

ACTA UNIVERSITATIS UPSALIENSIS
Uppsala Studies in Economic History, 110

Cover illustration:

Interiör av manufaktursmedjan, Gustavsfors, Dalsland, 1758.

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[accessed 15 March 2017]

Måns Jansson

Making Metal Making

Circulation and Workshop Practices
in the Swedish Metal Trades, 1730–1775



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Dissertation presented at Uppsala University to be publicly examined in Hörsal 2, Ekonomikum, Kyrkogårdsgatan 10, Uppsala, Friday, 9 June 2017 at 10:15 for the degree of Doctor of Philosophy. The examination will be conducted in English. Faculty examiner: Professor Karel Davids (Vrije Universiteit Amsterdam, Department of Art and Culture, History, Ancient Studies).

Abstract

Jansson, M. 2017. Making Metal Making. Circulation and Workshop Practices in the Swedish Metal Trades, 1730–1775. *Uppsala Studies in Economic History* 110. 281 pp. Uppsala: Acta Universitatis Upsaliensis. ISBN 978-91-554-9910-5.

This dissertation is concerned with the *making* of metal making. It explores how skills, knowledge, and artefacts were circulated and grounded within the Swedish metal trades during the period ca. 1730 to 1775. It also analyses how these processes were related to different ways of organising practices of work. The metal trades are referred to as comprising various forms of state-supported metal manufacturing outside the guild system. The focus is on finer metal making (*finsmide*), above all cutlery making.

The first chapter discusses the theoretical and methodological approaches. Critical to the analysis are the terms *strategies* and *tactics*, which are used to approach the interplay of different ways of knowing and acting in everyday metal making. This is done related to a trajectorial method. The trajectories of state official Samuel Schröder and the Stockholm cutler Eric Engberg are centred, but I also explore one broader *skills-trajectory*: the ‘English way’ of making cutlery.

Chapters 2 to 4 examine the *strategic stage* for metal making, focusing on the attempts made by the eighteenth-century Swedish state to order the domestic trades in line with ideas of an all-embracing division of labour. This development is investigated by discussing regulations, spatial mapping and supervision, as well as descriptions and ‘corrections’ of workshop practices. Chapters 5 to 7 highlight the interplay of *strategies* and *tactics* within a changing manufacturing ‘system’. Artisans’ journeys, the construction of workshops in Stockholm, and the introduction of piecework at provincial knife works during the 1750s and 1760s are explored. The discussion leads up to the founding of a ‘free town’ for metal-making artisans in Eskilstuna in 1771.

The results of this dissertation add to Swedish research on early-modern metal making in a number of ways. Urban space and the connections between metal-making communities are highlighted. In doing this, emphasis is placed on how practices of work were shaped over time by the movements of people, artefacts, and materials. Most notably, the circulation, imitation, and local adaption of knowledge and skills within the metal trades are accentuated. These findings also connect to recent research concerned with manufacturing and knowledge-making in pre-industrial Europe.

Keywords: metal trades, eighteenth century, knowledge, skills, circulation, strategies, tactics, cutlery, manufacturing, division of labour

Måns Jansson, Department of Economic History, Box 513, Uppsala University, SE-75120 Uppsala, Sweden.

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ISSN 0346-6493

ISBN 978-91-554-9910-5

urn:nbn:se:uu:diva-320274 (<http://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-320274>)

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Abbreviations

Archives

BbM – Bergsskolans biblioteks manuskript
BkH – Bergskollegium, huvudarkivet
DiplA – Diplomatica Anglica
EFoA – Eskilstuna Fristadssamhällets och ordningsrättens arkiv
ESA – Eskilstuna stads arkiv
FUH – Frihetstidens Utskottshandlingar
HMR – Hall- och Manufakturrätten
HrE – Hallrätten i Eskilstuna
JkFA – Jernkontoret, Fullmäktiges arkiv
KB – Kungliga biblioteket
KkAdv – Kommerskollegium, Advokatfiskalens arkiv
KkH – Kommerskollegium, huvudarkivet
KTHB – Kungliga tekniska högskolans bibliotek
MkA – Manufakturkontorets arkiv
MkKam – Manufakturkontoret, Kamrerarkontorets arkiv
RA – Riksarkivet
RÄs – Riksarkivets ämnessamlingar
SRr – Stockholms rådhusrätt
SSA – Stockholms stadsarkiv
TMA – Tekniska museets arkiv
ULA – Uppsala landsarkiv
UUB – Uppsala universitetsbibliotek
ÄmB – Ämbets- och Byggningskollegium
ÖfU – Överståthållarämbetet för uppbördsärenden

Monetary units

dlr. kmt. – *daler kopparmynt* (Swedish copperdalers)
dlr. smt. – *daler silvermynt* (Swedish silverdalers)

(1 dlr. kmt. was made up of 32 *öre*, and 3 dlr. kmt. equaled 1 dlr. smt.)

Acknowledgements

Some five and a half years ago, in the autumn of 2011, I stepped into K412 at the Department of Economic History with a plan, or so I thought. I was to take the last two courses of the Master Programme in Social Sciences, write my master's thesis, and then set out to work in the educational sector with evaluation and assessment. Anyway, the new course seemed promising. After a couple of weeks, it had completely taken up my focus. I thought and wrote — it appeared to me anyway — in new ways. I signed up for a second course in economic history. With encouragements from the lecturing professor, I found myself applying for the PhD program in economic history the following spring. If I ever had a big plan, it had certainly changed.

Some months later, in the autumn of 2012, I stepped into the same department, with an even more brilliant plan: I was going to write a doctoral thesis about knowledge and skills within the eighteenth-century manufacturing trades. I think I have kept reasonably well to that plan, but it has been a journey that has taken me to new places, motivated new ways of thinking and writing, and — most importantly — it has brought new perspectives on life in general. During this journey I have met people who have provided inspiration and given me good advice or shared their critical opinions, worries, and joys. Some have joined in for longer periods, some only briefly: I am grateful to you all. Some were always there: I could not have done this without you.

I was encouraged to apply for the PhD program by Göran Rydén, then my teacher and later my head supervisor. He has shared many of my good working days and, certainly, many of the bad ones too. He has tackled my ambivalence and worries with a calm perspective and, most importantly, inspired me to rediscover my curiosity about history. Meanwhile, he read. And read again. Early on during my first year as a PhD student, Göran Ulväng joined this project as my assistant supervisor. He has offered a likewise calm and encouraging approach, especially when I came running through the corridor with both smaller and larger worries. He has also guided me into teaching economic history, something that I enjoy a lot. Göran and Göran: You know I am very grateful to both of you. Thank you so much!

Great thanks to my first officemates: Marja Erikson, Linn Spross, and Sarah Linden Pasay. Marja always kept up a good mood in K420 and also helped me out during my first attempts with transcribing my material. Linn has shown a never-ending interest towards methodology, Braudel, and life.

Sarah is one of the kindest people I know. Her support has been very valuable during this whole project, and especially now during the end. Thank you!

Thanks also to all other colleagues at the Department of Economic history. Special thanks to Kristina Lilja, who always has encouraged me to continue with what I am doing, and to Pamela Tipmanoworn who has kindly helped me out with various practical things along the way. Thanks as well to my co-teachers on the ground-level course in economic history, Göran, Lars, and Linn, for good cooperation. My greatest appreciation goes to Lynn Karlsson, who has not only answered an enormous amount of questions about varying things during the past years but she also proofread the entire text with requisite speed and precision during the final weeks.

Some people have had the task of scrutinising my work more closely than others. Dag Lindström, from the Department of History, Uppsala University, gave valuable comments on my half-time text. Mats Hallenberg, from the Department of History, Stockholm University, was the opponent at my end seminar and pointed out areas where extra work could be done. Thanks to both of you for offering interesting perspectives and for raising important questions. Fredrik Sandgren and Mats Morell reviewed the manuscript version and both did an excellent job in finding things to be worked on during the last months.

Thanks also to the group of colleagues who undertook the task of reading chapters during the final stages of this project: Linn S, Mattias, Martin, Linn H, Jacob, Hedvig, Sven, and Sarah. I am especially grateful to Linn Holmberg and Jacob Orrje for also offering thoughtful and inspiring comments during this long journey. Great thanks also to Martin Söderhäll, who helped me out with the maps in this dissertation.

I have also been lucky enough to present my research at international conferences and workshops, as well as for interested colleagues with a special interest in the early-modern metal trades. Much of this work has been undertaken within the framework of the project *Places for making, Places for taking: Metals in the Global World, 1630–1820*, funded by Riksbankens Jubileumsfond. Thanks especially to Chris Evans, at the University of South Wales, who directed the project together with Göran Rydén.

There are of course other people, who have figured more in the background, but whom I am likewise grateful to. Thanks to the staff at Riksarkivet in Stockholm for repeatedly carrying up heavy folio volumes for me. Special thanks to Yngve Axelsson at Jernkontoret, Henrik Lithner at Riksarkivet, Jarmo Sundman at Stockholms stadsarkiv, Andrea Davis Kronlund at Kungliga biblioteket, and Anna Gerdén at Tekniska muséet for taking the photos used in this dissertation.

Others have been there when I have not been working — even though those days have been easy to count during the last couple of months: Mattias and Fredrik have taken me out for some pints — and many more laughs — from time to time; Emil has repeatedly beaten me in skiing; and my team-

mates in Järlåsa IF and Östervåla IF have let me pretend to be a brilliant footballer. Thanks to you all! This work would have been much harder without football and good music, so thanks to the Gunners for making football into art, and to Kent for making life into music.

None of this could have been done without the support of my nearest and dearest. Thanks to *mor* and *farsan* for offering their support during the entire journey, whether during stressful Monday afternoons in October or less-stressful ones in *Klakebäck*. Thanks to Simon and Fabbe for babysitting, dinners, and St Totteringham's days. Thanks to Mattis, Rebecka, and Edvin for good days and well-needed laughter. There will be more, I promise. Great thanks also to the Brandel family — Carita and Charlie, Emil, Sara, Knut, and Svea — for summertime days at *Dalälven*, winter days in *Fjällen*, and for all the other days in between.

Finally, to my beloved Sara: I have been away now for a while. I promised to come back. Here I am. Let's spend some time walking with the kids in *Stadsskogen*, hand in hand. Those are the best days. You and the boys kept me going during all the harsh times, but also at all times. I love you. I always will. And... I WILL NEVER write a dissertation again!

Melker och Sixten: Nu har pappa skrivit färdigt sin bok, på engelska. Det blev bara åtta kapitel. Det har varit både roligt och jobbigt. På slutet har det varit mest jobbigt. Det vet jag att ni har märkt. Tur att jag har två riktiga bäste-kompisar att komma hem till varje dag. Två underbara pojkar att krama om. Jag älskar er.

Sommarro, April 2017

MJ

CHAPTER 1

Introduction: The *Making* of Metal Making

On November 3 1753, the newly appointed *Directeur* for finer metal manufacturing in Sweden, Samuel Schröder, noted in his diary how he had witnessed steel being tested in a Stockholm forge owned by cutlery manufacturer Eric Engberg. This ‘test session’ assembled individuals from different places: from Tyresö steelworks, south of the capital, came the recruited English file maker James Campbell, and from the large twin-manufactory Vedevåg and Kvarnbacka in Västmanland came a steel smith named Hilpher. Present were also the cutler Engberg, his employed workers, and Johan Dragman, commissioner at the Swedish Board of Trade (*Kommerskollegium*). Schröder had showed up ‘without any order or imperative.’¹

The gathering was arranged by *Kommerskollegium*, which had earlier been presented with steel samples made by Hilpher. The Board ordered that tests should be conducted and selected Engberg’s forge as an appropriate place for doing so. Schröder noted how the craftsmen tested five varieties of welded steel. File maker Campbell tested Steyermark steel and spring steel in one hearth in which he used mineral coal. He tried to make chisels, but Schröder found these to be of poor quality. According to the *Directeur*, Campbell tempered the steel with too much heat which resulted in the objects breaking. The file maker then tried to use special steel pieces from Graninge steelworks in Ångermanland and obtained slightly better results. Master Hilpher worked at a second hearth with charcoal as fuel, making the same kind of tool as Campbell and using the same types of steel. He used lower heat and obtained a better result. Other steel pieces were then forged, tempered and broken by Hilpher to determine their qualities. In order to further investigate this steel, Schröder handed some samples over to instrument maker Daniel Ekström, who carried out additional tests in his workshop.²

Engberg’s smiths tested two types of knife steel, using mineral coal in the hearths. Backstoff steel was used for making table knife blades and butscher

¹ ‘utan tillsjelse eller befallning.’ Schröder, Samuel, *Dagbok rörande Directeurs-Sysslan öfver Jern- Stål- och Metall-Fabrikerne i Riket af S.* Schröder, vol. I, 1753, pp. 27–28. X.283. Handskriftssamlingen. KB. This source is referred to throughout this text as Schröder, *Dagbok rörande Directeurs-Sysslan*, with the specific volume and year. All other manuscript sources are presented with a full reference the first time they are mentioned in every chapter, followed by shorter references (writer, title of the source, and main archive).

² Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1753, pp. 29–33. KB.

steel for the making of kitchen knives. The ready-made items were later presented to *Kommerskollegium*, but Schröder found them all to be poorly made. He also noted that Engberg had told him that these kinds of steel, made with charcoal, were as good as they could get; still, they were inferior to foreign steel made by using mineral coal.³

During the following years, Schröder regularly described similar steel tests in his diaries. In a detailed way, these brief reports illuminate both work processes and movements involved in eighteenth-century metal making. When analysing the descriptions from Engberg's forge, we see a social context (if only a temporary one) where people, materials, and skills with different trajectories were interlaced with ideas about consumer preferences and the qualities of metals wares. This context was also related to the protectionist ambitions of state institutions. Finer metal making (*finnsmide*) was promoted and regulated during the mid-century, like other branches of the domestic manufacturing industries.

The extraction, processing, and circulation of metals in various forms played a vital part in eighteenth-century societies moving towards modernity. Still, these processes were more complex than suggested by scholars such as Eric J. Hobsbawn and David S. Landes, who famously described the technological progressions within the 'industrialising' iron and steel production of the late-eighteenth and nineteenth centuries.⁴ Likewise, the metal industries do not so easily fit into the idea of an 'Industrial Enlightenment', the term launched by Joel Mokyr. In his attempt to nuance the pre-industrial transition in eighteenth-century Britain, Mokyr stressed the impact of intellectual changes which supported a growth of 'useful knowledge'.⁵

Other scholars have offered alternative approaches in discussing eighteenth-century iron- and steelmaking. Chris Evans and Göran Rydén have emphasised how localities of production were connected to commercial networks and 'dealing' activities, various practices for use (the consumption of metals), and to a wider context of mercantilist policies and Enlightenment thinking.⁶ Chris Evans and Alun Withey have made similar points in an article on the British steel trades, in which they also question the applicability of the term 'useful knowledge'.⁷

In line with these observations, the entries in Schröder's diaries point towards the importance of gradual improvements and everyday innovativeness within the metal trades. They put emphasis on skills, ideas, and artefacts as used and negotiated in practice. Comparable views have been presented in other studies dealing with eighteenth-century manufacturing. Investigating the arms production in Enlightenment France, Ken Alder applied the term

³ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1753, pp. 31–32. KB.

⁴ Hobsbawn (1968); Landes (2003).

⁵ Mokyr (2002); Mokyr (2011).

⁶ Evans and Rydén (2007). See also Evans, Jackson, and Rydén (2002).

⁷ Evans and Withey (2012).

‘technological life’ in order to accentuate the relations between social negotiations and the materiality of manufacturing over time.⁸ In the preface to their influential book *The Mindful Hand*, Lissa Roberts and Simon Schaffer criticised the traditional separation (and hierarchical ordering) of science and technology or theory and practice. Instead, they turned their attention to sites where ‘material and knowledge production jointly took place’.⁹

In relation to this, the last decades have seen rewarding research contributions regarding the views on early-modern work, society, and everyday life. These have also shed more light on the complexities of manufacturing. Daniel Roche has spoken of the need to view consumption and production, as well as practice and discourse, as interwoven dimensions.¹⁰ By launching the concept of an ‘industrious revolution’, Jan de Vries has put emphasis on the decisions related to labour and consumption taken by European households during the ‘long eighteenth century’. The increased activity in these linked spheres supported growth in trade and a specialisation of production that gradually set the stage for industrialisation.¹¹

Accompanying — and influencing — these works, studies within the field of global history have emphasised the need for ‘comparisons’ and ‘connections’ in historical research. These two ‘C’s have been complemented by a focus on ‘circulation’ and ‘communities’.¹² This has further added to our understanding of social and economic life in pre-industrial societies, especially by highlighting the movements of people and the wider dissemination of knowledge and skills that linked localised working practices across space and over time. In this vein, scholars have also nuanced the position of eighteenth-century Sweden — on the periphery of a dynamic and transforming European context.¹³ Especially regarding the domestic manufacturing industries, however, we still know comparatively little about everyday practices of knowledge transmission and the encounters involved in these processes.

Inspired by these recent currents in historical research, this investigation departs from a curiosity about the relations between the ‘macro- and micro-levels’ of a changing eighteenth-century Swedish society. The main interest is in the links between localities of production and dealings or transmissions (that sometimes had a global reach). The orientation towards metal manufacturing is chosen in order to enable an exploration of connections between workshop practices and manual work and a wider context of policies, knowledge-making, and movements.

⁸ Alder (2010), pp. xi–xiv, 10–19.

⁹ Roberts and Schaffer (2007), pp. XIV–XXII; quotation from p. XV.

¹⁰ See Roche (1996); Roche (1998).

¹¹ de Vries (2008).

¹² See e.g. Markovits, Pouchepadass, and Subrahmanyam (eds.) (2006); O’Brien (2006); Raj (2007); Riello and Parthasarathi (eds.) (2009).

¹³ See e.g. Rydén (ed.) (2013).

Having a background in educational and behavioural academic studies, I am specifically interested in the transmission of skills and knowledge as related to the organisation of work. How were these processes changing during the period in question — if they did so at all? What possibilities had metal-making artisans and their employees to influence their daily work? How were different artefacts and mechanical devices transmitted, and in what ways were they used in production? All these questions stem from a will to know more about the lives of working men and women. What stories can they tell if elevated from the often passive depth of historical inquiries? How does this in turn influence our understanding of a phenomenon like the eighteenth-century manufacturing industries?

This interest has a lot in common with Emma Rothschild's emphasis on 'large' micro-histories, referring not exclusively to a global scope, but also to the drive of connecting the activities and movements of historical actors with the 'larger scenes of which they were a part'.¹⁴ If seen in this way, Schröder's notes referred to above from November 1753 tell us a great deal when they are contrasted with other sources. By using them in an interwoven fashion, we can trace people and practices within the metal trades over time and across space. This enables us to investigate the *making* of metal making.

1.1 Change, Practices, and Transfers: Problems and Potentials Regarding Swedish Metal Manufacturing

Early-modern metal manufacturing in Sweden is a classic and well-covered field of research. It early attracted scholars working on Swedish social and economic history and, in particular, on mining and ironmaking. Several comprehensive volumes that dealt with manufactories or metal-making communities were also produced in Sweden in the early twentieth century. Metal manufacturing did then not attract further attention until the 1980s and 1990s, when scholars influenced by historic materialist theories and the debate on proto-industrialisation undertook in-depth inquiries on the organisation of metal making. A third trend has gained strength from the mid-1990s. The links between metal making, politics, and science, as well as Sweden's role within a globalising economy, have been increasingly highlighted.

This chronology can also be related to a wider research context where the manufacturing industries have been recurrently discussed and debated. Regarding Sweden there are, however, several important aspects of eighteenth-century manufacturing that have been disregarded. The intention with this section is to identify problematic areas in previous research which can serve as the foundation for the specific research orientation of this study,

¹⁴ Rothschild (2011), pp. 6–7.

presented below. I deal with three such features here: the chronology and spatiality of Swedish metal manufacturing, the organisation of work, and the ‘transfers’ of knowledge and skills.

The Chronology and Spatiality of Swedish Metal Manufacturing

The very concept of ‘manufacture’ leads naturally to Karl Marx’s discussion on the emergent capitalist system. In his *Capital* ‘manufacture’ was distinguished as an intermediate stage of production, with its height from the sixteenth century and up until the late-eighteenth century. This period, Marx argued, saw increased tendencies of the type of ‘co-operation’ that was typical for early capitalist industries: a larger workforce employed by a capitalist manager in a more comprehensive labour process, and producing a greater quantity of goods than in traditional craft production.¹⁵

Marx’s thoughts on the stages of manufacturing were later developed by scholars who emphasised the impact of a *proto-industrialisation* in Europe. Above all, focus was put on the changing relations between an expanding agrarian economy, small-scale handicrafts, and merchant capital.¹⁶ According to Jürgen Schlumbohm, regional specialisation — notably so within textile production — often included a trend where petty commodity producers lost control over the means of production to capitalist merchants.¹⁷

The idea of early-modern manufacturing as evolving through certain stages has, however, also been criticised. Maxine Berg argued that the question of temporality — or change — must be dealt with in a way that does not start with teleological assumptions about a ‘definite path’ towards industrialisation. In her investigation of the British trades, Berg stressed the interweaving of economic, social, and cultural aspects of manufacturing, and concluded by emphasising a context of a diversified production landscape over time and space.¹⁸ In the same vein, Michael Sonenscher’s *Work and Wages* questioned simplified images of pre-industrial artisanal work and of the development towards modern capitalist industries. Rather, he noted a complex and protracted process of converging forms of production.¹⁹

Research on the Swedish manufacturing industries has been characterised by a similar discussion, often with influences from the perspectives referred to above. The debate has largely been centred around questions regarding the

¹⁵ Marx (2000), pp. 462–530.

¹⁶ See e.g. Kriedte, Medick, and Schlumbohm (eds.) (2008). The debate on European proto-industrialisation has been wide in its scope, and my intention is not to recapitulate approaches that have evolved over time. For such a discussion, see Ogilvie and Cerman (eds.) (1996).

¹⁷ Schlumbohm (2008), pp. 94–125.

¹⁸ Berg (1994), pp. 70–76, 280–283. See also Berg (ed.) (1990). Charles Sabel and Jonathan Zeitlin presented a similar critique in proposing the model of ‘flexible specialization’. See Sabel and Zeitlin (1985).

¹⁹ Sonenscher (2012), pp. 44–47, 372–376.

‘rise and fall’ of state-supported manufacturing, and, hence, whether it had any connections to the early industrialisation of the nineteenth century.

Eli F. Heckscher saw the rise of manufacturing industries in Sweden during the seventeenth and eighteenth centuries as tied to the mercantilist state’s protectionist policies and financial support. Especially, he discussed the rapid expansion of the dominant textile trades during the first half of the eighteenth century. The 1760s then saw Sweden being hit by a deep economic crisis and political turmoil. The most important manufacturing community, Stockholm, experienced a rapid decline in both output and employment. As argued by Heckscher, this downturn reflected the deficiencies of the period’s economic policies and regulations; the manufacturing industries largely faded away during the late-eighteenth century and had a very small impact on the later industrialisation.²⁰ Heckscher’s conclusions were later questioned by Per Nyström, who stressed that the manufacturing industries rather became more standardised and effective after the 1760s. He related this to continuity also regarding the regulative policies of the domestic trades, despite attempts at liberalisation. Heckscher’s image of manufacturing enterprises as non-viable creations of the state was largely rejected.²¹

The primary focus for both Heckscher and Nyström was the urban textile production, above all in Stockholm. The domestic metal manufacturing was considered to occupy a somewhat different position. Heckscher saw it as connected to older forms of large-scale production and above all to the iron trade — the only sector in early-modern Sweden that he referred to as an ‘industry’.²² The making of iron-, steel-, and copperware was thus not a new phenomenon in Sweden during the period of interest here. Still, like the textile trades, it was the subject of growing protectionist ambitions during the mid-eighteenth century. An institutional network was subsequently created to support both continuous exports of bar iron and the expanding metal manufacturing. During the 1750s, the latter was divided into ‘cruder’ and ‘finer’ varieties (*svartsmide* and *finnsmide*).²³

The endeavours to expand the domestic metal manufacturing were, however, to a great extent unsuccessful. Scholars like Heckscher, Karl-Gustaf Hildbrand, and Bertil Boëthius stressed that Sweden could never compete with other European countries, most notably Britain, and exports were therefore limited. In addition, the demands of the domestic market were overestimated. Metal manufactories were in many cases dependent upon generous funding and state privileges.²⁴ The crisis of the 1760s severely affected the domestic metal production. Further attempts were made during this period

²⁰ Heckscher (1949b), pp. 598–621, 640–642. See also Heckscher (1937).

²¹ Nyström (1955), pp. 141–148, 251–257.

²² Heckscher (1949a), p. 489.

²³ Sahlin (1925); Boëthius and Kromnow (1947), pp. 500–504.

²⁴ Heckscher (1949a), pp. 483–490; Hildebrand (1957), pp. 239–252; Boëthius and Kromnow (1947), pp. 429–462.

with exporting metal wares, but these were — again — less fruitful. Many state-sponsored manufactories now saw decline or closure. More successful were the attempts made in 1771 with founding a ‘free town’ (*Fristad*) for metal-making artisans in Eskilstuna, a project largely emanating out of a critique against the economic policies of the previous decades.²⁵

Eskilstuna *Fristad* is important here in that it later became one focal point for researchers discussing the development for pre-industrial metal making. Inspired by the theoretical framework of proto-industrialisation, Maths Isacson and Lars Magnusson saw the roots of later metal and mechanical industries as largely growing out of expansive and non-regulated handicrafts in some important regions during the eighteenth and nineteenth centuries. Advancing a more complex image than assumed in original theories, they also stressed the importance of some ‘urban centres’, like Eskilstuna.²⁶ In this respect, Isacson and Magnusson’s discussion can be related to the nuanced view of manufacturing and proto-industries proposed by scholars like Berg. Eskilstuna has also been extensively dealt with by Ann Hörsell and by Magnusson, who both discussed the expansion for metal handicrafts during the nineteenth century, following the founding of the *Fristad*.²⁷

The primary interest of the works referred to above was not in eighteenth-century manufacturing; Isacson and Magnusson did not include manufactories or ironworks in their discussion.²⁸ There are, however, studies that have specifically focused on large-scale metal making. Investigating the state-controlled weapon production, both Anders Florén and Sören Klingnéus have analysed the changing proto-industrial relations during the seventeenth and eighteenth centuries.²⁹ Also, Florén and Rydén proposed a wider perspective on proto-industrial ironmaking, where they highlighted the changing social organisation of work as related to wider networks of production.³⁰

Still, this leaves us with a rather problematic image. Large-scale workplaces have been studied in isolation; in books on the later expansion of proto-industrial metal making, the manufactories are largely left out. Despite the regional *comparisons* dealt with by several scholars, we lack a discussion on practices of work as *connected* over time and across space. Moreover, we can note a gap in previous research regarding urban forms of metal making for the period preceding the founding of Eskilstuna *Fristad*.

One place that can be dealt with more extensively here is Stockholm. Recent investigations have discussed the capital as a complex early-modern

²⁵ Boëthius and Kromnow (1968), pp. 368–385; Heckscher (1949a), pp. 492–493.

²⁶ Isacson and Magnusson (1987), pp. 14–17, 89–108. See also Isacson and Magnusson (1983), pp. 52–64, 141–165.

²⁷ Hörsell (1983); Magnusson (1988).

²⁸ Isacson and Magnusson (1983), p. 64; Isacson and Magnusson (1987), p. 15. Ironworks were included in the Swedish version, but excluded in the English translation. For a comprehensive discussion on the manufactories in Eskilstuna, see instead Hellberg (1920).

²⁹ Florén (1987); Klingnéus (1997).

³⁰ Florén and Rydén (1992).

space for the connected spheres of work, politics, and everyday life.³¹ It was also one important node for domestic and foreign trade, and most notably so in relation to metal exports.³² Heckscher indeed noted how many smaller metal workshops, which were not included in guilds, existed in Stockholm during the mid-eighteenth century. These were not further described.³³ In his comprehensive study on crafts in the capital, Ernst Söderlund also included discussions on metal making.³⁴ A few books have explored the undertakings of individual artisans or the developments for specific metal crafts in Stockholm, but much more can be done in this matter.³⁵

Eighteenth-century Stockholm has above all been dealt with as the centre for textile manufacturing. Here, Heckscher's and Nyström's conclusions have been questioned by Klas Nyberg. He stressed how the wool manufacturing in Stockholm adapted to a changing economic and political context during the 1780s.³⁶ In a later study, Nyberg described how regulations, a declining internal market, and an inability to meet the growing demand from rural groups were to disadvantage for Stockholm in the long run, when compared to other emerging manufacturing centres. The textile trades saw a gradual relocation.³⁷ This is one in a series of books that have emphasised how Stockholm's economy stagnated from the 1760s until the mid-1800s, following the economic crisis and the retraction of generous state policies. This downturn affected both the textile manufacturing and the guild crafts.³⁸

Similar assumptions regarding the changing relationship between the agrarian economy (with new manufacturing centres) and older towns or state-sponsored industries are a distinctive feature in research that stresses the connection between proto-industrial handicrafts and the later industrialisation.³⁹ Here, including Stockholm in a discussion on eighteenth-century metal making can throw new light upon this development.

The present investigation, thus, will add two largely neglected features to the existing research: the *connectedness* of practices and places over time and *urban manufacturing*. This enables a more comprehensive picture of Swedish metal making, as well as of the early-modern Swedish manufacturing industries in general. It offers insights that allow us to deal with the chronology and spatiality of metal making in a way similar to the 'multi-

³¹ See Sennefelt (2011); Ling (2016).

³² Wernstedt (1935); Müller (1998); Evans and Rydén (2007), pp. 92–121.

³³ Heckscher (1949a), pp. 488–489.

³⁴ Söderlund (1943), pp. 213–220.

³⁵ See Amelin (1999); Ronnestam (2013).

³⁶ Nyberg (1992). See also Nyberg (ed.) (2010).

³⁷ Nyberg (1999).

³⁸ Söderlund (1949), pp. 85–99; Edgren (1987), pp. 76–86; Hayen (2007). The decline of Stockholm as an economic and industrial center has also been related to a wider European trend from the mid-eighteenth century. See Söderberg, Jonsson, and Persson (1991), pp. 8–45.

³⁹ See e.g. Isacson and Magnusson (1987). The importance of agrarian handicrafts, in many ways competing with the manufacturing industries, was also emphasised by Heckscher (1949a), pp. 493–494, 559–584 and by Nyström (1955), pp. 151–156.

centered' perspective stressed by Evans and Withey — emphasising a variety of practices where metals were made, used, and traded.⁴⁰ Such a perspective is missing for the Swedish context. We therefore also need to thoroughly discuss how practices of metal manufacturing were organised.

The Organisation of Work: What Was Really a Manufactory?

An emphasis on change and space is related to the question of the organisation of work within the Swedish metal-making industries. Also this matter has been quite thoroughly dealt with. However, the tendency to study spatially isolated manufactories or communities and the ignorance of urban metal making (regarding the larger part of the eighteenth century) has resulted in an incomplete picture. In order to understand the different approaches taken in dealing with this matter, we might, again, start by discussing the three perspectives dealt with above.

Marx stressed how one fundamental principle of manufacturing, distinguishing it from the guild crafts, was 'the separation of the labourer from his means of production, and the conversion of these means into capital.'⁴¹ Still, the production continued to rely on manual skills and not on mechanisation. The gains in productivity were the results of an increasing intensity and division of labour. According to Marx, manufacturing industries could arise in two ways: either by bringing together previously separated handicrafts or by developing an already existing co-operation in other crafts (by splitting them into specific operations). In both cases the end product was the large-scale workshop where work was organised either *heterogeneously* or *serially*.⁴²

Scholars discussing proto-industrial developments criticised Marx and others for not thoroughly analysing, in Schlumbohm's words, 'the inner logic of pre-capitalist and transitional relations of production'.⁴³ Schlumbohm advanced a model for describing regional specialisation of agrarian handicrafts. The first phase was constituted by a petty commodity production, where a division existed between the spheres of production and circulation (a *Kaufsystem*). Producers were still in control of the former, but increasingly dependent on the capitalist merchant in marketing their goods. In the second phase, producers instead worked under the commission of the capitalist. In this putting-out system (*Verlagsystem*), merchant capital had thus penetrated into the sphere of production. The final phase of this process

⁴⁰ Evans and Withey (2012), pp. 538–541.

⁴¹ Marx (2000), p. 516.

⁴² Marx (2000), pp. 482–503.

⁴³ Schlumbohm, (2008), p. 94.

was the introduction of centralised manufacturing, with large-scale workshops that replaced or supplemented different stages of production.⁴⁴

Again, Berg's critique of the Marxist and early proto-industrial perspectives must be stressed. Moving beyond the limiting images of large-scale workshops or putting-out systems, she argued that the British eighteenth-century trades were dynamic and included coexistent and overlapping forms of organisation, as well as varied relations between urban and rural areas.⁴⁵ Specifically discussing the metal trades, she noted how skill-based technologies and diversifying divisions of labour developed side by side with large-scale production. Metal manufacturing in towns like Sheffield and Birmingham was characterised by flexibility and different types of enterprises, as well as by varying degrees of artisan independence.⁴⁶

Berg's discussion included a critique of the focus on scale in studies on manufacturing industries. Charles Sabel and Jonathan Zeitlin also criticised the classic accounts of the path towards mass-production and mechanised industries. They did so by emphasising the viability of small-scale enterprises in some European regions during the nineteenth century; manufacturing systems that were distinguished by 'flexible specialization'.⁴⁷ This perspective, Berg argued, was indeed valuable, but it suffered from the same tendency to obscure the complexity of manufacturing.⁴⁸

In this, Berg was inspired by Sonenscher's nuancing of pre-industrial craft work and manufacturing. He criticised the long-established beliefs in specific forms of urban and rural industries. Far from being fully coordinated with corporative rules or state laws, urban artisanal enterprises in eighteenth-century France were characterised by fluidity and variable divisions of labour.⁴⁹ Sonenscher noted the simultaneous existence of enterprises with different 'levels of integration'. Instead of stressing the supremacy of the 'economy of the factory', or of the static small-scale workshop, he noted an 'economy of the bazaar'.⁵⁰ Later inquiries have further developed this perspective, with Giorgio Riello emphasising how manufacturing enterprises in the London trades often relied on intricate subcontracting arrangements which were adaptive to seasonal variation and changing market stimuli.⁵¹

Other scholars have again focused on large-scale manufacturing during the period of interest here, but in a way that strongly questions deterministic views on the organisation of work. Alder dealt with the dynamics of

⁴⁴ Schlumbohm, (2008), pp. 98–111. The different organisational phases in this model did not necessarily follow upon each other, but rather were used in the model as ideal types in order to illustrate the changing relations between independent petty producers and merchant capital.

⁴⁵ Berg (1994), pp. 70–76.

⁴⁶ Berg (1994), pp. 255–279.

⁴⁷ Sabel and Zeitlin (1985), see especially pp. 142–156.

⁴⁸ Berg (1994), pp. 194–195.

⁴⁹ Sonenscher (2012), pp. 22–29, 40–45.

⁵⁰ Sonenscher (2012), pp. 130–149; quotations from p. 135 and 137.

⁵¹ Riello (2008).

state-supported attempts with interchangeable parts manufacturing in France by stressing the constant negotiations regarding skills and technology.⁵²

The views on the organisation of work within the eighteenth-century Swedish manufacturing industries have differed over time. Heckscher and Nyström both stressed the importance of variable capital. Heckscher related this to the dominance of a putting-out system and noted that the practical organisation of work did not often differ from that of guild crafts; most manufacturing enterprises were comprised of smaller workshops which were headed by a master.⁵³ Nyström emphasised the contemporaneous existence of two corporate forms: the widespread putting-out system (decentralised production) and the factory system (centralised production). In the Stockholm textile trades, he argued, a few larger works coexisted with many smaller workshops.⁵⁴

Both Heckscher and Nyström emphasised how the manufacturing industries resulted in new types of labour relations that were breaking with the traditional framework for craft production. Still, they differed in their views on the economic prerequisites for manufacturing enterprises. Heckscher saw them as more or less totally dependent on premiums and state funding, while Nyström also stressed the impact of other credit sources.⁵⁵

Again, it must be noted that Heckscher and Nyström to a large extent built their investigations on the town-based textile industries. Metal making was not given much attention. In Heckscher's view, the most important metal manufactories during the period could be classified as ironworks (*bruk*) mainly located close to the mining districts in central Sweden.⁵⁶ This image was reinforced by several books that described the state-supported attempts with large-scale metal making made at mid-eighteenth century, and sometimes including the promotion of piecework (or paced work).⁵⁷

The discussion on early-modern metal manufacturing was resumed in the 1980s, with more critical perspectives being advanced by several scholars. Using Schlumbohm's theoretical model, Florén described the changing relations of production at the weapon factory and ironworks in Jäder. He noted a development towards a putting-out system where the state-appointed supervisor gained control over production. Still, the implementation of regulations

⁵² Alder (2010), pp. 127–128, 346–347. Alder criticised the perspectives advanced within a Marxist tradition and in proto-industrial theories, but also positive images on the rise of the factory system and technological improvements. For the latter view, see Landes (2003); Mokyr (1992). The classical example here is of course Adam Smith. See Smith (2008), Sutherland (ed.).

⁵³ Heckscher (1949b), pp. 621–626.

⁵⁴ Nyström (1955), pp. 220–229, 271–283.

⁵⁵ See Heckscher (1949b), pp. 598–615; Nyström (1955), pp. 309–313.

⁵⁶ Heckscher (1949a), p. 489. For Nyström, this indicated that metal manufacturing was not included within the actual manufacturing industries. See Nyström (1955), p. 82, 96.

⁵⁷ See Hellberg (1920), pp. 207–230; Rönnow (1944), pp. 174–186; Forsberg (1953), pp. 107–122.

and new directions also resulted in conflicts when they clashed with the social frameworks of the guild and the household.⁵⁸ Klingnéus later discussed the organisational differences between manufactories, weapon factories, and ironworks, but he also noted variation within the three branches. During the seventeenth and eighteenth centuries, the weapon production saw regional specialisation and changing relations between towns and the countryside. In discussing the weapon factory in Närke, Klingnéus stressed the coexistence of a *Kaufsystem* and putting-out arrangements. Still, he also emphasised the impact of a wider and a more ‘complex’ division of labour.⁵⁹

Florén’s investigation is valuable in its emphasis on the social and material dimensions of metal making. It is, however, problematic because of the way in which it aims to fit the practical organisation of work into a narrow theoretical framework built around notions of oppression and struggle. Klingnéus paid greater attention to regional comparisons and spatial relations of production, but his in-depth analysis was largely delimited to one region.

These studies can, furthermore, be related to ones that have focused on later developments for proto-industrial metal making. Isacson and Magnusson emphasised a diversity of regional craft activities, including different paths towards industrialisation, during the late eighteenth- and nineteenth centuries.⁶⁰ In Eskilstuna *Fristad*, the metal making was liberated from the regulations prevailing in town-based crafts and large-scale metal production.⁶¹ Magnusson later discussed how one intention with the *Fristad* was to reduce the impact of the putting-out system, which had been dominant at the manufactories near the town.⁶² Making the artisans independent was, however, a difficult project. The putting-out system grew strong also in the *Fristad*. At the same time, there were alternative ways for the craftsmen to organise their work and sales. The dependence on putters-out decreased from the 1820s, when the group of artisans instead became more differentiated.⁶³

In these latter works, we see tendencies towards an emphasis on urban metal making. However, Magnusson’s investigation only dealt briefly with the developments during the eighteenth century and his discussion was limited to Eskilstuna. If there was a development from larger manufactories towards small-scale metal making, as illustrated in the case of the *Fristad*, this needs to be thoroughly discussed by tracing a variety of practices and different ways of organising work over time.

⁵⁸ Florén (1987), pp. 81–138, 227–231.

⁵⁹ Klingnéus (1997), pp. 38–44, 92–119, 241–245.

⁶⁰ Isacson and Magnusson (1987), pp. 14–17, 135–137.

⁶¹ Isacson and Magnusson (1987), pp. 93–99. Klingnéus criticised Isacson and Magnusson’s inclusion of urban crafts into the analytic framework of proto-industrialisation, and proposed a more traditional version of the term. See Klingnéus (1997), pp. 246–247.

⁶² Magnusson (1988), pp. 93–106. See also Hörsell (1983), pp. 38–39.

⁶³ Magnusson (1988), pp. 217–247.

Such a perspective has been advanced regarding the textile industries. In his study of wool manufacturing in Stockholm, Nyberg strongly criticised Heckscher and Nyström for exaggerating the implications of state regulations. He emphasised the diverse ways of organising work during the late-eighteenth century, especially after the crisis of the 1760s, with an increasing number of smaller workshops and independent artisans. Instead of a dominating putting-out system, Nyberg highlighted the existence of a *Kaufsystem (köpsystem)*.⁶⁴ In line with Sonenscher's ideas, this system was characterised as functional, flexible, and with substantial possibilities for variation.⁶⁵ Later inquiries have added to this complex picture by analysing how the downturn for Stockholm's economy affected the spatial organisation of textile manufacturing. In his dissertation, Mats Hayen described the changing networks of production in the capital's manufacturing 'districts'.⁶⁶

These investigations emphasise features that are important in understanding the non-linear development of production during the early-modern period. Such a discussion is, however, largely missing regarding eighteenth-century metal manufacturing. Here, the attempts at introducing a workshop-based division of labour within the metal trades stand out as a matter that can be further explored. Boëthius and Kromnow discussed the overarching problems with what they referred to as the 'factory system' (larger metal works or *fabriker*), but did not make any inquiries into the actual metal-making processes.⁶⁷ Rydén has recently noted how this state-initiated project was gradually abandoned during the 1760s, leading up to the foundation of Eskilstuna *Fristad*. Still, he argued, the increased emphasis on ideas of liberty and artisan independence included further attempts by the state to supervise workplaces and control manual work.⁶⁸

These attempts can be dealt with by an in-depth analysis, which also highlights alternative ways to organise practices of work. Drawing upon Nyberg's argument that the manufacturing industries can be defined more in judicial terms than as a specific type of organisation⁶⁹, this investigation can put emphasis on processes of negotiation and variation. In this respect, Stockholm is one important place. Söderlund stressed how the capital housed appreciable numbers of craftsmen who were not members of any guild. Among these were artisans working in the manufacturing industries. Including the guilds, he also dealt briefly with the diverging capital requirements

⁶⁴ Nyberg (1992), pp. 145–147, 177–179, 337–349. Especially, Nyberg criticised the historical materialist perspective advanced by Nyström. This, he argued, was built on a belief in manufacturing industries as distinguished by a division of labour, standardisation, and increasing control.

⁶⁵ Nyberg (1992), pp. 349–357.

⁶⁶ Hayen (2007), pp. 114–126, 151–154. The textile manufacturing was largely concentrated to *Södermalm*, south of central Stockholm.

⁶⁷ See Boëthius and Kromnow (1968), pp. 368–371. This is further discussed in chapter 2.

⁶⁸ Rydén (2013a).

⁶⁹ Nyberg (1992), p. 338.

and patterns of employment within different metal crafts.⁷⁰ The differences between guilds and manufacturers have also been recently discussed by Bo J. Ronnestam in a book on watchmaking.⁷¹

While not focusing on the metal-making guilds, the present investigation can thoroughly explore the different processes whereby metal manufacturing was defined, understood, and put into practice in everyday life. This is of particular interest when considering the developments leading to the founding of Eskilstuna *Fristad*, a place liberated from traditional regulations on craft production. Here, Sonenscher's emphasis on an *economy of the bazaar*, Berg's notion of diversity within the metal trades, and Alder's discussion on state involvement in large-scale manufacturing are all found to be of particular value. This approach allows for an investigation that focuses more on eighteenth-century perceptions of economy and work, and less on assessments regarding viability or failure. Related to this, one additional area must be addressed, namely the transmissions of skills and knowledge.

Skills, Manufacturing, and 'One-way' Transfers

When speaking of the links between the 'industrialising' iron trade and metal manufacturing, Heckscher indeed noted that the making of metal wares, unlike ironmaking, was characterised by innovations related to processes and products. Still, he argued that the two branches of production did not differ regarding the origins of improvements. Imports of foreign knowledge and skilled artisans were decisive for eighteenth-century Swedish metal manufacturing, as they had been for the iron trade during the previous centuries.⁷² The idea of Swedish metal processing as dependent on transfers from other European nations, above all from Germany and England, was advanced also by other twentieth-century scholars.⁷³ Related to this, some early investigations dealt with the journeys made by Swedish officials, merchants, and men of scientific professions. Sven Rydberg's dissertation on 'study tours' in England during the Age of Liberty (*Frihetstiden*, 1718–1772) emphasised how these journeys often were undertaken by persons with interests in the connected spheres of trade, mining, and manufacturing.⁷⁴

These 'transfers' from abroad were certainly important. Still, as has been increasingly highlighted, they must also be discussed in relation to processes of negotiation and local adaption. The most famous example, although adhering to the idea of 'transfers', is Svante Lindqvist's *Technology on Trial* which dealt with the failed attempts to introduce Newcomen engines to

⁷⁰ Söderlund (1943), pp. 213–220, 225, 293–301.

⁷¹ Ronnestam (2013).

⁷² Heckscher (1949a), pp. 489–490.

⁷³ Regarding steelmaking, see Sahlin (1931), pp. 55–70, 71–103. Regarding manufacturing, see e.g. Hellberg (1920); Rönnow (1944).

⁷⁴ Rydberg (1951).

