider how encounters in the milieu organized by the technical arrangement influence perceptions of the public transport system among metro users.

Thus far, I have outlined the development of the metro in Stockholm, and how over the years the means to manage residents' entrances into the network have changed. Electronic gates have been introduced in metro station since the beginning of the '00s along with attempts to secure income from ticket fares. By bringing up other anthropological studies of public transport systems, I emphasize that while metro networks are embedded in local settings and cultural differences, there are also similarities to consider. In what follows, I introduce the methodological approach and theoretical stance that have structured this study.

Methodological approach and theoretical framework

<u>**Tracing associations formed around the barriers**</u>

To attend to processes through which the barriers are made, I have applied what Hull (2012: 21) describes as "a methodological focus on associations formed around and through documents (rather than socially defined organizations)". Hull (2012) starts from documents and files, which he refers to as semiotic technologies, to study how bureaucratic processes partake in shaping how the city of Islamabad is constructed and inhabited by its residents. Drawing inspiration from his account, which reminds of Latour's (1987) proposition of looking at processes in which technologies are embedded, I have traced links from the barriers to a range of actors involved with them in various ways. To Hull's sentence in brackets I would add, with regard to my fieldwork, 'rather than socially defined groups of people'. It has taken shape with the lowest common denominator being associations to metro barriers without considerations of persons involved with these as affiliated to particular 'groups'. Similar to Hull's (2012: 31) approach on documents, I describe the metro gates, which are at the center, in more detail than persons whose personal biographies are ignored in this account. I began my fieldwork in mid-September in 2014 by talking to ticket collectors. In addition to numerous shorter encounters, I frequently met with six ticket collectors. During these meetings they shared their knowledge about and experiences of the barriers, which were primarily based on observations from their outlook from ticket booths. Parallel to these encounters I read political protocols from the County Council, documents by SL, news articles, and used Google to search for documents and settings in which the barriers were mentioned.

As I got to know about more actors involved with the barriers, I looked for settings in which they might be present, not necessarily physically, but through associations. A trade fair for passenger traffic was one such occasion, and a citizen consultation for a new metro station another. I have attempted to "visit the places where the papers are said to originate", which has lead me mainly to SL and technicians who work with the gates in Stockholm (ibid: 63). I also got in contact with the manufacturer of the gate, but instead of meeting with them I have incorporated some of their documents into my analysis. Latour (1987: 30) suggests that to attend to the processes through which technologies become black-boxed, one should "go from 'daily life' to scientific activity, from the man in the street to the men in the laboratory". By contacting SL's reception and asking for persons involved with the barriers, I got in touch with an official who invited me to visit their laboratory of barriers. This way, I could literally follow Latour's (ibid: 4) suggestion and enter "through the backdoor" into the making of technology. My limited technological knowledge has partly worked to my advantage as I have negotiated my position in relation to interlocutors through my genuine interest to learn more about how the gates function. However, my lack of knowledge might also have led to certain doubtful technical descriptions of the gates and I hope that my rendering of them do somewhat justice to how they are known to people working with them.

As my interest, in addition to the technical dimension, lies in opening up the gates to look at forms of sociality shaped around them, a major part of my fieldwork has been carried out in metro stations. In addition to talking to metro users I have followed Ingold and Lee's (in Coleman and Collins 2006: 69) suggestion of walking as a method to establish "a ground for affinity" between the researcher and the interlocutor. I spent longer moments in the metro with three metro users, walking in and out of gates. These occasions prompted comments, evoked through bodily experiences, which were difficult to reach by face to face-interviews that tended to become about to what extent the gates prevent unpaid passages. Talking to metro users while having the line of barrier in a shared visual sight has also been a fruitful method to get metro users thoughts and comments on experiences of passing through the gates. My fieldwork has been characterized by what Rabinow (2007[1977]: 79-80) describes as a dialectic between participation and observation. The participatory part, in which I used the gates together with interlocutors, talked with technicians at metro stations, and met SL officials in other settings, has allowed me to observe details of encounters among passengers

and the barriers that I had not been attentive to prior to the knowledge acquired along the fieldwork. While observing these encounters I had in mind the idea of the barriers' components as "mediators", which Latour (2005: 39) describes as being elements that "transform, translate, distort, and modify the meaning or the elements they are supposed to carry". My observations have thus been informed by my interest in understanding how technical components influence passages through the gates, which is observable in the ethnographic chapters where I emphasize the role of, for example, photocells.

Technology has a tendency to be perceived as deprived of political and social dimensions. Von Schnitzler (2008: 917) points to this fact and attempts to "render visible a realm of techno-politics that usually remains invisibly embedded within pipes and meters". She unpacks the politics in which water meters, which have been installed in households in Soweto in South Africa through a governmental project, are embedded. I draw from her work on techno-politics and attempt to find connections between social relations and politics in which the gates are embedded. Hull (2012: 115) writes regarding semiotic technologies that "the larger politics of files is embedded in their material qualities and in procedures". Entering through the barriers requires a ticket validation and in this procedure lies the legitimization of a person's usage of the metro. It is a procedure that I have observed in metro stations and discuss in Chapter Two, which focuses on social relations. In Chapter Three, I discuss this procedure as it was dealt with in a court case, which allowed to open up political dimensions that are less immediate in every day practices in metro stations. The gates are embedded in social relations and politics extending what I touch upon in this thesis, naturally. My 'field' has taken shape, and been limited, through the keywords *public transport* and *metro gates*, with the technical dimension of the gates constantly in focus. The field has also been influenced by the places I have gained access to, such as the trade fair and the laboratory of barriers. I attempted to get access to enter ticket booths to share ticket collectors' view of the barrier milieu. Several ticket collectors invited me to enter, but it would require permission from MTR since unauthorized persons are not allowed. I emailed a request and was told that SL, who through SLL owns the spaces of the metro, would have to decide. The person with whom I spoke at SL informed that it was up to MTR to make an "assessment of the risks" *(riskbedömning)* of having me entering a ticket booth. Turning to MTR again my request was denied, though the communication manager I spoke to explained that an interview with a ticket collector could possibly be organized. I chose to continue talking to

ticket collectors through conversations initiated in metro stations without going through formal channels. The ethnographic material is influenced by the period during which the fieldwork was carried out, which was by the end of the replacement of turnstiles with electronic gates.

Through the character of my fieldwork I have encountered people involved with the gates in various ways. While some are working with them more closely, others prefer to move past them rapidly, such as metro users. Since the gates are located in webs of relations, I deploy the concept of "boundary objects" proposed by Star and Griesemer (1989). As boundary objects, the gates "inhabit several intersecting worlds [...] *and* satisfy the informal requirements of each of them" (ibid: 393). This notion has also a meaning applicable to the ethnographic object at the center. All interlocutors I have talked to in Stockholm have referred to the gates as 'barriers' *(spärrar)*, which emphasizes their role as objects meant to prevent entrances into the metro. By analyzing the barriers as boundary objects, in the analytical sense, I examine how they comply with the purpose of allowing mobility and ensuring security, and how they are modified to avoid collision of these two purposes.

Aull Davies (2008: 231) notes that "withdrawal from the field is not simply a matter of physical distancing; it also involves a degree of intellectual distancing from the minutiae of ethnographic observations in order to discern structures and develop theories". It has been a challenge to distance myself from the field in both ways, since metro stations constitute spaces of my everyday life which have continuously prompted new associations to follow. I have distanced myself from the 'field' by taking the bus whenever possible, where I would not encounter the gates. The central period of my fieldwork ended in January 2015. However, Chapter Three is based on an event that occurred in March which I chose to include since it relates to issues I deal with in the previous chapters, though more explicitly from bringing up a political angle. The character of my fieldwork, including a variety of actors involved with the gates in different ways, can be discerned in how the ethnographic chapters are written. I introduce the reader to particular settings and encounters from my fieldwork and thicken these descriptions with quotes and observations from other encounters as well as references to documents and reports. These descriptions are intertwined with the theoretical discussions that run through the chapters. I take the liberty to bring forward the ethnography in this way,

with less emphasis on relations immediately connected in time and space, since my focus lies with associations formed around the technology (Hull 2012).

Notes on the field and ethical considerations

Appearing throughout the texts are 'metro users'. This heterogeneous group includes people who more or less regularly uses the metro in Stockholm. All metro users I have talked to have been familiar with the metro and use it to various degrees. None of the persons I have talked to have been tourists, in the sense of being in Stockholm for a shorter stay. When writing generally about passages through the gates, I mostly use the term 'passenger' to designate people in the barrier milieu. I have relied on the public environment and the anonymity of people in metro stations and assume my observations as not posing an ethical problem (Aull Davies 2007: 65). I have judged photographing in stations in a similar way and assured that no person is identifiable in the photographs used here.

Organizations and companies are mentioned by their actual name in the text. Persons working at the Traffic Administration are referred to as 'SL officials', since SL remains the word most commonly used to designate the operator of public transport and officials since they work for a political institution. Persons from SLL are referred to as traffic commissioners, since they are politicians particularly involved with the traffic section of the County Council. The company carrying out the technical maintenance work with the barriers is an exception in this regard. Since I have not found their name mentioned in SL's public writings, nor mentioned in newspapers, I chose not to mention it. Persons I have met from this company are referred to as 'technicians'. Interlocutors reappearing throughout the text, and with whom longer conversations are described, have been given pseudonyms.

I carried with me a dictaphone most of the time during my fieldwork but did rarely find occasions where it was a helpful tool. I felt rather like a journalist when I tried to record conversations initiated spontaneously with interlocutors. There were also practical reasons for why recording interviews were problematic. The recorder would not capture only the voices of me and the interlocutor, but all other sounds in the often quite noisy metro stations where

most of my fieldwork took place, in meetings with metro users, ticket collectors, and technician. The one recorded interview was done with a former politician whom I meet at a café. I have relied on a notebook which has throughout the fieldwork been in my hand and served as a 'recorder'. After a day of fieldwork I have been writing out more extensive field notes on my computer.

The choice of stations in which I have made observations varied upon a number of aspects. Some were of practical character, such as if there were benches to sit on and if they were located inside or outside. It has also been influenced by my acquaintance with ticket collectors. It was helpful to know where and at what times some ticket collectors worked since it did not require to decide upon a meeting. On the other hand, the fact that I knew where they were to be found, and their limited possibility to leave that place, made me careful to ask for their approval of me returning at another day to talk more. What Butcher (2011: 249) notes about Delhi's metro stations that "different lines at different times of day can tend towards particular constituencies" is true as well for the metro in Stockholm. I have done longer observations at ten stations which differ with regard to geographical, social, and temporal aspects. Some stations occur more often in the text. Tekniska högskolan, for example, is located next to a university and in a higher class residential area. Bredäng is located in a less affluent residential area of the city where most passengers passing through residing in the surroundings. T-Centralen is the hub where all metro lines pass through and where residents from all over the city mix with tourists and office workers in the financial area.

Other material in this thesis is collected from various kinds of documents from SL, newspapers, technical sheets, and political protocols. Quotations from these, when the original text is in Swedish, are my own translations. Certain expressions and words are rendered in italics in brackets for the reader who is familiar with the actors or expressions referred to in this version. The official documents I have used fall under the 'principle of public access to official records' (*offentlighetsprincipen*). The same goes for the court case which I attended. The protocol of the hearing and court's decision are public. However, I ensured that I got informed consent from the defendants to sit in on the hearing, as well as to use my notes from it once the final decision by the court was announced.

The work with the barriers is spread out among a number of documents, as well as actors. What I present in this thesis is shaped by the persons I have met and documents I have found, and got access to. It also reminds of the character of this study, involving no defined group of people, but a network stretching out in different directions from a technological device. Several of my interlocutors are employees and quotes from these persons are not to be read as immediate representations of an organization or company, but rather as styles of reasoning ongoing within these. I perceive my field notes from conversations to be of little controversial character, but as Hull (2012: 32) notes, information can become controversial in written form and related to a particular analysis. I have therefore chosen to avoid emphasizing links between people and places. For this reason, less attention is paid to people figuring in the text, and more details given to settings in which they figure. There is an ethical dimension to the way I draw together various actors, who are not necessarily known to each other, into one account. Throughout the fieldwork I mentioned to people I met that I was also in contact with other parties involved with the gates. It was a way to make the interlocutors familiar with the character of my study and to be as open as possible about what other perspectives their contribution to my material would be presented with.

The apparatus of public transport

"What gets defined as an "apparatus" is intra-actively constituted within specific practices" Barad (1998: 105) notes, and the apparatus of public transport that I outline has taken shape through my methodological approach. Rather than designating any coherent institution or entity, the apparatus of public transport serves as a concept to analytically grasp the heterogeneous elements that I through my fieldwork identified as involved with planning, manufacturing, and maintaining the gates. Some of these elements were introduced in the background; the regional government SLL, the Traffic Administration, the manufacturer of the gates, law regulations, architectural arrangements of metro stations, and moral propositions expressed through SL's campaign, while others will appear throughout the ethnographic chapters. Elaborating on Foucault's use of the concept, Rabinow (2003: 54) writes that an apparatus addresses a certain problem at a certain time and "can be turned into a technology" used in other settings to address other problems. While the installation of turnstiles in the '80s was addressed as a matter of rationalization by decreasing the number of

employees and increasing the flow of passengers, the recently installed gates address the problem of lost income due to unpaid travels. In line with Rabinow's description, I understand the different arrangements to control passengers moving through the public transport system, which I described in the background, as being expressions of an apparatus' working.