Sweden in the first half of the eighteenth century. In order to explain this less successful transmission, Lindqvist stressed the impact of technical, geographical, economic, social, and cultural factors.⁷⁵ Recent research has further emphasised the blurred boundaries between theory and practice and the social construction of knowledge during the eighteenth- and nineteenth centuries in related spheres such as chemistry, mining, and metal making.⁷⁶

Other investigations have dealt with the state's ambitions to improve the organisation of work within the metal trades during the period of interest here. Klingnéus discussed how such endeavours within weapon production were related to the European journeys made by state officials. Adapting these ideas to a local context was, however, difficult, in large part because of well-rooted craft traditions.⁷⁷ Discussing metal manufacturing, Rydén argued that plans for 'correcting' practices of work were launched successively in a 'top-down' manner during the 1750s and 1760s by Samuel Schröder. Likewise, the ideas of *liberty* characterising the founding of Eskilstuna *Fristad* were influenced by Schröder's experiences from British manufacturing towns. Still, Rydén saw this process as a 'long sequence of translations', rather than as a transfer.⁷⁸

The connections between politics, science, and manufacturing practices have also been highlighted in books discussing other European countries and regions. Andre Wakefield's study on mobile 'cameralists' in eighteenth-century Germany and Alder's investigation of engineers in Enlightenment France both stressed the negotiation and adaption of knowledge and technology as related to state-making over time.⁷⁹ John R. Harris dealt more comprehensively with the widespread eighteenth-century 'industrial espionage'. Efforts were made early in England to prevent the enticement of artisans and the transfers of technology — above all to the rivalling competitor France — through legislation.⁸⁰ Still, Harris emphasised some branches, like the hardware industry, where successful transfers were carried out. In others, like steelmaking, attempts were less rewarding.⁸¹

The investigations referred to above are indeed valuable. Still, they tend to largely focus on the 'top layer' of agents involved in transmissions, such as state officials, merchants, engineers, and entrepreneurs (although Harris

⁷⁵ Lindqvist (1984), pp. 11–12, 291–307.

⁷⁶ See e.g. Fors (2003); Evans and Rydén (2006).

⁷⁷ Klingnéus (1997), pp. 104–111.

⁷⁸ Rydén (2013a), pp. 133–144; quotation from p. 141.

⁷⁹ Wakefield (2009); Alder (2010).

⁸⁰ Harris (1998), pp. 7–27, 461–463. Harris emphasised the Act of 1719, but also the further attempts made in 1785 to regulate the export of tools and materials — the 'Tools Act'. The view on 'industrial espionage' in pre-industrial Europe as centered to England, and including accompanying attempts of regulation and secrecy, has been nuanced by Karel Davids. In studying the Dutch Republic he noted a substantial openness related to the transfers of knowledge — up until the mid-eighteenth century. See Davids (1995).

⁸¹ Harris (1998), pp. 173–221.

also stressed the role of skilled artisans). This image has also been reproduced in Swedish research on eighteenth-century metal making: the transfer of foreign know-how to Sweden was a matter that mainly involved savvy mobile men from the top ranks of society. Here, artisan mobility, as connected to the rise of manufacturing industries, needs to be further investigated.

Regarding the latter feature, it has recurrently been argued that guilds in early-modern Europe promoted innovation and the dissemination of techniques through the circulation of skilled craftsmen. While artisans' work to some extent always included a certain degree of 'tacit' knowledge, such observations nuance the view of craft skills as intimately bounded to the sphere of the workshop and the master craftsman himself.⁸² Other scholars have, however, stressed the need for moving beyond the guild framework in exploring training and workforce mobility, as well as the transmission of skills and knowledge.⁸³ In a similar vein, Lissa Roberts has questioned the, often suppositious, division between manual skills, scientific ideas, and technology by discussing 'geographies of skill' in pre-industrial Europe. These trajectories, she argued, not only connected different places, but also 'intellectual, administrative and manual labour'.⁸⁴

A few Swedish investigations have indeed dealt with craftsmen's journeys, as they related to the transmission of skills and knowledge during the period of interest here. Olov Amelin discussed the foreign journeys made by some Swedish instrument makers during the mid-eighteenth century. These were classified as early forms of 'industrial espionage' and involved a network of political and scientific institutions.⁸⁵ Discussing foreign craftsmen being recruited to Sweden, Linda Hinners studied French artisans working with the construction of the Royal castle in Stockholm. She noted how work processes involved wider transmissions of knowledge and the use of diverse manual and artistic techniques.⁸⁶ Other scholars have dealt briefly with journeys and the acquirement of specific skills as critical features for artisans who wanted state support for setting up manufacturing workshops in Stockholm, thereby distinguishing themselves from the guilds.⁸⁷

Still, not much is known about these practices. Apart from Amelin's dissertation, the transmissions of skills and knowledge within the metal trades are uncharted. Such an analysis can preferably include movements that connected different metal-making communities over time. It can also, related to Dag Lindström's discussion, thoroughly explore the practical organisation of craft work and the ways in which training was performed.⁸⁸

⁸² See Epstein (2008); Reith (2008). For the term 'tacit knowing', see Polanyi (1967).

⁸³ See e.g. Davids and De Munck (2014), pp. 20–33; Caracausi (2014), pp. 141–160.

⁸⁴ Roberts (2007a), p. 192. See also Roberts (2007c).

⁸⁵ Amelin (1999).

⁸⁶ Hinners (2012), pp. 159–206.

⁸⁷ Söderlund (1943), p. 298; Nyström (1955), pp. 264–266.

⁸⁸ Lindström (2011), pp. 196–203.

Investigating the Stockholm crafts, Söderlund emphasised the unstable position and mobility of journeymen, which often resulted in conflicts with master artisans. He also discussed apprenticeship, but dealt only briefly with the practical processes of training.⁸⁹ Later inquiries, mainly concerned with nineteenth-century urban crafts, have more comprehensively described these processes. Magnusson discussed the ‘patriarchal model’ for progression that characterised the metal crafts in Eskilstuna. It was based upon notions of hierarchy and generational cycles. Advancement was, however, a complicated process. Many apprentices never reached a mastership, which in turn undermined the model over time.⁹⁰

Despite these contributions, the links between training and the organisation of manufacturing in early-modern Sweden need to be further investigated. For the metal trades this is particularly evident regarding the period before the founding of Eskilstuna *Fristad*. On this matter, useful inputs can be gained from recent European research highlighting a more collaborative and mobile context for pre-industrial craft knowledge.⁹¹ Exploring apprenticeship in premodern England, Patrick Wallis noted variations regarding patterns of employment and the duration of training. The latter, he argued, was often a continuous process: ‘through observation, imitation, and practice by apprentices that occurred while they were engaged in useful work’.⁹²

Moreover, training was not an exclusively workshop-based process. Sonenscher stressed the complex patterns of recruitment and training within the French trades, noting a high degree of workforce mobility. This resulted in changing relations between employers and employees, as well as in variable workshop practices.⁹³ While the appraisal of skills was largely related to the working of materials, matters such as ‘adaptability and flexibility’ became increasingly important.⁹⁴ Berg has made similar remarks, arguing that workshop practices in the British metal trades were included in networks of exchanges and movements. This also brought about variation in training.⁹⁵

The two features dealt with above — wider transmissions and training — exemplify how the chronology, spatiality, and organisation of metal manufacturing during the eighteenth century can be further dealt with. Especially, that is, if they are related to a discussion on the interactions between state-ambitions of control and the practical processes of work.

⁸⁹ Söderlund (1943), pp. 239–292. See also Söderlund (1949), pp. 378–401.

⁹⁰ Magnusson (1988), pp. 159–173. Lars Edgren offered a similar view in discussing craftsmen and guilds in Malmö. See Edgren (1987), pp. 156–160, 166–173.

⁹¹ See e.g. De Munck and Soly (2007), pp. 13–16; Smith (2007), pp. 37–44.

⁹² Wallis (2008), pp. 845–851; quotation from p. 849. This is in contrast to the view that apprenticeship included different stages, with the master capable of capitalising on apprentices’ work at the end of the training-time. C.f. Söderlund (1943), pp. 284–285.

⁹³ Sonenscher (2012), pp. 99–100, 108–111, 170–173.

⁹⁴ Sonenscher (2012), pp. 321–324.

⁹⁵ Berg (1994), pp. 271–279.

As in both Marx's discussion and in the early theories on proto-industrialisation, the Swedish manufacturing industries have been associated with the growing potentials of exploitation of the workforce. As argued by both Heckscher and Nyström, this was also related to attempts made to tear down the collective framework of the guilds.⁹⁶ Scholars discussing larger metal manufactories or metal works during the eighteenth century have stressed similar tendencies, and linked them both to local processes, such as putting-out systems, and to a wider context, with a firmer state control.⁹⁷ This view has, however, also been nuanced. In contrast to Heckscher and Nyström, Gösta Walldén stressed how the diverse group of manufacturing workers in Stockholm were mobile and had possibilities to influence their working conditions — despite forceful attempts at control and regulation.⁹⁸

This matter has also been dealt with by researchers discussing metal making. Magnusson has noted how further attempts were made with introducing a workshop-based division of labour in Eskilstuna *Fristad* during the first half of the nineteenth century. However, this did not result in deskilling. Rather, innovative achievements made by some artisans, combined with an adaption to a more competitive market, resulted in a higher demand for skills.⁹⁹ In a similar way, Rydén has noted how improvements in ironmaking during the same period resulted from the *connections* between 'increasing worker skill, a modified organization of production, new divisions of labour, and some important technological innovations.'¹⁰⁰

What is still missing for a Swedish context is an in-depth analysis of eighteenth-century manufacturing. We do not know much about how transmissions of skills and knowledge influenced, and connected, different practices of work. Nor have the attempts with implementing a division of labour at manufactories and in metal workshops been dealt with by emphasising the everyday life and movements of artisans.

Such a perspective is proposed here. Influences are taken from recent works on manufacturing which have elucidated the links between protectionist policies, expansions in trade and shipping, and changing consumer markets. Berg has stressed the emergence of new practices of experimentation, process invention, and product innovation. By using the term *imitation*, also frequently used during the eighteenth century, she has drawn attention to the production of 'an inventive combination or reinterpretation of traditional principles.'¹⁰¹ Liliane Hilaire-Pérez has emphasised similar trends in

⁹⁶ Heckscher, (1949b), pp. 637–642; Nyström (1955), pp. 220–229.

⁹⁷ See e.g. Boëthius and Kromnow (1968), pp. 368–371; Florén (1987).

⁹⁸ Walldén (1955), pp. 347–357. As noted above, Nyberg (1992) proposed a similar view.

⁹⁹ Magnusson (1988), pp. 99–102, 129–158. A similar observation was made by Berg for a British context, where she argued that the metal trades illustrate how a division of labour and the implementation of technology went hand in hand with continuously high levels of manual skills. See Berg (1994), pp. 255–256.

¹⁰⁰ Rydén (1998), p. 407.

¹⁰¹ Berg (2002), pp. 1–30; quotation from p. 15. See also Riello (2013), pp. 160–184.

her exploration of the connections between trading, journeys, innovation, and transmissions of technology.¹⁰² Related to this, scholars have increasingly turned their interest towards urban contexts in emphasising the relations between innovation, creative encounters, new patterns of taste and demand, and the exhibitions of skills.¹⁰³ Towns were intermediary spaces that linked different practices for material and knowledge production, relating back to Roberts and Schaffer's discussion. These processes also included tensions and differing ambitions, such as varying relations between national and local authorities, patrons and clients, or privileged craftsmen and outsiders.¹⁰⁴

These investigations put emphasis on knowledge and skills as socially constructed by people in everyday practices (rather than adhering to notions of 'one way' transfers). Still, transmissions always included aspects of negotiation. Here, Alder has been influential. He argues that the social life and materiality of manufacturing is impossible to separate from questions of power; the artefacts used and produced have, in this sense, 'political qualities'.¹⁰⁵ Transmissions of knowledge, skills, and artefacts are not seen as processes of taking something from one place to another, but rather as complex — and entangled — patterns including 'cultural selection and local adaptation.'¹⁰⁶ Unlike Alder, however, I will not approach these processes by using the term 'technology'.¹⁰⁷ This choice is further discussed below.

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This investigation will add to the existing research on eighteenth-century Swedish metal making in a number of ways. It will highlight spaces that have been largely overlooked in previous studies, above all urban manufacturing. It will also pay substantial attention to movements and interactions between metal-making communities over time. In relation to this it deals with the connections between the organisation of work and transmissions of skills, knowledge, and artefacts, with a specific interest in the relations between the state and artisanal practices. In doing so, it moves beyond questions of 'scale' or specific forms of manufacturing. The primary interest has not been to rule in favour of any specific overarching mode of production. Rather, I am interested in working people, movements, and changing practices within the metal trades. This approach might nuance the image of the

¹⁰² Hilaire-Pérez (2002); Hilaire-Pérez and Verna (2006).

¹⁰³ See e.g. Roche (1996); Pérez (2008); Davids and De Munck (eds.) (2014).

¹⁰⁴ See e.g. Hilaire-Pérez (1991); Davids and De Munck (2014), pp. 4–12, 28–31; Bertucci and Courcelle (2015).

¹⁰⁵ Alder (2010), pp. 16–19.

¹⁰⁶ Alder (2010), p. 237.

¹⁰⁷ Alder's use of the term 'technology' differs from that of scholars advancing more evolutionary perspectives. See e.g. Mokyr (1992), pp. 3–16. According to Alder (2010), p. 18, 'technology is the physical embodiment of that form of knowledge which we call power.' My choice to not use this term also differs from previous Swedish studies. C.f. Lindqvist (1984), pp. 14–16 and Amelin (1999), pp. 186–189 who both linked 'technology' to 'transfers'.

‘rise and fall’ of manufacturing industries in Sweden during the mid- and late-eighteenth century. The next section develops the framework which is applied for studying metal making from a practice-oriented perspective.

1.2 Towards a Practice-Oriented Understanding of Early-Modern Metal Making

This section introduces the theoretical concepts that will be used in order to approach metal-making practices in Sweden during the eighteenth century. These form an interpretive framework which relates to the general interests of this investigation and target the three problematic areas discussed above. Some of the terms are additionally explained when they are contextually introduced in chapters 2, 3, and 4.

Eighteenth-Century Perceptions of *Trades* and *Systems*

One critical ingredient of this text is the use of eighteenth-century perceptions of metal manufacturing and of economy in general. One way of doing this is to use the term *metal trades* instead of manufacturing industries or proto-industries. The former term implies that commerce should not be seen as separate from production. As argued by Evans and Rydén, eighteenth-century uses of the term ‘trade’ (or the corresponding Swedish term *näring*) were ‘reflecting a reality whose features were hybrid and transitional’. *Trade* included practices of ‘manufacturing’ and ‘dealing’ without any ranking.¹⁰⁸ Moreover, as stressed by Rydén, one can preferably speak about the wider economic context by using the term *system*. Eighteenth-century perceptions and discussions of static systems, as created by God, reflected a mechanistic world view where change was only possible to bring about *from above*. This reflects an ‘*esprit de système*’. Gradually during the period of interest here, however, perceptions of the metal trades and of economy in general were influenced by more systematising approaches — an ‘*esprit systématique*’ — including notions about progress.¹⁰⁹

In studying arms manufacturing in late-eighteenth century France, Alder discussed ‘technological systems’ or ‘techno-social systems’, by which he emphasised the active role of humans in shaping production in its wider social and material context.¹¹⁰ This investigation endorses this view on early-

¹⁰⁸ Evans and Rydén (2007), pp. 9–13; quotation from p. 12. The mutual relationship between trade (commerce) and production is manifest both in works by Adam Smith and in earlier works by writers like Daniel Defoe. The term ‘metal trades’ is also used also by other scholars examining metal manufacturing. See e.g. Berg (1994), pp. 255–279.

¹⁰⁹ Rydén (2008); Rydén (2013b).

¹¹⁰ Alder (2010), pp. 14–15, 39–46. In using these terms, Alder was inspired by scholars such as Thomas P. Hughes and Trevor Pinch. See e.g. Bijker, Hughes, and Pinch (eds.) (1987).

modern manufacturing, but it will not employ these specific concepts. The reason for this is uncomplicated: the term ‘technology’ (*teknologi*) was not used by the actors that will be followed here.¹¹¹

I use the term *metal trades* when discussing Swedish metal manufactories and workshops, as well as the connections between them. This is in turn complemented by a notion of a manufacturing *system*, as it was discussed by the *Directeur* Schröder.¹¹² By doing this, diverse ways of organising metal making are explored from a perspective more in line with eighteenth-century perceptions; manufacturing is seen as connected to practices of dealing and using (consuming) as well as to the activities of regulating, ordering, and policing. Still, in order to thoroughly analyse these connections other concepts are needed. I consider the terms *strategies* and *tactics* useful for tracing changes in eighteenth-century metal making.

The *Strategies* and *Tactics* of Metal Making

The interest of this investigation in metal-making practices does not imply that it is concerned with studying certain well circumscribed places. Rather, in line with the theories of French philosopher Michel de Certeau, *practices* are understood here as being connected to people’s everyday actions, manipulations, and re-appropriations; to the “ways of operating” or doing things’.¹¹³ With that said, however, practices are still viewed as shaped by *different* ways of acting and knowing. De Certeau distinguished between *strategies* and *tactics*. The former are rationally calculated ways of establishing control through the defining of specific places or particular types of knowledge. *Tactics*, on the other hand, are carried out in ‘the space of the other’ by a ‘clever *utilization of time*’.¹¹⁴ They are ways of manipulating the strategic conditions – to be ‘always on the watch for opportunities that must be seized “on the wing.”’¹¹⁵ In this sense, acting tactically can also be a way of altering one’s position (or role) within a given social order.¹¹⁶

This has a spatial side to it as well. In line with the discussion on *strategies*, de Certeau argued that *places* are defined by stability and order. *Spaces*, in contrast, are defined by movements. They are ‘*practiced*’ places marked by the actions of users.¹¹⁷ Karin Sennefelt has used de Certeau in

¹¹¹ For a similar discussion, see Orrje (2015), p. 37.

¹¹² This term is further introduced in chapter 2.

¹¹³ de Certeau (1984), pp. xi–xviii. A similar view on practices, also building on de Certeau, is given by Lisa Hellman in her dissertation on the Swedish East India Company during the eighteenth- and early nineteenth centuries. See Hellman (2015), pp. 4–8.

¹¹⁴ de Certeau (1984), pp. 34–39.

¹¹⁵ de Certeau (1984), p. xix.

¹¹⁶ Such a discussion on ‘tactical performances’ is made by Orrje in his dissertation on eighteenth-century mechanical practitioners acting in relation to the ‘persona’ of the *mechanicus*. See Orrje, (2015), pp. 15–18.

¹¹⁷ de Certeau (1984), pp. 117–118.

exploring the political landscape in Stockholm during the Age of Liberty. She argued that public spaces in the capital were created through movements and encounters — ‘spatial and social practices’ that in turn changed the meaning of specific places. She also emphasised how actions do more than just re-produce structures, by drawing attention to the *tactics* of everyday life.¹¹⁸ One way of using *strategies* and *tactics*, according to Sennefelt, is to view the former as ‘boundaries’ related to different claims of power regarding the ‘usage of space’, while the latter are seen as ‘thresholds which made boundary-crossing possible.’¹¹⁹

Another, but related, way of using de Certeau is proposed by Rydén in an article on Swedish travellers in eighteenth-century London. He discussed the perceptions of urban space by distinguishing between a ‘General idea’ (as created from an elevated position) and the act of ‘walking the streets’. While the former makes possible an overview, it cannot produce an awareness of everyday life.¹²⁰ De Certeau discussed this difference by distinguishing between ‘*the concept of the city*’ (more in line with a strategic ambition) and ‘*urban practices*’ (which include a diversity of *tactics*).¹²¹

In this investigation, the term *strategy* is used in order to approach the attempts made (mainly by the protectionist state) to establish control, overview, and order within the manufacturing system and the metal trades. This was done through regulation, supervision, spatial mapping, and the implementation of ideas about how to organise work. *Tactics* is used to emphasise the everyday actions carried out within and related to the strategic conditions: the creative manipulation (or use) of knowledge, materiality, and places by men and women involved in metal making.

The intention here is not to suggest an all-prevailing difference based on social groups or positions within the social hierarchy; artisans could of course act strategically, just as state officials could act tactically. Still, in studying the organisation of work and the circulation of skills, knowledge, and artefacts within the metal trades, my interest is primarily directed towards the intersections of state-*strategies* and the everyday *tactics* of artisans. This way of exploring manufacturing practices over time moves beyond notions of oppression and reactive struggle, at the same time as it keeps focus on negotiations and conflicts. It highlights the interplay of different ways of knowing and acting in everyday metal making.¹²²

The use of de Certeau’s concepts is also discussed in the methodological section, which introduces the term *trajectories*. Here, the theoretical frame-

¹¹⁸ Sennefelt (2011), pp. 29–31; quotation from p. 31, my transl.

¹¹⁹ Sennefelt (2011), p. 179; quotation, my transl.

¹²⁰ Rydén (2013c), p. 257.

¹²¹ de Certeau (1984), pp. 91–96. He discussed *strategies* in terms of ‘the mastery of places through sight’, or the making of a ‘*panoptic practice*’. See *ibid.*, p. 36.

¹²² Parallels can be made here with Giovanni Levi’s discussion on individuals’ manipulations ‘in the face of a normative reality’. See Levi (1992), p. 94.

work is further constructed by discussing concepts that are thought of as complementing this focus in a fruitful way by highlighting the connections between movements and changing metal-making communities.

Contact Zones, Circulation, and Grounding: A Nuanced View on Practices of Work

In order to further nuance the view on the organisation of metal manufacturing, inspiration is taken here from Sonenscher's and Alder's works, referred to above, but also from Kapil Raj's discussions on movements and knowledge-making. Sonenscher's notion of a 'bazaar-like economy' is believed to be of specific value when discussing the metal trades in Stockholm. This term is not equal to organisational disarray. Rather, the order of the 'bazaar' has more to do with the 'ordinary concerns of its members', as well as with varying relations and divisions of labour.¹²³ Artisanal work, Sonenscher stressed, was always connected to the 'culture of the wider polity' and as such was a matter of constant negotiation.¹²⁴ While agreeing with Sonenscher on many critical points, Alder later went further in exploring the negotiations and social relations of manufacturing regarding how they were related to a changing materiality. In doing this, he also emphasised the interaction of state ambitions, artisans' skills, and 'thick objects'.¹²⁵

These two works put emphasis on a critical point in dealing with early-modern manufacturing: the importance of highlighting both the everyday materiality and its relation to a wider cultural and political context. The specific interest of this investigation in transmissions of knowledge and skills has inspired a use of the concepts *contact zones*, *circulation*, and *grounding* to complement *strategies* and *tactics*.

In order to emphasise the connections *between* different spaces for metal making as well as the local dynamics of manufacturing, I refer to these as *contact zones*. Originally applied for the study of encounters between different ethnic or geographical groups, Raj instead employed this concept to investigate encounters of various human activities.¹²⁶ A *contact zone*, he emphasised, 'was a site for the production of certified knowledges' through the intersections of 'intellectual and material practices'.¹²⁷

This study differs from Raj's in that the intention is not to study knowledge-making in a global setting. As used here, a *contact zone* could be a workshop or a manufactory, but also a metal-making community or a

¹²³ Sonenscher (2012), pp. 22–29; quotation from p. 27.

¹²⁴ Sonenscher (2012), pp. 46–47. Here, he emphasised both artisans' legal arguments, based on ideas of natural rights and the wider tradition of natural law, and the 'fluidity and impermanence of the workshop economy.' See *ibid.*, pp. 48–72, 97–98; quotation from p. 98.

¹²⁵ Alder (2010), pp. 6–10, 16–19.

¹²⁶ Raj (2007), p. 225. For the original use of the term, see Pratt (1992).

¹²⁷ Raj (2007), p. 13.

town. These spaces had in common that they attracted, and were transformed by, intersections of people and practices involved in the metal trades — and which produced certain types of knowledge and skills.

The importance of this term is, furthermore, that it allows a view of these spaces as connected through *circulation*. The latter, indeed widely used term, is employed by Raj in order to nuance the image of knowledge as ‘transferred’ from centre to periphery. It opens up for the exploration of negotiations, reconfigurations, and uses across time and space; *circulation* can in itself be seen as a “‘site” of knowledge formation’. This also puts emphasis on the role of intermediary agents (or go-betweens), who interacted with different social and material contexts. Consequently, this approach favours a notion of the ‘*mutable* nature’ of knowledge and skills, as well as of people.¹²⁸ In a similar way, Roberts has discussed the *circulation* of knowledge in early-modern Europe by stressing how these processes often included multivalent forms of ‘embodiment’. This brought about different appropriations as well as different ways of learning and knowing. Again, Roberts noted the relatedness of ‘material and knowledge production’.¹²⁹

My use of the term *circulation* comprises notions of movements forth and back between specific communities (such as Stockholm and provincial metal works) or nations (notably Sweden and England). It also incorporates the further movements of knowledge, skills, and artefacts that involved different agents and practices. Moreover, this focus includes the dynamic role of the local context (in this case a metal-making community or a town). Again with reference to Raj, processes of *circulation* are explored as ones by which ‘localities constantly reinvent themselves through grounding (that is, appropriating and reconfiguring) objects, skills, ideas, and practices’.¹³⁰ The concept of *grounding* recognises the non-static nature of skills and practices, and it also enables a study of these as *used* in diverse ways in different localities. I speak of these processes in terms of adaption, reconfiguration, and *imitation*, with the latter term being further discussed below.

The connections to de Certeau’s reasoning are strong. The focus on *contact zones*, *circulation*, and *grounding* incorporates the mobility and active manipulation of knowledge practices. At the same time, they suggest a bridging of cultural and material perspectives in encouraging the exploration of both the different meanings attached to metal manufacturing, as related to a wider cultural and political context, and the negotiations connected to the everyday materiality of production. This enables a discussion on movements within and beyond the Swedish manufacturing system, as well as their relations to varying organisations of work. Since the *circulation* of knowledge

¹²⁸ See Raj (2007), pp. 1–26; quotations from p. 20, 225–226. For similar discussions on circulation and intermediary agents, see e.g. Markovits, Pouchepadass, and Subrahmanyam (eds.) (2006); Hilaire-Pérez and Verna (2006), pp. 542–547.

¹²⁹ Roberts (2012), pp. 50–60; quotations from p. 52.

¹³⁰ Raj (2007), p. 21.

and skills are specifically targeted by this investigation, these terms must also be more thoroughly discussed.

To Know or to Be Skilled? Definitions and Links

Considering the approach outlined above, it is important to broaden the notion of skills and knowledge. Rather than viewing them as separated, this dissertation argues that they must be seen as connected and (often) mutually dependent. However, especially when studying the relations between *strategies* and *tactics*, it is important to also discuss them separately.

Studying the *circulation* of skills and knowledge in early-modern Sweden is indeed problematic. Partly because such processes are difficult to discover and trace; partly because there were numerous eighteenth-century terms that can be referred to either as *skills* or *knowledge* or, in some cases, as both. Similar problems occur regarding the term ‘science’.¹³¹ These problems are further discussed in the methodological section.

In *The Gifts of Athena*, Mokyr elaborated a distinction based on the ancient terms *episteme* and *techne* — which he termed as *propositional knowledge* (‘what’) and *prescriptive knowledge* (‘how’). The first of these, dealing with both knowledge about nature, regularities, and more ‘practical informal knowledge’, is in turn assumed to support the growth of the latter (‘techniques’ used in ‘economic production’). According to Mokyr, the narrowing gap between these two types of knowledge gave rise to an increase of ‘useful knowledge’ during the ‘Industrial Enlightenment’ in Britain.¹³² Critical in this process, he argued, were ‘creative communities’ and ‘elite networks’ of engineers, natural philosophers, and entrepreneurs.¹³³

‘Useful knowledge’ has been widely discussed, and Mokyr’s use of the term has been nuanced. Karel Davids argued that it cannot solely be viewed from the perspective of ‘*ex post*’ definitions by scholars seeking to explore its impact on technology.¹³⁴ Hilaire-Pérez approached this matter by focusing on ‘mobility, public culture and networks’, rather than on science and scientists. In doing this, she stressed the role of artisans for the development of ‘open technique’ and ‘the commercialization of knowledge’.¹³⁵ Evans and Withey have been more critical to Mokyr’s perspective. Indeed, they noted how the eighteenth century was ‘an age when the scientific laboratory and the artisanal workshop overlapped’ and where ‘new types of “enlightened”

¹³¹ See Lindqvist (1984), pp. 15–16. ‘Science’, as dealt with here, does not refer to our present notion of the term, but rather, and in line with the definition used by Orrje, to a ‘field of systematic knowledge making’. The eighteenth-century term *wettenskaper* (normally translated as ‘sciences’) was used also for knowledge in general. In the latter cases I have instead used the term ‘knowledge’. C.f. Orrje (2015), p. 37.

¹³² Mokyr (2002), pp. 4–5.

¹³³ Mokyr (2002), pp. 64–66.

¹³⁴ Davids (2012), p. 84.

¹³⁵ Hilaire-Pérez (2007), pp. 137–146.

activity were stimulants to technological innovation.’ The causal links between Enlightenment thinking and industrial change in the case of the steel trades are, however, doubtful. In fact, Evans and Withey questioned if ‘useful knowledge’, according to Mokyr’s definition, was useful at all.¹³⁶

Still, the interactive relation between different types of knowledge and skills has been recognised by other scholars as well. Discussing the making of bar iron during the nineteenth century, Rydén dealt with ‘genuine skill’ as consisting of knowledge and manual skills, as well as the workers’ ability to handle raw materials and the means of production. Also, artisans were distinguished by the way they could organise their own work.¹³⁷ Magnusson used a similar definition in his discussion on the *Fristad*, arguing that craftsmanship included independence regarding both the *planning* and *execution* of the work process.¹³⁸ This can be related to the widened approach later proposed by the researchers contributing to *The Mindful Hand*. Lissa Roberts argued that an artisan’s work involved ‘complex entanglements of head and hand’,¹³⁹ and Pamela H. Smith discussed craft as ‘a process of making *and* knowing’.¹⁴⁰

I use the terms ‘knowledge’ and ‘skills’ by defining the former as ideas, theories, and experiences related to metal manufacturing in its narrow or its wider meanings. The term ‘skills’, in turn, is seen as connected to the act of doing something in practice (making, using, constructing et cetera). Still, I do not assume any hierarchical relation between them. The emphasis is on knowledge and skills being *used* by humans in an integrative way in everyday practice. This was done in relation to a non-static materiality — with different combinations of artefacts, mechanical devices, and raw materials.

These definitions are in turn related to the focus on *circulation* and *grounding*. Skills and knowledge were used in different ways over time and across space. One way to approach these processes is to use the term *imitation*. In line with previous research, practices of *imitation* are understood here as involving active manipulations of processes and products. They incorporated notions of material qualities and finishes, new ideas about the organisation of work, and new uses of materials and skills.¹⁴¹ Such a view also comprises a notion of objects (whether models, drawings, tools, or complicated gear) as playing vital parts in circulatory processes.¹⁴²

¹³⁶ Evans and Withey (2012); quotations from p. 549 and p. 555. Another nuanced view on ‘useful knowledge’ has been offered by Riello, in discussing ‘the enlargement of the epistemic base’ of European cotton manufacturing (the printing of calicoes) during the eighteenth century. See Riello (2013), pp. 169–184; quotation from p. 183.

¹³⁷ Rydén (1991), pp. 168–173. The term ‘genuine skill’ is originally from More (1980).

¹³⁸ Magnusson (1988), pp. 137–141.

¹³⁹ Roberts (2007b), p. 7.

¹⁴⁰ Smith (2007), p. 34.

¹⁴¹ Berg (2002); Hilaire-Pérez (2002); Sonenscher (2012), pp. xiv–xv.

¹⁴² C.f. Roberts (2012).

These practices were, however, also related to strategic ambitions, such as state policing. This can be compared to Davids' discussion on the 'global travelling' of knowledge. He argued that these processes can be understood as involving complex 'machines', such as state institutions or trading companies, as well as 'self-organization'. The latter term is defined as the 'bottom-up processes' that occurred inside or outside the reach of the more formalised networks, and which played a vital role in wider transmissions.¹⁴³

Manufacturing practices thus always included negotiation, tensions, and, sometimes, conflicts. Alder has used the term *manufacturing tolerance* in order to show how some aspects of production were put under increasing supervision, but this did not *per se* result in deskilling. Rather, he saw it as a process that 'increases the stringency of the supervisor's control over the working process—albeit in a paradoxical manner.'¹⁴⁴ Combined with the highlighting of *strategies* and *tactics*, the term *manufacturing tolerance* suggests, on the one hand, a shift away from Marxist and strict proto-industrial notions of the gradually more exploitive relations in early-modern manufacturing. On the other hand, it does not seek to trace positive long-term benefits of an increased specialisation and division of labour. Rather, like Alder, I am interested in how and why *manufacturing tolerance* was shaped in relation to a changing material and social context.¹⁴⁵

As argued here, this is to take one step further in order to understand eighteenth-century manufacturing. Rather than speaking of oppression and resistance or, for that matter, of efficiency and the impact of new ideas or technology on practices of work, this investigation strives to explore the constant interplay between *strategies* and *tactics*. In line with Roche, this approach shows how change was possible also within a society defined by ideas of hierarchy, natural order, and stability.¹⁴⁶ Here, the active role of both state officials *and* artisans in processes of *circulation* is one critical feature in aiming for a comprehensive understanding of knowledge-making and the organisation of work over time.

1.3 Aim and Research Questions

The potential research areas pointed out in section 1.1 serve as foundations for this investigation. On the one hand, they relate to the overall interest here in the localities and everyday practices of metal manufacturing as related to a wider context of policies, knowledge-making, and movements. On the other hand, they illustrate how Swedish eighteenth-century metal making

¹⁴³ Davids (2015), pp. 869–873.

¹⁴⁴ Alder (2010), pp. 146–153; quotation from p. 148. Thus, in line with Magnusson (1988) and Berg (1994) referred to above, Alder instead stressed how new skills were introduced.

¹⁴⁵ C.f. Alder (2010), pp. 127–128.

¹⁴⁶ Roche (1998), pp. 6–7.

can be further explored. By relating to previous Swedish research, as well as to international inquiries, I have identified three main problems that will be under scrutiny. In section 1.2, I discussed the theoretical framework and concepts that are used in order to approach the context in question, with a focus on the spatiality and temporality of manufacturing, the varying ways of organising work, as well as the *circulation* and use of skills and knowledge. This has resulted in the following, more specified, agenda:

The aim of this investigation is to *explore how skills, knowledge, and artefacts were circulated and grounded in the Swedish eighteenth-century metal trades (from ca. 1730 to 1775), and to analyse how these processes were related to different ways of organising practices of work.* This aim can be broken down into three research questions:

How were skills, knowledge, and artefacts *circulated* and *grounded* within the metal trades during the period in question, and in what ways did these processes influence different metal-making communities (*contact zones*) over time?

How were different *contact zones* and practices of work shaped by the intersections of attempts to regulate, order, and control (*strategies*) and the *tactics* of everyday metal making?

Why were ideas on how to organise metal-making practices adapted and reconfigured in the specific ways they were over time?

In order to answer these three questions, it has been necessary to employ a methodological approach that distinguishes itself from previous studies of the Swedish manufacturing trades. This approach has taken its departure in the combined interest in both practices and movements. I have worked with different *trajectories*, through which people, materials, objects, and knowledge practices have been followed over time and across space. As argued here, this approach can offer valuable results not only related to the processes dealt with in this investigation, but also in a wider sense. Before I discuss the methodology, some further definitions and limitations must be dealt with.

Definitions: Time, Spaces, and Organisational Boundaries

This investigation is limited to the study of Swedish metal manufactories, metal works, and workshops — here labelled the *metal trades*. This was one branch of the manufacturing *system* during the eighteenth century. The interest lies in the form of metal processing that – especially from the 1750s and onwards – was referred to as finer metal making (*finsmide* or *blanksmide*). Also, the more practice-oriented chapters of this text focus on one particular

type of finer metal making, namely cutlery making, although comparative examples are taken from other crafts.

The discussion concentrates on larger provincial workplaces, often situated near towns, and the urban metal crafts in Stockholm. I am not primarily interested in agrarian handicrafts; that is, metalworking being operated by peasant households (often on a seasonal basis). Nor do I focus on metal-making guilds. However, these different forms of production did often overlap. Larger provincial metal works could include diverse connections with the agrarian economy, such as subcontracting arrangements with peasant smiths. Likewise, the boundaries between town-based manufacturing workshops and ones that were included in guilds were sometimes blurred. In these cases, it has been necessary to discuss and problematise these overlaps. Still, the emphasis is on workplaces included within the manufacturing *system* which produced metal wares by being supported, in different ways, by state-regulations or privileges.

This study also has as its primary focus the relations between state institutions and individual artisans or practices of work. It is to a lesser extent concerned with questions regarding ownership or credit arrangements. Thus, this is not an investigation designed to answer the question to what extent metal manufacturing depended on a putting-out system or a factory system. With that said, however, I emphasise attempts to organise metal making according to different ideas or production models. Most notably, I deal with the implementation of piecework at metal works and urban workshops. During the period of interest here, this was often referred to in Sweden as being done according to the ‘English way’ (*styckearbete på Engelska sättet*). Still, this is done by focusing on the *circulation* and *grounding* of knowledge and skills, and not on specific forms of payment or credit.¹⁴⁷

The period targeted is ca. 1730 to 1775. This timeframe covers the expansion of the metal trades during the 1740s and 1750s, but also the decade before the launching of (renewed) manufacturing privileges and regulations in 1739. The final year is chosen with respect to the founding of Eskilstuna *Fristad* in 1771. Including the first years of this metal-making community’s existence can produce comparative examples, and, at the same time, it links

¹⁴⁷ During the period of interest here, piecework did not primarily refer to work carried out for a piece wage. Nor was it restricted to larger manufactories or metal works. The forms of payment varied (even at the same workplaces) and piecework was early on introduced also in smaller urban workshops in Stockholm. Rather, as used here, piecework refers to an organisational model — which indeed took different shapes when implemented in practice. In most cases, however, it included groups of workers — working in the same workshop or in separate ones — who were employed with specific tasks. This has also been referred to as ‘paced work’ (*tempoarbete*), a term which we do not find in eighteenth-century sources. The terms ‘piecework’ (*styckearbete*) or ‘the English way’ (*Engelska sättet*) were in common use. C.f. Söderlund (1943), p. 221; Magnusson (1988), p. 99, 129–131. For discussions on piecework, and piece wages, as related to metal manufacturing and forerunners to the factory system in England, see Berg (1994), pp. 271–276; Mokyr (2011), pp. 341–348.

the findings in this investigation with ones in previous research. Still, the main focus here is on the period before the *Fristad*. The time period chosen also covers the economic crisis of the 1760s, which has been related to a decline and reorganisation in the manufacturing trades.

Finally, this investigation is concerned with the developments in one country, Sweden. However, by exploring journeys and *circulation* between Sweden and other European countries, it also places the Swedish manufacturing trades into a wider context.

1.4 Studying Metal Making: A Trajectorial Method

A consequence of the interest in both everyday practices of metal making *and* in the circulatory movements of the metal trades is that we need to take a broad methodological approach. This investigation cannot rely on a purely quantitative approach, which uses the compiling and computing of larger sets of data in order to treat longer periods and determine trends. While such an approach certainly is valuable in offering various contextual inputs, it does not say much about the practices of everyday life, knowledge-making, and work. In de Certeau's words, a quantitatively driven method would be concerned with '*what* is used, not the *ways* of using'.¹⁴⁸ Likewise, it is also problematic to build an investigation like this one exclusively on close readings of regulative texts, institutional reports, or 'scientific' works. Such an approach would always be at risk of reproducing a 'one-sided' image of eighteenth-century manufacturing or, alternatively, one where science and politics were separated from practices of work. This was, however, seldom the case, as argued by the scholars contributing to *The Mindful Hand*.¹⁴⁹

Finally, problems related to a micro-oriented approach must also be addressed. As argued by Levi, reducing the scale of observations also demands an awareness of the surrounding context in change.¹⁵⁰ In this case, this means that a study of metal-making practices cannot simply focus on places in isolation. These are better explored as being connected to the political, economic, and material context. This also has consequences for the practical work with the sources; the use of one type of material (say probate inventories or parish records) related to a specific place over time, becomes problematic if the investigation is oriented towards studying processes of *circulation* and varying organisations of work.

The methodological problem, related to the discussion above, can be formulated as follows: Can we approach the relation between circulatory

¹⁴⁸ de Certeau (1984), p. 35. Such approaches have also been questioned following the cultural turn and the stronger position of micro-history. See Ginzburg (1980); Burke (ed.) (1992); Bonnell, Hunt, and Biernacki (eds.) (1999).

¹⁴⁹ Roberts, Schaffer, and Dear (eds.) (2007).

¹⁵⁰ Levi (1992), pp. 91–113.

processes and the organisation of work within the eighteenth-century Swedish metal trades without resorting to either telling a story ‘from above’ or discussing micro-cases that (in the end) become nothing more than ‘examples’? This investigation suggests that this can be done.

One way to solve this problem is to approach the intersections of *strategies* and *tactics*, that is, the overlaps of general ideas of manufacturing and metal making and the everyday manipulations by users. This also relates to the discussion above on *contact zones* and *grounding*. Methodologically, however, a more fixed approach is needed. Here, all the methods discussed above have been used in complementary ways, but it is the use of *trajectories* that distinguishes this investigation.

This ‘trajectorial’ approach is influenced by inquiries in global history and the history of science and technology concerned with the transmission of knowledge and skills. Most commonly, this is done by the tracing of people. Raj has discussed this by emphasising how the historians’ role is ‘to follow their historical actors and to modify their point of view in line with the actors’ trajectories and spaces of circulation.’¹⁵¹ A similar method has been used by scholars tracing, or ‘mapping’, (geographies of) skills in early-modern Europe. Lissa Roberts stressed how these processes require comparisons to be made over time and space, with attention to changes regarding ‘meaning, significance and use’.¹⁵² Later, she discussed ‘embodied trajectories’, by which she emphasised knowledge and skills as embodied not only in moving people, but also in circulating objects.¹⁵³

It should be noted that, according to de Certeau, there are problems related to the mere *concept* of trajectory. Even though it suggests a movement, it can also be regarded as ‘a plane projection’. De Certeau discussed this by exemplifying with walking in the city. If interested in practices, the ‘temporal movement through space’ cannot be reduced to a line on a map. In its simple definition, however, that is what a trajectory would produce. This is why *strategies* and *tactics* are important. They reveal the intersecting ways of knowing and using that interfere with the order of a seemingly straight line.¹⁵⁴

As used here, a trajectory is an actual movement (both spatial and temporal) in the historical context of interest. It is also a methodological tool that enables the study of actors and practices. In line with Raj’s discussion, the researcher’s task is to follow the trajectory, or perform the mapping, in

¹⁵¹ Raj (2007), p. 93. This approach has a lot in common with Rothschild’s discussion on ‘large’ micro-histories. See Rothschild (2011), pp. 6–7.

¹⁵² Roberts (2007a), pp. 191–192. See also Roberts (2007c).

¹⁵³ Roberts (2012), p. 52.

¹⁵⁴ de Certeau (1984), pp. xviii–xix, 35; quotations from p. xviii and p. 35. Here, it must be noted that this use of ‘trajectories’ differs sharply from research that has employed the term ‘technological trajectories’ in discussing the impact of paradigmatic and cumulative processes of technological progress within microeconomic contexts, such as firms. C.f. Dosi (1988), pp. 1125–1130. For a discussion on this perspective, see also Berg (1994), pp. 177–178.

an open-minded way. In this sense, a trajectory is not something static; it deals with the ‘mutability’ of circulating skills, knowledge, and objects, but also of localities and of the people who are followed.¹⁵⁵ As such, it enables an exploration of changing practices over time.

This investigation uses two main trajectories of two different persons (who have been referred to in the introduction): the state official Samuel Schröder and the cutlery manufacturer Eric Engberg. These two trajectories have provided numerous examples of *circulation* and practices to be explored, connected, and compared. Moreover, they overlap. Schröder and Engberg were two persons (among many more) involved in the wider *skills-trajectory* of the ‘English way’ of making cutlery wares in mid-eighteenth-century Sweden. By following Engberg and Schröder, something more can thus be said about the metal trades during the period, as well about the manufacturing system in general. Their movements enable inquiries of metal-making practices over time, where intersections of *strategies* and *tactics* become evident.

Following other trajectories might have resulted in a slightly different understanding of metal manufacturing during the period in question. Other *strategies* and *tactics* might have been brought to the fore and other *contact zones* could have emerged. This can be seen as one weakness with this methodological approach. Still, the fact that the two individuals followed here to a large extent moved between the same places, involved themselves in similar practices and did this during the same period also gives depth to the presentation and the results offered here. In particular, this enables a deeper understanding of other circulatory movements, related to the same wider *skills-trajectory*, which did not directly involve Schröder or Engberg. In this sense, their trajectories become something more than ‘examples’.¹⁵⁶

The choice to follow two specific trajectories can also be related to other problems that are apparent when dealing with practices of transmission and knowledge-making in the early-modern societies. As stressed by Liliane Hilaire-Pérez and Catherine Verna, it is difficult to know exactly what was disseminated (or circulated). Also, the challenge of reconstructing these processes is demanding.¹⁵⁷ Here, one advantage with following a limited number of trajectories is that it makes possible a pluralistic empirical approach and thus a thorough investigation of practices and movements over time. This can also expose aspects of different social strata that have previously been largely overlooked.¹⁵⁸ The mobility of manufacturing artisans is one such feature, which is critical to this investigation.

¹⁵⁵ Raj (2007), pp. 224–226.

¹⁵⁶ C.f. Raj (2007), pp. 92–94.

¹⁵⁷ Hilaire-Pérez and Verna (2006), p. 542.

¹⁵⁸ C.f. Ginzburg (1980), pp. xx–xxii; Levi (1992), pp. 105–106.

Even a large empiric material has of course its limitations and gaps, and these are discussed throughout the text. I have also worked with contextualising comparisons (especially ones relating to other artisans), as well as more general presentations of the context(s) in which these actors worked, moved, and lived. The different research phases have in this way, like history itself, been actively constructed, not given.¹⁵⁹ Still, some sources have been more important in serving as entry points from whence I have proceeded.