Urban spaces have since at least the 17th century been organized to control the circulation of people, as Foucault (2007[1978]) demonstrates in his lectures from 1978. In one of these he discusses apparatuses of security which aim particularly at controlling the circulation of people and things, which resonates with the barriers' purpose. Pinning down what he implies with 'security', Foucault (ibid: 54) writes that firstly, it "will rely on a number of material givens". The 'givens' are the material conditions of a site where circulation is to be controlled. Secondly, security mechanisms are implemented with intentions to maximize positive elements, while minimizing the negative. This relates to the intended outcomes of the gates, since they are meant to allow mobility for most, while securing income which is ensured by minimizing unpaid travels. Foucault's third point is that estimations of both the positive and negative elements guide the development of security mechanisms, which resonates with how the gates are planned. First, estimations of lost income due to unpaid travels, and consequently the income supposed to be secured by the gates, constitute the ground on which the investments in new electronic gates were made. Second, estimations of peoples' movements and practices of passing through barriers lay the ground for how they are developed. The final point regards the temporal outlook, since security mechanisms are not implemented, Foucault (ibid: 54-5) argues, "according to a static perception that would ensure the perfection of the function there and then, but will open onto a future that is not exactly controllable". The continuous modifications of means to control entrances suggest that no perfection of the technology is in sight. Rather, the possibility to modify the gates constitutes an important part of why they are deemed valuable. They are also, as I discuss in Chapter One, located in a dynamic where the future is understood to be best secured by controlling entrances into the metro today.

In order to discuss how the social, technical and political dimensions of the gates intersect in metro stations I use the concept 'milieu'. It is an emic term used at a few, though noteworthy, occasions during my fieldwork which are discussed in Chapter One, as well as an analytical

term. Foucault (2007[1978]: 55) writes that an apparatus occupied with security "will try to plan a milieu in terms of events or series of events or possible elements […] that will have to be regulated within a multivalent and transformable framework". He concludes: "the space in which a series of uncertain elements unfold is, I think, roughly what one can call the milieu" (ibid: 55). Thus, when referring to the 'barrier milieu' I designate the site constituted by barriers in metro stations. It is from where I have departed both literally and analytically to unpack the technical, social and political dimensions they are embedded in. Interested in the practices and negotiations taking place in this milieu, I approach practices of metro users as formed intra-actively with material and discursive elements of the apparatus of public transport. Barad (1998: 112) argues that "agency is a matter of intra-acting; it is an enactment, not something that someone or something has". In line with Barad's argument, I have, rather than focusing on metro users' thoughts about the gates, focused on how encounters are shaped in and around them. This ties into my understanding of their components as mediators, which have informed my observations of practices in the barrier milieu. For my study it is, in Hull's (2012: 134) formulation, "less important what they stand for than, like tables and desks, how they arrange people around themselves". I show how the gates are continuously in the making through practices emerging from intra-actions taking place in the barrier milieu, which constitute the oscillation between the aims informed by the apparatus of public transport, and passengers practices.

While on the one hand including passengers as actors, the consideration of agency as intra-actions also raises the question: can the electronic gates be said to have agency 'on their own'? It is through ethnographic analysis, such as the accounts offered herein, that the lived experiences that subsist behind this abstract question can be examined. Barad (1998: 116) continues to discuss the matter of nonhuman agency, which I will not further explore in my current analysis, though the question remains pertinent. Human relations remain at the fore of what I am concerned with here, and I examine a technically organized environment to understand how social relations take shape through and around a particular technical arrangement. My interest lies in understanding how agency is not merely stemming from 'within' passengers as individual subjects. By this approach, I do not intend to insinuate that people arrive in metro stations with no preconfigured intentions, nor that metro users' actions are determined by the apparatus working. Conversely, this approach allows to consider how metro users continuously manage to evade the intended functioning of the gates, and that

encounters around the gates regard matters beyond fare evasion which is what they often come to stand for. My analysis ties into what Fisch (2013) suggests about technological interventions as spatially and temporally organizing the circulation of people and by doing this, influencing lived experiences.

In this section I have introduced the methodological approach through which I have collected the ethnographic material. I have also described the theoretical framework that has functioned as a lens through which I make sense of the material. The theoretical concepts I introduced reappear in the ethnographic chapters. In the following one, I introduce the apparatus of public transport currently occupied with the barriers in metro stations. It begins in a trade fair for passenger transport held in Stockholm in October 2014.

Chapter One: Technology in the making

Barriers for mobility and security

> "An advanced city is not one where even the poor use cars, but rather one where even the rich use public transport" – Enrique Peñalosa (2013)

The big name attending the trade fair is Enrique Peñalosa. He has become somewhat of a forerunner for public transport as a supporting pillar for democracy and as a solution to urban issues. The main attraction in material terms is the Scania Exqui.City bus. A murmur goes through the exhibitions hall when it is to be uncovered the first day of the fair, and applause breaks out after it is finally shown. The bus is placed at the center of the hall in a showcase built to resemble a bus stop with the floor before it resembling a pavement. The clean seats and smell of newly fabricated material reveal that it has not yet transported commuters in a city at peak hours. The design of the bus flirts with the current trend among many cities to prioritize tramways as a passenger traffic means. The tramway is going through a renaissance in Stockholm as well, with ongoing investigations of transforming on one of the most frequented bus lines into a tramway (Stockholms Läns Landsting 2015: 144). The Stockholm Transport Museum *(Spårvägsmuseet)* currently hosts an exhibition with photographs of tramway systems in various European cities. The colorful photos from contemporary urban settings stand in clear contrast to the wooden horse carriages and rowboats, used for

passenger traffic in previous centuries, exhibited next to the wall where the photos are placed. In the showcase at the fair, next to the exhibited bus, is a cottage-like house with windows. Visitors can get a peek of the meetings held around the conference table inside the house, where perhaps a city somewhere is taking its first steps toward a new set of transport means during the three days of the fair.

The showcase hosted by the Traffic Administration is the first thing welcoming visitors entering into the exhibition hall. It is rectangular with a wall on the inner long side. On its outer side, along the walkway separating it from the opposite exhibitor, are three television screens showing films about the 'Stockholm negotiation' *(Stockholmsförhandlingen).* It is an agreement between SLL, which will build nine new metro stations the coming decade, and Stockholm and three surrounding municipalities, which are responsible for constructing 78,000 new apartments (Stockholmsförhandlingen 2013). The agreement resembles the investments in the '40s when the metro network was constructed along with a large number of housing. Similar to that time, a shortage of housing and traffic congestions are immediate issues today. On a desk by the inner wall of the showcase are fresh lemonades, vaguely colored red, green, and blue, served. "Which is your favorite metro line?" the person behind the counter asks and invites me to choose from the three lemonades. On both sides of the desk stairs are leading up to a platform behind the showcase. From the platform that composes a walkway around a several meter long square, visitors can look down on a map of Stockholm with the metro network marked out, including the nine proposed metro stations. It is fascinating to imagine all the places and people that will be linked as the metro network expands. Surveying the mobility options of the metro network from this perspective brings to mind frictionless mobility across the city.

Regarding her visit to a conference on prepayment technologies, Von Schnitzler (2013: 676) notes that the water meters protested against by residents out on the streets were in the exhibition hall "no longer objects of anger and complaint, but rather displayed to promote the desire of their would-be buyers". I expected to encounter exhibited ticket gates when walking around in the trade fare among the number of buses, bus seats, ticket machines, and other exhibited objects. There were no gates to be found though, nor were there any seminars on the topic. Due to Stockholm being the only city in Sweden with a metro network, and that it has recently been equipped with new gates, there is assumedly a lack of potential buyers in the

trade fair. Other passenger transport means around the country, such as tramways and buses, are currently not equipped with ticket gates. Automatic Systems, the manufacturer of the new gates, informs on their webpage that they recently visited Intersec, an international trade fair for security and safety, in Dubai. Gunnebo, and also a Swedish retailer of Automatic Systems products, exhibited at the Swedish trade fair 'Protection' (*Skydd)* held two weeks earlier in the same exhibition centre as the one for passenger transport. While one fair gathers elements categorized within a realm of mobility, the other is dealing with a security realm. Such a separation is also present in documents by SL. The barriers are discussed in their yearly reports about securing of income, while less visible in other documents, such as their annual reports, where improvements and statistics of the whole public transport system are described.

| Figure 9. The brochure from Automatic Systems. | Figure 10. The brochure from Automatic Systems. |

Automatic Systems' webpage contains technical descriptions of a number of their products designed for entrance control of passengers. After having failed to find a description of the

particular gates in place in Stockholm, I sent an email to a person appearing in one of the company's brochures about SL's purchase of their products. He replied forwarding a brochure about the particular gate in question, which is a series of products referred to as 'TGH'. Security runs through as a main objective of the gates' capacities in the brochure. The front page includes a photo of the barrier line in the commuter train station Älvsjö, which is the public transport station closest to the exhibition hall (figure 9). Though seemingly nowhere available at the trade fair, the gates are found some 100 meters away in the train station. The photo depicts a person who enters into the walkway and is about to exit through the glass doors. The contours of the barriers are sharp in contrast to the contours of the person assumedly in motion when the photo is taken. The message above the image, "access controlled… future secured", resonates with how Foucault (2007[1978]: 54) describes security mechanisms as working toward a future perceived as best attained by exercising control in the present. It is described in the second page of the brochure how the gates manage to control entrances (figure 10). They have a "high performance anti-tailgating and anti-piggybacking detection", which are terms designating the practice of entering behind another person instead of validating a ticket. At the same time, the gates ensure "high-speed passenger flow". In other words, the barriers are "maximizing the good circulation by diminishing the bad" (Foucault 2007[1978]: 54).

Since they are "plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites", Automatic System's gates can be found in different settings, for example airports, docks, libraries, and borders for immigration control (Star and Griesemer 1989: 393). Their capacities to ensure both the requirements of mobility, foremost what the apparatus of public transport is concerned with being what the metro is to provide, and of security, in the sense of preventing unpaid passages to secure the future of the metro, make them usable also in passenger transit systems. The social worlds they inhabit, separated into different trade fairs, merge in metro stations where the gates operationalize management of residents. The separable though intersecting purposes are illustrated by a metro user. He recalls his reaction when entering a metro station from where the turnstiles had been removed in the period of replacement:

> "I thought damn, the trains aren't running, so I began to turn around and leave. Really weird connection to make, as if the barriers have anything to do with the trains…"

The engineer from Automatic System writes in our email conversation that gates from the 'TGH' series are also installed in the metro systems of Brussels, Lyon and Paris, though, "metro gates for Stockholm have been slightly modified from this standard". Just as Star and Griesemer (1989: 393) note, the gates are "weakly structured in common use, and become strongly structured in individual-site use". A SL official suggests that the moral of payment differs among residents in various cities. "In Hong Kong they only have these low in foam rubber", he moves his hand to hip level to show the height of the barrier, "so it's possible to walk through but nobody does it". He compares this to Stockholm and suggests that its residents have a lower moral of payment, which is why higher doors are needed to prevent people from jumping over them. "Though it's unique for Sweden to have such high doors, it's a political thing" he adds and explains that the most common system is that of 1,30 meters like the electronic gates from Gunnebo. To learn more about the gates from Automatic Systems, I got in touch with an employee from a Swedish retailer of their products. He was not involved with the purchase by SL, which was carried out in direct contact with Automatic Systems, but has worked with their products many years.

> "They [SL] tried with barriers from Gunnebo first but they didn't stop [unpaid passages] at all. They are standard products that you find in offices, they can't be used for metro stations. People don't care about anything in the metro, they smash them [the barriers]. Metro stations require very specific barriers like the new ones [from Automatic Systems], which have a lot of photocells. There are hardly two cities where barriers are alike, they are so very specific […] it is for example not possible to compare Dubai, where I was recently, with Stockholm. In Dubai the passengers have respect for everything."

The technology appears as universally usable when weakly structured, such as in the brochure by Automatic Systems, which addresses potential buyers. When installed in sites for individual uses and in relation between the buyer and the people to be managed, the technology is adapted to respond to the requirements requested in the particular setting (Star and Griesemer 1989). More can be said about how "technologies are enrolled within ethical and political assemblages in historically specific ways" (Von Schnitzler 2013: 675). The quotes above indicate that there are differences among residents' behavior in various cities. Dubai, Hong Kong and Stockholm are arguably cities with different social and political settings, which influence the assemblages in which the gates are enrolled. For the purpose of this analysis, the quotes are taken to demonstrate that the design and functioning of the gates

are meshed with assumptions of social relations and practices. Barad (1998: 102) notes that "the materialization of an apparatus is an open (but non-arbitrary) temporal process". The less structured 'gates', which are found in a variety of places, are consolidated into *metro* gates through the continuous working of an apparatus of public transport. From the links leading to the manufacturer of the gates, I now return to Stockholm.