Sources and the Procedure of Work

The most important sources used in each of the chapters below are presented in the corresponding introductions. Here, I present the different types of sources used, and some of the challenges they offer, as well as the procedure of work in tying them together coherently. By themselves, the different protocols, proposals, reports, and letters used in this investigation would not say much. However, when seen as overlapping traces of various activities and practices, they can be used to paint a more comprehensive picture — a story that moves between different levels. As argued here, such a way of working with the sources is facilitated by the use of a few trajectories.

The sources that compose the empirical foundation of this text have not been pre-selected. When starting this work, I did not know that this investigation was going to have its empirical focus on cutlery making, nor that the metal trades in Stockholm were going to occupy such an important part of the discussion. The choices made to narrow down this investigation in these directions have been made along the way.

Still, this investigation has had its empirical starting points. This is important to discuss, in relation to the discussion above, because other choices might have contributed to this dissertation being written in a somewhat different way. Here, the main empirical ‘entrance point’ has been the diaries kept by Samuel Schröder during his eighteen years as *Directeur* for the metal trades (1753–1771). Available at the Royal Library (*Kungliga biblioteket*) in Stockholm, these three manuscript volumes are full of entries that in different ways describe practices of making, using, and exchanging metals and metal wares.¹⁶⁰ Complementing the diaries, I have also used Schröder’s longer reports — submitted to *Kommerskollegium* in 1755 and 1760 — which are available in print.¹⁶¹ The use of Schröder’s writings is one reason for this investigation being concentrated to the mid-eighteenth century.

¹⁵⁹ C.f. Ginzburg (2012), pp. 209–213.

¹⁶⁰ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I–III. KB.

¹⁶¹ Schröder, Samuel (1925a). ‘Berättelse om de finare Järn-, Stål- och Metallfabriksverken i riket (under år 1754)’, in Malmborg, Gösta (ed.). *Berättelser över de finare järn- stål- och metallfabrikerna i Sverige åren 1754–1759*. Stockholm, Part I; Schröder, Samuel (1925b). ‘Berättelse om järn-, stål- och metallfabrikerna för åren 1755–1759’, in Malmborg, Gösta

Moving further from the rich descriptions in Schröder's diaries, the investigation has taken two main directions. First, it has been important to lay bare the political context, in order to further understand the regulative, but also supervisory, foundations of the manufacturing system. Here, I have used texts emanating from the King and the Diet (Royal Decrees), proposals and reports from state institutions and officials, complemented by different 'scientific' works — for example by the leading Swedish metallurgist of his time, Sven Rinman. In this process, I have also been helped by references in previous studies in finding and following up important texts related to the metal and manufacturing trades. In sum, this work has resulted in the three subsequent chapters below, where the *strategic stage* of metal making is depicted. These chapters are also linked to Schröder's trajectory.

Despite the many interesting aspects of the metal trades made visible in these types of texts, they do not fully uncover the changing everyday practices of metal making. In order to approach this dimension, which is of critical importance to this investigation, Schröder's diaries and reports have been followed up in a second way. Individuals referred to by Schröder have been searched out by using the vast archives of the eighteenth-century Diets available at the National Archives in Stockholm (*Riksarkivet*).¹⁶² An enormous amount of written material was sent in to these recurrent Diets, and some of the sub-archives abound with texts handed in by manufacturers and artisans.¹⁶³ A large quantity of this material is in the form of petition-like writings, which were often linked to specific conflicts or difficulties experienced by the writer in question. This makes it important to also understand the specific context for these writings.¹⁶⁴ Actors found in these archives have therefore also been traced in others. Here, I have especially used the archives of important state institutions such as *Kommerskollegium* and the Office of Manufacturing (*Manufakturkontoret*).¹⁶⁵ Local archives, such as the Stockholm City Archives (*Stockholms stadsarkiv*), Eskilstuna City Archives (*Eskilstuna stads arkiv*) and Uppsala Regional Archives (*Uppsala landsarkiv*) have been used to make additional follow-ups.¹⁶⁶

(ed.). *Berättelser över de finare järn- stål- och metallfabrikerna i Sverige åren 1754–1759*. Stockholm, Part II.

¹⁶² FUh. RA.

¹⁶³ Especially, I have used the vast folio-volumes of acts sent in to the Delegacy of Trade and Manufacturing (*Handels och manufakturdeputationen*), available for nearly all Diets during the Age of Liberty. Much of the work during the Diets was carried out in such delegacies (*deputationer*) or in specific committees (*utskott*). The most powerful organ in this regard was the Secret Committee (*Sekreta utskottet*), in which the peasant estate was excluded. See Sennefelt (2011), pp. 52–63; Kaiserfeld (2009), pp. 62–66. See further chapter 2.

¹⁶⁴ C.f. Ling (2016), pp. 40–42.

¹⁶⁵ See KkH. RA; MkA. RA. Regarding *Manufakturkontoret*, I have also used the sub-archive named Kamrerarkontorets arkiv (MkKam) which includes documents regarding the manufacturing fund (*manufakturfonden*). See chapter 6.

¹⁶⁶ In the first case, I have especially used documents and reports from the Stockholm *Hallrätt*, see HMR. SSA. In Eskilstuna City Archives, I have used the archive of Samuel

This work has resulted in the choice to mainly follow one artisan's trajectory more closely; namely that of Eric Engberg. A lot of (scattered) written material has been found regarding Engberg, and his trajectory intersected that of Schröder's on several occasions. Engberg's undertakings within the domestic metal trades also coincided with the rise and fall of the manufacturing industries — as stressed in traditional inquiries. This makes him an even more suitable actor to follow.

In following Engberg's and Schröder's trajectories, I have also made the choice to focus specifically on the attempts to implement the 'English way' of making cutlery wares. Exploring cutlery-making practices from the 1730s to the mid-1770s has enabled an in-depth inquiry of the relations between the organisation of work and the *circulation* of skills and knowledge over time, in line with the aim of this investigation. In order to enable comparisons and discussions on connections, other actors and practices have been looked for (in the same archives used for tracing Engberg's trajectory). This text thus contains a variety of trajectories — of people, materials, objects, and skills — which are only briefly dealt with as they intersect with the ones that are followed more closely. The two ways in which Schröder's diaries have been followed up are thus not to be seen as separate. Rather, as shown in chapters 5 to 7, the *strategies* and *tactics* of the eighteenth-century metal trades were constantly overlapping. This is well illustrated by Schröder's and Engberg's undertakings and movements; two individuals who moved between different spheres of the manufacturing system.

This approach demands a continuous procedure of recapitulation in order to make arguments solid. The work with the empirical material has been characterised by movements forth and back, with archives being perused a number of times in order to follow up new traces. When new empiric material has been found, I have cross-checked it with other sources in order to validate different statements or information. This is the case especially for the widely scattered material related to artisans and manufacturing practices.

Here, it is important to discuss the fact that this investigation makes use of sources that traditionally have not been used for investigating practices of work in order to do just that. Above all, I use proposals, reports, and letters by manufacturers and artisans (often addressed to various institutions or to the delegacies serving during the Diets). These sources have been compared with accounts, inventories, and descriptions and plans (of workshops). As recently stressed by Pamela H. Smith, these types of sources can be regarded as 'records of practice' when used in an integrative way.¹⁶⁷ However, they are still problematic in that they do not with certainty reflect the views of

Schröder(-stierna), related to Eskilstuna *Fristad*. See Bergsrådet S. Schröderstiernas Papper, 34:3. ESA. Documents related to the *Fristad* and the works in Eskilstuna have also been read in the Uppsala Regional Archives. See EFoA. ULA; HrE. ULA.

¹⁶⁷ Smith (2007), p. 36.

individual artisans. Nor can they be uncritically trusted as offering the whole image of practices of work. Additional material is needed. Here, protocols from institutions like *Kommerskollegium* and from local judicial authorities, as well as probate inventories and parish records, have provided further comparative examples.¹⁶⁸

In order to show what these sources actually tell us, it has been necessary to also include the quoted original eighteenth-century Swedish terms and sentences in the footnotes. Some terms — like ‘knowledge’ and ‘skills’ — have been used for several Swedish words. By including the translations, I want to make the reader aware of these as one important part of the work process, and, at the same time, make the process itself more transparent.¹⁶⁹ In some cases, I have chosen to stick with the Swedish term, often because no good translation is available. In these cases (most notably institutions), an English translation is always given the first time in the text and the reader can also use Appendix A, which includes these terms.

1.5 Chapter Outline

In order to make the approach outlined above clearer, I have used a thematic design for this thesis. Still, the themes treated by the different chapters also offer a chronological structure. The chapters can also be seen as being divided into two parts. Chapters 2 to 4 deal with *strategies*, while chapters 5 to 7 focus on the interplay of *strategies* and *tactics*. I use the trajectories of Schröder and Engberg in order to explore the wider *skills-trajectory* of the ‘English way’ from the 1730s to the 1770s.

Chapters 2 to 4 should be seen as constituting a *strategic stage*, a term that is dealt with thoroughly below. Chapter 2 focuses on the eighteenth-century Swedish state and its attempts to create order within the domestic economy during the Age of Liberty. The chapter emphasises the connections between protectionist measures and notions of the economy as a ‘household-ing system’ with a clear division of labour. I use regulations and state reports regarding the manufacturing trades, but also the reports and descriptions by Swedish officials travelling in Europe, in order to illustrate this system. Moreover, in discussing the crisis for the Swedish economy during the 1760s, with increasing notions of liberty, this chapter also emphasises the gradual changes leading up to the founding of Eskilstuna *Fristad* in 1771.

¹⁶⁸ This can be compared with Sofia Ling’s discussion on petitions from working men and women in Stockholm during the same period. These were often written by a professional scribe (for a fee). This is also the case with many of the written sources used in this investigation. Still, after reading many such writings, one can distinguish the standardised phraseology (such as phrases of servility) from more valuable information. See Ling (2016), p. 42.

¹⁶⁹ C.f. Ortje (2015), pp. 36–37.

Chapter 3 also deals with *strategies*, but with a spatial focus. I use Schröder's reports and diaries in order to describe what the system 'looked like'; a *map of metal making*. The main focus is on eighteenth-century descriptions, and this results in a rather different 'map' than offered in previous research on the metal trades. Most notably, the role of Stockholm is emphasised.

Chapter 4, in turn, deals with the state's interests in making sense of and controlling workshop practices. In doing this, it scales down the scope from the metal trades in general to a focus on cutlery making. This is done by discussing organisational boundaries and the practical processes of cutlery making. The division of labour, as promoted in state reports and scientific works, is again one critical theme, but this chapter focuses on workshops and not on the entire system. The chapter ends with a discussion on the materials used by cutlers. In particular, I discuss different types and adaptations of steel.

Chapter 5 introduces Eric Engberg by focusing on his two journeys in Europe during the mid-eighteenth century. Using these as the main examples, this chapter discusses important aspects of artisans' travels during the period, with a specific focus on *grounding* and *circulation*. Importantly, by also including a notion of change, it functions as a step into the *skills-trajectory* dealt with in the following chapters.

Chapter 6 deals with the setting up of workshops in the 'English way' in Stockholm during the 1740s and 1750s. Again, Engberg, and his cutlery works in the capital, are used as the main example. Still, by comparing with other artisans and manufacturers, I emphasise the connections between urban space, the *circulation* of skills and knowledge, and attempts to organise work in new ways. Especially, I focus on training and variously connected practices of *imitation*. Closing the chapter, I discuss the decline of workshops from a perspective of movements and the *tactics* of everyday life.

Chapter 7 continues to explore the *skills-trajectory* of the 'English way', but it does so by introducing several provincial metal works into the discussion. The attempts to implement a domestic large-scale cutlery manufacturing in Sweden are laid bare by following the movements of Engberg, of his workers, and of the *Directeur* Schröder during the 1750s and 1760s. The chapter leads up to the founding of Eskilstuna *Fristad*, which functions as an end point for this investigation, and — it can be argued — for the 'English way' of making cutlery in Sweden. The move towards the *Fristad* is discussed in terms of a *manufacturing tolerance*, relating to Alder.

Chapter 8 summarises the findings and discussions of the preceding chapters, as well as the main conclusions of the investigation.

CHAPTER 2

Making Regulations: Metals, Manufacturing, and the Ordering State

In 1747, the first Swedish professor in economics and former state official Anders Berch argued in his *Inledning til almänna hushålningen* that a well-ordered householding was ‘the only source, from which permanent power, esteem and wealth are brought to its ruler: it is an irrefutable truth, that the state of the Household in Countries and Kingdoms are signs of their *Political* strength or weakness.’ This order was to be upheld through various measures, expressed as *Politie*, *Oeconomie*, and *Cameral*, or ‘policing, economy and taxation’.¹

Some thirty years later, in 1776, Adam Smith began *The Wealth of Nations* by stating that ‘[t]he greatest improvement in the productive powers of labour, and the greater part of the skill, dexterity, and judgement with which it is any where directed, or applied, seem to have been the effects of the division of labour.’² At the same time, he related this to a wider context of dealings: ‘As it is the power of exchanging that gives occasion to the division of labour, so the extent of this division must always be limited by the extent of that power, or, in other words, by the extent of the market.’³

This chapter takes its departure in these two statements. Berch’s and Smith’s ‘models’ indeed differ in their views on economic life, with the latter strongly criticising the regulative orientation of the ‘mercantile system’.⁴ However, there are also similarities. One such feature is particularly in focus here: the emphasis on the *division of labour*. Perceptions of *trade*, *markets*, and a *division of labour* related to metals and manufacturing were critical ingredients in the policies of the eighteenth-century Swedish state — often described in terms of mercantilism, cameralism, protectionism, or

¹ ‘den endaste kiälla, hwarifrån beständig makt, anseende och rikedom tilflyter des idkare: warandes det en owedersägelig sanning, at Länders och Rikens Hushållnings tilstånd utmärker deras *Politiska* styrka eller swaghet.’ Berch, Anders (1747). *Inledning til almänna hushålningen, innefattande grunden til politie, oeconomie och cameral wetenskaperna. Til deras tjänst, som biwista de almänne föreläsningar inrättad, af Anders Berch*. [Electronic resource]. Stockholm, p. 3. For the quoted English terms, see Rydén (2013c), p. 261.

² Smith (2008), p. 11.

³ Smith (2008), p. 26.

⁴ See Smith (2008), pp. 374–378.

‘householding’ (*hushållning*).⁵ At the same time, the intermediate position of the metal trades illustrates the often contested boundaries between the different authoritative legs of the ordering state.

Smith’s ideas are thus not further discussed, nor do I engage in comparing the economic discourse in Sweden and Great Britain. The relations between these two countries are, however, highlighted in a number of other ways, which also suggest a wider perspective on state regulation during the period of interest. The aim of this chapter is to describe the *strategies* employed by the Swedish state in order to regulate, implement control, and ‘correct’ the metal trades from the 1730s to the 1770s.

Section 2.1 is oriented towards the *householding state* as expressed in Berch’s text. By targeting the manufacturing ‘system’, I focus the discussion on important institutions and regulations, which are further discussed in section 2.2. The emphasis is on several decrees from the late 1730s and 1740s, which illustrate how the state *strategies* targeted the system on all levels. They can also be related to Berch’s ideas about the ordered economy.

Section 2.3 introduces one of the two individuals who are central to this investigation, Samuel Schröder. This is done related to section 2.4, which deals with supervision and control. The manufacturing system was not only about texts and regulations. It had to be supervised in practice by officials working for the boards and offices in Stockholm. I draw attention to some of these men, and especially Schröder, by discussing their journeys in Europe during the mid-eighteenth century.

Section 2.5 switches focus and deal with the economic crisis that took its hold on Sweden during the 1760s. During the same period, the manufacturing policies of the state came under severe critique; voices calling for an increased *liberty* began to be heard from actors involved in the trades, leading up to the founding of Eskilstuna *Fristad* in 1771. I show how this development affected metal making and trade, but it was an extended process that also included new attempts by the state to implement a firmer control.

In working with these dimensions, I have used various types of sources. In section 2.2, I mainly use Royal Decrees and regulations. Section 2.4 is built on travel accounts written by officials travelling in Europe, with the most important ones from the pen of Schröder. Lastly, section 2.5 assembles reports and proposals submitted to state institutions, or to the Diets, during the 1760s and 1770s. These materials do offer methodological challenges. Still, letting the sources speak for themselves as much as possible enables a reliable interpretation of the discussions about metal manufacturing during the period.

This approach does not only describe the manufacturing system and the metal trades *from above*. It also opens up for an investigation of metal-

⁵ On the use of the term ‘householding’ vis-a-vis the changing usage of the concept of ‘economy’ during the early-modern period, see Tribe (2015), chapter 2.

making practices, movements, and the organisation of work. Together with the two subsequent chapters, it offers a contextual framework, at the same time as it functions as a comprehensive analysis of eighteenth-century perceptions of manufacturing and metal processing. In line with the theoretical approach outlined in chapter 1, the concept *strategic stage* is used in order to reflect the discursive and spatial claims emanating from the state. It also illustrates how this context was not static; different interpretations and descriptions intersected and shaped the ideas of metal making over time.⁶

2.1 The Householding State: Static Order and the Division of Labour

When King Karl XII died in 1718 during a campaign in Norway, a long period of autocratic monarchy in Sweden came to an abrupt end. During a Diet summoned in 1720, a new form of government was accepted that, more or less unmodified, lasted until Gustav III's coup d'état in 1772. This period, referred to as the Age of Liberty, saw increasing power being handed over to the Diet — constituted by the four social estates — while the authority of the monarch was limited. The political landscape was, however, characterised by discord. Conflicts between different socio-political groups appeared. This is evident in the disagreements between the two main political factions: the 'Hats' (in favour of a protectionist and mercantilist-oriented policy and constituted mainly by members of the new urban elites) and the 'Caps' (assembling members mainly from the old nobility, the clergy, and the peasantry — groups not benefited as much from the new policies).⁷

As argued by Sennefelt, eighteenth-century Sweden was a deeply unequal society built around the ideals of hierarchy and harmony. The parts constituting the 'social body' were seen as connected, but also as performing different duties within a God-given order. Power was still idealised as emanating from the state and its increasingly influential administration; the individual citizens had to obey and accept their place.⁸ This order was also expressed by eighteenth-century actors who dealt with politics and economy, such as Anders Berch.

The Well-Ordered Common Household

Berch's *Inledning til almänna hushållningen* has been interpreted as a typical expression of the politico-economic thinking characterising the Age of Liberty. Berch had made himself a name when serving in *Kommerskollegium*

⁶ C.f. de Certeau (1984); Sennefelt (2011), pp. 29–31.

⁷ See Heckscher (1949a), pp. 16–23; Lönnroth (2011), pp. 16–17.

⁸ Sennefelt (2001), pp. 78–112. See also Sennefelt (2011), pp. 13–14, 86–87, 180–187.

during the 1730s. He was also a defender of the ‘Hats’ protectionist policy encouraging trade and domestic manufacturing. When the ‘Hats’ seized power during the Diet of 1738–1739, he was appointed as the first professor in economics in Sweden at Uppsala University. On a theoretical level, Berch has been seen as inspired by William Petty’s political arithmetic, but especially by ideas on natural law and the ordered society as they appear in works by Samuel von Pufendorf and the Halle professor Christian Wolff.⁹ As argued here, Berch’s major work expressed a systemic relationship between the *state*, the hierarchically ordered *economy*, and a pervasive *division of labour*.

In his text, Berch commenced by arguing that the ‘expansion of Householding’ had resulted from humans leaving their older way of living — and hence their natural freedom — to instead become aggregated in communities.¹⁰ Bringing these into order was linked to a ‘Common Householding’.¹¹ On a general level, he described this as ‘an art of gaining, administering and protecting properties’. This was linked partly to things and ‘their profitable and advantageous use’, partly to people and their ‘industrious work’.¹² He then dealt with the three major components of this art. *Policing* pointed to the creation of an all-embracing scheme, which was to maintain order between the members and trades in society. *Economy*, in turn, targeted the relations between the private household and the common good. *Taxation*, finally, was oriented towards the possibilities for the state to gather and administer incomes.¹³

Regarding *policing*, Berch stressed the connections between a large population, a division of labour, and control. All ‘producing members’ of a society, he argued, ‘should be assigned to specific occupations, with which they would serve the others’. Therefore, it was also important that the political administration was familiar with each and every working practice respectively. Moreover, control was required regarding the practical ‘division of livelihoods’, so that urban and rural trades were not inappropriately mixed together. Each trade was to be carefully spread out according to a balanced order.¹⁴ Towns were the most important parts in Berch’s spatial plan, and the home for crafts and trade. In contrast, agriculture and mining were to be conducted exclusively in rural areas. Thus, he saw economic life as being possible to divide according to Nature’s order, so that each part could contribute to the common good. Still, the four main livelihoods were also seen as connected

⁹ See Magnusson (1989), pp. 46–49; Magnusson (2003); Runefelt (2005); Rydén (2008).

¹⁰ ‘Hushållningens tilwäxt’. Berch (1747), pp. 1–2.

¹¹ ‘Almänna Hushållningen’. Berch (1747), *Företal*.

¹² ‘en konst at förwärfwa, förwalta och bewara ägodelar’; ‘deras nyttjande til fördel och båt-nad’; ‘flitigt arbete’. Berch (1747), pp. 4–6.

¹³ Berch (1747), pp. 11–12.

¹⁴ ‘närande medlemmar’; ‘måge hafwa sig tildelte wissa göremål, hwarmed de skola betiäna de öfrige’; ‘näringsmedlens fördelande’. Berch (1747), pp. 28–30.

in a variety of ways; each of them was ‘putting the others in complete movement.’¹⁵

Dealing with the subject of *economy*, Berch described both agriculture and mining, but dwelt mainly on crafts and trade. He linked the ‘custody and supervision’ of the former to the fact that the production of — and the demand for — refined wares had increased beyond the limits of individual households, being partly a result of the interaction between different nations and peoples. Refinement processing (manufacturing) could be supported in many ways according to Berch. He mentioned how practitioners should be provided with opportunities to get further training in ‘Sciences’ such physics and mechanics. More generally, crafts also benefitted from being operated in towns, close to trade and the possibilities of increased revenues. Still, they could be favourably practised in rural areas when certain resources were needed or when specific facilities were required for production. The important thing, Berch argued, was that they were ‘adapted to the qualities of [different] places’.¹⁶

The simultaneous cultivation of all crafts was, however, difficult, even though they served the common good. Therefore, Berch also favoured regulations, which were to be instituted according to ‘degrees of utility’. The rule was that more support should be given to activities ‘that employ a larger number of people, make indispensable wares for the need of the inhabitants, [and] give rise to a large monetary motion, et cetera’.¹⁷

Crafts, like agriculture and mining, also depended upon trade. By cumulating quantities of specific goods and dividing the trade between different towns, both overseas shipping and the domestic circulation of money could be facilitated.¹⁸ The foreign trade was allocated to ‘Staple-towns’ (*Stapelstäder*), whereas ‘Country- or Up-towns’ (*Landt- eller Upstäder*) should be privileged only for domestic trade. This division, Berch argued, was necessary in order to centralise the knowledge and capital required when dealing with foreign nations.¹⁹

All these measures for creating order within *policing* and *economy* were not possible without a steady income. The householding state needed its cameral science, referred to as ‘the only *modus acquirendi*’. Taxation, so important for the rulers, should, however, be conducted so that people or trades were not harmed. Berch differentiated between persistent incomes,

¹⁵ ‘sätter de öfrige i fullkomlig rörelse.’ Berch (1747), pp. 10–11. On the construction of towns, see *ibid.*, pp. 106–126. C.f. Rydén (2013c), pp. 261–262.

¹⁶ ‘wärnaden och uppsikten’; ‘Wetenskaper’; ‘lämpas efter orternes egenskap’. Berch (1747), pp. 215–219.

¹⁷ ‘graderne af nyttan’; ‘som sysselsätta et större antal folk, som tilwårka outhärlige waror til inwånarnes behof, som förorsaka en större penningrörelse, med mera’. Berch (1747), p. 219. This did not mean that Berch defended a monopolistic view of economic life. On the contrary, he was critical to monopolies in crafts, trade, and manufacturing. See Runefelt (2005), p. 96.

¹⁸ Berch (1747), pp. 270–271, 279.

¹⁹ Berch (1747), p. 283.

such as stable taxes and interest rates, and transitory ones, related to the dealings with other nations.²⁰ Thus, *taxation* was distinguished from *policing* and *economy*, but at the same time linked to them — for example regarding incomes from duties on imports.

The ideas expressed in Berch's work were not new, but rather reflected a cameral discourse in Sweden and Europe.²¹ With regard to these aspects of householding, the Swedish state came to exercise an increasing power during the eighteenth century. This is obvious regarding the manufacturing trades, which should be encouraged according to Berch's ideas of a well-ordered domestic economy.

An Emerging Manufacturing *Systeme*

In 1767, Schröder included in his diary a text called 'Politico-economic remarks'. There he argued that a 'System' had begun to be put into practice during the Diet of 1738–1739, building further on the protectionist policies of the previous two decades. He stressed the founding of *Manufakturkontoret* in 1739, with its primary objective to dispose and distribute financial means from specific funds, such as the manufacturing fund (*manufakturfonden*), to the trades. These funds were largely built upon revenues from duties on imported goods. Manufacturers and artisans were also given access to several types of premiums. This aid was in turn related to a generous lending policy put into practice during this period by the Bank of Sweden (*Rikens Ständers Bank*). All these measures were, however, linked to control. Schröder emphasised the new regulations for the manufacturing trades — the *Hallordning* and the manufacturing privileges — issued in 1739. Also, *Manufakturkontoret* was responsible for supervising 'the Householding' at manufactories and workshops in the kingdom.²²

This system, Schröder argued, had brought considerable improvements to 'all kinds of livelihoods' during the 1740s and 1750s. Manufactories and crafts intensified and artisans were benefitted. He related this to similar improvements made within commerce, shipping, agriculture, and construction. In conclusion, he noted how 'Luxury and superfluity' had extended 'from the uppermost to the lowest standing of the Kingdom's Inhabitants.'²³

²⁰ 'den enda *modus acquirendi*'. Berch (1747), pp. 361–364.

²¹ C.f. Wakefield (2009); Buchner (2009). The links between the spheres of state making and the 'politics of information' have also been dealt with by John Brewer in his discussion on the English state. See Brewer (1989), pp. 221–230.

²² 'Politico-oeconomisk anmärkning'; 'Systeme'; 'Hushållningen'. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1767, pp. 43–49. KB. Schröder mentioned premiums for founding new works, relocation, the training of apprentices, the making of certain wares, and exports.

²³ 'alle handa näringsfång'; 'Yppighet och öfwerflöd'; 'ifrån de högsta til de lägsta af Rikets Innewånare.' Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1767, pp. 50–51. KB.

Although Berch never used the term *system*, the similarities with Schröder's description of developments during the mid-eighteenth century are striking. Both these men saw economy as a static, divinely ordered, structure where change only could be initiated from above (by the state).²⁴ However, as pointed out by Leif Runefelt, Berch never supported any excessive or widespread luxury. He rather argued for the connection between 'householding', a 'virtuous' way of living, and 'frugality'; living in a community came with a notion of one's place in the given order.²⁵ These dimensions were in turn intimately linked to ideas of an all-embracing division of labour and its practical implementation. This is further evident in the regulations and privileges for the manufacturing trades from the late 1730s and 1740s. In their interweaving, these texts exemplify the strategic views on economic life, as designed by an eighteenth-century protectionist state.

2.2 Regulating the System: An All-Embracing Order

In a report to the Swedish Board of Mines (*Bergskollegium*) from 1727, the Board employee Lars Harmens described the preconditions for metal refinement in Sweden. It required natural resources and an 'adroit, skilled and industrious people', but also public funding and effective ownership. If compared to semi-manufactured goods, finer metal making needed large putting-out supplies and ready money.²⁶ Some ten years later, Olof Hamren discussed the manufacturing trades in a similar way. He linked 'the Manufacturing-householding' to the well-being of the 'Political body'. This included improvements within the commercial and financial systems, but Hamren also stressed the spread of knowledge.²⁷ In the case of all these features, the Swedish state had a growing impact around the mid-century. In Evans' words, the lack of people in rural Sweden was to be compensated for by 'a powerfully centralized state apparatus that was relentless in exploiting the human and material resources at its disposal.'²⁸

²⁴ Rydén (2008), p. 72.

²⁵ Runefelt (2005), pp. 108–109. Schröder never argued *in favour* of widespread luxury, but treated it as a result of the economic policies of the mid-century. C.f. section 2.5.

²⁶ 'habilt, skickeligt och arbetsamt folk'. Harmens, Lars, *Berättelse om Wedwog och Qwarnbacka Jern och Stål Manufacturie, Upsatt år 1727, Inledning*. BkH, E2i:3. RA. This unpaginated text is divided into five sections.

²⁷ 'Manufactur-hushålningen'; 'Politiske kroppen'. Hamren, Olof (1738). *Manufacturspejel, som genom tillförlätelige uträkningar och uprichtiga grundsatzer gifwer et fulkomligt lius om manufacturers och fabriquers rätta art och beskaffenhet, samt oskattbara nytta genom försiktig anläggning. Wälment utgifwen af O.H.* [Electronic resource]. Stockholm, pp. 1–4, 12–14, 109–115; quotations from p. 3 and p. 113.

²⁸ Evans (2013), p. 35. See also Thomas Kaiserfeld's discussion on the three key organisational elements of the Swedish fiscal military state during the Age of Liberty: taxation, military, and political governance. See Kaiserfeld (2009), pp. 33–75.

The foundations of the system that Schröder spoke of had been gradually established during the late-seventeenth and early-eighteenth centuries, with the metal trades being connected to older forms of refinement production under *Bergskollegium*'s supervision — such as provincial manufactories and ironworks.²⁹ The support for the manufacturing trades increased during the first half of the eighteenth century, with the governing of the domestic economy being increasingly transferred to *Kommerskollegium*. More extensive regulations (referred to as a *Hallordning*) were launched in 1722 along with the creation of locally based judicial bodies (*Hallrätter*).³⁰ This was related to an increasingly protectionist policy of trade. In 1724, a Swedish-style Navigation Act (*Produktplakatet*) was instituted, which regulated imports on foreign ships. From 1727 the manufacturing trades were further supported by a specific fund (*landshjälpfonden*), partly based on the fees for imported goods.³¹

In line with Schröder's remarks from 1767 there is, however, good reason to argue that it was after the Diet of 1738–1739 that the manufacturing-oriented policy really took shape. Still, the governing of the domestic trades was not characterised by consensus. This is evident in the conflicts between groups that saw the benefits of some competition and those who rather defended a monopoly-like and privilege-based system. These conflicts were not only limited to the (often) infected relations between proponents of domestic manufactories and the guilds. Previous research has also noted disputes between *Kommerskollegium*, groups of manufacturers, and the increasingly powerful *Manufakturkontoret*.³²

Still, the dominant view was one of an ordered economy. As in Schröder's and Berch's writings, the regulative texts analysed below show how manufacturing and trade were perceived as interwoven spheres. Likewise, they put emphasis on the ideas of a systemic division of labour. This is evident in the *Hallordning* and the manufacturing privileges issued in 1739.³³

²⁹ See Klingnéus (1997), pp. 38–41.

³⁰ Berg (1969), pp. 46–51. The first laws for the manufacturing trades were issued during the late seventeenth century, with more uniform privileges from 1668 and specific regulations for the textile trades from 1688.

³¹ See Gerentz (1951), pp. 225–242; Heckscher (1971), pp. 129–133; Nyström (1955), pp. 191–197; Aldman (2008), pp. 42–48.

³² These different views are often referred to as 'polypolistic' and 'oligopolistic'. See Gerentz (1951), pp. 272–282; Söderlund (1943), pp. 31–32; Sundberg (1978), pp. 13–19; Hörsell (1983), pp. 22–25.

³³ The former: *Kongl. Maj:ts Utfärdade Hall-Ordning, Och Allmänne Factorie-Rätt, För alla Manufacturister uti Silke, Ull- och Linne, samt Handwärfkare och flere, som icke egenteligen under Skrå-Ordningen böra begripas. Gifwen Stockholm i Råd-Cammaren then 21. Maji 1739*, no. 46. (1739). Stockholm. The latter: *Kongl. Maj:ts Förnyade Allmänna Manufactur och Handwärfkeri Privilegier. Gifne och Stadfäste Stockholm i Råd-Cammaren then 29. Maii 1739*, no. 54. (1739). Stockholm. In this section, I refer to various regulations for the manufacturing trades. In order to clarify the importance of the *Hallordning* among these, the Swedish term is used for this regulation.

A Pervasive Web of Regulations

The regulations and privileges of the late 1730s and 1740s, most notably targeting the textile trades, embraced the idea of urban space as the driving force within the domestic economy. The manufacturing privileges stated that the wealth of the kingdom was dependent upon towns, where the most important elements were manufacturing, crafts, and trade. Works could be founded in rural areas only whenever forest, water, or additional space was needed for the work processes. Towns were, moreover, easier to regulate as urban space could be altered in order to fit in new works, new houses for recruited foreigners, or shops for retail trading.³⁴

As in Berch's *Inledning til almänna hushålningen*, the regulative texts also promoted a wider and harmonious division of labour within the domestic trades. Manufacturing was to be divided between different towns and places in order to avoid obstructive competition. The wealth of each town, in turn, depended upon the relations between its dwellers. The manufacturing privileges stated that merchants, manufacturers, and artisans should 'join hands, and contribute to each other's gain'.³⁵ The *Hallordning* stressed how merchants or putters-out ideally both provided manufactories with materials and money, and undertook to sell the finished goods.³⁶ During the Diet of 1738–1739, the Delegacy of Trade and Manufacturing (*Handels och manufakturdeputationen*) argued in the same vein that the negative trade balance was possible to correct through the 'Patriotic zeal' of merchants, who knew 'the quality of the goods' and 'the art of their best sale'. This group was seen as crucial for improvements within the linked spheres of manufacturing, consumption (of domestic goods), and the circulation of financial means. All this was dealt with in terms of a 'restructuring of the trade Systems'.³⁷

The elevation of urban industries also came with an altered network of supervising institutions, including the newly founded *Manufakturkontoret*. A joint control was also to be exercised by *Kommerskollegium*, which was the superior authority regarding privileges and the creations of new works, together with the local *Hallrätter* or magistrates.³⁸ According to the *Hallordning*, the latter were responsible for the inspection of workshops, hallmarking, and price control, as well as for the entry and exit of workers and for

³⁴ *Kongl. Maj:ts Förnyade Allmänna Manufactur och Handtjärkeri Privilegier* (1739), § 1–2.

³⁵ 'inbördes räcka hwarandra handen, och then ena til then andras befördran bidraga'. *Kongl. Maj:ts Förnyade Allmänna Manufactur och Handtjärkeri Privilegier* (1739), § 16–17, § 27.

³⁶ *Kongl. Maj:ts Utfärdade Hall-Ordning, Och Allmänne Factorie-Rätt* (1739), art. 4, § 1.

³⁷ 'Patriotiske zele'; 'wahornes godhet'; 'konsten till deras bästa afsättning'; 'handels Systemens ombytande'. (Undated) account by *Handels och manufakturdeputationen*, no. 20. FUH, R. 2679, fols. 128–129. RA.

³⁸ *Kongl. Maj:ts Förnyade Allmänna Manufactur och Handtjärkeri Privilegier* (1739), § 4, § 27. This division regarding the supervision of the manufacturing trades resulted in conflicts between *Kommerskollegium* and *Manufakturkontoret* (see further section 2.5).

their contracts. They also settled disputes regarding workers and manufacturing processes.³⁹

Rules were also established regarding the relations between workplaces, and artisan mobility was increasingly put under institutional control. The manufacturing privileges stated that the recruitment of foreign manufacturers and artisans was to be supported by public means. Their contracts were to be signed under the supervision of the *Hallrätter* and *Kommerskollegium*.⁴⁰ The *Hallordning*, in turn, stated that Swedish artisans who were willing to undertake journeys abroad in order to ‘gain greater perfection in their craft’ should communicate this to the *Hallrätt*, which decided if they were capable enough.⁴¹ Still, the most frequent form of artisan mobility was the one taking place *within* the domestic manufacturing system. In this matter, the *Hallordning* strived to regulate the movements of journeymen and apprentices by accentuating the role of the ‘master of the household’.⁴² The manufacturing privileges stated that all departures not approved by the owner or manufacturer were to be considered illegal, and it was forbidden to entice artisans to move. At the same time, the liberty of artisans to settle down in new places and practise their craft after being fully trained was also emphasised.⁴³

Successively during the 1740s, the manufacturing system was made more substantial through additional directions. The group of manufacturers, and the *Hallrätt*, also gained a powerful position in urban political life (especially so in Stockholm).⁴⁴ This development was related to further regulations of domestic and foreign trade as well as of consumption.

Interwoven Protectionist Measures: Trade and Consumption

The circulation of goods and materials was subject to recurring regulations during the period. Extended instructions regarding control and hallmarking were presented to the different *Hallrätter* and custom houses (*tull- or acciskammare*) in 1742. This was done in order to protect producers, sellers, and customers from the ‘intrusions of Foreign goods’. The transportation of materials, machines, and tools to the manufactories was also controlled by the *Hallrätt*, but freed from taxation.⁴⁵ Regarding the metal trades, the manufacturing privileges stated that metal wares were to be taxed, ‘only once, or

³⁹ *Kongl. Maj:ts Utfärdade Hall-Ordning, Och Allmänne Factorie-Rätt* (1739), art. 1–3.

⁴⁰ *Kongl. Maj:ts Förnyade Allmänna Manufactur och Handtwärkeri Privilegier* (1739), § 8–9.

⁴¹ ‘winna större fullkomlighet i theras handtwärck’. *Kongl. Maj:ts Utfärdade Hall-Ordning, Och Allmänne Factorie-Rätt* (1739), art. 2, § 12.

⁴² ‘husbonde’. *Kongl. Maj:ts Utfärdade Hall-Ordning, Och Allmänne Factorie-Rätt* (1739), art. 2, § 15.

⁴³ *Kongl. Maj:ts Förnyade Allmänna Manufactur och Handtwärkeri Privilegier* (1739), § 6–7.

⁴⁴ See Boëthius (1943), pp. 230–233; Lindberg (2001), p. 37.

⁴⁵ ‘Utländske warors in practicerigar’. *Kongl. Maj:ts Nådige Förordning, Angående Inrikes Manufactur- och Handtwärkare-warors förpaszning och förtullande. Gifwen Stockholm i Råd-Cammaren then 7. Maji. 1742*, no. 22. (1742). Stockholm, § 1–9.

in one place', with a duty (*landtull*) calculated according to the weight of the metal.⁴⁶ In 1747, trading with metal wares was facilitated, when these goods also could be transported and bought by the piece (without weight-certificates).⁴⁷ This alteration was linked to the expansion of the domestic metal trades, discussed in the next chapter. It was also related to policies oriented towards advancing refinement production and regulating trade, notably so in the form of import bans.

The latter feature is illustrated by several Royal Decrees from 1739, in which numerous metal goods were banned from import.⁴⁸ In addition, a tax (*licent*) of 4 percent was determined for ships carrying metal goods to Sweden.⁴⁹ Other goods were instead levied with fees to *manufakturfonden*.⁵⁰ Duties were also imposed on exports, with fees set at 2, 4, or 6 percent (of the goods' value) for semi-manufactured iron, copper, and steel. In contrast, several kinds of finer metal wares were only charged with a 1/8-percent fee.⁵¹ The sale and use of foreign manufactures was also regulated. Such goods could be confiscated and penalties issued, but more often a 'consumption fee' had to be paid.⁵² Similar attempts to regulate the flow of materials and finished wares were imposed by the manufacturing privileges, with an emphasis on the restriction of imports.⁵³ Still, foreign competition remained a problem affecting the metal trades. A decree from 1741 stated that the domestic metal works could provide the domestic market with goods if, that is, imports were strictly regulated and controlled.⁵⁴

⁴⁶ 'allenast en gång, eller på ett ställe'. *Kongl. Maj:ts Förnyade Allmänna Manufactur och Handtwärkeri Privilegier* (1739), § 15. This could be compared with textile goods of silk, wool, and linen, which were completely freed from such duties.

⁴⁷ *Kongl. Maj:ts Nådige Förklaring Öfwer 15. §. i Manufactur Privilegierna angående Jern-Stål- och Metall-warors förpazande Inrikes Städerna emellan. Gifwen Stockholm i Råd-Cammaren then 18. September 1747*, no. 56. (1747). Stockholm.

⁴⁸ *Kongl. Maj:ts nådige Förordning angående The Utrikes Wahrer och Persedlar, hwilka skola hädanefter til införsel här i Riket aldeles wara förbudne. Gifwen Stockholm i Råd-Cammaren then 19. Maii 1739*. (1739). Stockholm. Among these goods were tools, cutlery, nails, and wire.

⁴⁹ *Kongl. Maj:ts Taxa Hwarefter Stora Siö-Tullen Uppå alla Inkommande Waror Bör Ärläggas och upbäras. Hwarjemte bifogas en Förteckning uppå alla de Wahrer som förbudne äro at i Riket införas. Gifwen Stockholm i Råd-Cammaren den 8. Junii 1739*. (1739). Stockholm.

⁵⁰ *Taxa, hwarefter Ifrån den 1 Julii 1739 de på följande Förteckning, upförde Utrikes Wahrer, Som här i Riket inkomma, skola erlägga Afgift Til Manufactur Fonden*. (1739). Stockholm.

⁵¹ *Kongl. Maj:ts Taxa Hwarefter Stora Siö-Tullen Uppå alla Utgående Wahrer Bör Ärläggas och upbäras, Gifwen Stockholm i Råd-Cammaren Den 26 Aprill 1739*. (1739). Stockholm.

⁵² 'consumtions afgift'. *Kongl. Maj:ts nådige Förordning angående Wisze Utrikes ifrån inkommande Warors beläggande med en Consumtions Afgift eller Accis. Gifwen Stockholm i Råd-Cammaren/then 8. Maii 1739*. (1739). Stockholm. Similar sumptuary laws (*överflödsförordningar*) were issued no less than 58 times during the eighteenth century. See Murhem and Ulväng, forthcoming.

⁵³ *Kongl. Maj:ts Förnyade Allmänna Manufactur och Handtwärkeri Privilegier* (1739), § 12–15.

⁵⁴ *Kongl. Maj:ts Ytterligare Alfwarlige Påbud Emot Införslen och försäljandet af hwarjehanda utomlands tillwerkade Metall- Meszings- och Ten-knappar, samt annat både Metall-*

The regulative texts referred to above can be seen as treating their respective elements of the economy. Discussing them in an integrative way, however, better reflects the eighteenth-century view on economic life as promoted by Berch or Schröder. Manufacturing, trade, and consumption were seen as interwoven dimensions considered possible to regulate through different political, economic, and cameral *strategies*.⁵⁵ This also points to one critical aspect of these regulations and decrees. They all advocated a clear division of labour within the manufacturing trades — and in the economy in general. This can be seen on a broader level, as exemplified by the ideas regarding the division of the trades within and between towns and the countryside. More specifically, it can be traced in the promotion of cooperation between manufacturers, artisans, and merchants. As will be discussed in chapter 4, the state also made extensive efforts to implement a division of labour within workshop practices. In order to illustrate how regulations were adapted for the metal trades, the directions for the twin-manufactory Vedevåg and Kvarnbacka are used here as an example.

A ‘Mother Works’ for Metal Making: Vedevåg and Kvarnbacka

As stressed by the manufacturing privileges, and by Berch, manufactories could be founded in rural areas when additional space, larger assisting-works, water, wood, or other resources were needed for production. This was in fact the case for many metal works in the Swedish provinces during this period. Thus, they seem to fit badly into the idealisation of urban trades. However, they did not. Rather, the plans for large manufactories like Vedevåg were distinctly oriented towards similar ideas about an all-embracing regulation, and to the power of state authorities.⁵⁶

In 1737, two shareholders of the works, Anders J. von Höpken and Gustaf Boneauschiöld, stressed how the workers at Vedevåg should be ‘relieved from personal levies’ and that goods made there should be freed from duties. Similar privileges had earlier been given to Jonas Alströmer’s textile industries in Alingsås.⁵⁷ At the following Diet, Vedevåg was declared a ‘Mother

och Stål-Arbete, som för thetta varit til Införsel förbudit. Gifwen Stockholm i Råd-Cammaren then 26. septembr. 1741, no. 65. (1741). Stockholm. Heckscher claimed that the (comparatively) low quality and higher prices of domestically manufactured wares resulted in a widely-spread smuggling of foreign goods into Sweden. See Heckscher (1949b), pp. 615–621.

⁵⁵ C.f. Rydén (2008), pp. 72–73. Rydén reflected on the similarities between Berch and Schröder and British mercantilists such as Defoe and Massey. These similarities become evident below when discussing Schröder’s concept ‘iron system’. See also Evans and Rydén (2007), pp. 6–13.

⁵⁶ C.f. Rönnow (1944).

⁵⁷ ‘förskonte för personele onera’. *Landshjälpsdeputationen*, Report about Vedevåg and Kvarnbacka, October 1737 (submitted to *Handels och manufakturdeputationen*, 1738), Appendix no. 2 (*Lit: A*), von Höpken, Anders J. and Boneauschiöld, Gustaf, Missive presented at Vedevåg, 1737-10-08. FUH, R. 2684. RA. The report included 11 unpaginated appendices. C.f. section 3.1.

Works' for metal making and given 'unrestricted freedom' regarding iron and steel manufacturing, taking the supply of charcoal into consideration.⁵⁸

The directives for the works from 1739 further emphasised this role. It was stated that foreign masters should be employed for four years or more, and Swedish masters for a minimum of five years. Each master was in turn obliged to employ at least two Swedish apprentices. The movements of workers were also regulated, with an emphasis on the serious offense of leaving the works without approval.⁵⁹ Still, a proclamation from 1742 also stressed how the works functioned as a metal-making school where artisans could be 'completely trained and planted out in Towns around the Kingdom'. For this purpose, the owner of the works should support the continuation of both smaller and larger workshops. The production at the works was also linked to the trading with finished wares; Vede våg was allowed to have its own 'footmen' who vended goods at domestic market-fairs.⁶⁰

It is in this wider sense that the term 'Mother works' should be understood: a place which served the spatial planning and top-down-initiated ordering of the trades. The *making*, *using*, and *trading* of metals, as well as artisan mobility, were treated as related features which were possible to regulate and control. The manufacturing at Vede våg was linked to a belief in a domestic expansion for finer metal making, to protectionist policies, and to the regulative power of *Manufakturkontoret*. In return, the works was thoroughly funded and provided with privileges.⁶¹ In the early 1750s, the finer metal making was also tied to the supervision of *Kommerskollegium* and supported with various premiums. In this way, it was further connected to the manufacturing system.⁶²

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This section has shown how regulations were issued during the mid-century in order to create order within the economy and the manufacturing trades. Seeing them as interwoven expressions of the protectionist policy advocated by the state, I have stressed their goal of upholding a division of labour within the given order. Still, this system also had to be supervised in practice. As

⁵⁸ 'Moder Werk'; 'oinskränkt frihet'. Data regarding Vede våg's privileges, 1757, no. 839. Bergmästarämbetet i Nora med flera Bergslag, FIII:4. ULA.

⁵⁹ Fredrik I, (Copy of) Directives for Vede våg and Kvarnbacka, 1739-06-24, art. 2. MkA, B:b, vol. 145 (no. 43). RA.

⁶⁰ 'utlärd och omkring Riket i Städerna planterade'; 'betjänter'. Draft of the proclamation regarding the disposal of Vede våg and Kvarnbacka, Stockholm, 1742-03-26. MkA, B:b, vol. 145 (no. 42). RA. Together, this draft, the copied regulations, and a description of the works formed a sort of announcement for the disposal of the works in 1742.

⁶¹ Vede våg was one of the major beneficiaries of the *landshjälpssonden*. In 1739, the works had received a total of 118,000 dlr. smt. from the fund. See Gerentz (1951), p. 258.

⁶² Boëthius and Kromnow (1947), p. 434; Sahlin (1925). This coincided with the appointment of supervisors for the metal trades. The cruder metal making continued to be tied to *Bergskollegium* and to the Iron Masters' Association (*Jernkontoret*).

noted by Berch, the state needed information about all the different economic activities in the common household. In order to achieve this, the state wanted mobile officials. One illustrative example of this is Samuel Schröder.

2.3 From Junior Official to *Directeur*: The Biography of Samuel Schröder⁶³

Samuel Schröder was born 1720 in Stockholm into a merchant family. His father was the merchant Henrik Schröder and his mother Juliana Roland was daughter to another Stockholm merchant, Roland Eliason. After being privately tutored, young Schröder was sent to Uppsala to study chemistry, mathematics, and various languages. In addition, he took classes in mineralogy and assaying for Jakob Fischer at *Bergskollegium*. It was the latter subjects that attracted Schröder's further attention. In 1738 he was enrolled as a junior official (*auskultant*) in *Bergskollegium* and given the opportunity of travelling with colleagues from the Board around Sweden, inspecting mines and facilities for metal processing.⁶⁴ After serving the Board for a decade, Schröder decided to leave his position in 1748. He instead set out on a tour around Europe. According to his biography, the main purpose of this journey was to learn about foreign mining and metal manufacturing.

He travelled via Copenhagen to Hamburg, and then to Amsterdam. In December 1748, he left Holland for England, where he spent nine months, visiting numerous places where metals were made, used, and traded. He also met with his youngest brother, Wilhelm, who worked at a trading office in London. In September 1749, he crossed the English Channel and continued his journey on the European continent. He set off for Paris, and then visited Lyon, Marseille, and Toulon, before heading to the iron and steel industries around Saint Etienne and St. Chaumont. In May 1750, he arrived in Geneva and continued on into Germany. He spent one year travelling between German towns and provinces, and visited, amongst other places, the mining and metal-making districts in Schmalkalden and Harz.⁶⁵ Schröder kept a meticulous diary during the whole journey, with notes that give a comprehensive picture of the European metal trades from the perspective of an apodictic traveller.

⁶³ If no other reference is made, the section is based on an unpaginated copy of Schröder's own biography: *Anteckningar ur framl. Fristads Directeuren, Herr Bergsrådet Samuel Schröderstiernas egenhändigt författade Lefvernes Beskrifning*. Eskilstuna, Kloster och Fors Kyrkoarkiv, Ola:2, no. 353. ULA. Thanks to Göran Rydén for lending me this material.

⁶⁴ Rydén (2013a), p. 128.

⁶⁵ Schröder, Samuel, *Dagbok rörande Handel, Näringsar och Manufakturere m.m. Ut i Danmark, Holland, England, Frankrike och Tyskland. Under verkstälde resor, åren 1748–1751 förd af Samuel Schröder*, vol. I–IV. X.303. Handskriftssamlingen. KB.

Back in Sweden, Schröder was ordered by the Secret Committee (*Sekretar utskottet*) serving at the Diet of 1751–1752 to make an account of his journey, and to present the collections he had made. He left these to *Bergskollegium*, and also returned as an employee with the Board. This ambitious official soon got an opportunity to advance. In 1753, the King and Diet decided to institute two supervisory offices for the metal trades — one for cruder metal making and the other for finer metal making.⁶⁶ With his experiences of metal processing in general, and of foreign metal manufacturing in particular, Schröder was appointed as *Directeur* for the latter. He received his instructions from *Kommerskollegium* and quickly got to work.

During the following years, he inspected metal works, manufactories, and workshops in Stockholm and in the Swedish provinces. He was also assigned to establish a ‘Model house’ in the capital for collections of foreign and domestic metal wares. As in the case of his foreign journey, Schröder kept diaries during his eighteen years as *Directeur*. The three volumes are full of both general discussions on the metal trades and detailed descriptions about work processes, artisans, materials, and metal wares. In four longer reports submitted to *Kommerskollegium*, he also dealt more cohesively with domestic metal manufacturing.⁶⁷

The image of a straightforward road to promotion for Schröder has also been nuanced. His competence, and the value of his European journey, was at first met with reservations. It was rather his persistence in promoting himself as an expert on finer metal making that gave him the opportunity of becoming *Directeur*, a position he himself had stressed as essential.⁶⁸

Schröder continued his advancement during the 1750s, and was elected assessor at *Bergskollegium* in 1756. During the following years, he was responsible for compiling the notes taken by his colleague Reinhold Angerstein during the latter’s foreign journeys, and for founding a ‘Drawing and Modelling School’ for the metal trades in Stockholm.⁶⁹ In the 1760s, he also acted as the leading figure in the quest for the founding of Eskilstuna *Fristad*. In recurring correspondence with the boards and at the Diets, Schröder promoted his ideas of a community privileged with liberty for metal-making artisans. He also made recurrent visits to Eskilstuna to prepare its practical organisation. After more than ten years of deliberations, the *Fristad* was

⁶⁶ The supervision of the cruder metal making was appointed to Reinhold Angerstein, who was succeeded by Sven Rinman in 1760. Schröder was succeeded by Bengt Qvist Andersson in 1771. The expenses for Schröder’s office were initially paid with means from *manufaktur fonden*. From 1757, it was instead funded by *extralicent fonden*, controlled by *Jernkontoret* and built upon taxes on foreign ships carrying iron from Sweden. See Sahlin (1925); Boëthius and Kromnow (1947), pp. 500–504.

⁶⁷ ‘Modell-kammare’. As noted in section 1.4, two of these reports are printed in Malmberg (ed.) (1925).

⁶⁸ Rydén (2013a), p. 133.

⁶⁹ ‘Ritare och Modellerare Schola’.

founded in April 1771 and Schröder was appointed *Directeur*. Remaining in Stockholm, he took charge of the community's administration.

Schröder was married in 1765 to Agneta Cecilia von Shoting, daughter of a magistrate from Karlskrona. He was ennobled in 1769, and took the name Schröderstierna. He seems to have been a devoted 'Stockholmian', and was resident in the capital for the greater part of his life. Still, by the time of his death in January 1779, he had also spent a large part of his life on the move. While he certainly played an important role within the metal trades, Schröder was, however, far from the only official with experiences from journeys in Europe who travelled the Swedish provinces in order to supervise the expanding metal processing. The ordering state was indeed a mobile one.

2.4 Serving the State: Mobile Officials, Supervision, and the Metal Trades

The Swedish state administration expanded during the eighteenth century, and the institutional network needed experienced people to supervise and make inquiries about the domestic trades. The state was gradually provided with eager young men willing to serve the common good of the kingdom. Like Schröder, they often started their careers by combining academic studies and serving as junior officials within one of the boards. Increasingly, these officials *in-the-making* also undertook journeys in Europe in order to observe different practices for metal processing and manufacturing.⁷⁰ Their experiences were accounted for in diaries and reports written in line with the pervading discourse of *ars apodemica*. Journeys were of personal benefit; however, first and foremost, they were to be of use for the boards and for the public. This required careful preparation; often, travellers received specific instructions from the employer in question. The travel accounts nonetheless always contain elements of selection and do thus not provide entirely objective images of the European metal trades — although subjective opinions were restrained in favour of meticulous description.⁷¹

Arriving home, travellers used their experiences from foreign metal-making communities to promote themselves to the state, and for initiating 'corrections' within the metal trades. There is thus good reason to approach these mobile officials as both 'patriots' and 'cosmopolitans', to use Hjalmar Fors' terms.⁷² Their journeys made up an important foundation for the ambitions of the Swedish state during the mid-eighteenth century; the ordering of

⁷⁰ Foreign journeys were often among the last steps in a process of, in Orrje's terms, 'becoming a Bureau official', whereby the spheres of science, state making, and the shaping of the individual *persona* intersected. See Orrje (2015), pp. 108–111.

⁷¹ See Rydén (2013b); Nyman (2013), pp. 22–38.

⁷² Fors (2005).

the domestic economy included supervision and mobility. At the same time, the state gathered an increasing amount of information about competing European nations. The Swedish metal trades could be compared with those in other places, and improvements could be initiated (within the given frames of the householding order). Above all, it was England, with its extensive metal manufacturing, which attracted the attention of the Swedish state.⁷³ Here, I use Schröder's travel diaries, and compare them with other reports and accounts, in order to illustrate these connections.⁷⁴

Travelling Officials and Perceptions of the British Metal Trades

When Schröder arrived in England in December 1748, he set out for London where he visited theatres, coffee houses, shops, and artisans. He also made acquaintances with merchants, men from the learned aristocracy, and members of the Royal Society such as Hans Sloane.⁷⁵ Leaving the capital, he travelled to the towns in central and northern England and visited a variety of manufactories, furnaces, and workshops. In early 1749, he arrived at Birmingham where he stayed for some two months and observed the town's diverse manufacturing of metal wares. Schröder described it as a town where the artisans were free to practise their craft without impediments from any guilds or institutions. Rather, the metal trades were characterised by competition and liberty. A division of labour existed within and between the workshops, where manufacturers supervised other masters who in turn performed their tasks.⁷⁶

Later, in Sheffield, Schröder observed how the making of cutlery was divided into different tasks, so that 'the work proceeds through as many hands as possible.' He also noted that artisans in Sheffield had less freedom than those in Birmingham.⁷⁷ On a general level, he saw cutlery making in Sheffield as linked spatially and organisationally with the initial stages of processing: good quality cementation steel was made from Swedish bar iron, stretched under water-powered hammers, and used for finer pieces such as knife blades.⁷⁸ Continuing his *tour*, Schröder visited Leeds, Hull, and Newcastle, and travelled via Liverpool and Worcester to Bristol, where he visited ironmongers and experienced the town's vibrant commerce and metal trading.⁷⁹ After Bristol, he travelled via Oxford back to London.

⁷³ See Rydberg (1951); Harris (1998), pp. 507–515.

⁷⁴ For Schröder's journey in England, see also Rydén (2013a), pp. 128–133; Rydén, (2013b). Schröder's, as well as Alströmer's and Kalmeter's, journeys in the Dutch republic have been briefly dealt with by Davids (1995).

⁷⁵ Schröder, *Dagbok rörande Handel*, vol. I, fols. 103–150. KB.

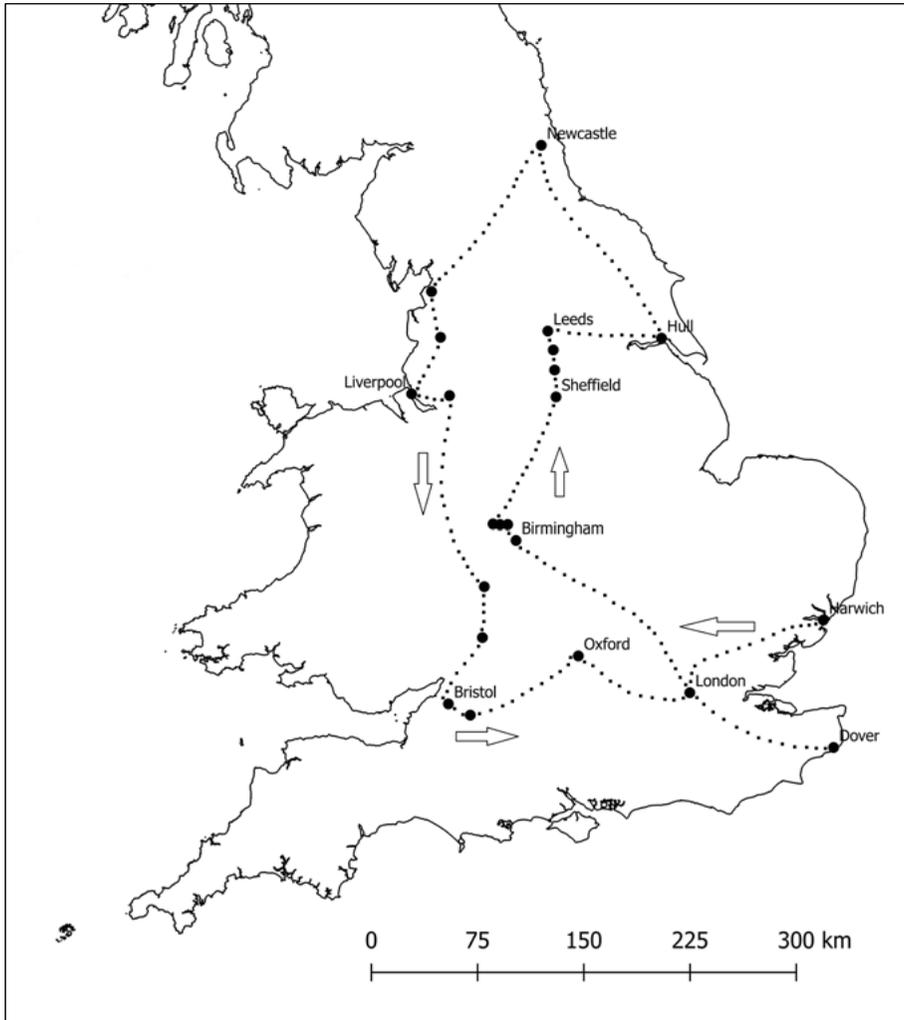
⁷⁶ Schröder, *Dagbok rörande Handel*, vol. I, fols. 226–233. KB.

⁷⁷ 'arbetet går igenom så många händer som möjligt är'. Schröder, *Dagbok rörande Handel*, vol. I, fol. 279. KB. C.f. Berg (1994), pp. 262–269.

⁷⁸ Schröder, *Dagbok rörande Handel*, vol. I, fols. 269–270. KB.

⁷⁹ Schröder, *Dagbok rörande Handel*, vol. II, fols. 381–390. KB.

Figure 2.1 Schröder's journey in England 1748–1749



Source: Data obtained from Schröder's travel diaries. See Schröder, *Dagbok rörande Handel*, vol. I–II. KB. Note: Map constructed from the coordinate system: OSGB 1936/British National Grid.

In his diaries, Schröder described the British metal trades as being integrated, with a clear division of labour however; files and various other metal wares were made in London, locks in Dudley, scissors in Salisbury, and pins in Warrington and Worcester.⁸⁰ The *manufacturing* was also treated as linked to a diversifying context of *trade*, and to the *making* and *making use* of raw metals. In a closing remark, Schröder discussed the iron trade and related British metal-making practices to the supply of Swedish bar iron. He

⁸⁰ Schröder, *Dagbok rörande Handel*, vol. II, fols. 458–460. KB.

dealt with price developments and the competition from Russia and North America. The further transportation of manufactured iron goods to the Mediterranean or Atlantic markets was brought up and reflected upon in terms of product specificity. In one illustrative example, Schröder mentioned how hoop iron (made from Swedish bar iron) was manufactured in England and exported to Portugal. This export, he argued, could also be done from Sweden, but required new metal works, access to models as well as the creation of commercial ties with Portuguese merchants. To describe what he experienced, Schröder used the term ‘Iron system’ (*Jernsystem*).⁸¹

This term comprised both mechanistic stability (the ordered system) and movements. The system was centred on England, but also extended beyond it to include a Baltic and European iron and metal trade, as well as an Atlantic trading system. Schröder used it to grasp the economy both in its entirety, and in its specific parts and daily activities. His diaries are oriented towards a description of a division of labour within and between workshops, urban communities and regions, and within the iron system in its widest expressions. This idea of a pervasive division of labour also later characterised Schröder’s undertakings during his years as *Directeur*.

Comparable descriptions had, however, been made by other Swedish travellers before Schröder. Jonas Alströmer visited many of the same British regions and towns during his journey in 1719–1720. In the case of Wolverhampton he discussed, comparatively, the metal trades, arguing that a diversity of metal goods was manufactured in the populous region around the town. The trading was to a large extent free, and Alströmer mentioned how merchants and ironmongers supplied the artisans with materials in exchange for ‘their work to a certain price’. Through additional merchants in London and other towns, the finished wares were then exported ‘to all places in the world’. Also Alströmer noted how a division of labour existed among the artisans. These observations were not unique for Wolverhampton. Rather, he wrote, each British town with metal works ‘has something in particular in which it surpasses the other’.⁸²

A similar perspective was advanced in the far more extensive travel account written by one of Alströmer’s contemporaries. Henrik Kalmeter made a longer tour in Europe during the 1720s. During his second stay in England, in 1725, he went to the metal-making districts around Bristol and Birmingham where he commented on steelmaking and metal manufacturing as well as on the wider trade with metal wares.⁸³

⁸¹ Schröder, *Dagbok rörande Handel*, vol. II, fols. 483–497. KB. C.f. Rydén (2008).

⁸² ‘deras arbete til wist pris’; ‘till alla orter i werlden’; ‘har något särdeles hwarutinnan han öfvergår den andra’. Alströmer, Jonas, *Resa i England 1719, 1720*, fol. 82. X.376. Handskriftssamlingen. UUB. After Wolverhampton, Alströmer travelled to the nearby towns of Birmingham, Sturbridge, and Coventry. See *ibid.*, fols. 83–95.

⁸³ *Henrik Kalmeters resa*, vol. I–V. M.249. Handskriftssamlingen. KB; for this passage, see vol. III, pp. 501–513, 541–585, 732–744. C.f. Rydén (2013b); Lindqvist (1984), pp. 121–130.

Tours were later made by yet other young officials. Anton Swab, Nils Psilanderhielm, and Erik Stockenström travelled together in Britain during 1735 and 1736 after having spent some time on the European continent. Commencing in London, the three men later set out on a journey around England, visiting Nottingham, Derby, Sheffield, York, Newcastle, and Cornwall.⁸⁴ In letters to *Bergskollegium*, Swab and Stockenström described the places visited on their European journey, where they noted the complex spatiality of the British iron and metal manufacturing.⁸⁵

These journeys connected a variety of places and practices. The travellers thoroughly described trading networks that linked metal-making communities in Europe. Like Schröder, both Alströmer and Kalmeter noted how steelmakers in England used bar iron from Sweden when making cementation steel. They also stressed the use of other varieties of steel, mainly imported from Germany.⁸⁶ Similar links were noted by Reinhold Angerstein, who travelled in Germany during the early 1750s, and later continued through Europe to England.⁸⁷ Observing steelmaking in the Bergisches land, he described different types of welded steel, with their qualities and prices. He also noted how some of them were exported to Holland and England.⁸⁸

Discussions on the wide networks of the metal trades were also offered to the Swedish state from trading consulates around Europe. The reports from London often related events within the British metal trades to the supply of bar iron from Sweden, Russia, and North America. In 1735, Alströmer and Johan Clason junior reported how rising quantities of Russian iron were imported to London and Bristol. From the latter town the iron was sent up north to various metal manufactories. Despite the influx of Russian iron, Swedish iron was referred to as still being in lead, both in terms of quantity (8 to 9000 tons per year only to London) and quality. Alströmer and Clason

⁸⁴ Swab, Anton, Undated biographical draft. X.240. Handskriftssamlingen. UUB. See also *Svenskt biografiskt lexikon, Band 33*. (2007–2011). Stockholm, *Stockenström, Erik* (article by Fors, H.), pp. 549–550. The three men had met up in the Harz area in Germany.

⁸⁵ *Bergmästarne Swabs och Stockenströms bref till Bergskollegium angående de Europaeiske Järnwärken, af den 2 Januari 1744 jemte utdrag af Bergs Kollegii bref till K:gen i samma ämne*. C:XVII, 1–12, no. 1, fols. 556–562. Engeströmska samlingen. KB. This text commences on fol. 541. C.f. Rydberg (1951), pp. 168–170.

⁸⁶ Alströmer, *Resa i England 1719, 1720*. UUB; *Henrik Kalmeters resa*, vol. III. KB.

⁸⁷ Angerstein set out on his journey in 1749, one year after Schröder, and travelled via Germany, Austria, and Italy to Spain and France. By orders from *Jernkontoret*, he went back to Germany and surveyed the ironmaking in the Rhine area during 1753, and then continued to England. Via the Low Countries, he arrived back in Sweden in 1755. See Boëthius and Kromnow (1947), p. 386, 500. Angerstein's travel diary from the English journey has been translated and printed: Angerstein, Reinhold (2001). *R.R. Angerstein's Illustrated Travel Diary 1753–1755: Industry in England and Wales from a Swedish Perspective*, transl. by Berg, Torsten and Berg, Peter. London: Science Museum.

⁸⁸ Angerstein, Reinhold, *Om Järnwärcken Bägge Sidor Renströmmen, Ifrån Bodensee i Sveitz till Coblentz. Af Reinhold Angerstein. Utgifwen År 1758*. BkH, E3:27. RA. See further section 4.4. Bergisches land, in today's Nordrhein-Westfalen, includes the steel- and metal-making communities Solingen and Remscheid.

believed that a major part of the Swedish iron was used in England, but noted how some of it was shipped out by the East India Company as ‘ordinary Iron’. Still, they concluded, the competition from Russia had resulted in a worsening market.⁸⁹

According to Rydén, descriptions like these were not characterised by notions about change, but rather oriented towards a ‘synchronic structure’ and an ‘esprit de système’.⁹⁰ Still, they can be seen as paving the way for attempts to improve finer metal making in Sweden around mid-century.

‘Corrections’, Supervision, and an Intermediary *Directeur*

The increasing amount of information that reached the boards in Stockholm created a potential for discussions where the domestic trades could be scrutinised and compared to ones in other European regions. In 1738, Hamren discussed Swedish manufacturing, and most notably the textile industries, by comparing them to those in other nations such as England, France, and Holland.⁹¹ In order for Sweden to catch up, he stressed the foundation of a political body, made up of ‘enlightened men’, who could ‘instruct and promote’ the trades. This, he argued, had earlier been done for the mining and metal industries (with the founding of *Bergskollegium* in 1637).⁹²

As later argued by the instrument maker and traveller Daniel Ekström, the metal trades were, however, in need of a similar support. In his presidency speech given to the Royal Swedish Academy of Sciences (*Kungliga Vetenskapsakademien*) in 1750, he dealt in detail with the prerequisites for metal making in Sweden, Germany, England, Russia, and France. In his view, Sweden was the only nation that had real advantages regarding the access to quality iron. Still, this lead was quickly lost in the further processing, where Sweden lagged far behind both Germany and England regarding organisational and commercial aspects. As evident also in Schröder’s discussion of the iron system, Ekström linked the God-made foundations of the economy with potentials for man-made improvements within the given framework. He noted how nature had ordered it so that many Swedes should work with the processing of iron. Still, the most successful nation was the one which could

⁸⁹ ‘ordinairt Jern’. Alström, Jonas and Clason, Johan, Letter to *Kommerskollegium*, London, 1735-03-14. Jonas Alström, London, 1730, 1732. KkH, EVIaa:231. RA. During his stay in England, Alströmer founded a trading house that later obtained the status of commissioner for the Swedish state. He was elected consul in London in 1722, but left England for the Netherlands the following year. The trading house and the consulate were instead supervised by Alströmer’s brother-in-law and co-partner Johan Clason junior (son to Johan Clason senior, owner of the Graninge steelworks). See *Svenskt biografiskt lexikon, Band 1*. (1918). Stockholm, *Alströmer, Jonas* (article by Heckscher, E.F.), pp. 556–564. See also Suneson (1998), pp. 30–32.

⁹⁰ Rydén (2013b), pp. 79–81.

⁹¹ Hamren (1738), pp. 106–108.

⁹² ‘uplyste män’; ‘underwisa och befrämja’. Hamren (1738), pp. 115–117. Such a political body was founded during the following year: *Manufakturkontoret*.

meet the public needs for finer metal wares and thereby, in Ekström's words, 'gain widespread sales.'⁹³

In this matter, the experiences and observations made by travelling officials in Europe became vital tools for the state to regulate and create order within the domestic economy. As evident in the case of Schröder, this included a growing ambition to supervise metal-making practices. Being appointed as *Directeur* in 1753, he had secured a vital position within the manufacturing system. According to his autobiography, this gave him the opportunity to supervise the 'condition and necessary Improvements' at the domestic manufactories. He assisted them with models and materials, and informed artisans about applying 'Tools for the Easing of the working methods'. He also oversaw the recruitments of foreign workers and the constructions of new workshops.⁹⁴

These dimensions are pervasive in Schröder's diaries from his years as *Directeur*. In 1754, he set out on his first *tours* in central and south Sweden. He visited large manufactories, metal works, and smaller workshops, many of which he recurrently came back to during the two following decades. He also commented on vending sites and made references to a wider context of trade. In sum, he described a system of diversification, movements, and interwoven practices. During the 1750s, this system expanded, with the founding of new workshops and metal works in the Swedish provinces and in Stockholm. The spatiality of this expansion will be further dealt with in the next chapter.

The diaries also reveal how Schröder used his experiences from England in order to promote improvements within the system. The links between an enhanced division of labour, the installation of devices, the use of materials, and the facilitation of trading networks, stands out as important measures encouraged by the intermediary *Directeur*. These features are discussed by Rydén as 'corrections', and related to Schröder's experience of British metal manufacturing. They were also associated to the ideas of a well-ordered society in which change was brought about by political authorities. Still, during the late 1750s and 1760s, Schröder came to shift his perceptions of the domestic metal trades towards an emphasis on *liberty* and a 'commercial and unregulated economy'. In 1771, Eskilstuna *Fristad* was founded in line with these ideas.⁹⁵

⁹³ 'vinna allmän debit'. Ekström, Daniel (1750). *Tal, om järn-förädlingens nytta och vårdande; hållit i kongl. vetenskaps academiens vid præsidiu afläggning d. 28 apr. 1750. Af Daniel Ekström, matematisk instrument-makare. På kongl. vetenskaps academiens befallning*. Stockholm., pp. 3–20. C.f. Amelin (1999), pp. 77–79.

⁹⁴ 'tillstånd och erforderliga Förbättringar'; 'Verktyg til arbetsmetodernes Lättande'. *Anteckningar ur framl. Fristads Directeuren, Herr Bergsrådet Samuel Schröderstiernas egenhändig författade Lefvernes Beskrifning*. ULA.

⁹⁵ Rydén (2013a), pp. 133–144; quotation from p. 142.

2.5 Changed Perceptions? Liberty and *Fristäder*

The 1760s saw a gradually changing economic discourse in Sweden. This has been discussed by scholars emphasising the trends of Enlightenment thinking, liberalism, or Physiocratic ideas. Magnusson has stressed how this period was characterised by a ‘reform mercantilism’. This was largely a ‘political movement’ with a ‘utilitarian approach’, connected to a severe critique of the policies represented by the ‘Hats’.⁹⁶ The 1760s stand out also in Jonas Nordin’s discussion on the ‘radicalism’ of the Age of Liberty. Still, he noted the impact of gradual shifts during the eighteenth century; more liberal opinions on economy and the political system were related to changing institutional prerequisites, to disagreements between socio-political factions, and to tendencies of secularisation.⁹⁷ Indeed, as emphasised by Carola Nordbäck, the ‘cosmopolitan’ economic ideas about freedom and tolerance, expressed by actors such as Anders Chydenius, also included notions of a God-given order and hierarchy.⁹⁸

As early argued by Heckscher, the manufacturing system came under increasing critique during this period, although steps in this direction were taken successively from the late 1750s. The domestic trades were then severely affected by the wider financial crisis that began in Amsterdam in 1763. As a consequence of this development, the ‘Caps’ seizure of power at the Diet of 1765–1766 resulted in more austere policies, which further targeted the generous loans and privileges given to manufacturers. The following attempts made by the ‘Caps’ to achieve deflation added to the downward spiral for the domestic manufacturing trades, which never recovered from the crisis years, according to Heckscher.⁹⁹

As has been discussed in chapter 1, the latter conclusion was questioned by later scholars. Still, it is important to note the emphasis on the changing views on domestic crafts and industries. Runefelt stressed how the 1740s and 1750s saw intense debates on the regulative and monopolistic policies of the ordering state, with a focus on the manufactories.¹⁰⁰ The following decade saw the special privileges for urban groups of manufacturers being largely retracted. They were subsumed into the obligations of other burgher groups.¹⁰¹ During the same period, and especially after the Diet of 1765–1766, steps were taken towards a less strict view on new establishments within the manufacturing trades. This coincided with the decision to close *Manufakturkontoret* and to hand its duties over to *Kommerskollegium*.¹⁰²

⁹⁶ Magnusson (2004), pp. 133–134.

⁹⁷ Nordin (2003).

⁹⁸ Nordbäck (2013).

⁹⁹ Heckscher (1949b), pp. 601–609. The ‘Caps’ lost power again at the following Diet.

¹⁰⁰ Runefelt (2005), pp. 153–166. See also Boëthius and Kromnow (1968), pp. 368–371.

¹⁰¹ See e.g. Boëthius (1943), pp. 312–316; Nyström (1955), p. 249; Lindberg (2001), p. 38. From 1767, manufacturers and fabricants had to apply for burghership. C.f. section 4.1.

¹⁰² Gerentz (1951), p. 68, 276–277; Nyström (1955), p. 248.

These changes also affected the metal trades. Magnusson has noted how discussions on liberty (with Eskilstuna *Fristad* being the prime example) targeted the authoritarian putting-out systems that characterised many of the larger manufactories.¹⁰³ Rydén later emphasised how liberty, as advanced by actors like Schröder, included structured plans and attempts at regulation not dissimilar from Berch's ideas of an ordered economy.¹⁰⁴ As will be argued here, the debates on the Swedish metal trades during the 1760s and 1770s did not herald a dramatic ideological shift. Rather, they are better understood as related to gradually changing perceptions of metal-making practices and of the manufacturing system.

The 'Natural Order' of Metal Making: Schröder's Critique

Visiting the Carl Gustaf Stad manufactory in Eskilstuna in 1754, Schröder commented on several potential 'corrections'. The sorting and use of iron was brought up, as was the access to suitable tools and devices. The organisation of work was also to be improved. The workforce was to consist of a larger share of journeymen and apprentices, so that each workshop could be managed by one master alone. Finally, the illegal trade between the workers and the people in the nearby area had to cease.¹⁰⁵ Two years later, *Handels och manufakturdeputationen* argued that the illegal imports of finished wares was still a manifest problem for the manufacturing trades, and it also affected the trading balance negatively. Several forms of capital advances and loans had been restricted, and the Delegation instead stressed how artisans, fabricants, and merchants should be given access to export premiums.¹⁰⁶

These two accounts are good examples of the features discussed above. The attempts made by the Swedish state to regulate the manufacturing system were connected to ideas of a pervasive division of labour, but also to the facilitating of relations between production and trade. Gradually from the early 1760s, these areas of potential 'correction' were, however, accompa-

¹⁰³ Magnusson (1988), pp. 94–95. See also Heckscher (1949a), pp. 492–493.

¹⁰⁴ Rydén (2013a), pp. 143–144.

¹⁰⁵ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 142–151. KB.

¹⁰⁶ 'Rikens Ständers Secrete-handels- och Manufactur-deputations berättelse, angående Swenske Fabriquernes tilstånd ifrån 1751 års början til 1754 års slut' [from 25 May 1756]. (1761), in Modée, Reinhold G., Lindhielm, Hedvig E., and Fougt, Elsa (ed.). *Utdrag utur alle ifrån den 7. decemb. 1718./1791 utkomne publique handlingar. Stockholm. 1–15. 1742–1829=*. [Del 6]. Stockholm: Grefning, pp. 3944–3946. When *Manufakturkontoret* was founded in 1739, the funds of *landshjälpsfonden* were transferred to *manufakturfonden*. The latter was used in supporting manufacturers and manufactories, by covering the interest rate on loans taken in *Rikens Ständers Bank* and by funding premiums (c.f. Schröder's discussion on the manufacturing system). One option for manufacturers was to take loans by pledging finished wares. This possibility was repealed during the Diet of 1755–1756 and so were many of the premiums (not export premiums). Instead, loans could be taken by promissory notes on delivered wares from the so-called *manufakturdiskontfonden*. According to Gerentz (1951), pp. 257–266, this form of credit expanded during the late eighteenth century.

nied in Schröder's writings by an emphasis on liberty. In his report from 1760, he used the metal works in Duvnäs to illustrate how domestic metal making was not operated according to a 'natural order', where 'the utility and benefit of the masters may depend merely on the rise and growth of the works'.¹⁰⁷

In the closing section of the report, the *Directeur* noted how a majority of all finer metal wares that had previously been imported now could be made at the domestic manufactories. He related this development both to beneficial policies and to the investments made by the owners of metal works. Several areas of further 'correction' were, however, also recognised. Larger works depended on the undertakings of a few individuals, and this was risky because of the extensive sums required to keep business going. The owners' responsibility for everything also brought about a lack of 'industry and competition' among the workers. They were not free, and were incapable of affecting their livelihoods, which in turn resulted in extensive cheating. This caused damage when combined with the fact that owners seldom had 'enough knowledge' about how to manage large-scale metal making. Schröder especially criticised the idea of encouraging 'mother works' (like Vedevåg), from whence artisans could be spread out all over the realm.¹⁰⁸

Instead, Schröder stressed an aggregation of finer metal making, arguing that 'one worker shall give the next his hand, so that they together can be a society'. Artisans in such a place were also to benefit from a common access to water-powered works and other necessary facilities. Compared to the British manufacturing towns he had visited, Schröder concluded that all this demanded a place where liberty was offered for domestic and foreign artisans to settle down and practise their crafts. This, he argued, would also contribute to population growth and competition.¹⁰⁹

These ideas were communicated by Schröder to the Diet, but the process came to a halt.¹¹⁰ The advocacy for liberty within the metal trades was, however, gradually increasing. In this matter, Schröder was later joined by the 'trade curator' (*handelsintendent*) Johan Westerman. In 1763, attempts were made by the latter to entice prominent Birmingham manufacturer Matthew Boulton to settle in Norrköping with some of his workers. Schröder instead considered Eskilstuna as a better destination. Boulton never arrived in Sweden. Still, Eskilstuna more and more came to be at the heart of the discussions about the formation of a *Fristad*, and Schröder travelled to the town the same year to investigate the potentials for its founding.¹¹¹ These plans were increasingly fuelled in the years that followed by the economic crisis that took hold on Sweden.

¹⁰⁷ Schröder (1925b), p. 62.

¹⁰⁸ Schröder (1925b), pp. 85–86. For the translated quotations, see Rydén (2013a), p. 137.

¹⁰⁹ Schröder (1925b), pp. 86–88. For the translated quotation, see Rydén (2013a), p. 137.

¹¹⁰ See Hellberg (1920), p. 266.

¹¹¹ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1763, pp. 29–34. KB.

The Crisis of the 1760s: A Downturn for the Domestic Trades

In his ‘Politico-economic remarks’ from 1767, Schröder discussed how the crisis was mainly the result of the economic policy of the ‘Hats’ during the mid-century. Large loans had been taken in Amsterdam and Hamburg to support the issuing of paper bills. According to the *Directeur*, this led to a disappearance of ready money from the country. It also resulted in a rising inflation, especially during the late 1750s. The manufacturing trades were not affected as long as they could get loans from *Riksens Ständers Bank* to cover the costs of production. Exports of finished wares — as of iron — were indeed promoted up until the 1760s, but sales on the domestic market were not stimulated. The situation worsened at the end of the Seven Years’ War. The currency rate now rose dramatically, as did the inflation.¹¹²

The real downturn came after the shift in political power in 1765. The restrictive economic policy of the ‘Caps’, combined with speculations on the value of the Swedish currency, had severe effects both for ironworks and the manufacturing trades. In the latter case, Schröder noted, stocks of finished goods, made from expensive raw materials, had to be sold at a loss; skilled artisans were dismissed or emigrated, while workshops and manufactories were closed down.¹¹³

In order to deal with this downturn, *Handels och manufakturdeputationen* noted in 1765 how strict regulations were needed in order to deal with the rising import of foreign goods, which were seen as favouring the spread of ‘luxury and superfluity’. Except for import bans, the Delegation advocated ‘Domestic luxury workshops’ which could partly replace some of the goods.¹¹⁴ Related to this, it also stressed how *manufakturfonden* could expand in order to match the rising currency rate. Otherwise, it was argued, manufacturers and merchants would ‘turn their industry away from the said useful enterprising’ due to intensifying competition.¹¹⁵

¹¹² Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1767, pp. 51–58. KB.

¹¹³ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1767, pp. 74–80. KB. Also Heckscher noted how the inflation largely resulted from the ‘Hats’ supportive manufacturing policy. Several ‘exchange offices’ were founded during the mid-century in order to lower the currency rate, but these efforts were only periodically successful. The international crisis, beginning in Amsterdam in 1763 and spreading to other financial centres (such as Hamburg), had strong negative effects also for the Swedish economy. The possibilities for new loans were stalled. When the ‘Caps’ gained power, attempts were made to gradually reduce the currency rate and to restrict the domestic circulation of money. The (to some extent) secret plans were, however, revealed and the currency fell faster than expected. This severely affected both the manufacturing trades and the iron trade. See Heckscher (1949a), pp. 428–443; Heckscher (1949b), pp. 757–781.

¹¹⁴ ‘yppighet och öfverflöd’; ‘Inrikes yppighets wärkstäder’. *Handels och manufakturdeputationen*, Account to the Diet, July 1765. FUH, R. 3329, fols. 198–200. RA. Luxury in general was, however, treated as a problematic feature. See Runefelt (2005), p. 101–123; Jansson (2013).

¹¹⁵ ‘wända hågen ifrån förenämnda nyttiga företagande’. *Handels och manufakturdeputationen*, Account to the Diet, September 1765. FUH, R. 3329, fols. 303–306. RA. Since 1763 premi-

The problems were, however, accumulating for many metal works and artisans. The owner of Vedevåg, Claes Hallenius, described how he was troubled by levies issued on his workers, duties on metal goods, and reduced privileges.¹¹⁶ Complaints were also handed in by several Stockholm artisans during the same Diet.¹¹⁷ In 1768, Schröder noted how the works in Carl Gustaf Stad and Tunafors struggled with the troublesome conditions created by the problematic currency rate.¹¹⁸

The downturn for finer metal making — and for the manufacturing trades in general — must also be related to changes within the political network. In 1766, the Diet communicated to King Adolf Fredrik its decision to discontinue *Manufakturkontoret*. It was noted how many of the premiums that had been given to manufacturers, funded by *manufakturfonden*, were ineffective. Barely one-third of the existing manufactories in the kingdom relied upon public funding. Works that were ‘maintained with private money’, it was argued, had managed better through the crisis than the ones relying upon state support. Many of the latter were ‘closed down, or in poor condition’. Above all, however, it was the division of supervision that had caused the Diet to take action; *Manufakturkontoret* and *Kommerskollegium* were performing the same duties, often resulting in contradictory outcomes to the confusion of manufacturers.¹¹⁹

The latter feature is important, in that it emphasises the often conflictual relations behind the *strategic stage* of the manufacturing system. The closure of *Manufakturkontoret* has been related both to a broader critique of the regulations for the domestic trades as well as to intricate controversies within the state apparatus.¹²⁰ For finer metal making, it meant that the possibilities of getting public loans were reduced. Eventually, this trade was also largely returned to *Bergskollegium*’s supervision (in 1770).¹²¹ Still, this did not result in a desertion of the ideas about careful planning and the implementation of a division of labour ‘from above’. This is evident in the discussions on the

ums were given according to fixed percentages. *Handels och manufakturdeputationen* argued that they should be adapted to the goods’ accurate values.

¹¹⁶ Hallenius, Claes, Proposal to *Urskiljningsdeputationen* (circulated to *Handels och manufakturdeputationen*), February 1765. FUH, R. 3332, fols. 97–100. RA. Hallenius was ennobled 1779, and took the name Hallencreutz. See Rönnow (1944), p. 175.

¹¹⁷ See e.g. Roth, Johan F., Proposal to *Handels och manufakturdeputationen*, March 1765. FUH, R. 3331, fols. 1167–1168. RA; Wahlbom, Anders, Proposal to *Handels och manufakturdeputationen*, April 1765. FUH, R. 3331, fol. 1581. RA.

¹¹⁸ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1768, pp. 31–32, 40. KB.

¹¹⁹ ‘äga bestånd på private förlag’; ‘nedlagde, eller på fallande fot’. (Copy of) Letter from the Diet to King Adolf Fredrik (regarding the closure of *Manufakturkontoret*), Stockholm 1766-05-16. L.101. Handlingar rörande manufakturkontorets indragande, no. 2. Handskriftssamlingen. UUB.

¹²⁰ See Gerentz (1951), p. 68. Increasingly during the 1750s, *Kommerskollegium* refused to recognise *Manufakturkontoret*’s role in supervising the manufactories. This coincided with a development where the Board lost its access to leading positions within the Office. See also Runefält (2005), pp. 167–177.

¹²¹ Boëthius and Kromnow (1968), pp. 396–397. See also section 3.1 below.

founding of several *fristäder*, which intensified during the latter half of the 1760s, with Schröder and Westerman as the two leading actors.

A *Fristad* in Eskilstuna: Liberty, Division of Labour, and Trade

In a report to the Diet of 1765–1766, Westerman stressed the small potential for exporting finer wares and the inability to compete with the British metal trades (in terms of quality or price). Rather, he favoured the export of semi-manufactured goods. Still, like Schröder, he made comparisons with British manufacturing towns and stressed how Sweden had to put the same ‘Method’ into practice. This involved the concentration of works, the use of machines, and a ‘rational Economy and division of labour’. According to Westerman, this would result in ‘more work in less time and to a lower price’. Related to this, he stressed ‘the benefit of some liberty and profits’ for artisans working together in a larger community.¹²²

Westerman’s reasoning resembles the ideas that Schröder had communicated in his report to *Kommerskollegium* in 1760. On the one hand, they can be seen as breaking with Berch’s ideas about the balanced spatial order and avoiding of harmful competition. On the other hand, both Schröder and Westerman built further on the prevalent ideas about the links between urban space and manufacturing.

The emphasis on liberty was now also more firmly rooted in the state apparatus. In April 1766, *Handels och manufakturdeputationen* dealt with the privileges for artisans dedicated to finer metal making. Artisanry was treated as exclusionary and complicated in its regulations. A majority of the artisans worked for someone else, and, therefore, they did not care about the ‘inner householding’ at metal works. Instead, the Delegation advocated an increased liberty: Norrköping, Norrtälje, Söderhamn, Eskilstuna, and Ronneby were proposed as ‘free communities’ where native and foreign metal-making artisans could settle. This ‘concentration of many working hands’ was to result in ‘the adoption of a better economy of work’ as well as competition among the workers. Liberty was also perceived as related to a wider market. Due to Sweden’s disordered economy at the time, it was thought that the only effective encouragement of the trades was ‘widespread sales, which is the soul and life of all Crafts’.¹²³

¹²² ‘Methode’; ‘förmufligt arbets Oeconomie och fördelning’; ‘mera arbete på kortare tid och til lindrigare pris’; ‘wissa frihetens och förmånens åtniutande’. Johan Westerman’s report to the Diet of 1765–1766. FUH, R. 3338, fols. 7–12. RA. Thanks to Göran Rydén for lending me this material. C.f. Boëthius and Kromnow (1968), p. 349; Wernstedt (1935), p. 116. Westerman was later ennobled Liljencrants and elected as Gustav III’s Secretary of trade and finances in 1773.

¹²³ ‘inre hushållning’; ‘fristads-orter’; ‘flere arbetande händers ihopsamlande’; ‘en bättre arbets oconomies antagande’; ‘en wig afsättning, som är själen och lifwet af all Slögde-handtering’. *Handels och manufakturdeputationen*, Account to the Diet, April 1766. FUH, R. 3330, fols. 282–286. RA.