Two weeks prior to the trade fair, the traffic county commissioner informed in the daily newspaper *Svenska Dagbladet* that SL lacks about 500 million for operating the public transport the forthcoming year (Mellgren 2014). The county council elections were held a few days earlier. The traffic county commissioner explains that the coming government will decide upon the necessary measures to tackle the budget gap, though an increase of ticket fares and a decrease of traffic frequency are mentioned as possible approaches. SL officials, recognizable because of their blue tennis shirts with 'Trafikförvaltningen' marked in white on the back, walk around among visitors stopping by in their showcase. Descending the stairs from the platform from which the extended metro network can be viewed, I bring with me the promising image of increased mobility highlighted by the scenery. To bring up the barriers as a starting point for a conversation feels out of place. Though also in conflict with the scenery of the showcase, the budget gap seems more related since it is about mobility rather than the security aspect in which the barriers are categorized. I catch the attention of a SL official with a brochure about the coming years' investments in my hand. How can it be, I ask her with reference to the news, that there is a lack of money for the public transport system next year, while at the same time the costly investments are being planned? She explains that a temporary administration, 'The administration for an extended metro' *(Förvaltning för utbyggd tunnelbana),* has been created for these investments that are separated from the administration working with the continuous operating of the public transport system. I introduce my interest in the barriers and she responds that she knows nothing about them. Willing to find someone who can give answers to my questions, she sends me to one of her colleagues, who in turn calls for another colleague. As it appears, several SL officials work as consultants for a period of years and are involved with specific projects; one with the upgrading of the red metro line, a second with the green line, and a third with a light train rail. Susan, who works with procurement, is not familiar with the purchase of the barriers, though shares that "it's a bit funny, we have the same kind of barriers at the entrance to the Traffic Administration". Since SL has been wound down with the staff transferred to the

administration, all operational work in the public transport system is carried out by contractors. SL officials recently went to visit the suppliers and companies working with the different transport means "to get closer to the user's experience" Susan explains. She visited MTR, the company running the metro, where they attempt to establish the idea of the barriers as a "welcome line"; probably, she suggests, "to make their employees and passengers more sympathetic toward the barriers". However, not one ticket collector I spoke to knows about this initiative made by their employer. One says "it's probably an idea up there" and nods her head upwards, insinuating that it remains an idea at office level. This is an example of how a variety of actors, from different perspectives, are involved with the gates. It also tells about the character of the 'field' of this thesis, which includes actors and settings spread out across the city linked through their involvement with metro gates.

Some 40 meters away from the showcase of the Traffic Administration, with no signs indicating that they are connected, is a showcase hosted by one of SL's contractors. An Ipad is placed on a pole on the outer corner of the showcase. I scroll through the photos and a representative from the company stretches out his hand to greet and inquires about my interest in their work. I registered online some weeks earlier to get a ticket to the trade fair. When arriving there I get a batch with my name and company – Stockholm University – marked out. All visitors wear similar batches and are assumed to be somehow related to public transport, which informs how contact is initiated among visitors of the fair. I introduce my project and explains that it is about interactions between human and technologies. He browses through the images on the Ipad and describes their work with ticket solutions for passenger transports. Suddenly a photo depicting a line of barriers appears. I tell him about my interest in these devices and am told "well, then you should talk to my colleague".

The colleague, Daniel, informs that there are about twenty technicians working with the maintenance of all barriers installed in metro and commuter train stations. The company has carried out the replacement of the new gates, which is a project to be completed one month later (figure 11 and 12). Daniel explains that the replacement work is carried out in collaboration with a number of other professions, such as smiths, floor layers, and electricians. The term 'barrier' appear as vague when I inquire about their functioning. It is a "'good enough'" term that "does not accurately describe[s] the details of any one locality or

thing" (Star and Griesemer 1989: 410). Daniel describes the term 'barrier' as designating its components like the glass doors and the pillars. Separated from the term, though technically integrated into it, are a computer, the software, and the ticket system. The supplier, Automatic Systems, provides the barrier while the buyer, SL, decides which ticket system to integrate. The current one is delivered by the company VIX, formerly known as ERG. "It happens", Daniel states, "that there is a problem with the computer, but not the barrier". 'Barrier' is in this regard an abstraction that ignores attention to the particularities that the device hold according to some actors. Simultaneously, it includes what is needed to communicate across social worlds what a barriers 'is', namely a device meant to control access.

Figure 12. Replacement of barriers at the Stadion metro station. Photo: by the author.
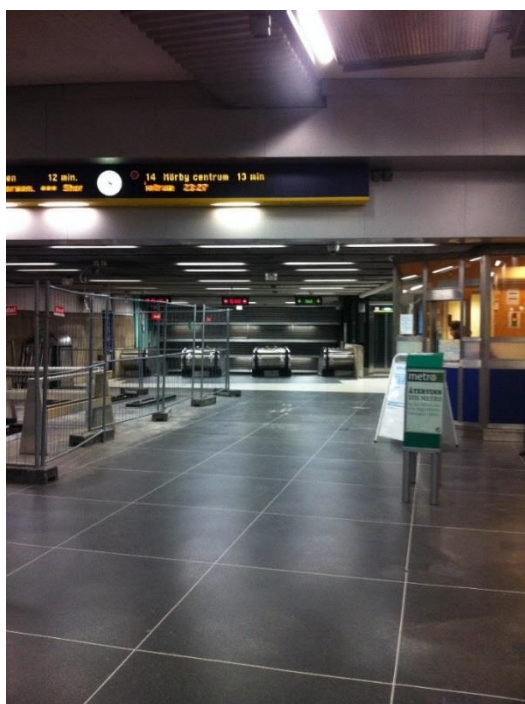
Figure 11. Replacement of barriers at the Stadion metro station. Photo: by the author.

While offering an introduction to some actors involved in the 'apparatus of public transport' through which the metro gates are materialized, the trade fair did not offer any encounters with the gates themselves. Thus far, I have focused on the leading notions of their functioning, namely mobility and security. In order to point to the various meanings they encapsulate, I have proposed that they can be understood as boundary objects. The following section takes place mainly in a laboratory of barriers located at the Traffic Administration. It

deals with events occurring in metro stations that have played a role in the reworking of the barriers.

Security at the expense of mobility

There is a lamp installation above the reception in the Traffic Administration. It is made of three tubes filled with lamp diodes in red, blue and green. The tubes intersect at one point. Of the different transport means that are part of the public transport system, the metro seems to be the jewel the way it is integrated in settings organized by SL. Next to the reception is a low and well cleaned gate consisting of glass doors, on which 'Trafikförvaltningen' is marked in white. If the same applies here as with the gates in the metro, one is not inside the administration before having passed through the gates. James arrives from inside and makes a subtle halt before the gates open up for him to enter into the reception. Aside from the receptionists, I am the only woman among a number of men waiting for our hosts in the reception entrance and he has no difficulty identifying the person with whom he spoke on the phone some weeks earlier. James is mainly working with a particular component within the gate, but in our phone call he invited me to visit their lab this day in the end of January, which is also by the end of my fieldwork. Once inside the gates, we enter through a door to the right and pass through two electronic gates. They are probably the one Susan mentioned at the trade fair. They are not identical to those in the metro, but function according to the same principle with retractable glass doors between two pillars. A note is scotched onto the glass plate, with a text urging the entering person to be careful with cups with liquid when passing through, since the gates 'do not appreciate getting wet'. Another official waits by the elevator and seems surprised when we are not entering together with her as it arrives. "We are descending" James informs and as we wait for the next elevator he asks me if I remember the tripod turnstiles and immediately adds "are you from Stockholm?" The question is common in this capital where a lot of people move in from other places. The growth of the city is often apprehended in terms of public transport; two buses of people move here every day. "I'm from Gothenburg, so I grew up with the trams" I answer, though add that I am familiar with the turnstiles. Gothenburg's urban topography is characterized by trams puffing through the city with ticket readers placed inside the carriages. "Ok, so you know them" James certifies and explains that he thought the turnstiles were working fine. "It was a political decision to replace them" he says and points to the fact that the SL's work is politically regulated. The

most recent electronic gates have been much debated, and he is among several other persons I talk to who work with the barriers without necessarily expressing support for, nor opposition against, their presence in metro stations.

We descend one floor with the elevator and exit into a compact basement corridor without windows. Light is provided by fluorescent lamps and along the white walls are folded cartoons and a forsaken office chair. I glimpse the back of a person turning left some meters ahead of us where the corridor splits in two. When we arrive there the person is gone, which leaves a desolate impression of the basement. Adding the colleague's surprise of us descending with the elevator, this place does not seem to be visited by the many officials working on the several floors above us unless it is necessary. We turn right and James opens up a door: "so, this is it, the 'laboratory of barriers'" *(spärrlabbet)*. On each side of the room are ticket gates with two walkways each. Between them are two desks on which hard disks, computer screens, and a reader for SMS-tickets that has recently been installed in booths in metro stations, are placed (figure 13). The order of the room gives reason for it being called a laboratory and it seems to have been recently used with the office chairs facing us where we enter, as if someone simply stood up and left the room. Sadana (2010: 78) describes being in the Delhi metro as an "all-encompassing sensory and spatial experience with its air-conditioned comfort and hi-tech surveillance". Being in this lab is similarly an all-encompassing sensory experience, though differing from metro stations, since no light, sound, or wind, enters into the room. It is like a vacuum. The gates, which in metro stations make up a line one has to move through, here are placed in the middle of the room and can be walked around, though the space left in between them and the wall is narrow. Rather than boundary objects, in the sense of constituting barriers, they here appear as technology ready to be rearranged.
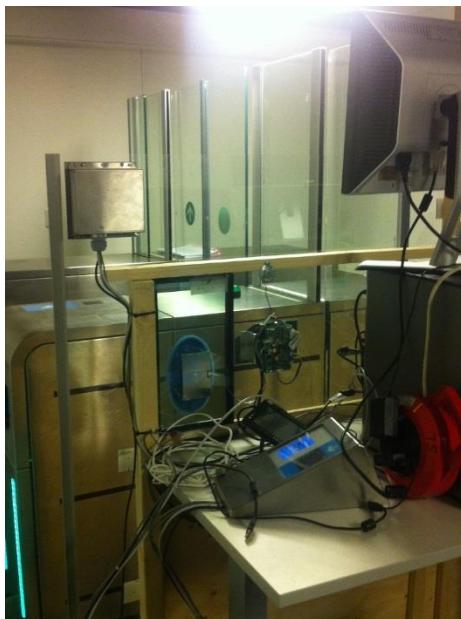
Figure 13. A gate from Automatic Systems in the laboratory of barriers with a SMS reader placed on the desk. Photo: by the author.

James explains that they continuously try out new settings to improve the gates. To do this, they bring down colleagues from the upper floors of the building. The intention is to make the situation remind as much as possible of how they are used in metro stations, so the colleagues walk around and around to cause pressure on the gate, "and some fare-dodge", James adds. Behaviors of people both validating and trying to evade a ticket validation are considered when the barriers settings are adjusted. All possibilities, "some positive and others negative, will have to be built into the plan" (Foucault 2007[1978]: 54). When a change of setting is decided upon, a regression test is made to ensure that it does not influence the functioning of former settings of gates in place in metro stations. Thereafter, the suggestion is sent to the SL official in head of the barriers who make the "go/no-go" decision before it is implemented in the "barrier milieu", James explains. The term 'barrier milieu' *(spärrmiljö)* was also used by another SL official and appears for the first time in SL's annual report from 2013. The term indicates that the barriers are not merely technological devices, but constitute a particular environment. Sorted out as constituting a specific milieu, they seem to be understood by SL as separated from other spaces in the metro. The term appears in SL's most recent published report on cheating in the phrasing "to survey the occurrence of cheating in the barrier milieu,

an observation study of entrances has been made in 14 selected metro stations"
(Trafikförvaltningen 2015: 16). The meaning of the term in this use coincides with how
Foucault (2007[1978]: 55) describes security apparatuses regulation of a milieu with a
"multivalent and transformable framework". The barriers are, as the work in the laboratory
illustrates, transformable, and as boundary objects, multivalent. SL's observations of cheating
in the "barrier milieu" highlights that technical and social dimensions intersect in this space.
The conclusion from the observations, in preselected stations, is that cheating is most frequent
in outer stations on the red and blue metro line. These stations are located in residential areas
with less affluent households and is suggestive of the barrier milieu as influenced by the
composition of people using a station. One ticket collector, who I meet in Backeberg metro
station on the green line, problematizes perceptions of the differences among stations by
describing an observation from the centrally located metro station Gamla Stan.