Schröder's plans had thus gained a growing support. In April 1770, he wrote a proposal to *Bergskollegium* where he discussed the creation of a *Fristad* in Eskilstuna. He depicted the spatial preconditions and described the town and the nearby works in Tunafors and Carl Gustaf Stad. Eskilstuna was depicted as possessing several important advantages, located within a populous province with favourable communications and with good access to raw materials. It also had many trained artisans on site. Schröder emphasised the community's potential for exports, linking the metal making to the involvement of merchants engaged in overseas trade. Related to this, he emphasised the use of foreign models and the importance of investigating the demand for metal wares in other countries.¹²⁴

Being involved in the discussions on the *Fristad* as well, both Westerman and Lars J. Hallenius, *Directeur* at Vedevåg, indeed saw the benefits of an enhanced organisation of work and improved relations between merchants and manufacturers. Still, they did criticise Schröder's plans for Eskilstuna. Westerman questioned the town's potential to house the making of cruder wares, which required more complicated assisting works. This, he argued, would have negative effects on the output and exports.¹²⁵ Hallenius, in turn, warned of the risks of founding metal works before knowing the market. Sweden was not populous like France or England and thereby without the same advantages for urban industries (including mechanisation and an advanced division of labour). Instead, he argued for 'a dispersion' of the trades around the kingdom.¹²⁶

The promotion of Vedevåg, his own works, as an important metal-making community is obvious in Hallenius' case. In a complementary document, he argued that this 'plant school' should obtain the same privileges as the *Fristad*. Otherwise the former was going to lose skilled workers.¹²⁷ As noted by Sixten Rönnow, the brothers Johan L. Hallenius, owner of Tunafors, and Claes Hallenius at Vedevåg later joined forces in 1772 in writing to King Gustav III, demanding such privileges. This application was denied.¹²⁸

Despite this criticism, Schröder elaborated on his plans for Eskilstuna. In 1770, he outlined the practical course of action for its creation. The crown should acquire land and facilities from the Carl Gustaf Stad manufactory and funding was to be obtained from *Jernkontoret*. Carl Gustaf Stad and the old

¹²⁴ Schröder, Samuel, Proposal to *Bergskollegium*, April 1770 (probably copy). Bergsrådet S. Schröderstiernas Papper, 34:3, vol. 1, Fascikel 1. ESA. This unpaginated volume contains 26 documents. See the notes below.

¹²⁵ Westerman, Johan, (Copy of) proposal to *Jernkontoret*, May 1770. Bergsrådet S. Schröderstiernas Papper, 34:3 (*Lit: H*), vol. 1, Fascikel 1. ESA.

¹²⁶ 'ett krigspridande'. Hallenius, Lars J., (Copy of) proposal to *Jernkontoret*, May 1770. Bergsrådet S. Schröderstiernas Papper, 34:3 (*Lit: J*), vol. 1, Fascikel 1. ESA. Related to this, also Hallenius pointed to the export of semi-manufactured goods as one prioritised measure.

¹²⁷ 'plant schola'. (Copy of) missive by Lars J. Hallenius (unknown date). Bergsrådet S. Schröderstiernas Papper, 34:3 (*Lit: K*), vol. 1, Fascikel 1. ESA.

¹²⁸ Rönnow (1944), pp. 186–187. C.f. section 3.3.

town of Eskilstuna could then be ‘united into one body’. Artisans who settled in the town would be free to manage their business and recruit workers without being obstructed by any guilds or by the state. Still, Schröder argued, the *Directeurs* of the metal trades were going to be ‘directing the workers into [the] correct skills and working order’ as well as being responsible for the use of appropriate machines and tools.¹²⁹

Schröder’s proposal was discussed in both *Kommerskollegium* and *Bergskollegium*, and with their approval *Fristaden* was founded one year later. Schröder was appointed *Directeur*, but in cooperation with his colleague Sven Rinman (who lived in Eskilstuna from 1773).¹³⁰ The community expanded during the 1770s. However, old problems remained. An unsigned memo from 1780 dealt with ‘Obstacles for the growth of the Works’, expressed both in terms of the masters’ poverty and in lagging manufacturing processes. Furthermore, the workers still relied on a putting-out system. As a result, they often ran into debt and became dependent on purchasers or merchants.¹³¹

Coinciding with the founding of the *Fristad*, a renewed version of the *Hallordning* was issued in 1770. This time, it specifically included also the metal trades. Like its forerunners, it made a sharp distinction between the manufacturing trades and the guilds. It also favoured a division of labour between fabricants, manufacturers and masters, and putters-out. A supervisory control was further stressed, and it was noted how the *Hallrätt* was obliged to ‘protect the Works from all obstacles and intrusions’.¹³² However, as stressed by Nyström, the *Hallrätt*’s jurisdiction became in fact limited. Also, he argued that the manufacturing trades remained largely unaffected by the ideas of liberty: the exploitive relations of work were made more solidified.¹³³ Nyberg later rejected this conclusion. Instead, he argued that the new *Hallordning* was built on an idea that did not reflect the ways in which manufacturing actually was organised.¹³⁴ Again, we thus see potential discrepancies between the regulative *strategies* of the state and the practical relations of a changing system.

Attempts were also made during this period to promote the export of metal wares from Sweden. The mutual relations between trade and manufac-

¹²⁹ ‘til en kropp förenadt’; ‘leda arbetarne på riktige handalag och arbetsordning’. Schröder, Proposal to *Bergskollegium*, April 1770. ESA.

¹³⁰ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1770, pp. 13–23; 1771, p. 12. KB. Rinman was appointed supervisor for the *Fristad* in 1784. See *Svenskt biografiskt lexikon*, Band 30. (1998–2000). Stockholm, *Rinman, Sven* (article by Nisser, M.), pp. 212–219.

¹³¹ ‘Hinder för Fabriquens tillväxt’. Undated memo regarding the masters in Eskilstuna *Fristad*, 1780. EFoA, H:1. ULA.

¹³² ‘skydda Fabriquerne från alt hinder och intrång’. ‘Kongl. Maj:ts Förnyade Hall-Ordning’ [from 2 April 1770]. (1777), in Modée, Reinhold G., Lindhielm, Hedvig E., and Foug, Elsa (ed.). *Utdrag utur alle ifrån den 7. decemb. 1718./1791 utkomne publique handlingar. Stockholm. 1-15. 1742-1829=.* [Del 9]. Stockholm: Foug, pp. 334–335, 339.

¹³³ Nyström (1955), pp. 251–257.

¹³⁴ Nyberg (1992), pp. 344–347.

turing were embraced by the persons and institutions involved in debating the *Fristad* during the 1760s.¹³⁵ This alignment took a solid form with the founding of an export company (*manufakturexportationscompaniet*) in 1773, resulting from negotiations between *Jernkontoret*, *Kommerskollegium*, and *Bergskollegium*. The intention was to export greater quantities of cruder metal goods. According to Boëthius and Kromnow, the company was, however, a failure and it was discontinued in 1781.¹³⁶ Still, before its closure the company contributed to increasing metal exports as stressed by Rinman, then supervising the cruder metal making, in 1778.¹³⁷ Cross-checking with the compilations found in *Historical Statistics of Sweden*, we can note rising exports of semi-finished iron during the 1770s and 1780s. This development slowed down again during the following two decades.¹³⁸

Eskilstuna *Fristad* and the export company were two interwoven facets of the discussions on metal making during the 1760s and 1770s. During this period, ideas of liberty and markets were interwoven with the perceptions of a division of labour within the metal trades. This was not a linear development, but rather a gradual reconfiguration and integration of ideas related to an economic and social context in change. Larger manufactories — heavily supported by subsidies and privileges — were perceived negatively in Schröder's writings. He also criticised the artisans' dependence upon proprietors or putters-out. Instead, he stressed the more flexible urban metal trades: the mutual assistance and competition among artisans as well as the beneficial relations between manufacturers and merchants were inserted in a wider context of *making, dealing, and using*.

As noted in chapter 1, Rydén has discussed Schröder's role in this process in terms of a 'long sequence of translations'. There is good reason to argue that 'liberty', in this case, also was a carefully planned project. While he certainly observed problems with the artisans' lack of autonomy, Schröder still promoted the importance of 'top-down' regulations within the trades.¹³⁹ This shows the complexity of the regulations emanating from the state during the period in question, with various *strategies* that intersected over time. Here, it is argued that the discussions on liberty and the division of labour also must be related to another debate which intensified during the latter half of the eighteenth century: the relation between theory and practice.

¹³⁵ The appointment of Westerman as trade curator during the Diet of 1760–1762 was linked to the promotion of overseas trade. He travelled in Europe during the following years before handing in his report in 1765 (referred to above). See Wernstedt (1935), pp. 112–123.

¹³⁶ Boëthius and Kromnow (1968), pp. 347–357, 362–364, 367.

¹³⁷ Rinman, Sven, Report to *Bergskollegium*, (presented) 1778-01-30. BkH, E2a:17. RA.

¹³⁸ *Historical Statistics of Sweden. Part 3, Foreign Trade 1732–1970*. (1972). Stockholm: SCB, pp. 149–152. The export of 'semi-finished iron' is treated as the total amount of bolt-, bundle- and hoop iron, in ship-pounds. The Mediterranean market accounted for the major share, but goods were also shipped to Britain, Holland, and to ports around the Baltic Sea.

¹³⁹ Rydén (2013a), pp. 141–144.

The Theory and Practice of Metal Making: Rinman's Critique

The state's ambition to regulate the metal trades during the mid-eighteenth century not only resulted in diverse *strategies* aimed towards the implementation of control. It also gave rise to an increasing interest in the practical processes of metal making. One text which illustrates this connection is Rinman's *Anledningur til kunskap om den gröfre jern- och stål-förädlingen och des förbättrande*, published in 1772. The first chapter of this book was addressed to manufacturers and owners of metal works, and dealt with the practical knowledge required to supervise metal processing.¹⁴⁰

Rinman carefully described how proprietors were obliged to be familiar with the handling of raw metals, the facilities and natural resources used in production, and the working methods required in different processes. Knowledge was also necessary regarding operations that 'could be achieved for the facilitation of manual work and the lowering of the costs of manufacturing'. A proprietor should, Rinman argued, 'as far as possible have a master's insight, although the actual practice and skills cannot be required.'¹⁴¹ Still, exact knowledge regarding metal making was not to be expected from 'travelling gentlemen'; nor could it be achieved simply by recruiting foreign artisans to Sweden. Rather, Rinman argued, a mobilisation of the domestic metal trades also demanded that Swedish smiths were encouraged to make journeys of their own in order to gain skills.¹⁴²

Like Schröder, Rinman had travelled in Europe during the late 1740s. After his return, he was deeply involved in various projects within the metal trades. Often, as in the case of Eskilstuna *Fristad*, the two men collaborated in different matters. As evident in his travel accounts and reports, Rinman was, however, more committed to the practical side of metal refinement.¹⁴³ This was also the case for the man who succeeded Schröder as *Directeur* in 1771, Bengt Qvist Andersson.¹⁴⁴

Still, Rinman was not unaffected by the ideas of liberty. He related improvements in work processes to the benefits of increased rights for

¹⁴⁰ Rinman, Sven (1772). *Anledningur til kunskap om den gröfre jern- och stål-förädlingen och des förbättrande, upteknade af Sven Rinman*. Stockholm. The main area of interest in this text was steelmaking. Marco Beretta has described *Anledningur til kunskap* and Rinman's later treatise on the history of iron, *Försök til järnets historia* (from 1782), as the 'first comprehensive works' on metal making after René Antoine Ferchault de Réaumur's *L'art de convertir le fer forge en acier et l'art d'adoucir le fer fondu* (1722). See Beretta (2011), p. 360.

¹⁴¹ 'kunna åstadkommas til handarbetets faciliterande och tilverknings kostnadens minskande'; 'i giörligaste måtto äga en mästaress insikt, fasthän utöfningen och handlagen ej kunna wara nödige.' Rinman (1772), pp. 6–8.

¹⁴² 'sielfwa handteringens practiska utöfning'; 'resande herrar'. Rinman (1772), pp. 12–14.

¹⁴³ Boëthius (1955), pp. 31–39. Rinman's reports from the 1760s have been printed in Malmberg (ed.) (1935).

¹⁴⁴ Qvist Andersson also started his career in *Bergskollegium*. He travelled in England 1766–1767, where he was introduced to the making of cementation steel and crucible steel. See Boëthius (1955), pp. 31–39; 76–80. C.f. section 4.4.

smiths and workers. At larger works, he argued, skilled masters should have the possibility of owning their workshops, and the training of apprentices was to be made more flexible. Regulations were indeed needed, but these should be implemented in a non-compulsory manner. Rinman concluded by favouring a ‘Manufacturing-town’ where different groups of workers could settle and practise their craft ‘without constraints and incertitude’.¹⁴⁵

Rinman’s discussion can be related to the increasingly closer connections between systematising science and political authorities. As argued by Fors, ‘consulting engineers’ like Rinman served as intermediaries who connected not only theory and practice, but also different groups within the mining and metal trades.¹⁴⁶ In his study on saltpetre production during the same period, Thomas Kaiserfeld has emphasised similar links between scientific actors, state institutions, and the policies pursued. Science, he argued, had both ‘practical’ and ‘ideological’ roles.¹⁴⁷ Rydén has later noted how the latter half of the eighteenth century saw a tendency towards an ‘esprit systematique’ and ‘thick description’, in line with enlightened thinking and the compilation of encyclopaedias and dictionaries. Actors like Rinman united a practical interest with more evolutionary ideas.¹⁴⁸

As argued here, Rinman’s critique shows how questions of liberty and order were interwoven. He noted the benefits of some rights for artisans, but also stressed the need for careful planning. Most notably, he related the supervision of metal-making practices to a more systematic understanding of work processes. However, the combined interest in the materiality, spatiality, and social organisation of manufacturing was not new for Rinman. Nor did it emanate *from within* the field of science. Rather, the attempts of merging ideas and practice were gradually shaped through the *circulation* of skills and knowledge during the eighteenth century. This draws attention to officials like Schröder, and, above all, to the largely disregarded role of artisans. Metal making in the *Fristad* was related to the negotiation of knowledge and skills over time, to the state’s interest in controlling work processes, and to artisans’ tactical performances in making use of them in order to alter their position.

2.6 Conclusion

The manufacturing system in Sweden has often been discussed as a more or less completely failed attempt with large-scale production of finished wares — an expression of the protectionist policies employed by the Swedish state

¹⁴⁵ ‘Manufactur-stad’; ‘utan twång och osäkerhet’. Rinman (1772), pp. 74–76.

¹⁴⁶ Fors (2003), pp. 107–113, 133–136.

¹⁴⁷ Kaiserfeld (2009), pp. 141–148, 159–162.

¹⁴⁸ Still, Rydén concluded, this did not lead to a bridging of ‘the gulf between the Enlightenment and the world of production’. Rydén (2013b), pp. 78–81.

during the eighteenth century. Often, this judgement has been made through comparisons with the later industrialisation — or with other (more and earlier) advanced European economies. This has resulted in misinterpretations of the policies and ideas of the period.

By studying a variety of sources during the period ca. 1730–1775, the aim of this chapter has been to give a more nuanced picture of the *strategies* employed by the Swedish state in order to regulate, implement control of, and ‘correct’ the metal trades. This has been done by emphasising how the order of the common household was linked to ideas of an all-pervasive and top-down initiated division of labour, as well as to the beneficial links between *manufacturing* and *dealing*. The discussion has dealt with the classic subject of regulations, where both general directives and ones specifically targeting the metal trades have been emphasised. I have, however, also highlighted the connections between journeys, perceptions of foreign metal making, and the supervision of the domestic trades.

The debates and discussions leading up to the foundation of Eskilstuna *Fristad* in 1771 have been related to shifts in the perceptions of the economy and to the critique of the manufacturing policies during the mid-eighteenth century. Increasingly, the emphasis was put on *liberty* and a more unregulated *trade*. This was, however, a gradual process of intersecting ideas. The *Fristad* integrated many aspects of the mechanistic and hierarchical worldview prevailing in eighteenth-century thinking.

New ambitions to order and regulate the metal trades are thus seen here as gradually altered *strategies*, which were, in turn, related to people’s active undertakings and movements within a complex politico-economic context. This is important, when linked to the other chapters in this investigation, in that it suggests a move beyond the often assumed dichotomy between ambitions to control and the practices of everyday life. This chapter has offered one part of what I refer to in this investigation as a *strategic stage*. Still, *strategies* are and were not only about regulation. As evident in Berch’s work referred to above, they also comprise spatial claims as well as an interest in understanding and controlling various processes of work. These two features will now be discussed. First of all, I direct focus on the making of maps — not in the traditional sense, but in the meaning of *making sense of space*.

CHAPTER 3

Making Maps: The Spatiality of the Metal Trades

In the first (and only) volume of his *Beskrifning öfver Sveriget*, from 1741, Lars Salvius described that he found it strange how Stockholm had ‘grown in Merchandise and various Sciences, beautiful crafts, size, adornment and richness, so that an incredible multitude of People in diverse trades now daily make their Livelihoods here.’¹ The capital was the epicentre of the Swedish realm, and Salvius argued that it was ‘like the Heart in a Human Body, absorbing and spreading the Bloods to all Veins and Limbs’.²

Salvius’ discussion of the capital not only reveals how space was an important aspect of eighteenth-century perceptions of economy. It also points towards the linking of spatial descriptions with practices and movements. In line with this observation, this chapter takes one step further towards understanding the *strategic stage* of metal making, by adding a spatial dimension to the discursive one given in chapter 2. The aim is to depict the spatiality of the metal trades during the period ca. 1730–1775, as it was perceived by the ordering state.

As the main guide, I have used the diaries kept by Schröder between 1753 and 1771, and his reports submitted to *Kommerskollegium*. This choice relates to the discussion in section 2.4, as well as to Berch’s *Inledning til almäna hushållningen*: the well-planned spatiality of the trades had to be supervised, and information about places and practices had to be collected. The making of a map is thus done related to the movements of an eighteenth-century official practising ‘mapping’ himself. Schröder’s texts are complemented by compilations of manufactories and workshops emanating from state institutions like *Bergskollegium* or from local authorities such as the *Hallrätt* in Stockholm. The resulting spatial presentation is one that is in line with the *strategic gaze* of the Swedish state.³ At the same time, it

¹ ‘tagit til uti Köpenskap och hvarjehanda Vetenskaper, vackra slögder, storlek, prydnad och rikedom, så att en otrolig myckenhet Folk i åtskillige rörelser nu äga dageligen här deras Näring och Bärgning.’ Salvius, Lars (1741). *Beskrifning öfver Sveriget. 1, första tomen om Upland, af Lars Salvius*. Stockholm, p. 19.

² ‘likasom Hiertat i en Menniskio-Kropp, tager til sig och utsprider Bloden til alla Ådror och Lemmar’. Salvius (1741), p. 21.

³ C.f. Brewer (1989), pp. 221–230; Wakefield (2009), pp. 26–48, 81–110.

provides a comprehensive picture of metal making during the period of interest, by pointing out the locations of workshops and important communities, as well as the connections between them.

Section 3.1 focuses on finer metal making in the Swedish provinces, and illustrates how the metal trades were connected to an expanding manufacturing system *and* to a wider iron system, as described by Schröder. The metal trades were, however, not only composed of larger provincial manufactories. This chapter also emphasises the role of Stockholm within this system. In the sources used, the capital stands out as a place that assembled a comprehensive metal manufacturing with close connections to political institutions and trade. The metal trades in Stockholm are presented in section 3.2.

In these first two sections, I cover a period from the 1730s to the mid-1760s. The descriptions and reports used do, however, also offer notions of change as the expansion of the mid-eighteenth century gave way for the crisis of the 1760s. The last section deals with the metal trades during this period, and it does so by focusing on Eskilstuna *Fristad* and the Stockholm metal trades from a comparative spatial point of view.

The presentation below has limitations. It focuses on the central and southern parts of Sweden, not the entire realm. Likewise, some metal-making communities are only presented briefly. Still, in their interweaving, the sources used render an image that adds an important dimension to the discussion in the previous chapter. This ‘map’ makes it possible to trace the movements of people and skills in the chapters to come. In doing this, it relates to inquiries that have emphasised *making use* of space, both from the perspective of historical actors and from that of historians.⁴

3.1 Provincial Metal Making: Metal Works and Communities

Schröder’s diaries and reports have been used by scholars discussing the chronology of works such as Vedevåg and Gusum.⁵ Notably, his supervisory tours have been connected to the expanding metal making in Eskilstuna.⁶ Still, this research does not use Schröder’s diaries in a way that incorporates his vast movements. Matters concerning spatiality have indeed been highlighted in research on proto-industrial metal making, and by Rydén in his recent writings on Schröder.⁷ Broadly speaking, however, there has been a neglect of the complex spatiality of the eighteenth-century metal trades, as it can be discerned by tracing Schröder’s first journeys as *Directeur* in 1754.

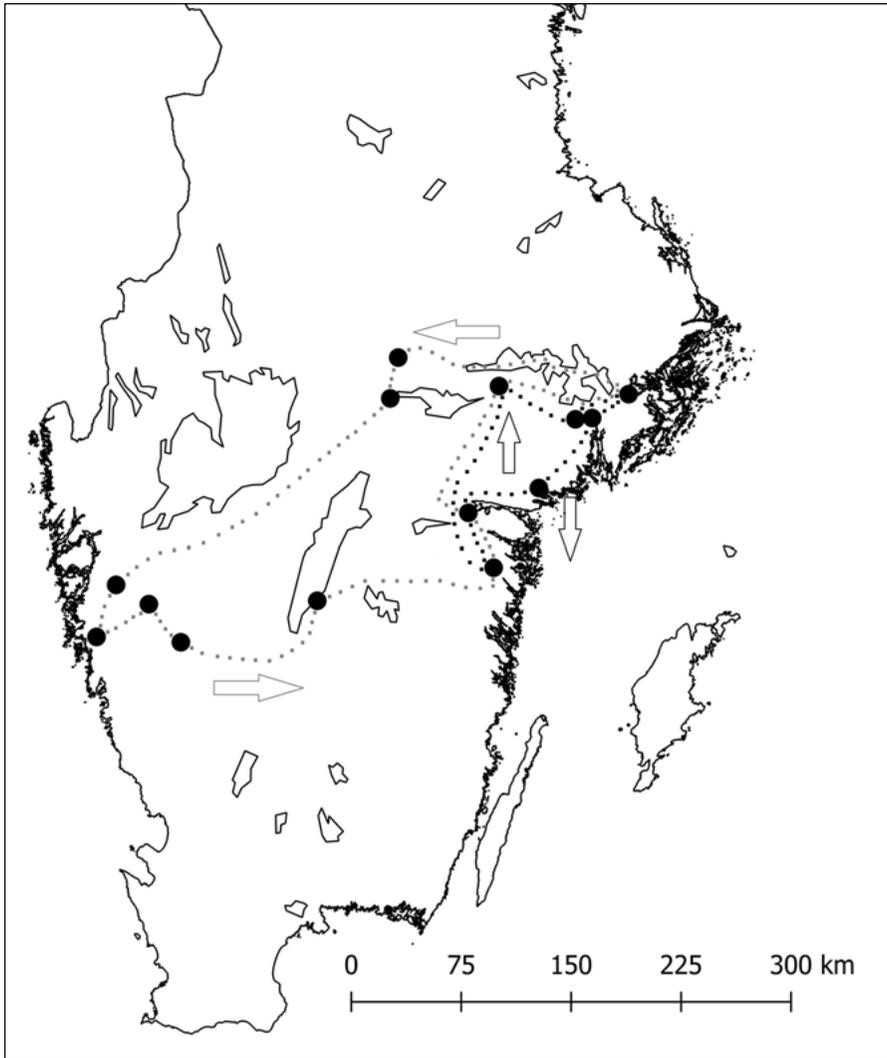
⁴ See e.g. Roche (1998), pp. 41–74; Raj (2007), pp. 60–94; Sennefelt (2011); Lamberg (2011).

⁵ Rönnow (1944); Forsberg (1953).

⁶ Hellberg (1920); Ohlsson (2001).

⁷ See e.g. Florén and Rydén (1992); Klingnéus (1997); Rydén (2013a).

Figure 3.1 Schröder's journeys as *Directeur* in 1754



Source: Data obtained from Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754. KB; Schröder (1925a). Note: Black depicts the first tour in January 1754 (with visits to Södertälje, Nyköping, Norrköping, Gusum, Eskilstuna, and Nykvarn). Grey depicts the tour made from August to October 1754 (with visits to Vedevåg, Örebro, Torskog, Göteborg, Alingsås, Borås, Gränna, Gusum, Norrköping, and Eskilstuna). Map constructed from the coordinate system: SWEREF99 TM 18 00.

Larger Manfactories and the ‘*Mother Works*’ at Vedevåg

Several of the places surveyed by Schröder during his early supervisory years were larger and older manufactories or weapon factories. The gun factories in Norrtälje and Örebro were both visited in 1754, but in a later

report Schröder noted how gun making had its specially appointed supervisors and was therefore not one of his duties.⁸ Still, he inspected other weapon-making works, such as the one in Vira, in Uppland, where blades, bayonets, and scythes were made.⁹ Similar goods were manufactured at the works in Torskog, north of Göteborg, which also had specialised in making metal wares for the Swedish East India Company (SOIC) in Göteborg.¹⁰ The *Directeur* also visited the large works in Jäder, close to Arboga in Västmanland, and Stjärnsund in Dalarna. About the former, he only made brief comments about how to improve the making of iron wire by using English samples.¹¹ The latter, founded in 1700 by Christopher Polhem, housed a large manufacturing that was inspected on several occasions by Schröder.¹²

Although important, these larger works were overshadowed by another manufactory with long traditions: Vedevåg and Kvarnbacka. The twin works attracted many artisans with diverse origins during the 1720s, and it was also among the first provincial manufactories to have an associated shop in Stockholm.¹³ In 1727, Harmens described how skilled smiths from several German provinces (such as Thüringen), England, and France had been recruited to Vedevåg in order to promote the ‘Factory smithery’ and train Swedish journeymen and apprentices. There were several forges and assisting works connected to the twin works, which also produced numerous varieties of steel. A majority of the 65 artisans were, however, employed with finer metal making in smaller workshops.¹⁴

Vedevåg continued to grow during the 1730s. In 1737, the deputies of the Delegacy of Land Support (*Landshjälpsdeputationen*) listed 41 masters and a total of 288 persons as living and working there, many of whom were from the Holy German Empire.¹⁵ The artisans produced a diversity of metal wares, which in turn often were transported to the shop and warehouse in Stockholm. Some of these goods were intended for export to Cadiz, Alger, Porto,

⁸ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 171–177. KB; Schröder (1925b), p. 33. From 1751, the gun factories were supervised by war councillor Jacob Röök and commerce councillor Carl Gustaf Bungencrona.

⁹ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1755, pp. 47–64. KB.

¹⁰ Schröder visited Torskog in August 1754 on his longer tour. See Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 222–229. KB.

¹¹ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, p. 296. KB. C.f. Florén (1987).

¹² See e.g. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1755, pp. 107–128. KB; Schröder (1925b), pp. 7–10.

¹³ The other pioneering works with a shop in the capital was Carl Gustaf Stad. See Wernstedt (1935), p. 72.

¹⁴ ‘Facturie-smidet’. Harmens, Lars, *Berättelse om Wedwog och Qvarnbacka Jern och Stål Manufacturie, Upsatt år 1727*, Section I–III. BkH, E2i:3. RA. Harmens came to Vedevåg in 1721 and served there as *Directeur* 1725–1727. See Rönnow (1944), p. 109, 125.

¹⁵ *Landshjälpsdeputationen*, Report about Vedevåg and Kvarnbacka, October 1737 (submitted to *Handels och manufakturdeputationen*, 1738), Appendix no. 1, Alberg, Olof, Protocol from the survey of Vedevåg and Kvarnbacka, October 1737; Appendix no. 4 (*Lit: A*), Haberman, David W., Specification on workers at Vedevåg presented at Vedevåg 1737-10-08. FUH, R. 2684. RA. C.f. section 2.2.

Hamburg, Lisbon, or Amsterdam, but the bulk was made for a domestic market.¹⁶ Still, Vedevåg also had financial problems during the late 1730s. At the Diet of 1738–1739 it was taken over by the state. During the following years, it was tenanted by David Haberman, before being sold again in 1742.¹⁷

At the time of Schröder's first visit to Vedevåg in 1754, the works had only just been bought by Claes Hallenius. Many buildings were run-down, and Schröder stressed how more apprentices had to be recruited and workshops had to be merged in order to obtain a suitable organisation of work. Still, the major problem was, again, the lack of financial resources, which restricted the cash payments to the masters and encouraged embezzlement.¹⁸ Later the same year, the *Directeur* assisted in recruiting two English masters to Vedevåg. This was related to his plans to bring the works 'into order.' In total, there were now some 120 artisans at Vedevåg.¹⁹

The discussion of Vedevåg as a 'mother works' was brought up again at the Diet of 1765–1766. Claes Hallenius described how some seventy masters and a corresponding number of journeymen, trained at Vedevåg, had moved to towns and other works around Sweden — most notably to Eskilstuna and to Stockholm. Despite these departures, the number of workers had increased to 172.²⁰ Nevertheless, Vedevåg was affected by the crisis of the 1760s. This period also saw an intensified competition from another metal-making community named frequently in Schröder's diaries: that of Eskilstuna, with the works at Carl Gustaf Stad and Tunafors.

Metal Making in Eskilstuna: Carl Gustaf Stad and Tunafors

Like Vedevåg, the two works in Eskilstuna had long traditions of metal manufacturing. The Carl Gustaf Stad manufactory was founded in the 1650s when a royal privilege was given to Livonian Reinhold Rademacher to initiate a works for steel and metal making. Tunafors had even longer traditions, being an old ironworks, and was also involved in the state's promotion of domestic weapon production during the seventeenth century.²¹

¹⁶ *Landshjälpsdeputationen*, Report about Vedevåg and Kvarnbacka, October 1737, Appendix no. 3, Lissander, Anders, Inventory, Stockholm, 1737-11-21. RA.

¹⁷ See Rönnow (1944), pp. 147–162. These problems largely depended on the involvement of the works in the venture with *landshjälpsfonden*. C.f. section 2.2.

¹⁸ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 183–202. KB.

¹⁹ 'i ordning.' Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 210–218. KB. A key role in recruiting the English workers was played by Angerstein, who travelled in England at this time and corresponded with his colleague Schröder. See further section 5.5.

²⁰ Hallenius, Claes, Report about Vedevåg and Kvarnbacka to *Handels och manufakturdeputationen*, February 1765. FUH, R. 3332, fols. 101–124. RA.

²¹ The early development of these works is not of further interest here, and has been thoroughly dealt with by others. See e.g. Ohlsson (2001), pp. 25–36, 45–61.

In his report from 1755, Schröder noted how Carl Gustaf Stad had been in decay for a long time, before being bought by Fredric Rothoff in 1739.²² The *Directeur* had by then surveyed the works, in January 1754, observing how it was being rebuilt. He inspected a finery forge, two steel houses with cementation furnaces, and six plating forges with tilt hammers. He also viewed a large workshop for table knives and one grinding mill. Finally, he described a ‘smithery works’ comprised of nine buildings, each shared by two artisans. In total, there were some 70 artisans employed at the manufactory.²³ Three years later, changes had been made. Schröder now investigated if it was possible for the masters to improve ‘the general Householding’.²⁴ However, the metal making at Carl Gustaf Stad then went into a decline during the crisis of the 1760s. In 1768, Schröder reported about some 60 artisans.²⁵

Also Tunafors was surveyed by Schröder in 1754. It had been bought in 1749 by Johan L. Hallenius, and gradually transformed.²⁶ Schröder described how several workshops constituted a ‘Works for Iron and Steel’; he mentioned one large workshop for the making of table cutlery, one for clasp knives, two for scissors, two for cruder tools, and one grinding mill. Hallenius had received his privileges from *Kommerskollegium* in 1752, and the new workshops were added to the already existing facilities (such as a copper-plate forge and an iron plate works). Some 15 workers were employed with finer metal making.²⁷ Tunafors then expanded rapidly during the following years. In 1757 Schröder noted a total of 107 workers, of which the majority worked with cutlery making.²⁸ The workforce continued to rise until the mid-1760s, when also Tunafors saw a decline.²⁹

Early on these two works, together with Vedevåg, were included in Schröder’s plans to arrange for a division of labour within the metal trades. In 1754, he tried to persuade the *Directeur* at Carl Gustaf Stad, Isak Rothoff, to specialise the production. Similar changes also occurred at Tunafors. Organising work in this way, Schröder argued, prevented the artisans from ‘running from one proprietor to the other’.³⁰ He also assisted Hallenius in his attempts to implement piecework at Tunafors during the 1750s and 1760s, which are further discussed in chapters 4 and 7.

²² Schröder (1925a), pp. 1–2.

²³ ‘smides fabrique’. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 115–141. KB. A majority of the workers were employed at the smithery works.

²⁴ ‘den allmänna Hushållningen’. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1757, pp. 154–159. KB.

²⁵ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1768, p. 34. KB.

²⁶ Schröder (1925a), p. 22.

²⁷ ‘Jern och Stål Fabrique’. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 91–112. KB.

²⁸ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1757, pp. 160–165. KB.

²⁹ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1768, pp. 40–42. KB.

³⁰ ‘löpa ifrån ena patron til den andra’. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 282–286. KB.

Specialised Metal Works and Metal-Making Communities

Many of the ‘metal works’ (*fabrique werk* or *fabriquer*) founded in the Swedish provinces during the 1750s were dedicated to the making of one or a few types of metal wares, above all cutlery items. At some places, these works were founded adjacent to older facilities for metal processing, but sometimes they were created from scratch. Moreover, some works had close connections to agrarian handicrafts and peasant smithery, while others were set up in towns. Taken together with the founding of numerous specialised metal workshops during the same period, as noted by Schröder during his tours, this suggests an expansion for finer metal making and the rise of several manufacturing communities.

At Gusum, in Östergötland, Schröder inspected one ‘Knife works’ and one pin works, owned by Eric Westerberg and founded during the early 1750s. Both were attached to an older brass works. Artisans had been recruited both locally and from Stockholm, and the work was divided between several workshops.³¹ There were two more cutlery works in eastern Sweden; one nearby Gränna in Småland belonging to master Johan Zihlfeldt, and one in Uggletorp, close to Linköping, founded by Erik Magnus Wetterblom.³²

Knife works were also founded in areas known for extensive peasant smithery — such as the countryside around Borås in Västergötland. Sent out by *Kommerskollegium* to inspect the potentials for manufacturing in this area in 1742, Olof Hamren noted how the peasantry was busy making all kinds of metal wares, especially knives. One merchant from Borås, Anders Graf, acted as a putter-out and Hamren stressed how Graf was eager to contribute to the knife smiths’ ‘improvement’. This was to be achieved partly by the founding of a knife works.³³ Ten years later, such a works was founded in Viskafors, one mile from Borås by the river Viskan. One of its owners was Lars Graf, son to Anders. Schröder inspected the works a first time in 1754 and would be in frequent contact with its supervisors.³⁴ Near Viskafors, Graf also had a finery forge which supplied the peasant smiths with processed metals. The finished cutlery was then sold by travelling peddlers. Schröder discussed the possibilities of letting some of the peasant smiths be trained at Viskafors, but noted how this was not easily done since they did ‘love their own freedom and their homes even more.’³⁵

³¹ ‘Knif Fabrique’. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 63–89. KB.

³² Schröder (1925a), pp. 34–35.

³³ ‘upodlande’. *Olof Hamréns reseberättelser från södra Sverige 1742*, pp. 162–166. MKA, De:1, vol. 176. RA. C.f. chapter 5 and 6. See also Palm (2005), pp. 138–146.

³⁴ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 242–256. KB.

³⁵ ‘älskandes mera sin egen frihet och sina hem.’ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 257–270. KB. This finery forge is the one later referred to as Gravenfors manufactory by *Bergskollegium* in 1772: *Bergskollegium*, List of Manufactories in Sweden, created in 1772 (issued in April 1774), pp. 149–150. BkH, D5:14. RA.

In the chapters to come, I will discuss how these cutlery works both reflected the state's regulative manufacturing policy, and, at the same time, a gradually intensifying competition within the metal trades. Still, they were not the only specialised metal works in the provinces visited by Schröder during his early years as *Directeur*.

In Alingsås, not far from Borås, were two workshops connected to the town's extensive textile manufacturing. One master Brun supervised the making of iron knitting frames, used for making wool socks, and nearby was a workshop for comb making.³⁶ In Alingsås there was also Petter Wirgman's metal works — originally founded in Göteborg. When Schröder visited this works in 1756, he described how locks were made there through a subcontracting arrangement; pieces were made by peasants in the area and delivered to the works where the locks were finished.³⁷ Yet another location was Norrköping. Besides a brass works and a gun factory, the town also housed Per Nyman's works for the making of cloth shearers' scissors.³⁸ Schröder also briefly commented on knife making in Göteborg and on the making of buttons in Malmö, but did not say more about metal making in these towns.³⁹

During the 1750s, several new metal works were founded around central Sweden, some of them adjacent to the communities referred to above. In his report to *Kommerskollegium* in 1760, Schröder described how one additional pin works had been founded in Gusum. In Norrköping, merchant Jean H. Lefebure had set up a metal and thimble works, complementing his brass works. Near Stockholm there were two larger works owned by merchants Robert Finlay and William Maister. The former had founded a metal works in Duvnäs with the assistance of an English master, and the latter had expanded his steel and metal works at Tyresö. North of the capital, in the university town of Uppsala, the engraver Anders Åkerman had set up a workshop for celestial and terrestrial globes with details of brass.⁴⁰

Schröder's diaries and reports were themselves examples of selection. Some larger manufactories were only briefly discussed, and other works were just mentioned in passing. Still, when compared to the list made by *Bergskollegium*, to be discussed shortly, most of the larger works making finer wares were covered in the diaries. Many smaller works and workshops visited by Schröder were, however, not listed by the Board.⁴¹

³⁶ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 237–242. KB.

³⁷ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1756, p. 101. KB.

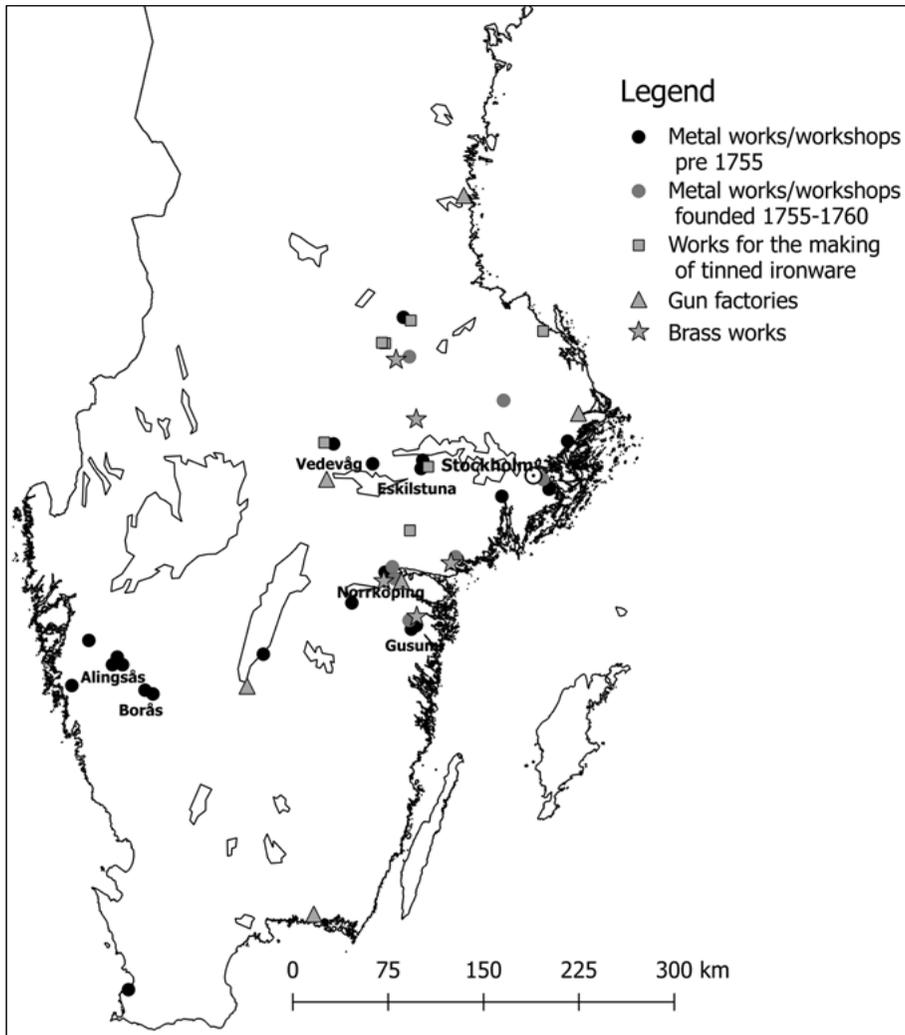
³⁸ Schröder (1925a), pp. 35–36.

³⁹ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, p. 229. KB; Schröder (1925b), pp. 26–27.

⁴⁰ Schröder (1925b), pp. 31–32, 56–63.

⁴¹ One reason for this might be that only metal works using water power came to be included under *Bergskollegium*'s supervision from 1770. See Boëthius and Kromnow (1968), p. 396.

Figure 3.2 Finer metal making 1750–1760



Source: Data obtained from Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I–II. KB; Schröder (1925a); Schröder (1925b). Note: Map constructed from the coordinate system: SWEREF99 TM 18 00.

Finer and Cruder Metal Making: Divided but Connected

In his diaries and reports, Schröder referred to several works for the making of tinned ironware and five brass works, including the ones in Norrköping and Gusum.⁴² These types of processing were also associated with the second branch of metal manufacturing. When speaking of an expansion for finer

⁴² Schröder (1925a), pp. 36–38.

metal making during the period of interest here, the far more extensive production of semi-manufactured iron and cruder wares must be remembered. The dominance of cruder metal making is well-illustrated by *Bergskollegium*'s list from 1772. A large part of the information given in the list is presented in Table 3.1.

Cruder metal making covered a wide range of items and different forms of organisation. Many of the workplaces in this category produced nails, wire, bundle-, hoop-, and bolt iron, or tools for farming, shipbuilding, forestry, and crafts. In Småland and Östergötland there were many smaller smithies engaged in nail making, complemented by some larger works.⁴³ Many of these workplaces had strong connections to the agrarian economy, with seasonal production, as stressed by Rinman in 1766.⁴⁴ In other provinces, there were larger works which produced tinned ironware, iron plates, brass, or steel. In the case of the latter, the list mentioned 26 steelworks (in the provinces referred to in Table 3.1). A majority of these (16) were located in Uppland, Södermanland, Västmanland, and Dalarna, but larger steelworks were also situated in Värmland, Dalsland, and Ångermanland.⁴⁵

Table 3.1 *Workplaces for metal making in some provinces, 1772*

	Finer (<i>Blank</i>)	Cruder (<i>Svart</i>)	Both	Total
Uppland	1	14	1	16
Södermanland	1	11	4	16
Närke	-	11	-	11
Västmanland	-	25	1	26
Dalarna	-	19	1	20
Östergötland	1	31	2	34
Småland	-	49	-	49
Västergötland	-	12	1	13
Värmland	-	24	-	24
Dalsland	-	9	1	10
Bohuslän	-	1	-	1
Gästrikland	-	3	-	3
Medelpad	-	4	-	4
Ångermanland	-	6	1	7
<i>Sum</i>	3	219	12	234

Source: *Bergskollegium*, List of manufactories in Sweden, created in 1772. RA. Note: The table does not cover all Swedish provinces. Works were successively added in the list after its creation in 1772. The date on privilege for each works was included, which makes it possible to remove these later works when compiling the numbers given in this table. Works privileged after 1772 have thus not been included, nor have those referred to as deserted or not in use.

⁴³ *Bergskollegium*, List of Manufactories in Sweden, created in 1772, pp. 87–144. RA.

⁴⁴ See Rinman, Sven (1935). 'Berättelse om järnmanufakturverkens och svartsmidets tillstånd uti Östergötland för år 1765', in Malmborg, Gösta (ed.). *Sven Rinnmans tjänsteberättelser 1761–1770*. Stockholm, pp. 65–91.

⁴⁵ *Bergskollegium*, List of Manufactories in Sweden, created in 1772. RA.

Practices for cruder and finer metal making were also connected by networks of trade and processes of *circulation*. This illustrates even further the diversity and complex spatiality of the metal trades. Schröder frequently discussed the importance of good quality bar iron and steel being used in workshops and metal works for finer metal making. Regarding iron, he often referred to the ‘Oregrund-iron’ (*Öregrundsjärn*), made at the ironworks in northern Uppland (such as Lövestabruk or Österby).⁴⁶ Regarding steel, he discussed how both prominent crude and welded steel (from the works in Graninge, Davidshyttan, and Vedevåg) and cementation steel (from the furnaces in Nykvarn, Tyresö, and Carl Gustaf Stad) were preferred by individual artisans and at the manufactories. Schröder’s way of linking different forms of metal refinement resulted in an integrated picture of the metal trades, connected both to a wider iron system and the domestic manufacturing system.

Except for his discussion about the metal crafts around Borås, Schröder however did not say much about the comprehensive peasant smithery in the provinces.⁴⁷ This household-based production was stressed by Heckscher as competing with the manufacturing industries, and as such being one reason for the latter’s difficulties in gaining sales on the domestic market.⁴⁸ Later research has nuanced this relation, and instead stressed the proto-industrial characteristics of many regions as well as the links between larger works and the agrarian economy.⁴⁹ Even if the present investigation is not primarily interested in peasant smithery, this dimension is brought up in the following chapters when dealing with movements, recruitment, and training.

This relates to another feature of more specific interest here. Although comprehensive, the presentation above misses one critical aspect of eighteenth-century metal manufacturing — one that has been largely neglected in Swedish research. The discussion above has shown that many metal works during this period were located within or near towns. Harking back to Berch’s ideas, or to the regulations issued by the state, this reflects the ambivalence of the metal trades, at the one and the same time a rural industry and part of the promoted urban mercantile life. Focusing on the latter, it is obvious that the map constructed above has missed out on Stockholm. This is, however, not the result of any neglect on Schröder’s part. On the contrary, he depicted the capital as an important and intermediary space for the metal trades.

⁴⁶ See also section 4.4. C.f. Evans and Rydén (2007), pp. 105–120.

⁴⁷ For this discussion, see Schröder (1925a), pp. 29–31.

⁴⁸ Heckscher (1949a), pp. 493–494. See also Boëthius and Kromnow (1968), pp. 371–375.

⁴⁹ Isaacson and Magnusson (1987); Klingnéus (1997); Florén and Rydén (1992).