> "Many people seem to think that it is mainly young guys, immigrants, who fare-dodge, but that's
> not the case. Every day in Gamla Stan I saw this man with an attaché bag entering behind other
> passengers but nobody saw him. The office workers are not seen, people only see the others [the
> young guys, immigrants]"

In March this year, ticket controls were intensified in the selected stations (Ritzén 2015). The
2015 amendment has been implemented, thus leading to an intensified presence of the police
along with ticket controls (SFS 1977:67). This is noteworthy, since it shows how the barrier
milieu is a setting for struggles which can be understood from different perspectives, though
beyond the scope of this study. When James in the laboratory of barriers refers to the barrier
milieu, he implies that the technological devices in the lab differ from those in metro stations
where social dimensions enter.

I try out the barrier from Automatic Systems placed to the left in the lab. We search for the
ticket cards they usually have laying around at the desk for tryouts but cannot find any, so I
use my own ticket card. I put it toward the reader half a step into the walkway and the doors
open up, though considerably slower than they do in metro stations. "It's a hint that you are
not supposed to be there, that you should stand further out" James informs. When the barriers
were installed at T-Centralen, the busiest metro station, long queues emerged. SL sent
observers to the station to find the cause of the queues and it was concluded that people
entered into the walkway before putting the card toward the reader. This practice resembles
how the earlier turnstiles were used. Passengers, while swiping the card, would in a

continuous movement walk forward to push the tripod and make it rotate for the passage to be completed. The electronic ones are made to require no physical contact between the passenger and the materiality of the gate besides when a ticket card is put toward the reader. This was brought up by Daniel at the trade fair. He explained that he has been "working too much" *(yrkesskadad)* with the barriers and now always stops the milliseconds it takes for the reader to send the signal to the computer of the barrier, which in turn steers the mechanism opening up the doors, before entering the walkway[7]. What happened in T-Centralen metro station was that people validated the ticket simultaneously as walking into, or once inside, the walkway. Along the inside are photocells that, when detecting a body unconnected with a ticket, deactivate the reader. This measure had been made to prevent tailgating. But, "making and using particular instruments in a lab does not produce whatever results are desired" (Barad 1998: 108). This measure, aimed at allowing only validated passages, resulted in queues because people entered the walkway, tried to validate their ticket, exited the walkway to redo the procedure and thus stemmed the flow of entrances. It was decided to negotiate the balance between the mobility of passengers and the securing of income. Ticket validations were enabled also as a passenger is one step into the walkway. The photocells closest to the doors still block the reader in when a body unconnected to a ticket is detected.

Another set of events that led to readjustments are brought up by James.

> "There was a period, maybe you heard about it, when a lot of people got hurt. We went out to observe if people really got hurt or if it was just that they were complaining because we installed new barriers. And people really got injured. Besides that, it happened that people got squeezed and lost their phone or something, and then that became a case…"

From 2010 and the following two years, along with the installation of the gates from Automatic System, reports on injuries caused by barriers increased. When I ask metro users about their experiences of the gates memories from this period are repeatedly prompted. One metro user comes to think about the son of the librarian at the university where she finished two years earlier. "He was badly hurt by the barriers and had to go to the hospital for several days, his lung was almost punctured it was really bad", she remembers. Another user describes how he is uncomfortable with passing through the barriers because "I was squeezed

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[7] The quote demonstrates that persons working with the barriers are also potentially 'metro users', though what they are saying in this thesis is taken as an expression of their position as actors involved with them in other ways.

one time, it really hurt I guess I was too slow when walking through but it really hurt, I never reported it though…" Yet another person describes how his friend avoids the metro since her child saw her being injured by the shutting doors and is now afraid to use them. Representatives from SL responded in newspapers to the critique raised during this period. The CEO of SL assured that also he had been lightly squeezed by the doors, though concluded that the new barriers "constitute a well-considered system with many good sides" and suggested that the incidents with injuries might be due to "people's behavior" (Ritzén 2012).

Initially, SL stated that they should have better informed passengers about how the barriers are meant to be used. The first measure to prevent injuries was communicative and presented as an information campaign. SL also tried out colorful stickers placed on and around the barriers in some stations to clarify how to go about when passing through. The CEO explained that "if you are calm and harmonious when passing through it always work […] some of the incidents have been caused by the passengers themselves" (Rolfer 2012). The instructing measures are comparable to the list of 'dos and don'ts' in the Delhi metro which urges passengers to "do stand in queue" and "don't jump over the ticket barrier" (Butcher 2011: 254). Butcher (2011: 243) suggests that while such a list can be understood as helpful given the recent inauguration of the network, it is also an attempt "to construct a certain subjectivity in line with how a population in a modern city should behave". SL's attempts to teach passengers how to use the gates were to a large extent criticized and ridiculed with an inverted reasoning: instead of the passengers changing, the barrier should be improved and treat passengers better. Their capacity to jam passenger was also joked about. As one metro user suggested, "they sort people out, everyone from the country side coming to Stockholm are cut, because you have to be quick to make it here". "Speed of entry", as Butcher (2011: 249) points out, is an urban competence required to be able to navigate smoothly through the spaces of the metro.

In the beginning of my fieldwork I meet Sofia, a former traffic commissioner. I had seen her name appearing in political protocols from the last years and got in contact with her through an acquaintance. Sofia opposed the investment in new gates during her term in office and questions the extent to which they prevent unpaid entrances. She compares the situation to

Berlin and Copenhagen, two metro systems with open entrances, and explains that "fare evasion is not more common here than there". Instead of barriers that complicate entrances and constitute a border between different means of transport within the public network, Sofia argues that more "flying controls" *(flygande kontroller)* should be carried out aboard trains. "It doesn't matter what you say, they have decided this [purchasing the new electronic gates], that we go for that and they went on with it" she remembers the discussions in the Traffic Commission leading to the purchase. One reason for the resolution among the parties arguing for the barriers might be related to what an SL official describes at the trade fair. From his over two decades of experience from working in SL, he explains:

> "Colleagues from other cities and countries have no problems at all with fare-dodging when you meet at trade fairs during the day, but then we grab a beer in the evening and it all comes out."

I ask if there is prestige involved and he affirms with a nod. SLL's vision is that an "attractive public transport within a sustainable transport system contributes towards making Stockholm Europe's most attractive metropolitan region" (AB Storstockholm Lokaltrafik 2013). Firm measures against fare evasion, which the investments in new gates are meant to signal, are to some extent a matter of positioning the city in relation to other cities through its public transport system. Sofia remembers the period during which the new gates became known as the 'squeezing barriers' *(klämspärrar).* "They were in despair because they had claimed the barriers were so very good, and we were just like, no…" she says referring to the traffic commissioners having supported the investment.

Eventually, SL decided to slow down the interval with which the doors closed to allow more time for each passenger to pass through. The decision was publicly announced and technicians went to all stations and changed the settings barrier per barrier. The number of injuries immediately decreased and the storm against the 'squeezing barriers' ebbed out. The risk of them squeezing passengers is recognized at the Stockholm Transport museum where a barrier from Gunnebo is exhibited. It is placed in the middle of a room with ample space around it. Inside the walkway is a plasticized orange note with black bold letters addressing the museums visitors, many of whom are children; 'risk of being squeezed' *(klämrisk).* Instead of requiring a ticket validation, the doors open up as soon as someone enters into the walkway. When I visit the museum, a child about five years old runs through the barrier,

around it to the entrance, and through the walkway again and again. "Be careful!" his father shouts.

In the laboratory, James concludes that "it was decided to take on a nicer approach" regarding the changed speed of the doors. "Part of why they were so aggressive in the beginning was that they closed faster", he states. These adjectives – nice and aggressive – are also used by metro users I talk to, which is suggestive of the barriers as boundary objects not merely differently understood by various actors, but also sharing features across the social worlds (Star and Griesemer 1989). Daniel, as a technician involved with the change of settings, explains that "SL decided to slow down the doors, so more people can fare-dodge, but it was said that 'rather give people the benefit of the doubt'". His remark emphasizes that perceptions about passengers are incorporated into the technical considerations of the doors' speed. Slower speed implies more trust in passengers' willingness to pay. Metro networks without gates, where tickets are validated on ticket readers placed on separate posts such as in Berlin and Copenhagen, are commonly described as having an 'honor system'. "The process of developing technology is thus not merely a mechanical process, but inherently social and moral", as Von Schnitzler (2008: 912) notes. The key part in her phrasing, in relation to what I discuss in this chapter, is 'the process of developing technology', since this process seems to be constantly ongoing when it comes to the metro gates.

Prior to my visit in SL's lab I met a technician, Sergio, in T-Centralen metro station. It is a weekday afternoon less than a week before the Christmas holidays are to begin and the station is packed with people. The exits of the entrance hall leads to Sergels Torg, the city's central square around which several shopping areas are located. People swarm through the entrance hall, some more skilled than others in zigzagging through the crowd to avoid collisions. The many shopping bags hanging in their owners' hands add to the messiness of movements. Sergio stands next to a walkway in which two of his colleagues are kneeling. From a distance it looks empty and several passengers arrive right at it before noting the two technicians in the middle of the walkway who have their attention directed toward the internal components of the open barrier pillar. The passengers make a turn and negotiate their way into the crowd of people lining up to exit through the walkways next by. "It will kill us…" Sergio jokes. He explains that new problems appear with the barriers "like aliens", and that to find the problem

with this one, broken since several days, it will take a year. There are about 1400 barriers spread out over the 100 metro stations and the additional commuter train stations. The broken barrier at T-Centralen is an example of how the barriers constitute no coherent entity, but each one functions independently from the next. For a passenger to be let through a gate upon a ticket validation, the internal components of that particular barrier ensemble have "to act as one", which make of it what Latour (1987: 131) terms a "black box". Sergio refers to the barrier from Automatic Systems, made from steel and metal, as "the soft ones" in comparison to those from Gunnebo, all in steel, which there are, he says, less problems with. In passing he mentions that "now they have one of each gate at Lindhagensgatan", which is the street where the Traffic Administration is located. I ask him why that is, since they are an administration and not involved with the operational dimensions of the public transport. He answers:

> "I guess they want to know more about them. They have their own engineers who work with them… but they enter unknown territory. If SL changes contractor now there will be chaos…"

The company carrying out the maintenance work is contracted by SL during a determined period of years. The contract has repeatedly been prolonged and no other company has worked with the electronic gates, which means that the knowledge about them lies mainly with the technicians who work with them daily. I return to my field notes from the conversation with Sergio when the fieldwork is completed. In the metro station I did not pay more attention to it, but after having visited the place that he was referring to, the quotes appear as pointing to an important dimension of the technology in question. Latour and Wolgaar (1979) examine how scientists make scientific facts in a laboratory setting. Once outside the laboratory setting, the scientific facts become established as "ready made science" (Latour 1987: 4). The laboratory of barriers does not comply with the idea of a laboratory in which technology is in the making, before being installed in metro stations as 'ready made' barriers. What is going on in the laboratory is to a large extent in response to what happens in the barrier milieu. The technicians, whose "ability lies in multiplying the tricks that make each element interested in the working of the others", are active in metro stations (Latour 1987: 130). Sergio and Daniel's descriptions of their work suggest that the two gates in the laboratory are not representative of the heterogeneous set of gates spread out in metro stations. Rather than the laboratory of barriers, it seems as if metro stations constitute the setting in which the technology is foremost in the making. It is through the everyday practices of passing through gates in the barrier milieu that events occur that are thereafter dealt with in the lab in order to find settings that improve the barriers' capacities to fulfil their purposes.

This chapter set out with the aim to outline an apparatus of public transport that plans and fabricates the barrier milieu. I have shown how the development of the technology is guided by, on the one hand, the purpose of the gates, and, on the other hand, passengers' practices of using them, which the events described in this chapter are examples of. The development can be understood as guided as well by the search for a balance between the conflicting purposes of them to both secure income and facilitate mobility. While the work carried out in the laboratory of barriers reflects this interplay, metro stations constitute the sites where the tension is played out in encounters among passengers and the technology. I suggest that metro stations can be considered laboratories, since they are the places where development of the gates are prompted. They are the places to go in order to see how the gates are in continuous making in not merely technical terms, but also social. The following chapter takes place in metro stations and picks up on the last words in Von Schnitzler's (2008: 912) formulation, namely that the development of technology is "social and moral".

Chapter Two: Social relations in the making

Negotiating mobility in the barrier milieu

The doors separating the street from the entrance hall of Skanstull metro station slide open. A man enters with a carriage stuffed with a mishmash of plastic sacks. It bumps down the four steps leading from street level to the entrance hall. The doors remain open for people arriving after him. Chilly winds enter, until the doors close and shut out the wind as well the sound from the busy street with commuters in cars this Friday afternoon. The man stops two meters ahead of the line of barriers. He fishes up a ticket card from one of the large pockets of his beige, well-used coat. A woman and a man walk by him and the woman puts her wallet toward the reader. The gate does not answer and while she takes out her card and put it toward the reader anew, her company in a blue jacket, in what looks as a polite gesture, signals to the man in the beige coat that he can enter before him. Where they stand only one barrier is for entrances, the others only for exits. The beige coat recognizes the offer with a nod though gives no signal as wanting to accept it. The man in blue jacket continues forward and when he enters the barrier walkway a third man in a black jacket catches up closely behind. The doors begin to close after the blue jacket has passed through but reopen as the

black jacket arrives. When he is between them, he puts his arms toward the doors, turns around and asks the man in the beige coat "are you joining?" He nods affirmatively in response. Once he gets the carriage into the walkway the man in black jacket moves forward. When the man in beige coat carriage exits he stops in front of me standing two meters away on the inside of the barriers observing their cooperation. Still with the ticket card in his hand, he informs me with a blink that "there is money on it". I return the blink. He continues forward to the escalator and enters it some steps after the man in black jacket. The latter turns around, looks upward the descending escalator and sees the man struggling to get the carriage in balance. "Can I help you?" he offers. The relation that began in the barrier walkway continues as the two men are brought down by the escalator to the platform, from where the train awaits to move them further throughout the city.

When describing what I observed in Skanstull metro station to another metro user, Alena, she shows no surprise. "Of course, I always try to help people through" she responds. "How do you know who wants to get through?" I ask. "You'll notice, it shows" she assures and explains that usually a smile toward people standing in the entrance hall is enough to signal that she approves of them entering with her. Alena has grown up in Stockholm and is familiar with the debates and the events in which the electronic gates have taken center stage. She concludes that "we're all in it together", with 'all' implying metro users. It seems as if her take on 'together' has a different meaning than the one SL aims at bringing forward through their slogan 'together it all works'. The slogan plays with the collective dimension of public transport, which by its nature is a shared transport means. In the setting of the website 'shop of fines', where passengers are encouraged to vote for what they wish income from penalty fares to be used for, the slogan implies that every metro user should pay for their ticket to make the metro work. Encounters between passengers in the barrier milieu are mediated in ways that allow for the intended meaning of the slogan to be transformed (Hull 2012). The cooperation among the two men, seen in the light of what Alena says, suggest that a moral position emerges in the barrier milieu through the door-like quality of the gate. One does not need to stay in a metro station for long to observe similar kinds of cooperation among passengers.

One afternoon in Liljeholmen metro station two guards, dressed in yellow vests with 'security guard' *(ordningsvakt)* marked on their backs, arrive from the platform. Liljeholmen is a traffic

junction where several public transport means intersect and where the red metro line departs toward two terminal stations southward. It is usually a busy station, but this Friday afternoon is calm and after a round in the entrance hall the guards return in direction to the platform. When arriving at a barrier one of them puts a card toward the reader. He enters and his colleague right behind casts a glance around in the entrance hall – only me, the ticket collector seated in a booth opposite the barriers, and two persons arriving through the entrance door are present – before following his colleague closely behind through the gates. The doors, retracted into the barrier pillar, close when they are both through. On top of the barrier pillars are glass plates in the same height as the doors that make the glass wall complete when the doors are closed. Stickers are placed on many, though not all, of these glass plates around in metro stations. The stickers depict an arrow and an image of a ticket card with the text '1 passenger, 1 card' *(1 resenär, 1 kort)* on each side of it (figure 14). The message of the sticker informs about the supposed use of the barriers. Correlated with the way the guards walked through, they point to the "slippage between classifications and standards on the one hand, and on the contingencies of practices on the other" (Bowker and Star 1999: 293).

Figure 14. The sticker places on glass plates on a barrier pillar at T-Centralen metro station. The blue rectangle is the ticket card 'SL Access' on which fares are charged. Photo: by the author.

In T-Centralen metro station at rush hour, there is a steady stream of people moving through the line of barriers. Or as a technician expresses the situation in this station at morning hours:

"the doors never have time to close, first one passenger passes, and thereafter a hundred…" Though Stockholm is a city with far less residents than Tokyo the same applies; the metro is "providing the primary means of transportation" and shapes "the rhythm of urban life" (Fisch 2013: 321). The queues caused by the electronic gates when they were first installed in T-Centralen, which James told about in the lab, disrupted this rhythm. The new settings allow for movements through them to happen at a steadier pace. While many passengers make a slight halt to validate their card, some swipe it rapidly over the reader without hearing the beep that signals that the card was properly validated, and others move through without picking up any ticket card at all. One metro user describes how she, particularly in rush hours, usually moves through the gates behind the previous person. Having moved from Gothenburg with its tramway without barriers, or fast pace, she states: "I have become part of the 'Stockholm-stress' now, I try to save seconds and it takes too long to bring up the card at every occasion". Her strategy is to reach out her bag before the doors close behind the previous person so that they remain open. Though far from all passengers skip validating their card when using the metro in rush hours, it is common. This does not necessarily mean that they are to be counted as unpaid travels, since presumably a majority of the commuting passengers have monthly fares charged on their ticket cards, which means that their travels are paid for in advance independently of how they pass through the barriers. The various examples of how people negotiate their way through the line of barriers can be understood along the lines of what Barad (1998: 112) writes; "even when apparatuses are primarily reinforcing, agency is not foreclosed".

One midday on a bench before the barrier line in Tekniska högskolan metro station I meet Reza. It is a bench on which I spent several days during my fieldwork observing and talking to metro users and employees of MTR. Reza is a retired air plane engineer and sits down on the bench for a moment to watch people pass by. A man with a baby stroller arrives and enters through the wider barrier. His child, one meter behind him, turns around to look for her mother who is pregnant and arrives at slower pace some steps behind. The child, about 4 years old, turns back toward the glass door, which is still open after her father's passage. She looks puzzled. She will end up on one side of the barrier with just one of her parents no matter what she does. Dressed in a winter zip suit which makes her movements ungainly, she takes off and runs into the walkway. Upon seeing this her mother grasps for air and is about to utter something which turns into a loud sigh when the doors close right behind her daughter. When

the father turns around and realizes what just happened he gets eye contact with the mother and they shake their head, relieved. When seeing her parents post-worry about the danger she put herself in, the child smiles innocently, though with an adventurous glimpse, at her mother who arrives at her family. They unite and move forward to the escalator. The barriers in metro stations are less child-friendly than the one in the Stockholm Transport Museum. Here, they do not open up merely as someone enters the walkway.

I dot down some sentences in my notebook about the child running through the gate. Reza notes this and suggests that I seem to sit there for the same reason as him. When I explain my interest in the gates he comments that automation is all the more taking over at the expense of mechanics in society, and argues that photocells have an important role in this development. They probably function as light sensors he explains regarding the photocells along the inside of the barriers, and when the light between them is broken, they know that someone is present. "So when one person walks in behind another, the door closes so that the person gets caught" he says and smiles. He points above the sliding doors by the entrance into the metro station. "You see the black thing above the doors there, it's photocells which feel when someone is getting closer". In comparison to those of the entrance doors that are set to open up as soon as a body is detected by them, the photocells of the barriers are working in two different ways. The technical sheet by Automatic System describes the photocells as serving two purposes; security and safety. The ones for security ensure that only one person at a time can enter through and thus operationalize the aim to secure income by making the doors close at the right moment. The other set of photocells ensure the safety of passengers as they move through the doors that in the sheet are referred to as "movable obstacles"[8]. On the one hand, the description informs that contradicting values are incorporated into a barrier that functions both as a door and as an obstacle (Star and Griesemer 1989). On the other hand, it explains how the openness of the doors can be negotiated. The photocells are described in the technical sheet as intermediators that carry out particular ends. At work in metro stations they are mediators deployable in multiple ways whose purpose is transformed in encounters with passengers (Latour 2005: 39).

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[8] The information about the photocells functioning is derived from Automatic System's technical sheet of the gate 'TGH810'. In metro stations, TGH810 is recognized by their slightly wider walkway than TGH800.

The photocells closest to the doors, on both sides of them, constitute what by SL officials and technicians is referred to as the 'safety zone' *(säkerhetszonen)*. Part of why injuries were more common in the beginning of their installation was that photocells closer to the doors were set to carry out 'security'. They then ensured that the doors shut closely behind the person having validated a ticket. As described in the previous chapter, this setting resulted in injuries, and more photocells were therefore added to ensure safety, in addition to slower down the doors. This means that when a body is detected by a certain set of photocells close to the doors, they will remain open to prevent the person from being squeezed. The retailer of Automatic Systems products states that the gates will never completely prevent people from entering through as long as people do not respect the barriers since "the barrier cannot kill anyone who is about to cheat, the safety impulse takes the lead before the closing mechanism". Though safety is not 'negative' in itself – surely no one wants people to get hurt by the barriers – this quote points to the necessity of planning the technology in response to both desired and undesired practices.

It seems important to consider the conditions of how passages can be carried out set up by the photocells, in line with what Hull (2012: 134) suggests about looking not merely at what technologies stand for. Most metro users I talk to are familiar with the fact that the barriers' doors close slower now than earlier, which is often expressed in terms of the doors as being "nicer" now. Few metro users are however familiar with the photocells' role in determining the doors' closing in relations to passengers movements through the walkway. Some passengers are though, which was mentioned by one SL official who recalls having observed "old ladies who know how to localize the photocells with their sticks". This observation suggests that the current control mechanism, in comparison to the Parisian turnstiles in 1986, allows also for "an elderly man or woman" to cheat (Augé 2002[1986]: 45). The SL official suggests that, contrary to the intentions, the possibility to influence the photocells and the period of "aggressive doors" have "decreased the moral of payment" among passengers. Perhaps a reason for the possible decrease of willingness to pay is explained by the rhetorical question posed by one metro user: "why should I respect the barrier, if the barrier don't respect me?" The purpose of the barrier seems to be distorted when its technical components mingle with social relations.

I have in this section described how photocells are continuously modified to respond to passengers' practices in the barrier milieu. These modifications to optimize the functioning of the barriers are examples of how the barriers are located within ongoing processes. Most of these modifications are never communicated to metro users which is reasonable in one way and presumably most passengers lack interest in knowing the details as well. Principally, the barriers should deliver the expected output when a ticket is validated so that one can rapidly get through and catch the train, which is the motive for interactions with them. However, a photocell's purpose of either securing or to ensuring safety has immediate consequences for interactions among passengers, and their bodies, since these purposes condition how passages can be carried out. In this section, I have also emphasized that metro users in intra-actions with photocells influence the openness of the barriers (Barad 1998). By juxtaposing situations where people hold the doors open for each other with the slogan by SL, which points out a shared responsibility for the public transport system, I suggested that the negotiations in the barrier milieu have moral implications. I will continue to discuss these moral implications in the following section.

Negotiating security in the barrier milieu

The street leading to Slussen metro station is reserved for pedestrians. This day, the stores along the street display their gift offers and wish 'Merry Christmas' on colored sign boards. It is afternoon and night is falling. People pass through the street at a fast pace. Heads are bowed, hovering under the large, watery, falling snowflakes, and lifted just enough to avoid collision with fellow pedestrians who cross over the street between the stores, interactions which Hannerz (1980: 105) calls "traffic relations". Relations are similarly managed in the stairs down to the metro station where people are "taking the end position of the queue as one arrives, without crowding the individual immediately in front" (ibid: 105). When entering the entrance hall, I notice two persons standing in the middle of a walkway. It looks odd since passengers would not stop to chat in the middle of a barrier. When using the stations as a meeting point, people usually stand along the walls in the first part of entrance halls, or sit down on benches in case there are any. The woman who entered first into the walkway is stretching out her arms trying to stop the man behind her from entering. She firmly says "stop, stop". The man backs out of the walkway. The woman continues through and the doors shut right before she exists the walkway. A third person, a young woman who was preparing to

pass though behind the other two, quickly moves to the adjacent barrier when seeing the dispute. When she notices that the man is behind her, she puts her hand toward the retracted door and gives him a moment to catch up. I end up next to the man in the escalator and ask him what happened up there. Noticeably affected by the situation, he repeats "it's so embarrassing when it happens, so embarrassing, she tried to stop me… It's so embarrassing". After the escalator brought us down to the platform, he moves on and merges in among the crowd of passengers of which also his earlier opponent is part. A similar incident is expressed in a tweet by a metro user who writes "stayed inside a barrier so that the fare-dodger couldn't fare-dodge. Another passenger helped the person to #fare-dodge hopeless!" (figure 15). This tweet, a comprised version of what happened in Slussen, illustrates how the gates put passengers in positions where two alternatives emerge: should I help, or hinder the following passenger to get through the gate? The technology does not determine how people go about, but sets the conditions for what practices that can be carried out (Barad 1998).

Figure 15. "Stayed inside a barrier so that [the] fare-dodger couldn't fare-dodge. Another passenger helped the person to #fare-dodge hopeless!" Tweet by anonymous metro user.

The platform of Bredäng metro station is placed on a concrete bridge which lifts the metro rails above Bredäng centrum, the central square of the neighborhood. One week before I arrived in this station, the turnstiles were removed and replaced with gates from Gunnebo. A technician mentioned that his company has a number of gates left over from previous

replacements in a garage. Instead of purchasing new barriers from Automatic Systems SL for this station chose to gets left over from previous replacements, probably to save money the technician suggests. There are a number of benches placed inside the sliding doors separating the outside platform from the entrance hall in Bredäng. I sit down on one of them and talk to Mona who is waiting for the train toward Norsborg with an empty bag to be filled with groceries. She shares her thoughts on the new barriers.