3.2 Stockholm and the Expanding Metal Trades

In his report to *Kommerskollegium* from 1755, Schröder mentioned that he had visited both guild workshops in several towns and many workplaces in Stockholm that instead sorted under the manufacturing privileges. The former were not under the *Directeur*'s supervision, and therefore not dealt with in the report.⁵⁰ The latter, however, were thoroughly described and can also be traced in Schröder's diaries. When comparing these with reports from the Stockholm *Hallrätt*, it is clear that the capital was home for a growing number of metal-making artisans of various professions and origins.

These craftsmen were often considered to be among the most skilled in Sweden, working with expensive materials and doing delicate work. This was also one requirement for them being included within the manufacturing trades — with the *Hallrätt* as the supervising local institution. As dealt with by Söderlund and Nyström, during the early 1740s the guilds came to strongly resist the privileges given to aspiring manufacturers. In particular, this was the case for crafts that were considered to be not directly included under the *Hallordning* or privileges from 1739 (such as metal crafts). Firmer boundaries were called for and accepted by the Diet and the King in 1741. Henceforth, privileges were handed out principally to recruited foreign craftsmen, to Swedish ones who had travelled abroad, or to artisans who used techniques or made wares that differed from those of the guilds.⁵¹

Söderlund noted that some metal crafts in the capital were severely affected by competition from provincial manufactories. Others, like the watchmakers' guild, experienced rivalry from Stockholm-based manufacturing enterprises.⁵² The latter group included artisans who expanded their workshops by improving the organisation of work.⁵³ On this point, Ronnestam has dealt with the watchmaking trade by using some of the sources also being used in this study — the reports by Schröder and by the Stockholm *Hallrätt*. Still, he only commented briefly on the capital's metal trades in their entirety.⁵⁴ The same thing can be noted in Amelin's dissertation on the making of mathematical and optical instruments in the capital, although he related this to a changing institutional context during the period of interest here.⁵⁵

As will be shown here, the metal trades expanded in Stockholm during the mid-eighteenth century. This is important when related to Söderlund's notion of the capital as an extensive, but unchanging, context for craft

⁵⁰ Schröder (1925a), p. 38.

⁵¹ See Söderlund (1943), pp. 298–299; Nyström (1955), pp. 266–268.

⁵² Söderlund (1943), pp. 160–162, 298.

⁵³ Söderlund (1943), pp. 220–221.

⁵⁴ Ronnestam (2013), pp. 288–301. Ronnestam investigated the entire scope of watch and clockmakers in Stockholm, thus both guild masters and manufacturers.

⁵⁵ See Amelin (1999).

enterprises.⁵⁶ The rising urban metal making will also be discussed as linked to commerce and trading. Being the largest staple town, as well as the most developed market for finished wares, the capital gained advantages regarding both foreign and domestic trade up until the mid-1760s.⁵⁷ The importance of the capital's ironmongers has been emphasised in this respect, and so has that of the intermediary group of wholesaler merchants.⁵⁸ Other studies have emphasised shops and retail trade in Stockholm; despite sumptuary laws and restrictions on advertising and competition, the period also saw new possibilities for craftsmen and manufacturers to organise their sales.⁵⁹ To this can be added other 'trading domains', such as streets, ports, and market squares.⁶⁰ For the metal trades, the proximity to these spaces for trading can be seen as beneficial, but also unfavourable in cases where foreign metal wares were imported and sold (often illegally).

The metal trades in Stockholm offer many examples of circulatory processes and diverse ways of organising manufacturing, and this also enables a nuancing of previous perspectives on eighteenth-century Swedish metal making. Here, I present the metal trades in Stockholm by taking notice of *making*, *using*, and *dealing*. These are further analysed from a more practice-oriented perspective in chapter 6.

Metal Manufacturing and the Urban Space

The diversified metal manufacturing is evident in many of Schröder's descriptions from workshops in the capital. In 1753, he commented upon several enterprises. In merchant William Maister's metal works near *Slottsbacken* worked Eduard Marrison from Birmingham, who supervised the making of buckles, buttons, spoons, and rings. Johan E. Schnack made exclusive knives, clocks, and toothbrushes in his workshop on *Skomakargatan*. On *Södermalm*, Schröder visited the medal maker Engel Hartman, who manufactured various types of tin buttons.⁶¹

Many artisans were of foreign origin, in most cases from England, Germany, or France, but Stockholm also attracted craftsmen from provincial metal-making communities in Sweden. Others moved in the other direction after being trained in one or several urban workshops. This mobility made

⁵⁶ See Söderlund (1943), pp. 137–138, 316–317. Apart from expansions during the 1720s and the late 1750s, he noted a stability regarding the number of craft workshops in the capital, although variations existed within different crafts.

⁵⁷ The so-called *Bottniska handelstvånget*, which was largely repealed in 1765, meant that the towns around the Gulf of Bothnia could not trade with towns other than Stockholm or Åbo. Stockholm also gained advantage through other regulations of trade, such as *Produktplakatet* from 1724. See Heckscher (1949b), pp. 709–720; Sundberg (1978), pp. 29–39.

⁵⁸ See Wernstedt (1935); Müller (1998).

⁵⁹ Nordin (2009); Murhem and Ulväng, *forthcoming*.

⁶⁰ Hayen (2007), pp. 161–166. See also Nordin (2009), pp. 55–80.

⁶¹ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1753, p. 7, 13–15. KB.

the capital into a fluid, but also conflicted, space for metal making. Also these matters appear in Schröder's writings. In his report from 1760, he noted how the French tinsplate worker Nicolas Joseph Isbeque had sued his former journeymen, also of French origin, for moving without permission to the tinsplate works in Johannesfors.⁶² In other cases, Schröder remarked on conflicts between manufacturing artisans and metal-making guilds.⁶³

Most often, however, the *Directeur* commented upon workshop practices and networks of transactions. In some cases, workplaces were connected through temporary arrangements. Such was the case with the capital's instrument makers. Many of them had apprenticed for Daniel Ekström, who supervised the making of mathematical, optical, and calibrated instruments in the Observatory on *Kungsbacken*.⁶⁴ In 1757, Schröder noted how he had involved four instrument-making craftsmen in producing samples of equipment for a surgical field kit. After these were compared with foreign models, the artisans got further requests for instruments from the newly founded hospital in Stockholm and later from the War Office (*Krigskollegium*).⁶⁵

Other crafts saw the development of subcontracting networks. Schröder surveyed numerous works for watch and clock making, and in his report from 1760 he described how this craft was divided up: details such as springs and chains were made in several smaller workshops and then delivered to three larger works where the watches and clocks were assembled.⁶⁶

To Schröder's descriptions we can add the compilations found in the Stockholm *Hallrätt* reports (*fabriksberättelser*), with the first one from 1740. These were put together from information from manufacturers about their employed workers. They also included information about the quantity of goods (made by each manufacturer) that had been inspected at the *Hallrätt*. From 1747, the reports became more systematic and followed the calendar year.⁶⁷

Nyberg has discussed this material, and some of his critical points must be considered here. First of all, he argued, the reports sometimes give a deceptive image of the number of workplaces. This problem is more urgent

⁶² Schröder (1925b), p. 51.

⁶³ Craftsmen from the latter group outnumbered artisans from the manufacturing trades during the whole period of interest here. C.f. Söderlund (1943), pp. 316–329.

⁶⁴ Schröder (1925a), p. 42. See also Amelin (1999).

⁶⁵ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1757, pp. 8–10, 69–70, 103–104; 1758, pp. 27–28. KB.

⁶⁶ Schröder (1925b), pp. 35–39. See also Ronnestam (2013), pp. 110–114, 288–301. For the period in question, watchmaking artisans constituted a rather large part of the total number of workers in the metal trades. One could thus have separated metal making and watchmaking into two different categories. However, such a distinction obscures the fact that many artisans were involved in both.

⁶⁷ Nyberg (1992), pp. 245–256; Berg (1969), pp. 59–61. One version was sent to *Kommerskollegium* and the *Hallrätt* kept a copy. The latter are used here. Before 1766 a third version was sent to *Manufakturkontoret*. The originals are kept in *Kommerskollegium's* archive. RA.

when investigating the textile trades, however, where several stages of refinement could be operated within the same works.⁶⁸ Still, the reports also tend to mention workshops which were not in use. These have been excluded from the analysis here.⁶⁹

A second problem, Nyberg argued, concerns the tendency of this source to underrate the number of non-permanent employees (such as day labourers).⁷⁰ From 1767, the reports separated between ‘skilled’ workers (masters, journeymen, and apprentices) and ‘unskilled’ ones. For the metal trades, the latter group is consistently low during the whole period in question. This matter is further discussed below, but one related issue must be addressed here. The reports are sometimes misleading in that all employees in some workshops are listed as ‘workers’ (*arbetare*). By cross-checking with previous and later reports, and with the ones from Schröder, I have been able to obtain a more reliable interpretation of the intragroup relationships.⁷¹ Still, these calculations must be interpreted with some caution. Moreover, the responsible artisans are often not included in the sum of workers. Here, I have added these when compiling the numbers given. These artisans were often referred to as masters with privileges from the *Hallrätt* or *Kommerkollegium*. In other cases, however, they were listed simply as ‘metalworkers’ (*metallarbetare*).⁷²

The reports lag behind to some extent regarding the number of workplaces (if compared to data on privileges and year of construction).⁷³ Still, this gives us no reason to doubt the general trend. Table 3.2 shows how metal manufacturing was expanding in the capital between 1740 and 1760, with an increasing number of workshops. Likewise, the total sum of metal goods inspected at the *Hallrätt* increased — from 13,725 dlr. smt. in 1745 to 108,421 dlr. smt. in 1760.⁷⁴

⁶⁸ Nyberg (1992), pp. 245–247.

⁶⁹ In some cases, Schröder also mentioned workshops not listed by the *Hallrätt*. These have not been included here, but I have added them when making the map below (see Figure 3.4).

⁷⁰ Nyberg (1992), p. 248, 254–256.

⁷¹ One alternative would have been to use the head tax records in computing the number of employees, as is done by Söderlund (1943). For Stockholm there are, however, only a few such records left for the period in question. In comparing the number of workers given by the *Hallrätt* report and the head tax records from 1760, I have found slight deviations. Still, this does not affect the possibilities of tracing the relative shifts over time.

⁷² When a merchant or other person owns the works or workshop, these have not been included.

⁷³ In the reports from 1740 to 1751, 46 workshops are referred to as founded before or during the 1740s, with eight of them referred to as being founded before 1740. Stockholm *Hallrätt*, Reports 1740, part II–1751. HMR, BIII:1–2. SSA.

⁷⁴ Stockholm *Hallrätt*, Reports 1745 and 1760. HMR, BIII:1; 5. SSA. Note that ‘produced goods’ should *not* be equated with ‘sold goods’.

Table 3.2 *Workshops, workers, and workshop size: Stockholm, 1740–1760*

	1740	1745	1749	1755	1760
Artisan alone	3	2	4	7	10
1–5 workers	2	8	21	30	28
6–10	1	2	1	5	11
11–15	2	3	-	-	1
16–20	1	-	1	-	1
<20	-	-	-	-	-
Not known	-	4	2	1	2
<i>Workshops</i>	9	19	29	43	53
<i>Workers</i>	62	99	117	151	222

Source: Stockholm *Hallrätt*, Reports 1740, part II–1760. HMR, BIII:1–5. SSA; Schröder (1925a); Schröder (1925b).

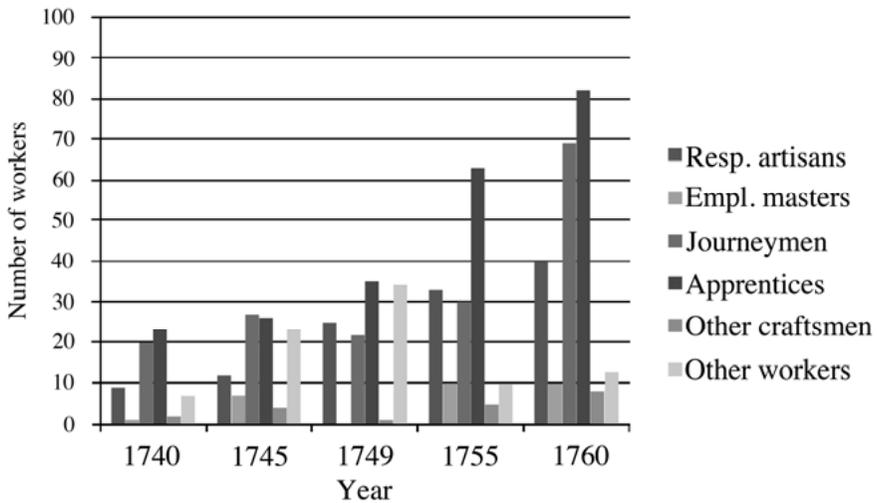
Some semi-large workshops indeed existed, with artisans specialised in making instruments, watches (or parts), cutlery, or tools. Some of these crafts expanded in particular during the period. In 1760, to mention two examples, there were six instrument-making workshops and eight workplaces specialising in watchmaking. In these cases, the largest annual sums of production are also to be found. Still, as indicated by Table 3.2, the expansion was primarily concentrated to a group of smaller workshops in which a craftsman (most often a master) worked alone or with a few employees. These artisans produced a variety of wares from metals and alloys, and often for much lower annual sums if compared to the groups mentioned above. Others specialised in specific tasks, such as repairing gear or machines for the textile trades. The average number of workers (per workshop) did not increase during the period, but remained around four to five.⁷⁵

However, the total number of workers grew steadily during the whole period, as seen in Figure 3.3. The numbers of masters, journeymen, and apprentices increased, while the numbers of other workers (including day labourers) varied more. A few other craftsmen (like carpenters) were listed, and mainly employed in the watch- and instrument-making workshops. The employed masters (*verkmästare*) were also few in numbers. This observation can be related to the minor share of larger metal works and to the fact that only a few workplaces were owned by merchants (or persons who were not artisans themselves). The most obvious exceptions are the works (in Tyresö and on *Slottsbacken*) owned by merchant Maister. The majority of workshops during the period were managed by masters referred to as smiths, metalworkers, or according to their specific craft.⁷⁶ In all these cases the artisans worked outside the framework of the guilds.

⁷⁵ Stockholm *Hallrätt*, Reports 1740, part II–1760. HMR, BIII:1–5. SSA.

⁷⁶ Stockholm *Hallrätt*, Reports 1740, part II–1760. HMR, BIII:1–5. SSA.

Figure 3.3 Workers in the Stockholm metal trades, 1740–1760



Source: Stockholm *Hallrätt*, Reports 1740, part II–1760. HMR, BIII:1–5. SSA; Schröder (1925a); Schröder (1925b). Note: ‘Resp[onsible]. artisans’ includes both artisans in charge of larger workshops and those working alone.

The *Hallrätt* reports suggest a diversity, with some metal works and semi-large workshops coexisting with many smaller ones. Still, the reports do not indicate the degree of independence for these craftsmen. Even though they were privileged for making metal wares, many of them could have been included in a putting-out system that was not perceptible in this source. On a few occasions, Schröder commented specifically in his diaries on such agreements between artisans and merchants or manufacturers. In 1757, he noted how merchant Maister acted as putter-out for the English master James Oakley. Still, the latter was not satisfied with this situation, and was going to apply for permission at *Kommerskollegium* to work on his ‘own account’.⁷⁷ It is rare, however, to find cases like this one in Schröder’s diaries.

Most often, Schröder described flexible arrangements that involved numerous artisans, traders, and, in some cases, state institutions. He also dealt with artisans’ ambitions to expand workshops by installing new devices or implementing new working methods. Importantly, his diaries indicate a large element of mobility within the urban metal trades. This included journeymen and apprentices, provincial artisans, and recruited foreign labour. Stockholm stands out as a space where the trajectories of artisans and skills intersected. The map below further illustrates this diversity.

⁷⁷ ‘egen räkning’. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1757, pp. 225–226. KB.

Figure 3.4 Map of metal workshops, Stockholm, 1760



Source: (Detail from) *Charta Öfver Stockholm Med des Malmar och Förstäder. Af hans Kongl. Maj:t till Strandernes anläggning i Nåder faststæld den 1 Julii 1751*. Original by Georg Bjurman, 1751. Kart och ritningsarkivet, tryckta kartor, Bjurman 1751. SSA. (Photo: Jarmo Sundman, Stockholms stadsarkiv). Note: On the map, I have added metal workshops (in black squares) and trading domains (numbers).

In constructing the map, I have compared the reports by the *Hallrätt* and by Schröder from 1760 with the Stockholm head tax records (*mantalslängder*) from the same year.⁷⁸ Here, Schröder's report is of particular importance. In many cases, he mentioned the streets where workshops were

⁷⁸ Stockholm *Hallrätt*, Report 1760. HMR, BIII:5. SSA; Schröder (1925b). The head tax records from 1760 have been searched online in the database *Mantalsregister, mantalslängder 1760*. Available from: Stockholms stadsarkiv. I have also used two additional online property registers, *Registernyckel för fastigheter 1730 och 1810* and *Fastighetsregister 1675–1875*. Both available from: Stockholms stadsarkiv.

located. This information has been compared to data from the records. Still, the exact locations of some workshops have not been found, and in these cases I have only marked the quarter mentioned in the records.⁷⁹ In total, 43 of the 53 workshops listed by the *Hallrätt* were found, and I have also added three additional ones mentioned by Schröder. As the map indicates, metal workshops were not concentrated to any specific manufacturing district. A large number of the craftsmen (often listed as ‘metalworkers’) rented rooms in others’ houses and had no reported employees. Still, an appreciable part of the manufacturing artisans owned houses, where they also had set up one or several workshops. As will be discussed in chapter 6, the spatiality of the urban metal trades suggests how the spheres of the workshop and the dwelling areas overlapped. Moreover, setting up workshops in the capital was a matter of both creativity and negotiations over time.

One additional aspect of this complex spatiality was the connections to commerce and trade. Except for metal workshops, I have marked some of these spaces on the map: number 1 depicts the iron weigh (*järnvågen*) and numbers 2 to 5 depict the larger shipyards. Workshops in the capital were also close to political institutions that both regulated and supported the *circulation* of metals, objects, and finished wares. Moreover, Schröder’s diaries offer examples on how practices in the capital were linked to provincial metal works and a wider iron system.

Making Space for Trade and Flows: Stockholm as *Contact Zone*

Due to the connections with other towns and ports around Europe, Stockholm saw a considerable inflow of finer metal wares during the mid-eighteenth century. As one example, the records kept by Stockholm merchant Peter Westman during the 1730s illustrate the extensive imports of cutlery and buttons from England to Stockholm.⁸⁰

It was these kinds of imports that were targeted by the protectionist policies referred to above. To a large extent, the various import bans match the specialised works and workshops that were founded in Stockholm and in the provinces during the 1740s and 1750s. In order to cope with this protectionist turn, the state needed to support domestic metal processing in every way possible. As we have seen, privileges and regulations were issued along with a system of taxes and duties; new urban institutions were founded for supervision and control. Still, it is in the practical solutions within the metal trades itself that this emerging system really can be understood. Artisans’ access to metals needed to be facilitated, and knowledge about finishes had to be spread. Moreover, both exports and the possibilities of selling wares on the

⁷⁹ On the locating of workshops, see also Nyberg (1992), pp. 102–106. In chapter 6, I use a wide range of other sources in order to explore the setting up of workshops over time.

⁸⁰ E.g. *Journal, 1731*. MkA. Peter Westmans arkiv, C:489. RA.

domestic market needed to be supported. During the mid-century, Stockholm became a *contact zone* where various types of circulatory movements intersected.

A large quantity of bar iron and steel from different works in the provinces passed through the capital's iron weigh. This was a hive of activity, where precious materials (or less favoured ones) changed hands. Steel and metals were also sold at the capital's shipyards. The Stockholm *Hallrätt* report from 1740 mentioned four private shipyards; one was tenanted by 'certain Shareholders of the Town' and the other three were owned by merchants Grill, Clason, and Lotshak.⁸¹ In 1756, Schröder reported that eleven varieties of welded steel from Clason's steelworks in Graninge were sold, 'Wholesale and retail', at the consul's shipyard on *Blasieholmen*.⁸²

These spaces for dealing were also connected to practices where metals were *used*. Schröder repeatedly described how he had assisted artisans in the capital, as well as provincial metal works, with procuring good quality steel or iron, transported via the iron weigh or the shipyards. Often, he involved artisans in Stockholm in testing steel to be used for specific items. File maker Johan F. Roth was involved in testing cementation steel from the furnaces in Carl Gustaf Stad, and instrument maker Anders Wahlbom tested numerous types of steel produced at Nykvarn, Vedeväg, Graninge, and Tyresö.⁸³ Examples like these illustrate how urban workshops were linked to provincial metal-making communities by the flows of materials.

The diversification of the capital's metal manufacturing also included trading with finished wares. Related to Hayen's and Christina Nordin's observations, this illustrates the simultaneous existence of many domains for metal trading in the urban space. Provincial works like Vedeväg, Carl Gustaf Stad, and Tunafors had associated shops and warehouses in the capital. Other shops belonged to ironmongers.⁸⁴ Schröder also noted how other traders purchased and sold (often smaller) quantities of metal wares. The hatter Reimers sold goods made by Johan E. Schnack as well as knives from Tunafors; tools made by Anders Wahlbom and Petter Hultsten were vended in merchant Shyrer's shop on *Storkyrkobrinken*; and knives from Gusum were sold by the grocer Eric Norman.⁸⁵

⁸¹ 'wissa Intressenter af Staden'. Stockholm *Hallrätt*, Report 1740, part II, p. 133. HMR, BIII:1. SSA. All these shipyards fell under the manufacturing privileges.

⁸² 'i Parti och minut'. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1756, p. 105–106. KB. Clason's shipyard is marked as number 2 on the map above.

⁸³ See e.g. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, p. 3; vol. II, 1756, pp. 13–17. KB. C.f. the introduction in chapter 1, about the steel tests in Engberg's forge.

⁸⁴ According to Schröder, the ironmongers' society consisted of eight persons in 1768. See Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1768, p. 13. KB. Wernstedt noted that conflicts arose during the mid-century, due to the competition between ironmongers and the shops associated with larger manufactories. See Wernstedt (1935), pp. 84–86, 103–107.

⁸⁵ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1753, p. 41; 1754, p. 88; 1755, p. 17; vol. II, 1757, pp. 123–124. KB. This can be related to Nordin's discussion on the different possibilities for the vending of manufactured goods. From 1749, manufacturers were also

Schröder not only saw these urban shops as connected to metal works and workshops, but also as complementing them. The most illuminating example of this link is his discussion of young shopkeeper Magnus Wahlbom at *Riddarhustorget*. There were several advantages to letting a merchant handle the sale of metal wares, which demanded ‘a different mind and practice than the manufacturing’, according to Schröder. Shops, he argued, counteracted delayed payments, but also lessened the burden for manufacturers dealing with ‘the curiosity of people to see their workshops’.⁸⁶

Schröder’s own role as a go-between within the metal trades is further evident in the attempts to export metal wares and in the *circulation* of models. These also illustrate how the manufacturing-oriented policies were put into practice. In 1754, Schröder initiated the founding of a ‘Model house’ in Stockholm to which Swedish consuls in Europe and the Middle East sent samples of metal wares. Items sent by Angerstein from England were included, as well as Schröder’s own collections (from his European journey).⁸⁷ According to the *Directeur*, the Model house had a dual purpose. The collection of foreign metal wares was to keep Swedish manufacturers and owners of metal works informed, and the wares made at domestic works could be used to update merchants about prices and qualities.⁸⁸

These collections were often used by Schröder to exhibit and circulate models to be imitated by artisans around the kingdom. The finished goods were in turn compared with foreign samples, and occasionally exported. In 1760, Schröder mentioned some twenty attempts, made during the preceding decade, to export wares, including some made by provincial works like Vira, Viskafors, and Gusum as well as several Stockholm artisans.⁸⁹ Usually, however, the items made through the *imitation* of foreign models were intended for the domestic market, and Schröder often visited the works in Eskilstuna for this purpose. This type of production was encouraged by the state through premiums, something that gave the supervising institution, *Manufakturkontoret*, a substantial power to regulate the making and using of metal wares. Most importantly, however, the discussion above accentuates Stockholm’s role within the mid-eighteenth century metal trades. As depicted by Schröder, the capital was truly a *metal bazaar*.

allowed to sell the production from their workshop or, together with others, in smaller shops. See Nordin (2009), pp. 58–61. Such examples are, however, rare in Schröder’s diaries.

⁸⁶ ‘ett helt annat sinne och waner än tilwerkandet’; ‘folks nyfikenhet at se deras verkstäder’. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1756, pp. 62–65. KB.

⁸⁷ Schröder (1925a), pp. 50–51; Schröder (1925b), p. 84.

⁸⁸ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 178–179. KB.

⁸⁹ Schröder (1925b).

Towards a Notion of the *Metal Bazaar*

In Schröder's diaries and reports, the mid-century metal trades in Stockholm stand out as being characterised by flexibility, fluidity, and diversity. Metal making was organised in varying ways and many of the workshops were connected to wider networks of trade. Artisans with different origins were attracted to the capital, while others left for works in the provinces. Stockholm also housed a variety of dealing practices, as well as important institutions which encouraged the *absorbing* and *spreading out* of people, practices, and goods — to use Salvius' terms.

Relating to Sonenscher's discussion of a 'bazaar-like economy', and to recent research stressing the role of urban space as a catalyst for production, I argue that this image of Stockholm points towards a notion of a *metal bazaar*.⁹⁰ Although it was by far inferior to textile manufacturing, finer metal making in Stockholm was extensive if compared to other metal-making communities in Sweden. It comprised a growing number of artisans, who were not gathered together at a few larger works or in specific districts; nor were they tied to the guild framework. Rather, they were spread out between many workshops with different organisational solutions. This variation indeed caused conflicts and competition, but the urban space also seems to have brought forward innovative tactics, mobility, and everyday creativity.

This notion of a *metal bazaar* must also be related to the *strategic gaze* of the state, and most notably that of Schröder. While it certainly was placed in the middle of the manufacturing system, the capital was never portrayed as isolated. Rather than breaking with the traditional picture of eighteenth-century metal making in Sweden, this adds to the inquiries that have highlighted larger manufactories and proto-industrial metal making. Thinking in terms of a *metal bazaar* in fact leads us beyond the notion of centres and peripheries. Instead, it suggests that Stockholm was one important *contact zone* within the domestic metal trades: it was a space where the trajectories of people, ideas, skills, materials, and artefacts intersected.

The metal trades in the capital encourage a further investigation of the relations between access to place, workshop size, and the organisation of work. Such an inquiry can be framed by a discussion on the links between *manufacturing*, *dealing*, *using*, and *policing*. Moreover, the connections between Stockholm and other metal-making communities in Sweden and Europe were intense during the period, as seen in Schröder's diaries. A study of metal making must therefore also take into account features such as artisan mobility and the *circulation* of skills, with comparisons of different spaces being directed towards the practices of work. This is of further importance when studying the development of the metal trades during the 1760s and 1770s, adding Eskilstuna *Fristad* to this map.

⁹⁰ C.f. Sonenscher (2012), pp. 22–29, 40–41, 130–140; Pérez (2008); Riello (2008); Davids and De Munck (eds.) (2014).

3.3 The Crisis and Afterwards: An Altered Spatiality?

As briefly discussed above, many of the larger manufactories saw a declining number of workers during the 1760s. The crisis severely affected the metal making at Carl Gustaf Stad, Tunafors, and Vedeväg — although the latter works seems to have managed slightly better. Schröder stressed how these works had both organisational and economic problems. They faced hard competition from the import of foreign metal wares, but also vied with each other on the domestic market, with little potential to export. This competition is evident in the case of Vedeväg and Tunafors.⁹¹

Metal making continued at both these places however. Other works were more severely affected by the economic crisis and the growing competition. The knife works in Gusum was abandoned in 1767, after seeing many workers departing during the early 1760s.⁹² The same year, Schröder stressed how the domestic metal making could be further supported. This discussion was related to the decisions at the previous Diet to limit the funding of the metal trades. The *Directeur* included a list counting 38 works that he thought of as deserving extra financial means. Among these were many of the manufactories, brass works, and gun factories that he had visited during the 1750s. Still, a number of new metal works, founded in different provincial towns, were included, as well as the metal trades in Stockholm.⁹³

While also supporting the continuation of larger manufactories, Schröder's discussion thus indicates a slightly changing spatial strategy. Increasing attention was given to urban metal making. The decline continued for many workplaces during the years following. The works in Viskafors was discontinued in 1773 after a period with rapidly decreasing production.⁹⁴ It is in this context that the rise of Eskilstuna *Fristad* should be dealt with. This discussion must, however, also include comparisons with Stockholm where the metal trades continued to be extensive.

Two Urban Communities: Eskilstuna and Stockholm

Eskilstuna *Fristad* expanded during the 1770s, to a large extent by attracting artisans from nearby works. Ohlsson has argued that the majority of the craftsmen came from the incorporated parts of Carl Gustaf Stad, but also from Tunafors, Vedeväg, and Vira. Also, some workers were recruited from Germany.⁹⁵ As indicated by the discussion in chapter 2, the *Fristad* offered

⁹¹ See Rönnow (1944), pp. 184–187.

⁹² Forsberg (1953), p. 121.

⁹³ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1767, pp. 16–21. KB.

⁹⁴ Palm (2005), pp. 144–145. Above all, the production decreased during the years 1763 to 1768. The neighbouring works in Gravenfors was continued into the mid-nineteenth century.

⁹⁵ Ohlsson (2001), pp. 137–138. 58 persons (11 masters) moved from Vedeväg to the *Fristad* during the period 1771 to 1802, while 38 persons (14 masters) went in the opposite direction.

serious competition to the older works. The failed attempts made in 1772 by the Hallenius brothers to gain similar privileges added to the problematic position of these previously subsidised manufactories. When Tunafors later obtained special rights, in 1776, the works had already lost many artisans to the *Fristad* community.⁹⁶

By studying protocols and head tax records from the local magistrate in the *Fristad*, the growing number of artisans in the community can be observed. One record from October 1774 listed 40 masters and one widow in charge of production, and a total of 231 inhabitants.⁹⁷ In a protocol from the same day, dealing with the payments to the artisans' common till, 58 journeymen and apprentices were mentioned. Based upon this source, it can also be noted that most workshops were smaller ones where the masters worked together with one or two employees.⁹⁸ Six years later, in 1780, another record listed 66 masters and one widow as being in charge of workshops, and 108 journeymen and apprentices. This gives a total of 175 persons directly involved with metal making in the community. Again, the majority of the workshops were smaller ones.⁹⁹ According to a memo written the same year, 29 of the masters made finer wares, such as cutlery, sword blades, or instruments, while the remaining 37 were employed with the making of cruder items or work pieces.¹⁰⁰

The *Fristad* thus gradually grew and diversified. Still, this expansion was not at the immediate expense of the metal trades in Stockholm. Nor does the capital's metal making seem to have been severely affected by the crisis of the 1760s. The Diet noted in 1766 how the capital still was an attractive place to work for manufacturing artisans. Despite premiums that had been offered for relocation to provincial towns, it was argued that 'no one, who is not inclined to do so or finds it favourable, makes such a move.'¹⁰¹

That is, however, the general picture, viewing the total number of workshops and workers in the capital. On a lower level, the conditions often seem to have been harsher. When comparing the *Hallrätt* reports with a database for early-modern bankruptcies in Stockholm (*Tidigmoderna konkurser*), it can be noted that some 15 artisans or manufacturers from the metal trades

During the following period, 1803–1819, 259 persons left Vedevåg to work in Eskilstuna, compared to 54 persons moving the other way.

⁹⁶ Rönnow (1944), pp. 186–187; Boëthius and Kromnow (1968), pp. 385–387; Ohlsson (2001), p. 41.

⁹⁷ Head tax record, 1775, Eskilstuna *Fristad*, Eskilstuna, 1774-10-19. EFoA, H:1, no. 8. ULA.

⁹⁸ Eskilstuna *Fristad*, Protocol, 1774-10-19. EFoA, AI:1, no. 370. ULA.

⁹⁹ Head tax record, 1781, Eskilstuna *Fristad*, Eskilstuna, 1780-10-21. EFoA, H:1, no. 11. ULA. C.f. Hörsell (1983), pp. 50–53.

¹⁰⁰ Undated memo regarding the masters in Eskilstuna *Fristad*, 1780. EFoA, H:1. ULA.

¹⁰¹ 'ingen, utan egen böyelse och funnen fördel en sådan flyttning sig företager.' (Copy of Letter from the Diet to King Adolf Fredrik (regarding the closure of *Manufakturkontoret*), Stockholm 1766-05-16. L.101. Handlingar rörande manufakturkontorets indragande, no. 2. Handskriftssamlingen. UUB.

applied for bankruptcy during the 1760s and first half of the 1770s.¹⁰² This does not mean that their workshops also were immediately closed. Some of them are mentioned in the *Hallrätt* reports after the applications, with employed workers and listed production. In the reports, only five workshops are explicitly referred to as discontinued. More workshops are, however, referred to as having no workers or no production.¹⁰³

During the first half of the 1760s the total number of workshops and workers varied, and in some cases decreased from one year to another. The expansion of the previous two decades was slowed down. As seen in Table 3.3, the number of workshops and workers then increased again during the second half of the 1760s, only to show new signs of stagnation during the early 1770s. The trend with small workshops with a master and one to five employees is even more evident during this period. The larger workshops are mainly found in the watchmaking trade. The diversification observed for the 1740s and 1750s continued, and from 1767 the *Hallrätt* reports distinguished between three categories: metal, iron and steel, and watchmaking.¹⁰⁴ The greatest increases during the period can be observed within watchmaking as well as in instrument and tool making, but also regarding the manufacturing of metal or alloyed wares and trinkets. The 1770s also saw a number of foundry workshops being set up, or expanded, in the capital.¹⁰⁵

On the one hand, the Stockholm metal trades seem to have been viable despite the crisis of the 1760s. This can be related to the decline of many provincial works. Several new workshops being founded in the capital during this period were dedicated to crafts which had previously been promoted at the larger provincial works, such as cutlery making. In line with this observation, Schröder noted in his diaries how artisans from Tunafors, Carl Gustaf Stad, and Gusum moved to the capital during the late-1760s in order to set up workshops of their own or to work for other manufacturers.¹⁰⁶

¹⁰² See the online database *Tidigmoderna konkurser*, based on material from the magistrate's court in Stockholm (*Stockholms magistrat och rådhusrätt*) during the period 1687–1849. Available from: Stockholms stadsarkiv. The database has been constructed in cooperation between Stockholms stadsarkiv and Uppsala University. Searching the database, I have used the titles and names referred to in: Stockholm *Hallrätt*, Reports 1760–1776. HMR, BIII:5–10. SSA. I have also used HISCO-classifications available in the database, such as 'manufacturer' (*manufakturist*), 'metalworker' (*metallarbetare*), 'metal fabricant' (*metallfabrikör*), and 'watchmaker' (*urmakare*). For an introductory discussion on the database as well as on bankruptcies in Stockholm during the period 1720–1850, see Hayen and Nyberg (2017).

¹⁰³ Stockholm *Hallrätt*, Reports 1760–1776. HMR, BIII:5–10. SSA. Bankruptcies during this period were protracted processes. The average time for such a case during the 1780s was ca. 1,000 days. See Hayen and Nyberg (2017), p. 39.

¹⁰⁴ See Stockholm *Hallrätt*, Report 1767. HMR, BIII:8. SSA.

¹⁰⁵ Stockholm *Hallrätt*, Reports 1760–1776. HMR, BIII:5–10. SSA. For a discussion on foundry workshops during the period, see Boëthius (1955), pp. 76–84. The notion of an increasing number of instrument-making workshops must be related to the fact that many of the more specialised artisans within this trade faced harsh conditions during this period. See Amelin (1999), pp. 143–161.

¹⁰⁶ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III. KB. C.f. chapter 6.

Table 3.3 *Workshops, workers, and workshop size: Stockholm, 1760–1776*

	1760	1765	1771	1776
Artisan alone	10	9	14	12
1–5 workers	28	39	48	47
6–10	11	5	5	2
11–15	1	2	1	1
16–20	1	-	2	2
<20	-	1	-	-
Not known	2	2	-	2
<i>Workshops</i>	53	58	70	66
<i>Workers</i>	222	234	257	249

Source: Stockholm *Hallrätt*, Reports 1760–1776. HMR, BIII:5–10. SSA. Note: For 1765, I have excluded two workshops producing clock casings, since this craft is later separated from the watchmaking trade. The three main categories listed (from 1767) have been aggregated.

On the other hand, the vast majority of workshops were now operated on a smaller scale. Figure 3.5 illustrates how the groups of journeymen and apprentices continued to be large, but they did not increase as rapidly as during the late 1750s. We can, however, note a rising number of masters (or responsible artisans). In line with Nyberg's conclusions from the textile trades, the observations made here can be related to the gradual loosening of the restrictions regarding new manufacturing enterprises during the 1760s. This would have made it easier for aspiring metal-making artisans (and especially journeymen) to practise their crafts within the metal trades. The growing number of small producers might thus reflect both an adaption to a harsher economic climate, with fewer incentives for recruiting new apprentices, and a development where more artisans had opportunities to practise their craft independently. Probably, this context stimulated both competition and collaboration between smaller workshops and larger ones.¹⁰⁷

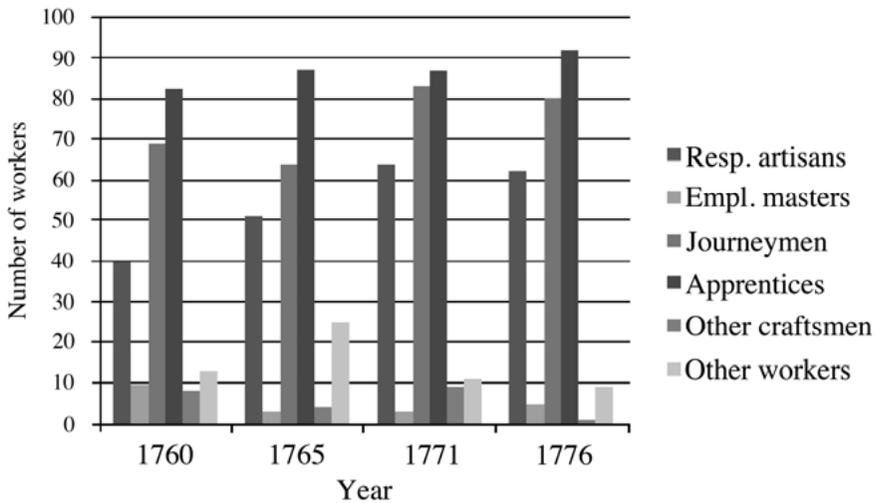
Finally, the low share of 'other workers' (day labourers and extra workforce) must be addressed. Again relating to Nyberg's discussion, one possibility is that the *Hallrätt* reports tend to underestimate the group of 'unskilled' persons who performed temporary labour. In his study of the Stockholm crafts, Söderlund noted that the average number of 'other workers' per workshop was low (1.6 in 1740–1741 and 1.8 in 1770), but there was also a considerable variation between different crafts.¹⁰⁸ The corresponding number obtained for the metal trades, if using the *Hallrätt* report from 1771, is very low: 0.35 if including 'other craftsmen' and day labourers, and excluding all the 14 workshops where artisans worked alone.¹⁰⁹ This difference might support Nyberg's argument.

¹⁰⁷ C.f. Nyberg (1992), pp. 347–349. See also section 2.5.

¹⁰⁸ See Söderlund (1943), pp. 318–325.

¹⁰⁹ Stockholm *Hallrätt*, Report 1771. HMR, BIII:8. SSA.

Figure 3.5 Workers in the Stockholm metal trades, 1760–1776



Source: Stockholm *Hallrätt*, Reports 1760–1776. HMR, BIII:5–10. SSA; Schröder (1925b). Note: ‘Resp[onsible]. artisans’ includes both artisans in charge of larger workshops and those working alone.

At the same time, it must be noted that the majority of enterprises within the metal trades were smaller ones, probably with few incentives to recruit extra labour. This does not mean that these workplaces were static. The tendencies towards stagnation discussed above should not be seen as obscuring the fact that Stockholm was still a vital *contact zone* for the domestic metal trades during the 1770s. The capital assembled a variety of workshop practices, and there seems to be a good reason to stress the impact of fluidity and flexibility also for urban metal making. Whether the metal trades were organised more according to the principles of a *Kaufsystem*, as noted by Nyberg, is not the primary interest here.

This period also saw tensions and conflicts between manufacturing artisans, local institutions, and the capital’s metal-making guilds. This matter is important when placed alongside the rise of Eskilstuna *Fristad* — a place liberated from the influence of guild control. Both these communities were shaped by negotiations and by the interplay of *strategies* and *tactics* over time.¹¹⁰ In chapters 5 to 7, I build further on these observations in analysing how different ways of organising metal making were imitated and reconfigured in relation to the *circulation* of skills and knowledge. This also demonstrates the connections over time between workshops in Stockholm, provincial metal works, and, eventually, the *Fristad*.

¹¹⁰ Negotiations and conflicts between manufacturing artisans, local institutions, and guilds are discussed in chapter 6, as related to cutlery manufacturing.

3.4 Conclusion

This chapter has depicted the spatiality of the metal trades during the period 1730–1775, as it was perceived by the ordering state. This has been done by using Schröder's diaries, complemented by reports and compilations emanating from national and local authorities. The resulting map has thus been created in relation to the *strategic gaze* of the state, and most notably so to the supervisory journeys of an eighteenth-century official on the move. At the same time, the sections above have pointed out several important metal-making communities and connections that will be further investigated in the following chapters.

Finer metal making in Sweden was conducted in a multitude of ways during this period. It was carried out at larger manufactories and weapon factories, some of which had emerged out of older ironworks. Most important among these were Vedevåg, the '*mother works*', which was one important *contact zone* within the metal trades. Still, it was Eskilstuna, with Carl Gustaf Stad and Tunafors, which came to see the most notable expansion during the 1750s. The latter, with extensive cutlery making, became an important place for the state-promoted attempts with large-scale metal manufacturing. Other specialised metal works also emerged in the provinces during this period, with a majority being dedicated to cutlery making. Some works were founded in areas recognised for their extensive peasant smithery; however, in most cases they were built near towns or communities with already existing facilities for metal processing.

This chapter has also highlighted Stockholm as one very important place within the mid-century metal trades. Based on the sources used, I have dealt with the capital as a *metal bazaar* characterised by flexibility, fluidity, and alternative forms of organising metal making. By also discussing trade and institutions, I have pointed out how Stockholm functioned as a vital *contact zone* within the metal trades. It was an intermediary space where different circulatory movements intersected, and, therefore, it connected metal works, manufactories, and metal-making communities within and beyond the Swedish realm. This role of Stockholm has not been accentuated by previous research. As argued here, it illustrates the complex spatiality of the metal trades. As evident in Schröder's diaries, finer metal making was related both to an expanding manufacturing system and a wider iron system.

During the 1760s and 1770s, this spatiality gradually altered. Numerous larger works in the provinces experienced problems during the crisis years of the 1760s. During the following decade, Eskilstuna *Fristad* began to expand largely by recruiting artisans from other works. In comparison, the metal trades in Stockholm continued to be comprehensive throughout the crisis and the early growth of the *Fristad*. However, metal making in the capital also shows signs of stagnation when approaching the mid-1770s. This is an important feature to be followed up by this investigation.

In sum, this chapter has showed how the spatial organisation of the metal trades, accompanied by a careful supervision and gathering of information by mobile officials like Schröder, was an important part of the *strategies* developed during this period by the Swedish state. However, in order to really implement control within the metal trades, the state also needed to control the practical processes of work. Institutions like *Kommerskollegium*, *Bergskollegium*, and *Manufakturkontoret* came to pay increasing attention to metal workshops and artisans' skills. Most clearly, the all-embracing division of labour within the well-ordered household was to be complemented by distinct forms of organising work. The next chapter deals with this interest in *practices* and *processes*, and with the alternative forms of organising metal making that emerged within the manufacturing system. Above all, I deal with cutlery making and the use of steel — two areas that received a considerable attention from both political arenas and science.

CHAPTER 4

Making Descriptions: Understanding and Controlling Cutlery-Making Practices

In his *Anledningur til kunskap* from 1772, Rinman's critique of the gap between the theory and practice of metal making can be viewed as an expression of the growing interest from science and state authorities into the different aspects of metal manufacturing: the extraction and processing of raw materials, the chemical reactions of metals under treatment or when combined, and the various methods and manual skills used in different stages of finishing. The emphasis on the importance of understanding these features was not new. Various actors had made similar observations before Rinman.¹

In 1750, Daniel Ekström discussed the elevation of the domestic metal trades by stressing the importance of raw materials and their qualities, resources like wood and water, and advances in commerce.² He also pointed out one thing in particular that united the different areas of improvement stressed by actors from the 1730s and onwards. He argued that Sweden's inability to compete with foreign nations regarding finer metal making largely depended on a reluctance and incompetence among many artisans to embrace the advantages of dividing work processes (into specific tasks). Only a few had adopted methods and techniques aimed towards the 'facilitation and shortening of work'. Many more worked, Ekström concluded, 'with more effort than art', which resulted in 'blunt files and weary arms'.³

The two previous chapters have targeted the attempts made by the eighteenth-century Swedish state to implement a general order within the manufacturing system and the metal trades. Regulations and spatial claims were built around ideas of a pervasive division of labour. Inspiration was taken from England, with travelling Swedish officials describing the benefits of both a *wider* and a *workshop-based* division of labour. By focusing on the latter, this chapter continues to explore the *strategic stage* of metal making. The aim is to examine the interest in describing, understanding, and control-

¹ Other scholars have also dealt with this subject. See e.g. Fors (2003); Rydén (2013b). Here, I will focus on finer metal making, above all on cutlery making and the use of steel.

² 'arbetets lättande och förkårtande'; 'med mera möda än konst'; 'slöa filar och uttröttade armar'. Ekström (1750), pp. 14–16.

³ Ekström (1750), pp. 19–20.

ling workshop practices and processes of work. This is done in four sections, each directed towards cutlery making and the making use of steel.