> "They're better than the earlier ones. At least people don't jump over. Yet. But they will always find a way. You have to make halt once you've past through so that they have to pay for their own ride if you don't want to offer one. It happened to me once in Gamla, someone walked through behind my back."

Mona assumes that the new barriers will not hinder people from entering through, and argues that one have to participate in making them prevent people from entering. Her strategy to make halt and with her body blocking the walkway can be understood as an enactment of the barriers functioning. When the barriers fail to fulfill their purpose of stopping passenger who do not validate tickets, metro users can operationalize that purpose. Apparatuses are "constituted through particular practices that are perpetually open to rearrangements, rearticulations, and other reworkings" (Barad 1998: 101-2). Thus far, I have mainly described how the technology is rearranged by people working with its internal components. The strategy of making halt to prevent unpaid passages suggests that as well metro users through particular practices rearticulate the working of the apparatus.

I will pick up on another thread in the quote. Mona describes feeling as if she is offering a ride to the fellow metro user entering through the gate opened by her ticket. SL launched a campaign in the beginning of this year that can be connected to her feeling. The campaign depicts a car made to look like a metro carriage on a paved street in front of a house facade (figure 16). The destination, Liljeholmen metro station, is displayed in the front window. The additional text encourages people to "make a trial run with our cheapest model. Private leasing for 790:- per month", which is the price for a monthly ticket fare for the public transport system. The campaign plays with the idea of the metro as being a car, which brings associations to an individual transport means and contradicts the premise of the metro as a collective transport means. Similarly, Mona's experience of offering a ride to fellow passengers indicates a perception of the metro as transport means one is entitled to use based on one's individual entrance into it. The collective dimension of the metro is remembered of

by the slogan 'together it all works' marked out in the bottom of the poser. The slogan appeals, as noted above, to the common responsibility of all passengers to ensure the well-functioning of the metro. The practice of hindering fellow metro users from entering the metro indicates that its message is enacted not only by helping other passengers through, but also by helping the barriers to prevent unpaid passages.

Figure 16. "Make a trial run with our cheapest model. Private leasing for 790:- per month". Campaign by SL. Photo: by the author.

Passengers' responsibility to pay for their ticket is formulated in calculable terms in SL's webpage 'shop of fines' in which one unpaid travel is made to equal the 1200 kronor each visitor gets to choose what SL do with. The "efforts to encourage payment" are in Von Schnitzler's (2008: 906) words "couched in a moral-pedagogical language". This should be read to the background of decreased financing of the metro by public means and the needed increase of income from ticket fares. The moral-pedagogical language depoliticizes the issue of financing the public transport system by emphasizing passengers' shared responsibility. The reason for the gates' presence becomes more acute to the backdrop of SL's budget gap, which makes one metro user's passage through a gate all the more a matter of concern for all metro users. According to a logic where each unpaid travel is related to the decay of the metro, one's own mobility seems to be at stake when other passengers avoid paying. The

manifestation of other passengers holding of a ticket, which is rendered visible in the barrier milieu, "encourages the capacity for economic calculation" (ibid: 902). Not only does it become visual, but the technological devices "entail injunctions to act in a particular way" (ibid: 912). These injunctions take shape through practices of hindering other passengers access the metro based on assumptions of them lacking a valid ticket.

We look out across the line of barriers and people passing by from where we sit in Bredäng. The doors opening produce a knock – bam – as they enter into the notch of the barrier pillar and a second one – bam – when they close. Beeps from the readers – one for full fare ticket and two for reduced price – accompany the knocks. There is a certain "tardiness" to the barriers, as one metro user suggested, the way they interrupt peoples' walking, talking, and thinking and demand their attention for a moment. "It's really a source of irritation, when they try to enter behind your back…" Mona says when we see a person slipping through behind another person. The first one entering does not seem to notice this. Or perhaps does not care about it, as is of course common as well, although in this chapter I focus on instances where people do care about how other metro users pass through. "How do you notice when it happens?" I ask Mona who responds "you just notice" without further description. When she gets ready to leave for the platform she asks me "what do you do when you see someone who tries to get through?" The underlying assumption of the question is that one *should* do something. If the functioning of the metro is a shared responsibility among all metro users, and metro users' passage through the gates are crucial for the functioning of it, then the issue of helping or hindering other metro users from entering is arguably a moral one. Doing nothing about it implies that one is not part of the 'togetherness' that 'makes it all work'. Hull (2012:129) writes that "bureaucratic organization is a social form designed for collective action, a social technology for aligning the efforts of a large number of people so that they act as one", and, paradoxically, "the mechanisms by which this is done is the precise individuation of action". Although the semiotic technologies he refers to differ from the one I am concerned with here, the formulation resonates with the mechanism of the barriers. They are in place in metro stations for the supposed benefit of the collective of metro users, by ensuring that every person in this collective pays for their ticket precisely by organizing passengers so that every individual passage matters. As one metro user described it, the line of barriers "comb through the crowd like a fine comb". The barrier 'comb' is supposed to be thorough enough to allow only one person to pass at a time. The organization of entrances can

also be related to the car campaign that associates the metro with values of an individually used transport means. Mona's description of feeling as if she is offering a ride when another person enters through the gate with her is comparable to opening the door of one's private car. The car keys are substituted by the SL Access card charged with a ticket needed to be allowed entrance into the metro. The metro gates' door-like qualities are embedded in particular moral assumptions, which differ from the entrance into metro stations and trains. It is hard to imagine that one person would prevent another person from entering through the sliding doors into an entrance hall or into a metro train the same way as some passengers block others from entering through the gates.

A woman sits down next to me on the bench in the metro station in Bredäng with a Metro, a newspaper that is freely distributed at stations, on her lap. Regarding the new barriers she states that "they're good, before they were like this" and weaves her arms to visualize the rotation of the tripods. She explains that many people misused the turnstiles and shows with her foot and arm the technique used to get through them. It is mainly the practice of jumping over the turnstiles that is emphasized in SLL and SL's documents as an argument for the electronic gates. The metro user illustrates that people also got through them in other ways and that it is not only the height of barriers that matters. "But now people do this" she continues and puts the flat of her hand toward the other hand's outer side and moves them forward indicating that one person moves closely behind another person. "But it's expensive too" she says with reference to the ticket fares, "800 per month, and some people don't have a job, they should make it less expensive so more people can buy it, and make it more expensive to cheat". She thus points to how barriers as a technical solution to decrease unpaid travel ignores attention to the variety of reasons for people using the metro without valid tickets, of which one's economic situation is one. Also without the means to pay for a ticket fare moving around in the city is necessary to carry out everyday life.

The woman in Bredäng points to the preamble of an article in the Metro she reads and asks me what the word 'chance' (slump) means. "By accident", I suggest, "or that something unexpected, not planned, happens". She nods and continues reading for a moment until the train toward the city center arrives. She leaves me staring at people walking through the line of barriers wondering; is it by chance the gates are designed as walkways with doors? The

repetitive sound of opening and closing doors is interrupted by an intense alarm – bep bep bep – coming from one of the gates. A woman is standing between its doors waiting for her company to catch up. He enters into the walkway and the alarm continues as the woman moves through. She smiles and starts to joke with her company. The alarm signals that something is wrong, and the smile and jokes seem to be a way to ease up the atmosphere thickened by the alarm. When the doors close behind them the sound disappears and there is no sign left of what just happened. This alarm goes off when the doors are held open for a longer time than supposed to be required for one person to pass through, in order to make other passengers attentive to what is going on. Mona did not mention the alarm when answering my question of how one notices, which can partly be explained by the fact that settings of the barriers differ among stations. The alarm is more frequent in some stations than others, though no reason for this has been mentioned in my conversations with SL officials or technicians. The alarm is a component that impacts how social relations are formed in the barrier milieu. The jokes by the woman causing the alarm can be understood as a way to negotiate the immorality of her act, seen in the light of the questions embedded in the wake of the alarm: do you pay for your ticket? Do you contribute to the well-functioning of the metro?

One metro user, Ayla, describes how her friend once turned around to hit a man who passed through behind him. She laughs and suggests that her friend's action probably can be explained by him having had a bad day. However, confrontations issued from encounters around the gates do occur not merely as an effect of peoples' daily mood, but also because of the way the barriers organize people around them. Ayla expresses frustration over having "people squeezing through behind you, breathing into your neck and pushing your back". Several metro users have expressed similar experiences of having been pushed from behind by the following metro user. This interrupts the flow of traffic relations by "causing offense through unnecessary claims on the other's senses" (Hannerz 1980: 105). Metro users' descriptions of having been pushed were not necessarily followed by references to whether or not the following person should pay for their own ticket. Rather, common sense and correct ways to behave in metro stations were emphasized. "They could at least ask before" Ayla says, "I mean if they would ask, just like 'I don't have a ticket can I go in with you?' it would be fine, it's just so annoying to be pushed". If traffic relations are managed by as little interaction as possible, Ayla's description assumes that interactions around the gates enter into another sphere of relations which involves some sort of exchange. I ask her if it happens

often that people ask about entering with her, to which she responds no. She then explains that "with the turnstiles it felt more as if you're were against the system when you leaped over, now it feels more like you're against other people". Her comparison adds to the suggestions that the design of the new gates arrange people and shape relations differently than the turnstiles. The question 'can I enter with you' does not seem to have had any relevance in relation to the turnstiles which allowed people to get through by own means. The question does have relevance however in encounters by the gate with door-like qualities. One metro user who uses the metro since several years without a ticket says that "it feels more personal to fare-dodge now". He explains that it feels more personal since he relies on other persons to pass through, which was not the case with the turnstiles. The moral implications became explicit in an incident described by another metro user. She had entered an entrance hall where only one other metro user, a girl about 10 years, was present. "I entered through behind the girl" she explains, "but I felt so bad, I mean it doesn't feel very morally defendable to take advantage of a child…" These quotes and descriptions point to the technological device as eliciting experiences and evoking moral considerations based on the positions in which it puts metro users.

What Ayla and the fare-dodging metro user express suggests that the barriers presence in metro stations appear as less of a political issue. The moral negotiations emerging through the use of them appear as more immediate in everyday encounters. Also SLL and SL emphasize moral dimensions of the barriers by referring to residents' "moral of payment" as a reason for lost income (AB Storstockholms Lokaltrafik 2004). The fact that half of the public transport system is financed by tax income is neglected in this statement. Fisch (2013: 322) argues that in Tokyo "the specific sociotechnical environment and network topology of the commuter train network informs the manner in which the disorder of the commuter train suicide is thought". Moral negotiations in the barrier milieu can be understood to emerge from intra-actions among metro users and "material-discursive" elements of the apparatus (Barad 1998: 106). Conceptions of morality seem to not only preexist the encounters around the barriers, but are shaped in the milieu they constitute. This proposition ties into Fisch's (2013: 322) note on human thoughts and experiences as being influenced by the way a technological assemblage organizes the circulation of people. Moreover, the ethnographic examples discussed in this chapter show how there is "no inherent distinction between object and apparatus" (Barad 1998: 96). If passengers are understood as the object that the apparatus of

public transport aims to manage, metro users become part of the heterogeneous grouping of elements that the apparatus comprises when confronting other passengers who potentially enter without a valid ticket. Metro users' negotiations in the barrier milieu of who should be allowed through and who should not exemplify practices through which distinctions between the apparatus working and its objects are constituted. The boundary, nor the apparatus, are as already argued, fixed; they "materialize through time" (Barad 1998: 102).

I have in this chapter discussed how the metro gates arrange entrances into the metro in ways that allow people to negotiate the degree to which they are open and close for entrances. These negotiations take place in intra-actions among passengers, the gates, and discourses informing about passengers' shared responsibility for the metro, while simultaneously depoliticizing the matter of how public transport should be financed. The following chapter takes place in a courtroom where a case between SL and a passenger is dealt with, and continues to discuss how responsibility is negotiated around the gates.

Chapter Three: Politics in the making

Negotiating responsibility in the barrier milieu

It is mid-March when a newspaper reports that SL has sent in an application for summons against a passenger who was caught in a ticket control without a valid ticket. The passenger claims that she validated her ticket and refuses to pay the fine. The oral preparation takes place one week later in Södertörn District Court. I arrive at Flemmingsberg commuter station in the midst of a peak hour. The outside platform is filled up by the many passengers getting off at this station. The crowd moves slowly toward the station entrance also packed with people. The passengers arriving from the train are many more than those descending, who bend their bodies through the stream of people pushing in the opposite direction. The situation resembles Sadana's (2010: 77) description of when a train arrives at a platform in the Delhi metro where "the logic of entering and exiting the train is whichever side has more people wins". Inside the entrance hall is an escalator to the left bringing people upwards, in the middle one bringing people downwards, and to the right are stairs. I take the stairs and arrive at the one wider gate in the barriers line. A woman with a baby stroller is waiting on the other

side and attempts to enter between each passenger exiting. She seems to be at the end of her patience and has nothing to do but wait until the flow of people diminished, it being the only barrier wide enough for a baby stroller. If one passenger stops to let her pass through the flow of people up the stairs will be interrupted. The situation does not bring out much helpful gestures as passengers try to get out of the packed zone of which the barriers are the last obstacle. Metro users who regularly use this station describe the crowdedness as being what they meet daily when arriving in the morning. The barriers are continuously located in the tension between security and mobility, which in this case is played out in the confrontation among passengers who enter and exit through the same barrier at rush hour. Rather than making it difficult only for passengers wanting to enter without a valid ticket, the barriers occasionally render it difficult for all metro users to access the metro. SL's suing of a passenger regards the same tension. The incident behind the dispute in the barrier milieu that enters into the courtroom suggests that the technology has difficulties distinguishing between the passengers who are to be classified within the 'mobility' realm, and those within the 'security' realm, as passengers not intending to not buy a ticket. All metro users' access to mobility is potentially limited by the barriers.

The court is located opposite the railways. The television-screen in the reception hall presents the cases that take place this day. An oral preparation between SL and the sued passenger Lisa Boyle starts at 13.00 in preparation room 21. Outside the room I meet Lisa Boyle, her father Henrik, and a friend of theirs. They say that their case has got much attention since the news article was published last week and encourage more attention to it, since they are not the only passengers having had problems with SL's ticket cards. The journalist who wrote about the summons has been contacted by several persons sharing similar experiences of having validated a ticket, being let through the gates, and when returning home finding out that no travel had been registered on their card. Henrik says that SL is really making fools out of themselves by continuing this case, since the number of similar experiences suggests that SL has problems with their technology. One person has sued SL for not having charged his ticket because, as Henrik describes it, "he wants to point out that a public authority cannot behave that way". The summons against SL was a way to emphasize that they are responsible to ensure that the technology functions adequately.

Lisa could not find a lawyer who would represent her because the claim made by SL is below half of the basic amount a case must be about for a lawyer wanting to get involved. Her father, with no previous experience of court cases, steps in as an attorney. Henrik and Lisa explain that they find the case important in order to make a statement toward SL in the long run, though that they do not know what to expect of the court's judgement. The district court clerk, henceforth referred to as clerk, looks out from the room and announces that the preparation will begin. Lisa, Henrik, their friend, and another man simply present out of curiosity, enter the room. There is a conference table in the middle with windows facing the commuter train station. The clerk and recording clerk sit by the short end, the defendants on the long side with their back toward the windows, and me and the other onlooker along the back wall where four chairs are placed. The clerk informs that SL will be present by phone, which surprises the defendants who had prepared for a face to face meeting. SL's technologically mediated presence reminds of the situation in metro stations where there is no apparent presence of the actors on behalf of which the technology is controlling passengers' entrances. The court case draws political implications of the gates into the spotlight.

The clerk explains that SL's attorney is placed in Uppsala, a county north of Stockholm, and starts to get hold of the person by phone. "Lars Nilsson, can you hear me? Can you hear me?" she repeats as the attorney answers. It is not obvious from where it comes, but his voice suddenly appears and fills up the room. Clear and all-encompassing, it makes him appear more present sound-wise than the other persons in the room. A black pole is hanging down from the middle of the ceiling with a microphone, like a drop turned upside-down, placed about a meter above the heads of the persons around the table. The clerk clarifies that this is an oral preparation, and explains that it implies going through what the dispute concerns. Since it is a fairly small case, she says, the main hearing is put off until it is sorted out if the oral preparation is sufficient to reach a decision. The clerk suggests that it is possible and directed toward Lisa and Henrik adds "so you can put this behind you and move on".

The preparation begins with SL's attorney stating their demand, which includes the fine, the interest accumulated since it was issued, and the cost for an hour legal advice; in total 3500 kronor. Henrik, on the defendant's side, opposes the demand and answers that they accept 36

kronor, which is the price for a single ticket[9]. Thereafter, SL's attorney describes the reason for the demand. SL have listened to Lisa's story and understand her line of argument, but, Lars concludes, "when you have passed through a barrier, you enter into an agreement with SL and then you are required to be able to show a valid ticket". He repeats the time, date and place that ticket controllers found out that no ticket had been validated on the ticket card presented by Lisa. The clerk turns to Henrik who confirms that he does not object to the claim that the defendant has made use of the metro. From here on begins the difficulty for the clerk to identify what is to be trialed in this dispute. What is it that the parties disagree about?

Henrik explains that Lisa has tried to log on to the account on SL's webpage connected to her ticket card. The identification number of her card includes only 9 numbers and 10 are required to login. SL's costumer service confirmed that to access the history of the card, 10 numbers are needed, so there were no possibility for Lisa to control her card when returning home after having got the fine. Lars informs that SL's technicians have double checked the history of the card in the computer section without finding a registered ticket and states that "we have done what we can". Henrik responds that if SL can control the card, which was impossible for the defendants, they must somewhere have "a secret small machine, in a secret small room, with secret staff". While the barriers are public and mundane in some regards, this remark emphasizes that residents are excluded from knowledge about the making and functioning of the barriers. Henrik refers to the SL official responsible for their project on 'securing of income' who in a news article has claimed that every barrier's well-functioning is supposed to be controllable. No control of the barrier that let Lisa through has been done to the defendants' knowledge. Henrik thus points to the plurality of barriers at metro stations that also technicians I have meet with point to when describing their work with the barriers. The clerk responds that they are currently holding an oral preparation where both parties' perceptions of the case are to be clarified, and not the main hearing. There is a dissonance in the two parties' knowledge about the process of a summons, which is widened by the plaintiff's physical absence from the room. Henrik and Lisa, as well as the clerk, look toward the microphone or the table when addressing Lars, who when silent could just as well not be there. It happens several times that the clerk adds Lars' name after posing a question when no

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[9] 36 kronor is the price for a single ticket in zone A when it is bought from a ticket collector, in a ticket machine, or by SMS. A single ticket in zone A costs 25 kronor if one pays with credit charged on a ticket card, which Lisa did. Travels to other zones, of which there are three, are more expensive.

response is heard. The clerk, who tries to be as explicit as possible regarding the formalities of the process, explains that an oral preparation serves to sort out the nature of the dispute to know what is to be trialed. Henrik's reference to the assumed malfunctioning barrier is left at that. Lars repeats that SL is continuing this case since it is incumbent upon each passenger to ensure that a valid ticket is in place when the metro is used. Entering through a gate means entering into a contract with SL which requires a valid ticket.

Henrik explains that they asked SL to review the footage from the surveillance cameras but the request was never met. The footage would confirm that Lisa passed through the gates according to the description available on SL's webpage, where it is described that when a card is validated, the doors open up, and the passenger can move through. Lars questions if Lisa when having entered through the gate did everything she could to ensure that her ticket was valid. What else could she have done, Henrik argues that if she would confirm the validity once entered, she would already have broken the agreement which was applied in the moment of entrance. Lisa adds that before validating her card she had confirmed that there was enough credit on it and that the barrier let her through. "What should have made me think that I had not paid my way?" she asks. Henrik asks Lars if there are any machines inside the line of barriers in Liljeholmen where Lisa could have controlled her ticket. Lars responds irritated that he is only an attorney for SL and cannot answer about such specifics. The clerk tries to calm down the situation and urges the parties to stick to the preparation to sort out in what the dispute lies. Henrik returns to the fact that no control has been done of the barrier that let Lisa through. The clerk explains that bringing this into the burden of evidence brings the dispute to be about something else than the passenger's responsibility to have a valid ticket. The evidence brought forward should respond to the claim made by SL, namely that the passenger had not done enough to ensure the validity of her ticket. Foucault (2007[1978]: 55) writes that a milieu is "the medium of an action and the element in which it circulates". The line of argument brought forward by SL separates the passenger's responsibility from the setting in which the action to be accounted for was carried out. Meanwhile, Lisa's answer emphasizes that her action depended on the barriers response. A barrier constitutes, in Hull's (2012: 116) formulation, a "material disposition to be acted upon". The gate, given the authority to legitimize entrances, let her pass through, which is why there seemed to be no problem with the validity of the ticket.

It becomes clear that the parties will not reach an agreement and the preparation turns into a main hearing. Lisa take the oath and retells the incident leading to the court. When arriving at the metro station, since she rarely uses the metro, she confirms on a ticket machine that the ticket card has credit on it. Thereafter she puts the card toward a reader, a green lamp flashes, the doors open up, and she moves through. When arriving at T-Centralen are ticket controllers by the exit of the barriers. Lisa hands over her card and is told that no ticket is registered. This shocked her, and she tells them that she registered the card when entering the metro. The ticket controller responds "I've heard all excuses, you'll have to take that with ISS[10]". Lisa adds that she felt embarrassed "to stand among all the passengers at T-Centralen and look like a villain". She accepts the fine, describing it as the only thing she could have done at that moment. In the afternoon, she returns to T-Centralen and is let through the gate when validating her card. By the stairs down to the platform are ticket controllers. "I feel really bad, it's a really difficult situation" she says about again encountering ticket controllers. The card is read, a ticket has been registered, and she is allowed to move on. When back home she writes to SL about what happened and is told that she still has to pay the fine.

Following the hearing, the clerk informs that Henrik can ask Lisa questions. It seems a bit awkward for him to ask his daughter questions about the event for which she is sued. He poses a number of questions clarifying that she walked through the gates in the correct way. Thereafter it is Lars' turn. He repeats the part of the story where Lisa describes the procedure when the gate opened up and adds: "you did not write anything about the green light in your mail to SL, which is considerable in this case". He continues; "did you see any ticket collector?" When Lisa confirms that she did, he asks if she went over to control her card. "No, nothing made me think that I should have" she answers. Again, the procedure of validating the card, and the action in relation to it, are described as having been influenced by the encounter with the gate (Barad 1998).

It is time for the closing arguments. SL's attorney says that it was easier before when every passenger "got a ticket which was stamped by a physical person[11] … now we have a simplified system which is required for it to be economically profitable". The attorney argues that the new system with electronic tickets requires more responsibility of the passenger for

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[10] ISS Facility is the company carrying out ticket controls on behalf of SL.
[11] The ticket type he refers to (*bussremsa)* was discontinued in 2013. It was a slip on which ticket collectors stamped for every trip. Monthly fares were charged on cards with magnetic stripes which were validated by the automated gates.

the collective – as in public transport – system to function. He adds that "nobody believes that Lisa Boyle fare-dodged, she had good intentions". When this phrase is uttered, Lisa, Henrik, and their friend look at each other, shake their heads and seemingly struggle to grasp what they hear. The friend turns her head toward me, seated closest to her on the other side, and we share eye contact, which seems as the only way to assure that what we hear is actually real. As Henrik explains afterwards, it felt absurd to sit in court and hear from the plaintiff that the defendant has done nothing wrong. Lars continues and explains that regardless of Lisa's good intentions there are people with other intentions which is why the system is needed. He does not specify which 'system', though he seems to imply the barriers, with its integrated ticket system, since the next comment regards the green light. "It is maybe not of crucial significance, but considerable significance", Lars says about the fact that Lisa in her mail to SL did not mention having seen the green light before entering. Noteworthy is how this comment highlights a component of the barrier as being of importance for how the passenger's action is to be judged. The emphasis is however put on whether or not the passenger was attentive to the color of the light, in line with the responsibility she is supposed to take independently of the functioning of the technology. When it is Henrik's turn for closing arguments he repeats that Lisa did what can be required from a passenger to ensure the validity of a ticket. "It's a catch 22 situation" he says and describes how entering into an agreement with SL as a metro user, if SL's argument is given validity, means being charged with all responsibility but no means to control if one has a valid ticket or not. He makes a comparison with the USA, "not famous for its public transport", but there, passengers are given a receipt by the electronic gates when passing through.

The session finishes. The clerk explains that the decision will be announced about a week later. "How is this possible?" Henrik exclaims when the phone call with SL's attorney is ended. "I don't understand how it's possible, he says that Lisa has not fare-dodged. We claim the same thing?". "Well…" the clerk shrugs her shoulder, seemingly trying to balance her role as a clerk with compassion for the defendants' perplexity. We exit the room and as we enter the corridor Henrik exclaims anew "how is this possible?" There is something unreal about the situation, as if it is still not sure what is to be trialed. While brought forward as central to the situation having caused the court case when Henrik and Lisa were talking, the barriers appeared during the hearing as a huge elephant in the room. The ticket gate was treated as "simply standing between things that really matters" (Hull 2012: 12). The social dimensions,

brought forward by SL's attorney regarding the passenger's assumed intentions and responsibilities, appeared as separable from the technological and political dimensions in the barrier milieu.