Section 4.1 deals with traditional ways of organising cutlery making in guilds, compared to the new networks and employment solutions within the manufacturing system. The latter did indeed incorporate some of the traditional organisational features, but there were important differences. Moreover, the organisation of work also varied *within* the metal trades.

In section 4.2, I deal with the practical processes of cutlery making, as well as its material and spatial prerequisites. This is of vital importance in order to understand the ideas behind the attempts to implement piecework, in accordance with the ‘English way’, in cutlery workshops and metal works. These ideas are dealt with in section 4.3. The improvement of the organisation of work was also connected to a more diversified use of metals and materials. Section 4.4 deals with this matter, and especially with steel.

These sections offer a *strategic* account of the cutlery workshop and of cutlery making, in line with the orientation of the two previous chapters. The writings analysed in this chapter do not offer the whole picture of this craft. With reference to de Certeau, they can be understood as describing ‘fragments’ of practices (although varying in their extent). Nevertheless, they also provide a ‘narrative’ continuity, which is especially relevant if related to the supposed ‘know-how’ of craft work.⁴ Descriptions are thus seen here as attempts to make sense of, conceptualise, and establish certain ideas about skills and processes. In this way, this chapter enables comparisons between different perspectives on cutlery making — and metal processing — over time.

This does not mean, however, that I advocate an understanding of knowledge or scientific ideas as separated from manual skills. This investigation rather relates to research that has emphasised the connections between science, protectionist institutions, and manufacturing practices in early-modern Europe. Above all, I draw upon the view held by the authors of *The Mindful Hand*. Knowledge-making is seen as including various types of interactions over time and across space.⁵ Still, it is important to first present ‘general ideas’ related to cutlery making during the period of interest, because they offer points of departure that are used when I discuss workshop practices and the *circulation* of skills in the following chapters.

The sections below are composed by eighteenth-century sources that, in different ways, make claims regarding understanding or regulating metal making. The composition of sources also reflects the connections between science and the political institutions of protectionist states. In the first section, I compare the records from the cutlers’ guild in Stockholm with the

⁴ See de Certeau (1984), pp. 70–71.

⁵ See e.g. Roberts and Schaffer (2007), pp. XIX–XX; Roberts (2007a), pp. 191–193; Roberts (2007b), pp. 7–8.

Hallordning from 1739. In section 4.2, I use six different sources. Of these, Harmens' report from Vedevåg has been introduced in section 2.2.⁶ This text is complemented by three other Swedish sources: Christopher Polhem's *Påminnelse wid Stål-Tilwårkningen*, written in 1740, and his *Patriotiska testamente*, from 1761, as well as one report from 1758 dealing with cutlery making at Tunafors, Vedevåg, and Gusum.⁷ I have also used two extensive French books on this craft: Jean-Jacques Perret's *L'Art du Coutelier, Première Partie*, from 1771, and Auguste-Denis Fougereux de Bondaroy's *L'Art du Coutelier En Ouvrages Communs* from the following year.⁸

Section 4.3 comprises reports and proposals from state institutions, officials, or other individuals with interests in the metal trades. The common denominator in these texts is the implementation of a division of labour in cutlery-making workshops and at knife works. Important here are the texts by Olof Hamren, from the 1730s and 1740s, and by Schröder, from the 1750s. The last section, on the making and making use of steel, builds on the works by Rinman: his *Anledning ar til kunskap* and the later *Bergwerks lexicon* from the late 1780s.⁹ It also includes writings by some of Rinman's contemporaries, such as Reinhold Angerstein and Bengt Qvist Andersson.

⁶ Harmens, Lars, *Berättelse om Wedwog och Qwarnbacka Jern och Stål Manufacturie, Upsatt år 1727, Inledning*. BkH, E2i:3. RA.

⁷ Polhem, Christopher (1743). 'Påminnelse wid Stål-Tilwårkningen, i anledning af 10:de frågan uti 2 Quart, 1739' [originally from 1740], in *Kongl. Svenska wetenskaps academiens handlingar för månaderna Aprilis, Majus, Junius, 1740, vol: 1*. Stockholm. Reissued in *Kungl. Svenska vetenskapsakademiens handlingar (1739–1974)*, vol. 1, 1739–1740. Stockholm: Almquist & Wiksell, pp. 303–309; Polhem, Christopher (1761). *Commerce-rådet, riddaren och commendeuren af kongl. nord-stjerne-orden, Christopher Polhems Patriotiska testamente, eller Underrättelse om järn, stål, koppar, mässing, tenn och bly för dem, som wilja begynna manufacturer i desza ämnen. Jemte en förteckning på: alla desz mekaniska inventioner*. Stockholm; Münchenberg, Samuel, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. MkA, De:1, vol.176. RA. The first of Polhems texts was submitted to the *Kungliga Vetenskapsakademien*, while the second one was compiled by his son Gabriel Polhem and published ten years after Christopher's death (in 1751). Finally, the report from 1758 was submitted to *Manufakturkontoret* by a delegacy sent to investigate cutlery making at larger metal works. See further section 7.3.

⁸ Perret, Jean-Jacques (1771). *L'Art du Coutelier, Première Partie, Descriptions des arts et métiers, faites ou approuvés par messieurs de l'Académie Royale des Sciences. Avec figures en taille-douce, Coutelier Tom I*. [Electronic resource]. Paris: Saillant et Nyon; Fougereux de Bondaroy, Auguste-Denis. (1772). *L'Art du Coutelier En Ouvrages Communs, Descriptions des arts et métiers, Coutelier Tom III*. [Electronic resource]. Paris: impr. de L-F. Delatour. The series *Descriptions des arts et métiers* was published by *l'Académie Royale des Sciences*, between 1761 and 1788.

⁹ Rinman (1772); Rinman, Sven (1788). *Bergwerks lexicon författadt af Sven Rinman. Första delen*. Stockholm; Rinman, Sven (1789). *Bergwerks lexicon, författadt af Sven Rinman. Andra delen*. Stockholm.

4.1 Organising Cutlery Making: Guilds and Manufacturing Trades

The number of workplaces for finer metal making gradually increased in Sweden from the late 1730s, and clearly so also in Stockholm — with new manufacturing workshops being founded. Parallel to this development, traditional ways of organising crafts continued to exist, with numerous guilds in the capital and in other towns.¹⁰ On a regulative level there were similarities between these ways of organising metal making, but also important differences. This is discussed here by focusing on cutlery making, a craft that was particularly embraced by the state's promotion of metal manufacturing during the mid-century.

All cutlers in Stockholm were — by tradition — members of the cutlers' guild. Led by an elected alderman, this was an hierarchical organisation where matters such as membership and length of training were handled at internal meetings. The masters paid quarterly fees, and also made payments when taking on apprentices, when applying for mastership, and when becoming a master. According to the guild's records, the length of apprenticeships varied. In some cases, boys were signed in for as long as seven years, but shorter periods of four or five years were also mentioned.¹¹

Advancing through the guild's hierarchy was a thoroughly regulated process associated with the exhibition of skills and knowledge about materials and finishes. The apprentice years ended with an examination, and tests were also required of journeymen applying for mastership. In the latter case, the applicant had first to be approved during a meeting. If he was found qualified enough, the journeyman was then assigned a masterpiece, the production of which was supervised by appointed masters. When finished, the piece also had to be approved by the other members of the guild. One illuminating example that can be mentioned is Petter Åhman's application for mastership in 1738. In this case, the masters selected a clasp knife with brass details and several attached tools as his masterpiece, as well as two knives with hafts (handles) of tortoiseshell. The items were approved at a meeting in July the following year, and Åhman was free to practise his craft as master.¹²

While mastership in the guild offered cutlers in the capital a valuable social network, it did not *per se* result in financial stability for the individual artisans. Several members lagged behind with their fees, for shorter or longer periods during the 1730s. Still, the number of masters remained at a steady level; for the latter half of the 1730s it varied between seven and eight.¹³

¹⁰ During the 1720s, *Kommerskollegium* had also promoted so-called 'free masterships' (*fri-mästerskap*). These attempts were abandoned in 1731. See Söderlund (1943), pp. 60–70.

¹¹ *Knivsmedsämбетet*, Skråarkiv, 32:1. SSA.

¹² *Knivsmedsämбетet*, Procotol, 1739-07-31. Skråarkiv, 32:1, pp. 8–10. SSA.

¹³ *Knivsmedsämбетet*, Skråarkiv, 32:1. SSA.

During the following decades, the guild-based cutlery making in the capital declined, and, as Schröder noted, only one such workshop existed in 1759.¹⁴

From the late 1730s, the expanding manufacturing system offered an alternative, and often competing, form of institutional affiliation. The regulations for the manufacturing trades were also greatly occupied with work processes and procedures for progression. On some points, they did not differ from those of the guilds. Regarding others, forceful measures were taken in order to create a distance between manufacturers and guild artisans. The *Hallordning* from 1739 stated that all regulations and gatherings of the guilds were to be ‘severely forbidden’ within the manufacturing trades.¹⁵

This dissociation was expressed by the fact that manufacturing artisans and owners of manufactories were free to employ as many apprentices as they wanted. This was one important divergence from the non-competitive and collective framework promoted within the guild system. The advocated lengths of apprenticeship did, however, not differ from the ones practised by the cutlers’ guild. From the age of ten or twelve, children could be employed for five to eight years of training. Before contracts were signed, apprentices could also be accepted for a trial period. The master was in turn obliged to completely train each apprentice in his craft.¹⁶

The *Hallordning* spoke of more than one route of progression. Becoming a journeyman was associated with a test where the applicant was supervised by masters of the trade and the *Hallrätt*. The applicant also paid a fee. No other requirements were mandated. The emphasis was on journeymen being ‘skilled in their proper duties, or otherwise having a good commendation.’ If there was a contract signed, the journeyman was free to leave his employer when it expired. If not, he had to finish any pieces he had started on before leaving. Journeymen could either share a household with the master or live at the works, or live alone and ‘earn their wage piecewise’.¹⁷

Mastership could be obtained through employment at a works (referred to as *verkmästare*) or for a putter-out.¹⁸ The alternative was that the applicant had the ability to ‘practise and operate the craft on his own’ — in other words, an economic potential to keep business going. In all cases, a test had to be completed and approved by the *Hallrätt*, in some cases together with

¹⁴ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1759, pp. 2–4. KB. C.f chapter 6.

¹⁵ ‘alfvarligen förbudne’. *Kongl. Maj:ts Utfärdade Hall-Ordning, Och Allmänne Factorie-Rätt* (1739), art. 2, § 11.

¹⁶ *Kongl. Maj:ts Utfärdade Hall-Ordning, Och Allmänne Factorie-Rätt* (1739), art. 6, § 2–5.

The training could also be shorter, if the person in question was older or considered as skilled.

¹⁷ ‘uti sine tilbörliche sysslor finnas skicklige, och elliest godt låford hafwa.’; ‘bekomma sin arbetslöhn stycketals’. *Kongl. Maj:ts Utfärdade Hall-Ordning, Och Allmänne Factorie-Rätt* (1739), art. 5, § 7–12. Similar procedures were practised also by the guilds; either the journeyman shared his master’s household and earned a weekly wage or he lived alone and worked for a daily (*not* a piece) wage. See Söderlund (1943), pp. 269–271.

¹⁸ C.f. Nyström (1955), p. 220. The former was often referred to as work ‘indoors’ (*inom hus*), while the latter was referred to as work ‘outdoors’ (*utom hus*).

the intended employer. Masters who were employed at larger works were freed from the procedures of applying for burghership. In the case of a master's death, the *Hallordning* stressed how his sons (or journeymen) were permitted to take over the craft of their deceased father (or master); in such cases, a fee had to be paid and the applicant had to apply for mastership and burghership. A widow who wanted to continue the workshops of her late husband was freed from such obligations.¹⁹

Nyström emphasised how the manufacturing system brought about new ways of regulating progression and assessing skills; the skilled-based career advancement practised by the guilds was challenged. Still, he also noted that the most common arrangement (within the Stockholm textile trades) was the small-scale workshop where masters and their employees worked under conditions that did not differ from traditional crafts. Larger works buildings (*fabrikshus*), in turn, were in most cases similar to dwelling houses and the investments in fixed capital were low.²⁰

Chapter 3 has shown the small share of large metal works in the capital, and the number of employed masters was low according to the *Hallrätt* reports.²¹ Still, as evident in Schröder's diaries, there were also manufacturing artisans who owned works-like houses that included several workshops. On this matter, Ronnestam has emphasised the construction of 'watchmaking works' (*urfabriker*) in the capital.²² Similarly, Söderlund briefly noted that some manufacturing enterprises were distinguished from the guild crafts by a tendency towards larger workshops which were organised according the principle of 'piecework' (done in the 'English way'). He also argued that some metal crafts required larger capital investments, for example in procuring expensive raw materials.²³ Nyström's conclusions must thus be discussed more thoroughly by emphasising the practical processes of constructing workshops and organising work. This can also include a discussion on progression and training within the metal trades.

The mid-century metal trades in Stockholm consisted of a diversity of workshops. Among them during the 1740s and 1750s was one for cutlery making, that of the former guild master Eric Engberg. It is possible to follow him from the late 1730s and onwards. Still, he continued for some time to be mentioned as a member of the cutlers' guild.²⁴ It thus seems like the boundaries between the guilds and the metal trades were sometimes fluid. The

¹⁹ 'idka och drifwa handtwärcket för egen räkning'. *Kongl. Maj:ts Utfärdade Hall-Ordning, Och Allmänne Factorie-Rätt* (1739), art. 5, § 1–6. C.f. Lindström (2012). Investigating crafts in Norrköping and Linköping, Lindström found that the share of widows who actually did supervise the late husbands' workshops was low. See also Hörsell (1983), pp. 91–97. This matter is further discussed in chapter 6.

²⁰ Nyström (1955), p. 268, 275–283.

²¹ Stockholm *Hallrätt*, Reports 1740, part II–1760. HMR, BIII:1–5. SSA. C.f. section 3.2.

²² Ronnestam (2013), pp. 238–287.

²³ Söderlund (1943), pp. 213–218, 221.

²⁴ *Knivsmedsämbetet*, Protocol, 1743-10-25. Skräarkiv, 32:1, p. 13. SSA.

1760s then saw several other cutlery-making workshops being founded in the capital, which makes this craft suitable to follow over time.

Moreover, cutlery making is of particular interest here because it also was practised at provincial manufactories. At many of these, the overarching organisation was that of the *bruk* — with a putting-out system where the proprietor supplied the smiths with raw materials and then received the finished wares. As noted by Harmens in 1727, metal making at Vedevåg included several small workshops where masters worked together with a few journeymen and apprentices.²⁵ I have also shown how this works was embraced by directions similar to ones targeting the other branches of the manufacturing system, and which aimed at regulating workshop processes.

If compared to metal workshops in Stockholm, provincial metal works and manufactories had other potentials regarding the installation of mechanical devices. Still, as will be illustrated in the following chapters, the latter also differed regarding the practical organisation of work. This is evident in the case with the many knife works founded during the 1750s. These workplaces indeed gave rise to much competition for the cutlers in the capital.²⁶ This was, however, a development that also included flexible connections. Artisans, materials, and objects circulated between urban workshops and provincial metal-making communities. Thus, the rise for the metal trades certainly affected the flows of people, knowledge, and skills.

A focus on changing cutlery-making practices can thus illuminate connections made visible neither in guild records, nor by regulations such as the *Hallordning*. This is in line with the orientation proposed in chapter 1, taking notice of the organisational complexity of metal manufacturing by highlighting processes of *circulation* and knowledge-making as well as the interplay of *strategies* and *tactics*. Still, in order to fully grasp the intricacy of cutlery making, we must also pay attention to the actual processes constituting this craft. As described in eighteenth-century texts, this was truly an ‘art’ demanding a range of skills.

4.2 Descriptions of Workshops and Cutlery Making

The spatial layout for cutlery making differed from workshop to workshop, as did the organisation of work. Although these features are hard to analyse in detail, the intention here is to give an *idea* of how a cutler’s workshop may have looked like during the period, and to describe the devices and processes included in this craft. Such a discussion is of great importance for the following chapters. The six texts used below are separated both in time

²⁵ Harmens, *Berättelse om Wedwog och Qwarnbacka Jern och Stål Manufacturie, Upsatt år 1727*, Section III. RA

²⁶ This was noted also by Söderlund (1943), p. 298, 318–321.

and in space. Harmens' report from Vedeång is the earliest one (from 1727). Polhem's description on the handling of steel was written thirteen years later (in 1740), but three decades before his later *Patriotiska testamente* and the report about Tunafors, Vedeång, and Gusum. Finally the two French texts were written in the early 1770s.²⁷ Still, the texts make it possible to give a general image of cutlery making as they complement each other, by dealing with different aspects while also sometimes overlapping. The result is a coherent presentation of cutlery making built upon the observations made in eighteenth-century works. Still, it can never be said to be more than a peek through the keyhole to a cutler's workshop.

The most important material for a cutler was steel. It arrived at the workshop in different shapes and qualities, but cutlers often obtained it in bars of lengths appropriate for the task at hand. The first stage of cutlery making was the forging of steel blades. This required certain devices. At the heart of the workshop were the hearths, and connected to these were bellows supplying them with air. Close to the hearth were several anvils, used for working the steel pieces. According to Perret, it was important that the anvils were placed correctly for each worker.²⁸

The initial stages of processing were among the more critical ones for a cutler, including the selection of appropriate fuels for the hearth and adjusting the temperature. Often they were collaboratively performed, as can be illustrated by Kilian Zoll's painting below (see Figure 4.1). The smiths used either charcoal or mineral coal, with the latter allowing for a higher and more consistent heat. Traditionally, however, charcoal was more common in Sweden. Once the steel was placed in the hearth, it was turned regularly and the supply of air kept steady. After being evenly annealed, the steel was taken to the anvil where a hammer was used to get rid of irregularities and cinder. The blade was then shaped; the hammer and chisel were used to cut the blade against the anvil, in order for it to obtain an appropriate length. The tip was then rounded and the bottom end was prepared attachment to a haft. In doing the latter, Polhem argued, an iron piece (or *tånge*) could be forged together with the blade. This tapered part was later fitted into the haft.²⁹

Some types of steel contained strains of iron, which made them particularly suitable for certain kinds of knives. Iron and steel bars could also be welded in order to further adapt the steel. According to Polhem, this also resulted in specific techniques being used in later stages. When shaping the blade, the smith needed to cut it in a precise way in order for the steel to be placed at the edge and the iron at the back.³⁰

²⁷ Perret was the only one of these authors having practical experience working as a cutler.

²⁸ Perret (1771), pp. 42–46.

²⁹ Polhem (1761), p. 86. In Britain this part is called a 'tang', a term that in turn can be referred to different techniques and finishes. See Moore (1999), p. 276.

³⁰ Polhem (1761), p. 85.

Figure 4.1 Collaborative work in the forge



Source: *Interiör av en klensmedja med flera smeder* (unknown place, nineteenth century). Original by Kilian Zoll. Jernkontoret, bildbank. Available online from: Jernkontoret.

The forged blade was then further shaped. This stage consisted of numerous tasks, often jointly performed until perfection was reached. The blade was filed and sometimes ground on a coarser stone. It could also be treated with a finer hammer in order to be straightened. According to Harmens, these tasks were combined with tempering, which made the blade solid.³¹ The techniques used when tempering differed, depending on the type of knife being made and the smith's skills. Non-combustible materials like coal could be used for covering the blades when putting them into the fire. After being heated, they were carefully cooled. If a blade had been excessively annealed during the forging, it was difficult for the smith to file and temper it correctly. Such a blade was often considered as useless. Likewise, if the tempering was not performed with care, the blades could be damaged during the final stages. The smith needed to balance temperature and time, in order to protect the blade from becoming too hard (and breaking) or too soft (and folding over).

³¹ Harmens, *Berättelse om Wedwog och Qwarnbacka Jern och Stål Manufacturie, Upsatt år 1727*, Section II. RA.

The knives were then ground on a finer stone, cleaned, and polished with oil and emery in order to give them a shiny finish. Depending on space and surroundings, the solutions employed for grinding and polishing differed. In smaller workshops, or places without water power, the stones could be hand-powered or, alternatively, horse-powered, as noted by Angerstein in the Newcastle area in 1754.³² At larger works, often founded along streams, these devices were preferably erected in separate buildings. In Birmingham, Schröder observed how such grinding mills were constructed. A cogwheel was attached to a larger wheel log and powered several smaller wheels. These were in turn attached to the stones by straps. When grinding, the worker sat ‘straddled on a bench’ with the stone rotating away from him.³³ According to Polhem, the construction of such a mill was a matter of precise mathematical calculations.³⁴

The blade was the crucial part of a knife, but it also needed a haft. According to Perret, hafts could be made from and decorated with a variety of materials. He mentioned horn and wood, and for more delicate knives imported wood like ebony and rosewood. Details could in turn be made from tortoiseshell, ivory, and nacre. Cutlers also used other metals, such as gold, silver, brass, or various alloys. This range of materials resulted in the use of a number of different tools and devices, like lathing chairs, saws, moulds, pressing works, or rolling devices.³⁵ All cutlery workshops did not have access to all these devices, or to workers specialised in the making of hafts (hafters). Therefore, these items were sometimes made by specific masters working in separate workshops. The last stage of the process, often referred to as ‘finishing’ (*finicering*), was most often carried out by the master cutler himself, since it was a complicated task that required its specific skills. It often consisted of attaching blades and hafts, but could also include additional decoration work. Again, the specific methods applied depended on the type of knife being made.

Cutlers also made scissors and forks, and in doing that they often used techniques and processes similar to knife making. The report from Tunafors, Vedevåg, and Gusum closely examined the making of forks. They were forged out of specific types of steel, and the pieces were further formed by files or in a lathing chair. The prongs were then filed and the forks were tempered, ground, and polished.³⁶ Polhem stressed how they also could be

³² Angerstein (2001), p. 253. Angerstein also depicted one ‘Horse-driven grinding wheel’, used for the making of steeled spades.

³³ ‘grensle öfwer en bänk’. Schröder, Samuel, *Dagbok rörande Handel, Näringar och Manufaktur m.m. Ut i Danmark, Holland, England, Frankrike och Tyskland. Under verkstälde resor, åren 1748–1751 förd af Samuel Schröder*, vol. I, fols. 221–225. X.303. Handskriftssamlingen. KB.

³⁴ Polhem (1761), pp. 86–87.

³⁵ Perret (1771), pp. 17–40.

³⁶ Münchenberg, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. RA.

formed by the use of dies.³⁷ Forks were then given different hafts and decorations, to match the table knives. Together, these two specific items constituted an emerging new commodity during the period in question here. The same could be said regarding a wide variety of other cutlery wares, such as fine scissors. Thus, cutlery making was closely linked to the vending and displaying of commodities, as part of the changing demands and ‘tastes’ of consumers.³⁸ Perret argued that the cutler was both ‘Master and Merchant’, and his workshop ‘should be proper and clean in order to receive decent people.’ Bulky and dirty devices, such as the hearth, were preferably placed in the innermost parts of the workshops.³⁹

The Art of Proportioning Processes and Tasks

The processes and tasks described above were all complicated in their own right, but it was the proportioning of them that was crucial to the cutler’s work. According to Harmens, knowing how to do this distinguished the most skilled masters.⁴⁰ The description above should thus not be seen as arbitrary, as is also shown by Perret’s division of the work into specific processes (which in turn brought together various tasks).⁴¹ On the one hand, this reflects the fact that metal crafts — as well as other crafts — by nature consist of a variety of techniques that are performed in a specific order and are connected to each other. The texts used above can thus be seen as attempts to make sense of the tasks included in cutlery making, in order to understand the craft itself.

On the other hand, these descriptions can also be related to a changing European context for metal manufacturing. Gradually during the early-modern period, metal processing saw divisions of labour developing in certain regions or urban areas. The most famous example is the British metal trades, where towns like Birmingham and Sheffield were characterised by intricate ways of organising metal making — through a division of labour within and between workshops, as well as through wider patterns of subcontracting and co-operation. The cutlery making in Sheffield was early on divided both regarding processes (like forging and grinding) and products.⁴²

However, attempts were also made to implement a division of labour ‘from above’, that is, by the initiatives of protectionist states and in line with

³⁷ Polhem (1761), p. 84.

³⁸ C.f. Berg (2002); Pérez (2008). Regarding table cutlery, see Moore (1999), pp. 195–200.

³⁹ ‘Maître & Merchant’; ‘doit être propre & décente pour y recevoir d’hônnetes gens.’ Perret (1771), p. 41.

⁴⁰ Harmens, *Berättelse om Wedwog och Qwarnbacka Jern och Stål Manufacturie, Upsatt år 1727*, Section II. RA.

⁴¹ Perret (1771). He distinguished between the making of hafts (including sawing, shaping, and engraving or making inlays), blade making (including forging, filing, tempering, grinding, and polishing), and finally the attaching of the two parts.

⁴² See Berg (1994), pp. 262–268.

manufacturing-oriented policies. Alder has exemplified this by discussing attempts with ‘English style’ hardware manufacturing operating in larger factories in French metal-making communities. In other cases, such as the state-supported gun making, the French solutions came to differ from the British context. These processes, Alder argued, reflect the importance of selections and adaptations over time.⁴³

The interest in describing cutlery making, and other metal crafts, can thus be connected to emerging ideas on the benefits of a division of labour — both in its wider and more specific forms. Polhem argued that some workers should be trained to make hafts, some in forging, and yet others in grinding. This working order was connected to the fact that cutlery items belonged to the ‘necessary manufactures’ rather than being ‘curiosities’; prices had to be kept low.⁴⁴ A similar view was offered in 1772 by Fougroux de Bondaroy in a discussion on cutlery making in ‘public works’. He wrote that the processes of knife making had to be ‘executed promptly’ since the prices of the finished wares did not permit ‘that one seeks to greatly perfect them.’ Still, he argued, knives that depended on the skills of several workers could be better made than others. He illustrated this by discussing the attaching of hafts and blades, and stressed how the workers should be given ‘a separate place, enough spacious for everyone to do one part of the work without bothering his comrades who are occupied with other tasks’.⁴⁵

Both Polhem and Fougroux de Bondaroy described the proportioning of processes within a metal works where tasks and skills were linked spatially and organisationally. However, attempts with a division of labour were not carried through in exactly the same way all over Europe. Rather, in line with Alder’s discussion, these processes are better understood as shaped through selections and adaptations. This is well demonstrated by the attempts with implementing piecework in the Swedish metal trades during the mid-eighteenth century. These were related to the state’s increasing interest in controlling and ‘correcting’ workshop practices. In particular, it was cutlery making that became the target of such ambitions.

⁴³ Alder (2010), pp. 233–237. C.f. Harris (1998), pp. 173–204. In discussing the making of hardware and cutlery, both Alder and Harris paid especial attention to the British manufacturer Michael Alcock, who was recruited to France in the 1750s.

⁴⁴ ‘nödiga manufacturer’; ‘curieusiteter’. Polhem (1761), pp. 78–79, 82–83.

⁴⁵ ‘ouvrages commun’; ‘executées promptement.’; ‘qu’on s’attache à y donner de grandes perfections.’; ‘un endroit séparé, & assez spacieux pour que chacun puisse faire une partie de l’ouvrage sans gêner ses camarades qui sont occupés à d’autres operations’. Fougroux de Bondaroy (1772), p. 37.

4.3 The ‘English Way’ or ‘From Hand to Hand’

Schröder’s ambition to implement a division of labour within the Swedish metal trades is most clear in his comments about workshops, with their specific processes and tasks. In this, he was inspired by his journey in England. He saw the organisation of work as related to improvements regarding the use of materials and mechanical devices. Still, the emphasis on a division of labour did not ‘arrive’ in Sweden from England with Schröder, but was rather a gradual process. Attempts with larger scale and to some extent standardised metal making had been made at provincial weapon factories since the seventeenth century. As discussed by Klingnéus, this included both a broader and a ‘complex’ division of labour.⁴⁶ Ideas on how to ‘correct’ workshop practices and improve the organisation of work were increasingly stressed by proponents of the domestic manufacturing trades during the 1730s. This was done in relation to the expanding protectionist policies. Like Schröder, these individuals often used the British trades as an example, describing metal making as organised in the ‘English way’.⁴⁷

One of them was Olof Hamren. Discussing cutlery making and the Stockholm cutler Eric Engberg in a text written in 1738, he described workshops constructed according to the ‘English way’, consisting of ‘5, and more specific workshops with their associated Machines and tools’. The benefit of such workplaces, he argued, was that ‘each worker may have his particular task, without having to grapple with one and then another chore, whereby the time is wasted, resulting in a slow and expensive work’.⁴⁸

Improving production in this way was interwoven with the recognition of a wider trade and specific commodities, but also with the further spread of skills within the domestic manufacturing system. Harmen stressed how the founding of several knife works in Sweden, with the associated training of many workers, would contribute both to a domestic supply and possibilities for export. The ‘English way’ of making cutlery was to be spread and implemented all around the kingdom, and he included a spatial plan for this diffusion where certain regions were pointed out as appropriate.⁴⁹

⁴⁶ Klingnéus (1997), pp. 92–119.

⁴⁷ This is referred to in different ways in the Swedish sources; ‘Engelska sättet’, ‘Engelska maneret’, ‘Engelska foten’ et cetera. I use the same term for all of them: the ‘English way’. On some occasions the sources refer to the ‘French way’ (*Franska sättet*), which is only another way of dealing with the same matter — piecework. Still, the ‘English way’ is a far more common term. C.f. Söderlund (1943), p. 221, 298; Ronnestam (2013), p. 265.

⁴⁸ ‘Engelska maneret’; ‘5, och flere särskilte handtwärkerier med deras tillhörande Machiner och wärktyger’; ‘hwarje arbetare måtte komma at hafwa sitt wissa arbetsämne, utan at behöfwa nu gripa till det ena, nu till det andra giöromåhlet, hwarigenom tiden förspillas, och förordsakar ett långsamt och dyrt arbete.’ Hamren, Olof, Proposal to *Handels och manufakturdeputationen*, 1738. FUh, R. 2682, fol. 484. RA.

⁴⁹ Hamren, Proposal to *Handels och manufakturdeputationen*, 1738, fol. 483, 487. RA. These regions were the countryside around Borås in Västergötland, Ronneby in Blekinge, the areas

Later while visiting Petter Wirgman's metal works in Göteborg, Hamren noted how it was organised 'in the English way, so that each and every one performs his specific task or piece of work, from hand to hand'.⁵⁰ The 'English way', as described by actors like Hamren, was thus a method for organising manual work that included both a division of labour (piecework) and spatial rearrangements. This discussion continued during the mid-century, with an increased focus on the relations between craft skills and the possibilities for further improvements within the domestic metal trades.

Instrument maker Ekström linked the inappropriate division of labour to the reluctance of many craftsmen, but he also pointed to exceptions. Among these were the Stockholm-based artisans Eric Engberg and Christian Backman. The former had arranged his cutlery workshops in such a way that the organisation of work could be improved. According to Ekström, this counteracted the main problem within this craft, that 'one worker does it all, to his own great detriment.' The watchmaker Backman was described as mastering both cruder metal processing and detail work. He had also procured and improved machines needed for his trade. Most notably, however, Ekström discussed the achievements made by the mechanic Polhem at the manufactory in Stjärnsund, directed towards 'the shortening of [working] time, the easing of handiwork and the saving of materials within iron processing'.⁵¹

In relation to Ekström's discussion, Polhem described in his *Patriotiska testamente* the necessary requirements for those who aspired to set up manufactories. For cutlery making, he argued, it was important to learn the craft 'with one's own hands'. This made it easier to detect faults made by artisans. He then described several ways in which the processes of work could be improved. The forging of blades could benefit from being divided between several smiths working with their specific tasks. He distinguished this organisation from the 'German way', which resulted in a lower daily output.⁵²

Both Hamren and Ekström argued for the benefits of a combined state support, including public funding, and initiatives taken by extraordinary talented artisans or, in the case of Polhem, men of mechanics. Organising work in suitable ways was discussed as a skill in itself, and connected to practitioners who had embraced new ideas and methods. In turn, this was

around Jönköping in Småland, Norrköping with surrounding parishes, and finally Örebro with Kumla parish in Närke. This will be further dealt with in chapters 6 and 7.

⁵⁰ 'efter den Engelske foten, så at hwar och en förrättar sitt besynnerlige giöromål eller arbete, uhr hand i hand'. *Olof Hamréns reseberättelser från södra Sverige 1742*, p. 117. MkA, De:1, vol. 176. RA.

⁵¹ 'en arbetare gör alt, sig sjelf til största last'; 'tidens förkårtande, hand-arbetets lättande och materialiers besparande vid järn-hanteringén'. Ekström (1750), pp. 20–25.

⁵² 'med egna händer'; 'Tyska sättet'. Polhem (1761), p. 81. He discussed the differences in output by comparing the number of blades forged per day. See also sections 5.4 and 6.3. In referring to the 'German way', Polhem probably meant that artisans involved themselves in many (or all) tasks. See further section 7.3.

dealt with as being of great profit for the domestic trades and the market. These texts also point to the importance of other communities within the Swedish metal trades. Above all they indicate the role of Stockholm as one *contact zone*, in line with the discussion in chapter 3.

Polhem's discussion can be seen as somewhat different in that he, at the same time as he stressed the importance of practical skills, created a distance between himself and the artisans working in his forge. They worked *for* him and according to his ideas. This can be related to the earlier plans for piecework during the 1750s. The state claimed an increasingly vital role regarding the organisation of metal making, including the ordering of workshop practices through a top-down implementation of a division of labour.

Piecework, Knife Works, and the Role of Schröder

Several of the larger metal works founded during the 1740s and 1750s were knife works (*Knivsmidesfabriker*) making knives, forks, scissors, and other edged tools. The most important of these were Tunafors, Viskafors, and Gusum. An account by *Handels och manufakturdeputationen*, from 1752, dealt with the applications for their establishment. This account will be further discussed in chapter 7, but it is important here to emphasise the way in which the Delegacy dealt with its own role in the implementation of a proper division of labour. It was 'attempting to encourage the Fabricants and Manufactories that work and support the refinement of the Realm's own products'. This encouragement pointed towards one major problem within the metal trades: 'work has not been operated in such a way, that each and every working man has had his specific skill or piece to finish, but instead one single person has been used for many crafts'. The result was that workers failed to develop their skills. Moreover, the work was slower and metal wares became expensive. The solution was a division of labour, where each worker could 'gain proper knowledge and complete skills'.⁵³

During the same Diet, Schröder tried to promote his experiences from foreign metal-making communities. After being appointed as *Directeur* in 1753, he devoted himself to forcefully encouraging the plans launched by the Delegacy. When visiting Carl Gustaf Stad in 1754, he stressed that the organisation of work could be improved in the workshops, 'so that the material as much as is possible may be passed from hand to hand, whereby dexterity in each and every skill is gained.' This improvement was also dependent upon other 'corrections' being made at the manufactory — of

⁵³ 'söka upmuntra de Idkare och Manufactur werk, som arbeta och befrämja Rikets egna producters förädlande'; 'arbetet icke blifwit drifwet på det sättet, at hwar och en arbetskarl haft sitt wissa handalag el: stycke at förfärdiga, utan i des ställe en enda person till flere slögder blifwit brukad'; 'winna wärkelig kundskap och färdigt handalag'. *Handels och manufakturdeputationen*, Account to *Sekreta utskottet* regarding the improvement of domestic cutlery making, June 1752. FUh, R. 2963, fols. 386–387. RA.

which the most important was that one master alone should be the head of each workshop. These changes, Schröder argued, would benefit both the works *and* the individual artisans.⁵⁴ Similar comments were made at the knife works referred to above. In May 1755, the *Directeur* noted how a *Satzverk* had been initiated at Tunafors. He described this as an organisation where ‘each and every piece is made finished by many workers, who are employed with specific tasks and skills’.⁵⁵

Reporting to the Diet in 1756, Schröder identified six main areas for ‘correction’ within domestic finer metal making. Owners of metal works were to be assisted with premiums for accepting apprentices. Access to the best varieties of iron was to be facilitated, and premiums were to be given to those who made high-quality iron or steel. In addition, the *Directeur* argued in favour of the founding of a drawing and modelling school, improvements in file making, and encouragement for the peasant smithery around Borås.⁵⁶ The same year, *Handels och manufakturdeputationen* noted how two knife works had been founded in the provinces according to the ‘English way of manufacturing’. Improvements related to the implementation of piecework were again linked to the needs of the domestic market, but even more clearly to the potential for export.⁵⁷

These texts illustrate the state’s increasing interest in implementing a workshop-based division of labour during the 1750s. From being discussed as a matter where artisans themselves had a substantial role in improving production, Schröder came to encourage more comprehensive attempts with organising work in a top-down fashion. This corresponds to Berch’s ideas about the supervisory role of state authorities within the common household, not only to gather information and knowledge about practices of work, but also to determine the degree of utility and to promote ‘corrections’.

The plans for piecework were, however, less successful. This can be related to Schröder’s gradually changing insights during the 1760s, including a critique of the larger manufactories. Confirming this view, the memo from 1780, which dealt with the work in Eskilstuna *Fristad*, noted how ‘there are few workshops where Piecework is operated according to a correct Works-order.’⁵⁸ Carl Rinman, who succeeded his father Sven as supervisor for the

⁵⁴ ‘at ämnet så mycket möjligt är måtte komma at gå utur hand i hand, hwarigenom färdighet i hwart och ett handalagen winnas.’ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 147–148. KB. See also section 2.5.

⁵⁵ ‘hwart och et stycke förfärdigas af flera arbetare, som sysselsättes i särskilt ämne och handalag’. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1755, p. 44. KB.

⁵⁶ Schröder, Samuel, Proposal to *Handels och manufakturdeputationen*, regarding finer metal making, March 1756. FUH, R. 3075, fols. 1120–1122. RA.

⁵⁷ ‘Engelska tilwäknings sättet’. ‘Riksens Ständers Secrete-handels- och Manufactur-deputations berättelse, angående Swenske Fabriquernes tilstånd ifrån 1751 års början til 1754 års slut’ [from 25 May 1756]. (1761), pp. 3941–3942.

⁵⁸ ‘få wärkstäder gifwas der Stycke-arbete uti en rätt Fabrique-ordning drifwas.’ Undated memo regarding the masters in Eskilstuna *Fristad*, 1780. EFoA, H:1. ULA. C.f. section 2.5.

Fristad, reported in 1796 that most workshops were organised in such a way that ‘some persons forge and process the different parts which are finished by others, and later assembled’. Still, piecework was not the ‘common practice’. The masters were employed with making a diversity of items, and, above all, they rejected new methods due to the risk of losing their skills and professional pride.⁵⁹

Magnusson emphasised how metalworking in the *Fristad* during the first half of the nineteenth century was characterised by a majority of small-scale enterprises — built on traditional craft techniques and a low degree of division of labour. At the same time, the community continuously saw attempts to implement new working methods, directed towards specific processes and products. In particular, Magnusson dealt with the role of some innovative manufacturers, often with experience from metal-making communities in Europe and England (like Sheffield). During the 1840s and 1850s, such plans were increasingly referred to in terms of the ‘English model’ or the ‘English method’.⁶⁰

As shown here, the promotion and attempts with a workshop-based division of labour can be seen in a wider perspective and during a longer period. Ideas about the ‘English way’ of making metal wares had been launched already a century before the discussions in the 1840s, as illustrated by Hamren’s writings. Moreover, these early attempts gave rise to an increasingly more ‘curious’ state. The ambition to control the different linked processes of the metal trades gradually directed the state’s interest towards various practical aspects of specific crafts, such as cutlery making. Here, one related feature was the interest in the qualities of metals.

4.4 *Making and Using Diversifying Metals*

During the eighteenth century, the diversification of materials and metals intensified alongside that of finished wares. This was evident in cutlery making, and notably so in relation to the use of iron and steel. For an eighteenth-century observer like Rinman, it was widely known that the latter was made from the former. Pig iron, with higher carbon content than steel, was used for crude steel. When instead improved through a process of decarburisation — lowering the carbon content — the iron could be shaped into bars. The resulting product, bar iron, was used for cementation (or blistered) steel.⁶¹

⁵⁹ ‘vissa personer smida och tillämma arbetets delar som af andra göras färdiga, och sedan sammansättas’; ‘allmän vana’. Rinman, Carl, Letter to *Kommerskollegium*, 1796-04-04, quoted in Hörsell (1983), p. 52, my transl.

⁶⁰ Magnusson (1988), pp. 129–158; quotations from p. 131 and p. 133.

⁶¹ Rinman (1788), (*Bränstål*), pp. 329–331; Rinman (1789), (*Smältstål*), p. 750.

The techniques of making iron, and of processing it into steel, had been successively developing from ancient times. This production is also one widely researched area. The intention here is thus not to recapitulate the history of iron- and steelmaking, nor to discuss the exact production techniques in eighteenth-century Sweden. Rather, my interest in iron and, above all, steel lies in the *use* of them when making cutlery. As we have seen, eighteenth-century descriptions on cutlery making included thorough discussions on these metals. The use of steel was perceived as interwoven with the potential to ‘correct’ and organise cutlery-making practices.

This relates to the work done by Evans and Withey. They have approached the British steel trades from a perspective which emphasises the demand for steel, by discussing the links between artisanal practices, ‘Enlightened’ professions, and dealing activities. They concluded that steel was a ‘multivalent material: a metal that had couture prestige and scientific associations as well as functionality.’⁶² This is well-illustrated by the texts used in this section, and especially the ones written by Rinman. They can indeed be regarded as comprehensive works intended to describe and grasp the qualities of metals. They were, however, also deeply concerned with their further processing and functionality. In these texts, the *knowing* and the *making* of iron and steel were connected to the *making use* of them.

Iron: The Material Foundation of Steel

Iron was thus, seen in a wider perspective, the material foundation of all types of steel. It was also used to further adapt the steel for the task at hand, by the welding of iron and steel bars. This was often done at the steel forge, but it could be done in the cutler’s workshop as well using special iron pieces which were welded with steel during the forging. In both cases, it was important that the smiths applied the right heat in the hearth and treated the piece with care so that the iron was placed correctly in relation to the steel. The techniques used varied and depended on the shape of the finished knife.⁶³

Using iron for these purposes also depended on the varying qualities and properties of different iron sorts. When Alströmer visited Sheffield in 1719, he noted how English iron was used for cutlery since it ‘blended better with the steel than the Swedish [iron], is better processed, and becomes softer or smoother, when it is hot, but harder and more rigid when it is cooled’. The

⁶² Evans and Withey (2012), p. 556. As noted in chapter 1, Evans and Withey were critical to the perspective held by Mokyr. For the latter’s discussions on iron and steelmaking, see e.g. Mokyr (1992), pp. 92–96, 116–119; Mokyr (2011), pp. 131–133, 142. The image of science as impacting the processing of metals during the eighteenth and nineteenth centuries was early nuanced by Smith (1961).

⁶³ See e.g. Münchenberg, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. RA. C.f. chapter 7.

Swedish iron was ‘too smooth and easily bent’, and was instead used for other goods (like cementation steel).⁶⁴

A more comprehensive discussion on the combining of iron and steel was offered by Perret. He described how pieces of iron were preferably used for increasing the resilience of knife blades. Iron was soft and the steel more brittle and delicate, and when combined the blade became both sharp and proof against regular wear.⁶⁵ Iron and steel thus had different qualities, and by welding them together the smiths created something new. Various processing techniques developed alongside the expansion for finer metal making during the eighteenth century, which is especially evident regarding steel. Breaking steelmaking down into two major categories, crude steel and cementation steel, gives a preliminary view of this diverse metal.

The Multi-Functionality of Crude and Welded Steel

Crude or boiled steel (*Råstål* or *Smältstål*), ‘Natural steel’ according to Rinman, was made directly from pig iron in specific fineries — like bar iron — but, ‘rather turns into steel, than into soft iron’. It was preferably made from specific ‘steel ores’.⁶⁶ The resulting steel could be obtained in various qualities, which were in turn suitable for different uses. Rinman argued that the purest variety, *Kärnstål*, was preferably used for cruder tools. Other qualities, *Mittelkörn*, were seen as inferior, as they contained strains of iron, but after being improved by welding, these kinds of steel could be suitable for items of regular use, such as table knives.⁶⁷ During the early-modern period, a multitude of such welding procedures developed across Europe.

In his *Anledningur til kunskap*, Rinman referred to welded steel (*garvstål*) as refined crude steel. By combining different types, the finished steel could be adapted for a variety of metal wares. He described how these techniques had been developed in Germany, Austria, Hungary, and Italy — in places such as Steyermark, Schmalkalden, the Tyrol, Remscheid, and Solingen. Still, he argued, welded steel of similar quality was also made at Swedish steelworks, such as Gravendal, Graninge, Forsmark, and Skisshyttan.⁶⁸

The connections between Sweden and other European regions were described by Swedish travellers and officials. In his description from Vedevåg, Harmens mentioned how foreign artisans, among them German

⁶⁴ ‘blandar sig bättre med stålet än det svenska, arbetas bättre, och blifwer miukare ell:r lenare, då det är het, jemwäl hårdare och styfware när det är kalt’; ‘för lent och böyas’. Alströmer, Jonas, *Resa i England 1719, 1720*, fol. 71. X.376. Handskriftssamlingen. UUB. As discussed in section 2.4, the use of Swedish bar iron was common in the steel furnaces around Sheffield.

⁶⁵ Perret (1771), pp. 31–32.

⁶⁶ ‘Naturligt stål’; ‘snarare vänder sig til stål, än til mjukt järn’; ‘stålmalmer’. Rinman (1789), (*Smältstål*), p. 750.

⁶⁷ Rinman (1789), (*Råstål*), pp. 458–460.