One week later the decision is announced in favor of the passenger. The verdict states that the defendant has done what can be required from a passenger in order to ensure the validity of a ticket. Hence, the demarcation line of responsibility can be understood as drawn in this case along the line of barriers. Depending on what the gates allow when a ticket is put toward the reader, the action is deemed justified or not. The decision opens up for an unknown juridical space. It suggests that the barriers are entitled responsibility for legitimizing passengers' entrance, and opens up for cases in which passengers, when caught in a ticket control without a valid ticket, can argue that 'the barriers let me through'. It is uncertain where the responsibility for the validity of a ticket is to be located then, from a juridical point of view. With the passengers? With SL? Or with the barrier?

I have in this chapter discussed a court case that actualizes the issue of responsibility in the barrier milieu. Whereas the line of argument brought forward by SL emphasizes the passenger's responsibility, the passenger argues that she did act responsibly and that the error lies with the metro gate who let her through without registering her ticket. I follow on Fortun's (2010: 188) note that "ethnographers will have to pay attention to the currents in which they work" now that I move on to the conclusion. It begins with a description of upcoming modifications of the barriers, which suggest that they do not cease to be in the making.

Conclusion

The gates became the topic of public discussions again when I was in the process of writing this thesis. It was announced that because of SL's budget gap, the ticket fares will be increased and the frequency of trains on certain commuter lines will be reduced. In addition to these measures, it was announced that the barriers will be modified. The speed of the shutting doors will be increased, the alarm going off when a door is open longer than supposed to

raised, and, lastly, a campaign informing passengers of how to behave in the public transport system and why they should purchase a ticket is in the pipeline (Sundström 2015, Thurfell 2015). These announcements stirred up debates about fare evasion, for example in a televised debate between a member of the free fare organization fare-dodge.now and a traffic commissioner (SVT Debatt 2015). Though the gates have undergone changes since the '00s when they were first installed, and are continuously changed to attain their purpose. The hopes of their capacity to stop non-paying passages remain. In 2004, the heading of a news article about the installation of electronic gates informs that "SL gets tough on cheaters" (Ellemark 2004). Eleven years later, the modifications of the barriers are announced with a similar heading: "SL is now going to put an end to the cheaters" (Sundström 2015).

"Recall how agency and accountability are tied together", Barad (1998: 116) urges. In the analysis of my ethnographic material I emphasized that technical, social and political dimensions intersect in the barrier milieu. I have showed how practices in the barrier milieu take shape through intra-actions among passengers and material and discursive elements of the barriers. Agency is in that regard not located within a passenger, or the gates, but "rather constituted within specific practices" (ibid: 116). My aim was to raise questions of where responsibility lies with regards to the outcomes of a technological arrangement, which I have attempted to do by opening up the gates and consider practices taking place in the milieu they constitute. In this conclusion, I will recapitulate the three ethnographic chapters. Leading me through the study were the following two research question that I will relate to throughout the discussion of each chapter:

1) What can be revealed about the apparatus of public transport by opening the black box of metro barriers?

2) How are the purposes of mobility and security, encapsulated by the gates as boundary objects, continuously negotiated in the barrier milieu?

In the **first chapter**, I opened up the gates to look at their technical components and outlined styles of reasoning amongst actors working with them. The gates are invested with capacities to both enable the flow of passengers and control entrances by detecting illegitimate passages, capacities that in the manufacturer's brochure do not appear to be in conflict. As I began to

track the gates I found them exhibited not at fairs dealing with public transport, but at those dealing with security, thus showing how elements of the apparatus of public transport are linked to apparatuses in other settings. More generally this illustrates how barriers, as boundary objects, encapsulate multiple values which are consistent on a broader level in relations between the manufacturer and the buyer (Star and Griesemer 1989). Conversations with people working with the gates revealed that once installed in particular places, the technology have to be modified in response to how they are used by the passengers, whose circulation is to be managed. The need to modify the barriers became evident when they were first installed and caused queues and injuries. The aim to secure income, which informed the photocells settings and the shutting speed of the doors, was then downplayed to prioritize settings enabling the flow and safety of passengers. The laboratory of barriers constitutes a place where SL, who manages the gates, try out the devices to make them achieve their purposes best possible. The existence of this lab reflects SL's attempts to control the circulation of passengers, however, it is not the main place for developing the technology. Technicians, who work in the barrier milieu, described that the barriers are a number of entities spread out in the metro system which gate per gate have to be worked with so that its components cooperate and make the gate function automatically. Being where controversies occur and where incidents leading to the development of the gates take place, I suggested that metro stations are more similar to laboratories. If passengers are included in the analogy of metro stations as laboratories they are arguably the guinea pigs whose bodies, and access to mobility, are at stake in the continuous modifications of the barriers. The modifications are made in an interplay with securing of income and mobility of residents as the two purposes that are to be attained. These purposes appear to be in conflict and situations emerging in the barrier milieu require modifications of the technology to adjust the balance between the two. The question emerging from the ethnography in this chapter is: how are the side effects from experiments in the laboratory to be accounted for? The events described, caused by the security measurements prioritized at the expense of mobility, show how the technical arrangement has consequences not only for passengers deliberately evading to buy a ticket, but all passengers moving through metro stations.

The **second chapter** focused on how social relations are shaped in the barrier milieu. I showed how metro users manipulate the openness of the doors by use of the photocells that mediate this process. "The very mechanisms for protecting the integrity of government, are

often the means through which it is undermined", as Hull (2012: 36) notes. The photocells do not only serve the purpose of securing income, they also *allow* passengers to pass through without tickets and thus cause loss of income. This possibility leads to practices among metro users to prevent other passengers' potentially unpaid entrance. By making halt in the walkway or confronting the following person, metro users 'become' barriers. This practice indicates that there is no apparent boundary between the apparatus of public transport and the people whose circulation is to be managed. Foucault (2007[1978]: 56) writes that the milieu "is what is needed to account for action at a distance of one body on another". In the barrier milieu, it is the manifestation of the procedure of entering a gate which is to be accounted for among passengers, and I described this procedure as being embedded in moral negotiations. Passing through without letting a gate decide upon one's entrance based on a ticket validation is differently understood among passengers. Juxtaposed with SL's slogan, I suggested that the practice of enacting the gates 'security' purpose is an interpretation of 'together' in the metro network as implying that everyone have to pay for their ticket. Meanwhile, the practice of helping fellow passengers through showed how 'together' is also taken to mean that everyone should get access to mobility. The discursive elements of the apparatus emphasize passengers' responsibility toward each other and the well-functioning of the metro. Political action seems to be excluded from the 'togetherness' required to make it all work. One metro user compared the turnstiles with the gates and suggested that with the latter it is as if people are against each other rather than the 'system'. The way the gates shape relations emphasizes entrances into the metro as being a moral matter instead of political.

In the **third chapter**, I traced links from the procedure of passing through a gate in the barrier milieu, to court. The sued metro user claimed having carried out the procedure in a way that, accounted for at a distance by another passenger, would be deemed correct since she was let through upon a ticket validation (Foucault 2007[1978]: 56). While in chapter two I mainly discussed how moral subjectivities are elicited in encounters in the barrier milieu, the court case between the regional government, through SL, and a resident shows that these subjectivities are also political. Moving from the barrier milieu to court allowed to consider a realm of "techno-politics" in which the barriers are embedded (Von Schnitzler 2013). Though they are meant to cause trouble solely for passengers with intentions to *not* pay for their ticket, the suing of a passenger who attempted to pay for her ticket is an example of how the barriers intervene in the mobility of all metro users. Similar to the gates multiple capacities,

passengers are dealt with both as subjects to be provided mobility and as a security risk to the metro, judging from the court case initiated by SL. Foucault (2007[1978]: 48) describes mechanisms of security as being "exercised over a whole population" and the same goes for the metro barriers. Every passage through a barrier entails a manifestation of the passenger as being, or not being, a 'responsible' resident. The court's decision ended with the passenger being acquitted from the penalty fare she was issued, since her actions were deemed adequate within the context they were carried out. While it can be assumed that the particular barrier letting the passenger through was malfunctioning, the verdict taken as a juridical statement questions the legitimacy of the technology in deciding upon entrances into the metro. This decision opens up for rearrangements of the apparatus of public transport and destabilizes the distribution of responsibility as solely located 'within' a passenger.

By opening up the black box of metro barriers, I have showed how the continuous reconfiguration of the apparatus of public transport is prompted by practices in the barrier milieu. As Butcher (2011: 252) points out, social relations are formed through circulation itself, and the way the circulation is conditioned by the barriers influences how accountability among metro users is understood. By analyzing practices in the barrier milieu as formed through intra-actions, I showed how not only technology, but also social relations are in the making through the working of a technical device. I juxtaposed campaigns and the slogan by SL with quotes from one metro user who expressed feeling as if she is offering a ride when others enter the gates behind her. Following Fisch (2013: 321-2), who emphasizes that technical assemblages mesh with human thought, one might argue that the gates, the way they arrange people around them intra-actively with discursive elements of the apparatus, shape subjectivities that are less inclined to perceive of the public transport as good to be financed collectively. The moral positions played out in practices negotiating fellow residents' access to the metro suggest that conceptions of the public transport is influenced by relations formed in the barrier milieu. I described the moral negotiations as signaling that the presence of the technology is depoliticized. By bringing up practices in the barrier milieu to the backdrop of SL's deficient finances and emphasize on passengers shared responsibility, I emphasized that the gates' presence *is* a political matter. This became evident in the third chapter. SL's suing of a metro user to push for accountability of residents for the situation of the metro system highlighted that also politics are in the making in the barrier milieu.

I analyzed agency as a matter of intra-actions not to write off responsibility from passengers, but to show how a technical device can be understood to influence how social relations are formed. Exploring the making of barriers has rendered visible how they play a role in shaping everyday life in the city in ways beyond the particular purpose they are meant to serve. The tension between mobility and security in which they are located is continuously negotiated with consequences for all residents' both mobility and safety. The ongoing search for the golden mean between the two purposes, of which the upcoming modifications of the barriers is an expression, suggests that metro stations remain laboratories. I believe that a perspective considering the gates not merely as a technical solution to a social problem, but as a technology intermeshed with social and political dimensions, opens up for considerations of accountability for various consequences of the barriers workings. It implies that responsibility in the barrier milieu does not *only* regard the unpaid entrances that the barriers were put in place to prevent. By considering how agency is enacted in the barrier milieu, other consequences of the technical arrangement can be taken into account, since agency and accountability are tied together (Barad 1989: 116). This seems particularly pertinent with regards to how the gates, by their way of arranging people around them, influence perceptions of the role of public transport.

If it can be said that human thought is influenced by our intra-actions with the surroundings, the future of the public transport system lies not only in the securing of income from metro users' tickets today. The future of the public transport system lies also in practices taking place within that system today, since they influence the direction toward which the system is developed for the future. Differently put, the public transport system, and with it the city, are arguably at stake in the struggles taking place in the barrier milieu. Foucault (2007[1978]: 55) writes that security mechanisms are planned with a view toward the future, why, "a good town plan takes into account precisely what might happen". By opening up the barriers, which as black boxes mainly regard prevention of fare evasion, I have attempted to draw attention to a variety of practices occurring through and around them. These practices, when regarded as shaping social relations and influencing the "reality of a population", should be taken into account when technical arrangements are given the role of managing residents' movements (ibid: 48). I stated in the introduction that this thesis leans toward the understanding that the

metro is not merely a reflection of the society in which it works, but partakes in shaping that society. This goes as well for the practices and events taking place in the barrier milieu in the metro. They partake in forming the society and the lives of people who move and live in it.

> "We are responsible for the world within which we live not because it is an arbitrary construction of our choosing, but because it is sedimented out of particular practices that we have a role in shaping" – Karen Barad (1998: 102).

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Three days before I hand in this thesis, it is announced that the monthly fare for a ticket card will be raised from 790 to 900 kronor (Mellgren 2015). The County Council presents this as the solution to cover the budget gap for the daily maintenance of the public transport system. The option to increase taxation as a means to secure income for the metro is dismissed. Meanwhile, projections for extensions of the metro continue and promise a future with improved mobility options. To reach this envisioned future, it is not unlikely that greater importance will be placed on the barriers capacity to secure income from ticket fares.

The barriers are thus continuously remade in the oscillation between, one the one hand, the aim to secure income, and, on the other, the aim to ensure mobility. The county traffic commissioner, when asked about implications of the upcoming increase of the speed of the doors, says: "I assume that one knows about the history and take it for granted that they consider the risk of being squeezed" (Thurfell 2015). 'One' and 'they' in this statement probably refers to the technicians who carry out the change of settings, and who are most likely familiar with the history. However, the risk of getting squeezed seems to lie beyond considerations of the history among persons working with the gates in metro stations. The ethnography presented in this study, which can be taken as part of the history by now, suggests that the risk is embedded in the technical devices themselves. The gate of which the doors were repeatedly opening and closing in Telefonplan will get the last say. Its photocells aimed at ensuring that no passenger was hurt, while simultaneously preventing unpaid entrances. As long as the tension between securing income and facilitating mobility is materialized through the barriers, it seems as if residents will continue to get jammed.

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