⁶⁸ Rinman (1772), pp. 245–246. C.f. Sahlin (1931), pp. 55–70.

steelmakers, had been recruited to the works. He stressed how the smiths made steel by using pieces of pig iron that were melted, refined from cinder, and powdered with ash, vitriol, and alum. The steel was then welded, smelted, and lumped together in pieces that were hammered out into bars in a chafery. After being broken into smaller pieces, the same procedure was repeated until the steel reached the desired quality. Different types of steel required a varying number of re-weldings: barrelled steel (*fatstål*) was forged directly from the smelt, blade steel (*klingsål*) was welded four times, and spring steel (*fjäderstål*) eight times.⁶⁹

Rinman later came to criticise descriptions like Harmens'. He turned strongly against the ideas of adding materials, such as sand, glass, or ash, when making steel, which according to the mining official were nothing but pure fabrications. Instead, he argued in favour of further practical experience in order to come up with credible descriptions of steel and its refinement.⁷⁰ This critique reflects his ambitions to merge the theory and practice of steel and metal making, and to describe these processes in more systematic ways.

Still, Harmens seems to have been right in stressing the connections between artisan mobility and the *circulation* of processing techniques. Swedish officials travelling in Europe described similar connections between other regions and steelmaking communities. Steel and welding methods were locally adapted in diverse ways. In Sheffield, Alströmer noted how 'Woolver-steel' was imported from Solingen in Germany, and used for cutlery items. It was welded with iron and, therefore, got 'tougher and more easily bent, without braking' compared to English steel.⁷¹ One related variety, known as damascened steel (or Damascus steel) was described by Anton Swab during his journeys in Germany in 1730. He noted how iron and steel bars were melted together, which made the steel both striped and more resilient. This was done 'through imitation of' Turkish steel.⁷²

The making of crude steel was, however, surrounded by problems. The process was difficult to control and the results varied accordingly. It was time consuming to make and, due to the techniques used, it often contained strains of iron. The latter problem could be avoided by welding. Still, in order to obtain purer steel, steelmakers had instead to rely on the cementation method, making a steel that Rinman saw as 'the product of art.'⁷³

⁶⁹ Harmens, *Berättelse om Wedwog och Qwarnbacka Jern och Stål Manufacturie, Upsatt år 1727*, Section II. RA. The use of a chafery differed from an older technique where such a hearth was not used. See Rönnow (1944), p. 63.

⁷⁰ Rinman, Sven, *Påminnelser wid Herr Bergmästaren Lunds Rön ock anmärkningar om stål och des tilwærkning* (probably from 1772), Rinmanska arkivet, S-K 8 71–73. TMA.

⁷¹ 'Woolver-stål'; 'segare och smidigare at böya, utan brytande'. Alströmer, *Resa i England 1719, 1720*, fol. 71. UUB.

⁷² 'i imitation af'. von Swab, Anton, (Copy of) *Resa till de Tyska Bårgverken 1730*, entry for July 23 1730. X.384. Handskriftssamlingen. UUB.

⁷³ 'konstens product.' Rinman (1789), (*Smältstål*), p. 750.

Cementation Steel: A Product of Art

The making of cementation steel was not as common as making crude steel, but it was still not a novelty in mid-eighteenth-century Sweden. Harmens mentioned it in his discussion of Vede våg. He described a furnace with two chests, in a traditional German manner, and how iron bars were ‘burnt to Steel in three weeks’. The result was swollen steel covered with blisters. It was often unevenly carburised, and the smiths had to knock off unwanted parts before it could be further processed in the hearth. Steel made in this way, Harmens argued, became free from sulphur and cinder, and it was high in demand by artisans who improved it by welding and tempering.⁷⁴

Attempts were also made at other works during the first half of the eighteenth century with cementation furnaces built after English fashion. Not far from Stockholm, in Tyresö, the English manufacturer John Peter Smith supervised the making of cementation steel from the mid-1730s. He had been recruited to Sweden in 1722 to assist in the promotion of the domestic manufacturing trades. In 1738, he argued that finer metal items made in Sweden often were characterised by decent shapes and external finishes, but also by inferior ‘internal quality’. The root of the problem, Smith continued, was the steel and the incorrect uses of it. He admitted that German and Swedish steel could sometimes be of good quality. Most often, however, it was ‘hard and badly blended.’ This problem could not be remedied by a fine polish. Rather, the solution was to make good quality cementation steel. Together with his brother, Smith built the furnace at Tyresö by procuring building materials, coal, and workers from England.⁷⁵

There were, however, problems related to the making of cementation steel as well. When official Samuel Linder visited Tyresö in 1744, he stressed how good quality iron was required, ideally, Oregrund-iron. Attempts had been made at Tyresö with other kinds of bar iron, all found to be impossible to use.⁷⁶ Yet other problems were related to the sorting procedures applied for cementation steel.⁷⁷ Despite these problems, the cementation method was gradually advanced in Sweden. Sahlin noted, in fact, that the domestic market for steel became increasingly saturated, which resulted in a temporary ban for new furnaces in 1753 in order to counteract a price decrease.

⁷⁴ ‘brännes till Stål på tre veckor’. Harmens, *Berättelse om Wedwog och Qwarnbacka Jern och Stål Manufacturie, Upsatt år 1727*, Section II. RA.

⁷⁵ ‘inwärtets beskaffenhet’; ‘hårdt ock swagt blandat.’ Smith, John P., Proposal to *Handels och manufakturdeputationen*, June 1738. FUH, R. 2682, fols. 57–59. RA.

⁷⁶ S. Linders *Beskrifning öfver en Engelsk Stålugns byggnad samt om processen af sielfwa Bränningen el: Stålets beredan – ingifwen d. 1 Junij 1744*. MkA, De:1, vol. 180. RA. The furnace in Tyresö was by this time owned by merchant William Maister, and associated to the metal works referred to in chapter 3.

⁷⁷ In Sweden, a barrelling procedure was often used for cementation steel, by which it was forged in smaller pieces and packed in round barrels. This method was less popular among Swedish manufacturing artisans. See further section 5.4. In contrast, British cementation steel often came in bundles. See Rinman (1788), (*Bränstål*), p. 331, (*Bunkstål*), p. 342.

Still, the expansion continued. In 1764 there were 21 cementation furnaces in Sweden (compared to 11 works for the making of crude steel).⁷⁸

The improvement of the cementation technique was also further encouraged during the 1760s by officials like Rinman, and was linked to the advancement of finer metal making. In his *Bergwerks lexicon*, Rinman described three types of furnaces: English ones in which mineral coal was used as fuel, German ones fuelled by charcoal, and Swedish ones where wood and ‘flash-fire’ were used ‘after the most recent invention’.⁷⁹

Due to the higher temperature reached with mineral coal (giving a purer steel), Rinman considered British cementation steel made from Swedish Oregrund-iron to be the best product. Still, he stressed how equally good steel could be made in Swedish furnaces. He also compared cementation steel and crude steel, and noted how the former was more appropriate for the making of goods which were not intended to ‘endure any strong impact’. It was in general harder than crude varieties, but also more delicate and thereby difficult to forge. Importantly, he argued that this type of steel was proper to use in metal works, since it could be made ‘in the largest quantities by a minimum of smiths and workers’. Combined with the smaller usage of coal, this led to better prices than for welded crude steel.⁸⁰

However, even the British cementation steel had its flaws, one being that the bars were often unevenly carburised. Evans and Withey have argued that the development of the crucible steel technique in England during the mid-century was to a large extent driven by the dissatisfaction with the domestic steel, as well as by the competition offered by German steelmakers.⁸¹ Gradually, the making of crucible steel also attracted the attention of Swedish officials. Qvist Andersson scrutinised it closely in 1769, arguing that it only consisted of the melting of cementation steel, which was later casted in order to become more even. He then carefully described this process in more detail, before concluding that the crucible steel was preferably used for tools and cutlery wares (such as files, razors, and scissors).⁸² In his longer travel account, Qvist also dealt with improvements of the cementation method. He particularly emphasised the welding procedures, of German origin, that had been developed at the steelworks Blackhall mills.

⁷⁸ Sahlin (1931), pp. 87–89, 95.

⁷⁹ ‘flämd’; ‘efter nyaste påfinning’. Rinman (1788), (*Bränstålsugnar*), p. 331. The invention of the latter technique has been attributed to the Robsahm brothers, owners of Vissboda steel works in Närke. Johan L. Robsahm travelled in England in 1761 and observed the making of cementation steel and crucible steel. Five years later, and in cooperation with Rinman, the two brothers carried out successful tests with a furnace fuelled by wood. See Sahlin (1931), pp. 91–93, 202–203; Rydberg (1951), pp. 189–193.

⁸⁰ ‘uthärda någon stark påkänning.’; ‘til största mängd med minsta antal af smeder och arbetare’. Rinman (1788), (*Bränstål*), p. 330.

⁸¹ Evans and Withey (2012), p. 538.

⁸² Qvist Andersson, Bengt, Description of the making of crucible steel, Stockholm, 1769-12-15, §3, §10. BbM, E:12:5. KTHB.

This welded cementation steel — referred to as ‘German steel’, ‘Newcastle steel’, ‘shear steel’, or ‘spur steel’ — was highly demanded, he noted, by cutlers and tool makers in Sheffield⁸³

Adapting Steel for Cutlery: *Messerstahl* and Knife Steel

Both welded crude steel, cementation steel, and, later, crucible steel could thus be used for making cutlery. Importantly, by applying different welding techniques, smiths could create steel appropriate for specific kinds of knives. In his *Bergwerks lexicon* Rinman discussed knife steel, originally from Germany (*Messerstahl*) and made from welded crude steel. It was obtained in two kinds: ‘boutscher steel’ (*krampstål*) and ‘beckstoff steel’ (*klöflagt*).⁸⁴

The Swedish metallurgist had by then already observed the making of knife steel himself when travelling in Germany in 1747. Visiting the famous steelmaking community Remscheid, he noted how these were two out of many welded varieties that were made and used by the artisans. The making of ‘boutscher steel’ caught his attention since it included a ‘secret and rare’ art of welding iron and steel bars with different firmness. In detail, he described and depicted the steps of placing the bars correctly in order to obtain the desired quality. This steel was exported to England where it was used for table knives. According to Rinman, this was because British cementation steel could not be used for making ‘boutscher steel’.⁸⁵

The same kinds of knife steel were later referred to by Angerstein during his journey in Germany. His description differed from Rinman’s, in that he referred to the ‘beckstoff steel’ as *krampeståhl*, and argued that it was the one used in England for the making of table knife blades. The broader and thicker ‘boutscher steel’ was instead used for kitchen knives and craftsmen’s knives. In addition to England, these two varieties were extensively exported to Holland from the Bergisches land, according to Angerstein.⁸⁶

The story is, however, even more complex. During his second stay in England, in 1725, Kalmeter visited a cutler named Mr. How in Southend, near London, who used a steel called ‘backstuff’. This specific variety had formerly been made only at this works, but the technique had later been

⁸³ Qvist Andersson, Bengt, *Anmärkningur uti Hwarjehanda förefallande Ämnen Samlade på Resan i England åren 1766 och 1767*. BbM, D14. KTHB. See also Evans and Rydén (2007), pp. 135–139, 321.

⁸⁴ Rinman (1788), (*Garfstål*), p. 578, (*Knifstål*), pp. 992–993. He also dealt with these types of steel in his earlier writings. See Rinman (1772), p. 294.

⁸⁵ ‘nog hemlig och rar’. Rinman, Sven, *Utdrag af Beskriningarne öfwer Någre Utländske Jern och Stål Fabriqwer besedde År 1747, af Swen Rinman, Första stycket*, pp. 37–42. BbM, K12. KTHB.

⁸⁶ Angerstein, Reinhold, *Om Järnwärcken Bägge Sidor Renströmmen, Ifrån Bodensee i Sveitz till Coblentz. Af Reinhold Angerstein. Utgifwen År 1758*. BkH, E3:27. RA. C.f. Rinman (1772), p. 294, where the beckstoff steel is referred to as ‘Dutch knife steel’ (*Hollenskt knifstål*).

transmitted to Solingen. At the time of Kalmeter's visit, Mr. How obtained all his 'backstuff steel' from Solingen, often transported via Amsterdam. It came in 'long bundles' appropriate for the making of table knife blades, and Kalmeter noted that it was particularly distinguished by a strand of iron in the middle. Unlike Rinman and Angerstein, however, he argued that it was preferably made from several bars of 'blistered steel'.⁸⁷

These types of steel (from now on referred to as backstoff steel and butscher steel) have also been mentioned in research dealing with the diversifying steelmaking in Sweden during the eighteenth century. Sahlin dealt briefly with them in describing the making of welded steel at Vedevåg, Skisshyttan, and Graninge.⁸⁸ In his work about Vedevåg, Rönnow argued that these varieties were distinguished by the fact that they were made by the welding of steel *and* soft iron bars. They could also be improved through repeated welding.⁸⁹ As will be dealt with in the following chapters, the making and making use of this steel was connected to the attempts to introduce piecework at Swedish knife works.

The story of knife steel shows how welding methods were circulated and adapted during the mid-eighteenth century in order to achieve metals with specific qualities. Steel was truly a multivalent material, referring back to Evans and Withey. The *making* and *using* of steel also became of increasing interest within the often linked spheres of science and policing during the period. Supporting and controlling the flow of metals was, however, not only a way for the state to increase the revenues to the treasury. It was also a way for officials and supervising authorities to gain access to workshop practices and the processes of work. To these observations, we can also add the use of other materials, which further illustrate the intricate context of cutlery making that is in focus here.

Wood, Alloys, and Precious Metals: The Art of Combining

In his book on the cutler's trade, Perret discussed the use of three other metals, complementing iron and steel. Copper was used for making ornaments, while silver and gold were used for decorations on hafts and blades.⁹⁰ The making of hafts in turn involved the combining of metals with wood, horn, or other exclusive materials such as ivory or nacre. Many of these materials were imported over vast distances. The increased use of them also

⁸⁷ 'långa knippor'; 'blester stål'. *Henrik Kalmeters resa*, vol. III, pp. 751–759. M.249. Handskriftssamlingen. KB The cutler in question was John How, who had taken over this works from his late father Ephraim How. The How family works was situated at Southend Corn Mill, Lewisham, and at Chingford Mill, Essex. See Moore (1999), p. 170, 200, 207.

⁸⁸ Sahlin (1931), pp. 58–70.

⁸⁹ Rönnow (1944), p. 171. At Vedevåg during the 1740s, backstoff- and butscher steel were made either by welding four times or twelve times. See also section 5.4.

⁹⁰ Perret (1771), p. 27.

gave rise to specialised industries during the period of interest here. Traveling in Europe in the 1730s, Swab mentioned how he had passed through Rouen and Dieppe in north-western France where he observed various factories for the processing of materials used for hafts.⁹¹

Regarding this matter, books concerned with the making of table cutlery have stressed the spread of processing techniques during the mid- and late-eighteenth century. As one example, Bengt Bengtsson mentioned how the ‘English method’ for pressing silver hafts gradually was implemented in Sweden.⁹² Such observations put emphasis on the connections between artisan mobility and the *circulation* of skills. A discussion on changing cutlery-making practices during the eighteenth century will hence preferably include the *making use* of metals and materials in relation to a social context. Such an approach, it is argued here, will make visible not only the connections between workshops in Stockholm, larger provincial works, and foreign metal-making communities, but also how cutlery making was negotiated by individuals with different agendas. One such person was Stockholm cutler Eric Engberg, whose trajectory will be followed in the subsequent chapters.

4.5 Conclusion

This chapter is the last part of what I have called a *strategic stage* for metal making. Using this term, an attempt has been made to portray the eighteenth-century perceptions of economy in general and of the manufacturing of finer metal wares in particular. While chapters 2 and 3 explored the regulative and spatial claims emanating from the state, this chapter has targeted the practical processes of metal making. The aim has been to examine the interest in describing, understanding, and controlling workshop practices. In doing this, I have shown an increasing ambition on the part of political and scientific actors and institutions to grasp the organisational and material aspects of cutlery making.

The regulations of the manufacturing system incorporated some organisational features from the craft guilds, at the same time as instituting new forms of practices, networks, and rules for metal-making artisans. One related and important aspect of the emerging system was the interest of the state to enter workshops and supervise work. I have illustrated how such ambitions increasingly relied upon descriptions of manual skills, mechanical devices, and the proportioning of tasks and processes. The discussions about the division of labour during the mid-century have a dual character; partly they show how curiosity and a genuine interest in practice were connected to attempts to control and ‘correct’; partly they demonstrate the links between

⁹¹ Swab, Anton, Undated biographical draft. X.240. Handskriftssamlingen. UUB.

⁹² Bengtsson (1963), pp. 46–48.

policing, science, and artisanal practice. Here, the early attempts with setting up workshops in the ‘English way’, according to the principles of piecework, stand out as particularly suitable for further exploration.

Finally, this chapter has demonstrated how such a discussion also needs to integrate the diversifying materiality of manufacturing, and especially the *making use* of steel. An increasing attention was given during the period to the connections between the organisation of work and the use of metals. In the chapters to come, I will show how this development also included artisanal practices where knowledge, skills, and materials were negotiated. Not only did this contribute to more systematic accounts of metal processing; it also opened up ways for artisans to *move* within the system.

This points towards an important aspect of this investigation: eighteenth-century metal making cannot be exclusively studied from the vantage point of general *strategies*. In order to really grasp the merging of practice and theory, knowledge and skills, as well as attempts to implement a division of labour or the advocacy for liberty, another layer is needed. Metal manufacturing must be studied *in its making* on the streets of the *metal bazaar*, in cutlery workshops, or in other contexts where people, practices, and skills intersected.

It is in this sense that the *strategic stage* proposed above should be understood: as attempts to make sense of, and establish ideas about, places and practices. Still, the *strategies* shaped by the eighteenth-century Swedish state administration did not exist unchallenged or unaltered. Rather, it is by following the interplay between *strategies* and peoples’ *tactics* in everyday metal making that changes within manufacturing really can be grasped and clarified. Such a perspective makes evident the importance of wider movements, as well as of local adaptations and *imitations* over time.

In the following two chapters, I will analyse artisans’ journeys and the construction of workshops. In these chapters, I mainly relate to the trajectory of one artisan, the Stockholm cutler and manufacturer Eric Engberg. Still, this is done by contextualising his undertakings by discussing other actors and practices. This way of approaching the ‘micro-level’ of eighteenth-century manufacturing is not an attempt to derive historical change from extraordinary examples or exclusive events. On the contrary, it draws upon and makes evident the dynamism and intersections of everyday human action. This will be evident in chapter 7, where the negotiation of practices and skills — related to the state-initiated attempts with piecework — is further discussed. As a whole, these three chapters illustrate and explore a *skills-trajectory* being shaped over time.

CHAPTER 5

Practising Crafts on the Move: Artisans' Journeys and the *Circulation* of Skills

The previous chapter dealt with an organisational, spatial, and material presentation of eighteenth-century cutlery making. It demonstrated important features that will now be investigated by a closer look at changing metal-making practices. This chapter begins by analysing artisans' journeys and the *circulation* of skills and knowledge during the mid-eighteenth century. I mainly investigate two foreign journeys made by Eric Engberg, in 1735–1738 and in 1754–1755, but comparisons are regularly made with other travelling craftsmen. Artisans' voyages have been discussed in some other Swedish studies. Ronnestam related them to the founding of watchmaking works in Stockholm, and Amelin linked them to transmissions of technology within the instrument-making trade.¹ Still, there is a substantial need to deal with artisan mobility within the metal trades more extensively. There are three main reasons for starting the practice-oriented section of this text with such a discussion.

Harking back to one main argument of chapter 2, I argued that the tours made by Swedish officials were ways for the protectionist state to gain knowledge about foreign metal manufacturing. At the same time as they served a purpose of control, these journeys point to the state's growing interest in, or curiosity about, metal-making practices. Still, as argued by Rinman in his *Anledningur til kunskap*, practical knowledge could never be fully obtained by travelling gentlemen. State officials could make observations of processes and techniques, but they never fully understood the concrete operations of work. In order to achieve this, the state also needed artisans to travel abroad. Artisans' journeys thus offer examples of the connections (and differences) between *systemic observation* and *practising skills on the move*.

Related to this, artisans' journeys are good examples of one major argument of this investigation: changes in early-modern production cannot be seen as one-way transfers. Incentives for improvements did not just 'arrive' from abroad to be implemented within the Swedish manufacturing trades. The approach of seeing journeys as more complex practices, going beyond the act of being away, is one way to nuance this picture. This is in line with

¹ Ronnestam (2013), pp. 245–250; Amelin (1999).

investigations that have stressed the merging of scientific ideas, artisanal practices, and politico-economic strategies in early-modern Europe, especially by following and mapping out trajectories of skills and the dissemination of technology.² Ideas and techniques were *grounded* as they were *circulated* between different metal-making communities. These processes included selections, adaptations, and reconfigurations in localised practice.³

Furthermore, journeys were matters of negotiation, integrated within the politicising of processes and practices. Foreign voyages and acquiring of new techniques were ways for artisans in Stockholm to obtain privileges, thereby distancing themselves from the guild framework. Journeys were thus *used* by aspiring manufacturers in order to promote themselves and their skills to political institutions or at the Diets. In this way, movements created a potential for social mobility within the system.⁴ At the same time, state institutions wanted something in return for offering their support. This tension touches upon the interest of this investigation in the intersections of *strategies* and the *tactics* of everyday metal making. As argued here, such an approach also questions Mokyr's notion of 'useful knowledge'.⁵

In order to capture these features, this chapter is organised thematically. The first section introduces the main character in the following three chapters, Eric Engberg. Following this presentation, I deal with the art of setting out as artisan. Here, the social networks and expectations related to artisans' journeys are laid bare, with a specific focus on patronage relations.

Section 5.3 targets the art of being away, including the most difficult task for an artisan on the move: getting into the practical processes of work. Relating to the notion of *tactics*, I discuss the ways in which artisans manoeuvred within different social, material, and political contexts. At the same time, Swedish artisans on the move were monitored by the Swedish state, and, in some cases, also by other nations with interests in 'keeping' foreign craftsmen.

Journeys did not end with the arriving home. Rather, as discussed in section 5.4, craftsmen could continue their journeys in Sweden, in order to serve the 'spread' of skills. These prolonged movements included the *grounding* of knowledge practices in different localities as well as exhibitions and negotiations of skills. This is also related, in the closing section, to the recruitment of foreign craftsmen to Sweden. This latter type of artisan mobility has been emphasised in previous research. I rather speak of intersecting movements as shaping domestic metal-making practices in various ways.⁶

² See e.g. Hilaire-Pérez (2002); Roberts (2007c).

³ C.f. Raj (2007), pp. 18–22, 57–59, 92–94; Alder (2010), pp. 233–237.

⁴ For discussions on social mobility, people's movements, and change during the eighteenth century, see Roche (2002); Roche (1998), pp. 55–74. For a Swedish context, Orrje has discussed the 'performances' of oeconomic visions at the Diets. See Orrje (2015), pp. 170–198.

⁵ See Mokyr (2002). See also the discussion in section 1.2 above.

⁶ C.f. Hilaire-Pérez and Verna (2006); Davids and De Munck (2014), pp. 22–27.

Discussing artisans' journeys from a practice-oriented perspective is not easily done, mainly because of the lack of sources. Artisans seldom wrote longer reports or kept travel diaries, as was the case for travelling officials. Instead we have to rely on other types of materials, which in their connectedness can be seen as 'records of practice', speaking with Pamela Smith's terms.⁷ There are some sources left that were written by artisans. Often, however, I have traced journeys in different sub-archives. They have gradually emerged when protocols, letters, applications, and instructions have been added together. In this respect, the archives from *Kommerskollegium* and *Manufakturkontoret* have been particularly valuable. These sources are also useful in that they illustrate how artisans' movements took place within a wider context in change. By using Engberg's two journeys in this way, this chapter points to changing notions regarding metal manufacturing. It emphasises in particular the links between a diversifying steelmaking and attempts to organise cutlery making in the 'English way'.

5.1 From Refugee to Manufacturer: Eric Engberg's Biography

Eric Engberg was born 1691 in Finland.⁸ Not much is known about his early family circumstances, but two of his brothers and his mother later came to live with him in Stockholm. Growing up on the outskirts of the Swedish realm, young Engberg experienced the conflicts with the adjacent Russian empire, something that also influenced his 'choice' of craft. In a text from 1756, he wrote that:

It has well been my discipline from my childhood years, to practise the smith's handicraft, ever since I as a Boy in my 15th year was abducted by Russian Cossacks, who then left me with the Russian General Alepiwaniwou, who, after 12 years in his service, first put me in a farrier's forge, and then in the forging of Blades and Rifles at Systerbeck in Russia, where I worked just over 6 years under harsh supervision and surveillance, until I, with Love for my Fatherland and relatives, at last got the opportunity to take my escape skiing through the forest to my home Finland⁹

⁷ C.f. Smith (2007), p. 36.

⁸ All the birth dates mentioned for members of the Engberg family in this section are obtained from later parish records from Stockholm. See e.g. Parish catechetical meeting, 1753, *Jakob och Johannes*. Jakob och Johannes, AIa:6, pp. 88–89 (51). SSA. Arkiv Digital AB.

⁹ 'Det har ock varit mit ämne ifrån barnaåren, at idka Smedhandwäret, alt sedan jag en Gosse på 15de året blef tagen och bortförd af Ryske Cossaker, de der öfwerlåta mig til Ryske Generalen Alepiwaniwou, som, efter 12 års tjenst hos honom, insatte mig först i hofslagars-medja, och sedan i Klinge och Gewärs smidet wid Systerbeck i Ryssland, derest jag något öfwer 6 års tid under sträng tilsyn och bewakning arbetade, intill des jag af Kärlek för Fäderneslandet och anhörige, omsider fick tillfälle på skidor skogledes taga flykten til min fädernes

Returning to Finland, Engberg decided to continue to work as a smith and set out for Stockholm. In the Swedish capital he became a journeyman to the cutler Michael Häggblom at *Smedjegatan*. After six years, in 1731, he made his masterpiece and obtained a mastership.¹⁰ He also became a member of the cutlers' guild.¹¹ These dates in Engberg's biographical information must be treated with some caution, however. He was mentioned as a master cutler already in 1728 in the records of the Office for Trades and Constructions (*Ämbets- och Byggningskollegium*).¹² He was also listed in master Häggblom's household in the head tax record of 1721, referred to as a 'refugee from Finland' and as being 14 years old.¹³ The fact that Engberg worked for Häggblom as early as in 1721 does not correspond with the information provided by Engberg himself in 1756¹⁴, nor does the age given in the head tax record. Most likely, Engberg arrived in Stockholm shortly before 1721 and worked for Häggblom up until the late 1720s. In 1730, he lived on *Karduansmakargränd* on *Norrmalm* with his old mother Brita and his brother Simon, referred to as Eric's apprentice.¹⁵

Soon after being established as a cutler in Stockholm, Engberg was approached by Jonas Alströmer about making a journey to England. Engberg accepted, and was supported with money from *Kommerskollegium*. He set off in late 1735 and stayed for about two years, practising in particular knife making.¹⁶ For some time he was accompanied by his brother Morten, while the third brother Simon supervised the workshop back in Stockholm.¹⁷

After leaving England, Engberg travelled through the Low Countries and France to Solingen in Germany, where he had the opportunity to learn more about the making of backstoff and butscher steel.¹⁸ He arrived in Sweden, at Göteborg, late in 1738. After returning, he was encouraged by *Kommerskollegium* and *Manufakturkontoret* to share his skills with artisans at provincial manufactories.¹⁹ During this period, he also settled in Stockholm with his wife Brita — born Fogel — (1710/1711–1776). Together they had three

ort Finland'. Engberg, Eric, Proposal to *Handels och manufakturdeputationen*, May 1756 (*Engberg, om årl: pension*). FUH, R. 3077, fols. 371–372. RA.

¹⁰ Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fol. 372.

¹¹ See *Knivsmedsämbetet*. Skråarkiv, 32:1. SSA.

¹² See *Ämbets- och Byggningskollegium*, Protocol, 1728-09-17; Protocol, 1728-09-24. ÄMB, AI:26, fols. 380–381, 406. SSA.

¹³ 'flycktinge ifrån Finland'. Head tax record, 1721, Stockholm, *Norrmalms östra övre del*. ÖfU, G1BA:12:4, fol. 88 (93). SSA. Arkiv Digital AB.

¹⁴ C.f. Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756.

¹⁵ Head tax record, 1730, Stockholm, *Norrmalms västra nedre och övre del*. ÖfU, G1BA:13:1, p. 86 (49). SSA. Arkiv Digital AB.

¹⁶ Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fol. 372. See also KkH, Alaa:104; EVIaa:231. RA.

¹⁷ *Knivsmedsämbetet*, Protocol, 1736-01-30. Skråarkiv, 32:1, p. 4. SSA; Alströmer, Jonas and Clason, Johan, Letter to *Kommerskollegium*, London, 1737-05-13. Jonas Alströmer, London, 1736–1739. KkH, EVIaa:231. RA.

¹⁸ Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fols. 372–373. RA.

¹⁹ KkH, Alaa:108; Alaa:110. RA.

children: Eric Jr. (1736–1758), Brita Lisa (1741–1756), and Maria (born in 1742 or 1743).

Throughout the early 1740s, Engberg was in frequent contact with *Kommerskollegium* and *Manufakturkontoret* about the building of a new workshop in Stockholm. Construction began in 1740 on a place by the water close to *Packartorget* on *Norrmalm*. *Manufakturkontoret* noted that it was set up in the ‘English way’ in order to make cutlery in the ‘English manner’. The workshop was part of the manufacturing system, but for some time Engberg was also listed as a member of the cutlery guild.²⁰

Engberg, however, soon found himself in trouble during the political turmoil of the early 1740s, following the Swedish defeat in the Russian War in 1741. He assisted the escape of General Charles Emil Lewenhaupt (accused for the lost war) from prison the night before the general’s execution in 1743. The coup was discovered and Engberg was sentenced to prison.²¹ Despite this setback, his workshop expanded during the 1740s, employing his two brothers and a growing number of apprentices.²² The expansion was spatial as well. The family owned two courtyards in the quarter *Trädgården* (or *Styrpinnen*), with two separate buildings.²³ During the late 1740s and early 1750s, Engberg also owned a courtyard at *Malmskillnadsgatan*, which he inherited from his father-in-law.²⁴

In 1755 Schröder spoke of Engberg’s workshops as constituting a ‘Works-facility’ or knife works, and mentioned how it was the first of its kind in Sweden.²⁵ By then, however, many of the workers had left. Some of them founded cutlery works of their own, but a majority moved to the newly-founded knife works at Tunafors, Viskafors, and Gusum.²⁶ Still, Engberg remained deeply involved in domestic steel and metal making and this encouraged him to undertake a second journey to England. With the support of Alströmer again, he set off in 1754 with his two oldest children, Eric and Brita Lisa. During a year in England, they became involved in various forms

²⁰ ‘Engelska sättet’; ‘Engelska maneret’. *Manufakturkontoret*, Report to *Sekreta utskottet* (circulated to *Handels och manufakturdeputationen*), January, 1741. FUH, R. 2766, pp. 158–162. RA; *Knivsmedsämbetet*, Protocol, 1740-08-07; Protocol, 1740-10-25. Skrårarkiv, 32:1, pp. 12–13. SSA.

²¹ This episode was mentioned by Linnaeus in *Nemesis Divina*. See von Linné, Carl (1968). *Nemesis divina: Den gudomliga vedergällningen*, Malmeström, Elis and Fredbärj, Telemak (eds.). Stockholm: Bonnier, p. 132. The escape is more thoroughly described in material from the Royal Supreme Court: (Undated copy of) memorandum regarding the escape of C. E. Lewenhaupt (in *Öfverrätten tillsatt för rannsakningen mot de för delaktighet i C. E. Lewen. Flyktförsök anklagade m.m. 1743*). RÅs, Militaria, M:1594. RA.

²² Stockholm *Hallrätt*, Report 1740, part II, p. 126. HMR, BIII:1. SSA; KkH, A1aa:112. RA.

²³ Probate inventory, Eric Engberg, 1766-07-23. SRr, 1:a avdelning, F1A:207, fols. 609–612 (6130–6160). SSA. Arkiv Digital AB.

²⁴ Probate inventory, Mattias Fogel, 1744-02-06. SRr, 1:a avdelning, F1A:134, fols. 117–124 (1390–1460). SSA. Arkiv Digital AB.

²⁵ ‘Fabriques inrättning’. Schröder, Samuel, Report to *Kommerskollegium* (presented 1755-01-28), pp. 134–135. KkH, FIV:50, no. 197. RA. This is the original to Schröder (1925a).

²⁶ See Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1753–1756. KB.

of metal processing, of which the most important was the making of cementation steel.²⁷ When he returned to Sweden, he asked for an annual pension for his undertakings abroad and his services to the metal trades. With support from Schröder, this request was granted at the Diet of 1755–1756.²⁸

At that time, however, Engberg's knife works was in decline and several misfortunes followed during the late 1750s. After returning home from England, Brita Lisa Engberg died in September 1756, followed by her brother Eric in January 1758.²⁹ Despite these disasters, their father continued to be involved in attempts to improve finer metal making. In 1758, he took part in an inspection of the manufactories at Tunafors, Vedevåg, and Gusum, arranged by *Manufakturkontoret*. During this journey he encountered some of his old workers as well as the techniques that he had brought with him from his journeys abroad.³⁰

New misfortunes again eclipsed the life of the Engberg family when Eric became the target of a Royal Commission. In June 1759 he was sentenced to prison a second time for his involvement in an event taking place two years earlier, later referred to as the *Landbergska Upprörssaken*. According to Carl Gustaf Malmström, Engberg played a minor role in these events, supporting a conspiracy in opposition to the Diet by a mining peasant from Värmland, Jöns Landberg. Malmström argued that the attempted coup was largely the result of disappointment with the increased power of the highest councillors of the state (*Riksrådet*), related to a weakened position for King Adolf Fredrik. However, Landberg also had strong personal reasons for organising the plot. During the spring in 1758 the plans were revealed, and in June 1759 Engberg was sentenced to prison.³¹ As recorded by Schröder, the cutler was to spend two years at the fortress *Bohus fästning*, near Göteborg.³² Probably, he was released again in 1762.

In June 1765 Eric Engberg died, 74 years of age. His wife Brita outlived him by a decade, and died in 1776.³³ Engberg's probate inventory reveals a

²⁷ Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756. RA. See also KkH, A1aa:2. RA; DiplA, I:366. RA.

²⁸ Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756. RA. See also Schröder, Samuel, Proposal to *Handels och manufakturdeputationen*, regarding finer metal making, March 1756. FUH, R. 3075, fols. 1122–1123. RA; Schröder, Samuel, Report to *Kommerskollegium* (presented 1758-02-28), pp. 76–77. KkH, FIV:50, no. 411. RA.

²⁹ Death record, Stockholm, *Jakob and Johannes*. Jakob och Johannes församling, *Död- och begravningsbok, 1736–1884, Elg-F, Del 02*, p. 329. SSA.

³⁰ See Münchenberg, Samuel, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. MKA, De:1, vol. 176. RA. See also chapters 4 and 7.

³¹ Malmström (1899), pp. 355–362. He noted that Engberg's involvement indicated that the cutler had reversed his political stance. Assisting in Lewenhaupt's escape in 1743, Engberg was supported by the 'Hats'. Some 15 years later, he was involved in a conspiracy favouring the monarchy. This conclusion must, however, be interpreted with caution. See also Schröder (1925b), p. 40. The conspiracy of 1757 was related to a failed coup d'état, involving the royal couple, during the antecedent Diet of 1755–1756. See Sennefeldt (2011), p. 13, 81–82.

³² Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1759, pp. 123–124. KB.

³³ Death record, Stockholm, *Jakob and Johannes*. p. 329. SSA.

scanty and impoverished household with a large debt to *Manufakturkontoret* as well as smaller ones to various persons.³⁴ Still, the workshop remained in the hands of the family for some time. With Engberg imprisoned, his wife supervised the workshop, and when Eric died it passed into the hands of his son-in-law, the farrier smith Anders Söderbom (married to Maria Engberg).³⁵ He supervised the workshop until his death, also in 1776.

An Extraordinary Biography or a Useful Trajectory?

This biography can be viewed as extraordinary in its own right and Engberg seems to have been an adventurous man making journeys abroad, setting up workshops, and involving himself in political conflicts. However, this thesis is not focused on a biographical study, analysing the life of an eighteenth-century artisan. Rather, my intention is to *make use of* Engberg's trajectory in order to investigate the connections between the *circulation* and *grounding* of knowledge and skills and changing metal-making practices. This trajectory also illustrates the blurred boundaries between *strategies* and *tactics* in different spaces.³⁶

Nevertheless, it is still worth noting that Engberg has been discussed in several previous studies. His political involvements have been noted, but he has also, although briefly, been referred to in surveys dealing with larger provincial metal works or with manufacturing in Stockholm. Irene Sigurdsson described how Engberg made cutlery in the 'English way', and mentioned that this might refer to the use of specific kinds of steel or to a certain technique for pressing silver when making hafts.³⁷ Rönnow has also written about Engberg. Discussing steelmaking at Vedevåg, he argued that the cutler had introduced the making of butscher steel in Sweden.³⁸ Moreover, both Forsberg and Hellberg described how some of his workers were recruited to the knife and metal works at Gusum, Tunafors, and Carl Gustaf Stad.³⁹

Other researchers have brought up Engberg when discussing important actors or institutions within the manufacturing system during the period. Boëthius and Kromnow noted that his cutlery works was connected to *Jernkontoret*. From 1749, the association assisted the cutler through a specific (putting-out) fund.⁴⁰ Also relevant for this chapter, Karl-Henrik Suneson has described how Engberg was one of several craftsmen who were supported by

³⁴ Probate inventory, Eric Engberg, 1766-07-23. SSA. Arkiv Digital AB.

³⁵ Stockholm *Hallrätt*, Reports 1765–1767. HMR, BIII:7–8. SSA.

³⁶ C.f. de Certeau (1984), pp. xviii–xix.

³⁷ The technique used when making such silver hafts (filled with resin), Sigurdsson argued, was disseminated from England during the mid-century. See Sigurdsson (1982), pp. 26–27. C.f. Bengtsson (1963), pp. 46–48; Moore (1999), pp. 199–200.

³⁸ Rönnow (1944), p. 171.

³⁹ Forsberg (1953), p. 108; Hellberg (1920), pp. 211–215, 243–244.

⁴⁰ Boëthius and Kromnow (1947), p. 492. See further section 6.3.

textile manufacturer, commerce councillor, and affiliate to the ‘Hat’ party, Jonas Alströmer, during the 1730s.⁴¹

These books illustrate how Engberg, being an artisan, was deeply involved in the manufacturing trades. He had connections within the political network and at larger manufactories, and seems to have been appreciated for his skills and experience.⁴² Still, his political connections sometimes led to negative consequences. Furthermore, Engberg’s own business in Stockholm was never ‘successful’ in terms of sales. These contrasts are interesting in that they suggest intricate connections — and tensions — between the political *strategies* of the manufacturing system and the everyday life and work of metal-making artisans. These features are not dealt with in the investigations referred to above. None of them have aimed towards a comprehensive understanding of the practical processes of metal making.

Such an approach is offered in this chapter and the following two ones. Commencing with an analysis of Engberg’s journeys during the mid-century, this chapter is a step into a *skills-trajectory* that stretched from the 1730s well into the 1770s, thus covering the period described in the previous chapters. This trajectory makes evident how skills and knowledge related to cutlery making were imitated and reconfigured during journeys, within the *metal bazaar* of Stockholm, and at larger manufactories. In so doing, it illuminates the shifting relations over time between movements, the organisation of work, and the use of space, artefacts, and materials.

5.2 The Art of Setting out: Expectations and Patronages

When he made his first trip abroad, in 1735, Engberg had practised as master cutler in Stockholm for a few years. He was, however, far from professionally settled in the capital. He had applied for permission to build a workshop on *Kungsholmen*, but lived with his family in the quarter *Norrbro* on *Norrmalm*.⁴³ Moreover, he used a separate grinding mill by *Norrström*.⁴⁴ In

⁴¹ Suneson (1998), pp. 58–59.

⁴² In this sense, one possibility would have been to view Engberg as an ‘expert’, in line with inquiries emphasising the connections between expertise and the development of early-modern states. Similar roles could also have been ascribed to other artisans discussed below, as well as to officials like Schröder and Rinman. C.f. Ash (2010). Still, I have chosen to instead discuss these actors as ‘intermediaries’ and ‘go-betweens’, because these terms better reflect their movements between different spheres within the manufacturing system.

⁴³ *Ämbets- och Byggningskollegium*, Protocol, 1730-04-14. ÄmB, AI:27, pp. 252–254. SSA; Tax register, Stockholm, 1735. ÖfU, G1AA:33 (1735), fol. 119 (152). SSA/SVAR. Available online from: Riksarkivet. After returning from his journey, in 1739, Engberg was referred to as having yet another workshop on *Norrmalm*. See *Kommerskollegium*, Protocol, 1739-03-23. KkH, AI:aa:108, pp. 962–964. RA. See further section 6.1.

⁴⁴ Alströmer, Jonas, Letter to *Kommerskollegium* (via M. Alström), Stockholm, 1735-07-03. Jonas Alström, London, 1730–1739. KkH, EVIaa:231. RA. See also Elers (1800), pp. 75–76. According to Elers, Engberg was permitted to set up a water-powered mill by *Norrström*,

addition to this spatial dispersal of workplaces, Engberg had been accused, in 1728, of illicit ironmaking by the blacksmiths' guild.⁴⁵ He also lagged behind with payments to his own guild, which later resulted in conflicts when his workshops were included into the manufacturing system.⁴⁶ Setting off for England a second time, almost twenty years later, in 1754, Engberg was in a different situation. By this time, he was established as a manufacturer and operated a knife works with apprentices and journeymen. This position was closely related to the support from state institutions.

Despite these differences, both of Engberg's journeys, and comparable ones made by other metal-making artisans during the same period, seem to have been made possible in similar ways. Above all, they indicate the importance of forming patronage relations. Sennefeldt has argued that these types of relations were expressions of the social hierarchy in an early-modern society based on power and subordination. They could be temporary or persistent over time, but always included services and favours.⁴⁷ Other scholars have connected patronage relations to attempts to integrate theoretical knowledge and artisanal practice.⁴⁸ However, as argued here, relations like these did not exclusively present some powerful individuals or state institutions with possibilities for domination and exploitation. They also opened up potentials for *tactics* and social mobility.

Travelling on Behalf of Jonas Alströmer and the State

It is difficult to know exactly when Engberg and Alströmer first encountered each other. Alströmer knew of Engberg's work in 1735, and described it in a letter to *Kommerskollegium*, arguing that the craftsman had 'shown good proofs of his skills and deftness'. According to the councillor, Engberg had expressed a wish to go to England to make 'inquiries about their manners and practices' — especially regarding the making of knives and scissors. Alströmer noted how this would make Engberg capable of 'informing and instructing the Swedish youth', by the setting up of a manufactory upon his return. To make such a journey, the cutler was in need of financial support. Insuring the Board of Engberg's allegiance, Alströmer argued that the risk of sending him abroad was low, since he was married and had his own workshop.⁴⁹ A different view was offered by Engberg himself. He later argued, in

close to the Royal Castle, in January 1733. He then set out for England two years later and the mill was never fully constructed. C.f. section 6.2.

⁴⁵ *Ämbets- och Byggningskollegium*, Protocol, 1728-09-17, fols. 380–381; Protocol, 1728-09-24, fol. 406. SSA.

⁴⁶ See Skråarkiv, 32:1. SSA. See further chapter 6.

⁴⁷ Sennefeldt (2011), p. 142, 150.

⁴⁸ See e.g. Bertucci and Courcelle (2015).

⁴⁹ 'aflagt goda prof och bewijs om dess skicklighet och qwikhet'; 'giöra sig underrättad om deras maner och handgrep'; 'underrätta och tillära den Swenske ungdomen'. Alströmer, Letter to *Kommerskollegium*, Stockholm, 1735-07-03. RA.

1756, that he had been hesitant about leaving, and mentioned how his ‘long training’ made it ‘inappropriate to once again seek further knowledge’. At last, he agreed and set off through Alströmer’s arrangements.⁵⁰

The image of Alströmer as a patron for domestic manufacturers and craftsmen, as well as an avid supporter of foreign journeys (above all to England) has been reproduced from the mid-nineteenth century onwards. In one biographical lexicon describing Alströmer’s life, Engberg is mentioned as one, amongst others, who was encouraged by Alströmer to improve the domestic manufacturing trades. As a proof of this direct link, it is noted how Engberg received specific instructions from the councillor.⁵¹ Since Alströmer himself had travelled in England and Europe, it is likely that such instructions actually were offered to Engberg.

Foreign journeys made by other artisans also illustrate the importance of this type of relationship. One example is offered by the watchmaker Christian Backman, who visited England during the same period as Engberg. Writing to King Fredrik I in 1737, he stressed how his journey had been made possible by borrowed money and recommendations by ‘a private Man from a foreign nation’. This support was sufficient in order for Backman to enhance his skills and collect instruments.⁵² Later, in 1741, he wrote that his patron was ‘very supportive’ of the Swedish manufactures.⁵³ In Backman’s probate inventory from 1750, it seems likely that this man was merchant William Maister. The watchmaker had borrowed 12,000 dlr. kmt. from the merchant, a loan later repaid by *Manufakturkontoret*.⁵⁴

As evident also in Engberg’s case, patrons often had close contacts with — or worked for — state institutions. When the instrument-making journeyman Georg Niclas Carlsberg set out for England and France in 1765, he did so with the direct support of Schröder. The *Directeur* had argued in Carlsberg’s favour at the *Hallrätt* and assisted him in procuring letters of recommendation. During Carlsberg’s journey, Schröder arranged for financial support from *Manufakturkontoret*, in order for the journeyman to practise the making of scissors and to collect tools.⁵⁵ Still, patronage relations not only expressed the agendas of influential men like Alströmer,

⁵⁰ ‘lång öfning’; ‘mindre anständigt at å nyo söka vidare kundskap’. Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fol. 372. RA.

⁵¹ See *Biographiskt lexicon öfver namnkunnige svenska män: Första bandet*. (1835). Uppsala: Palmblad, Sebell & c., *Alströmer, Jonas*, p. 156.

⁵² ‘en främmande nations private Person’. Backman, Christian, Missive to King Fredrik I, Stockholm, September, 1737 (circulated to *Kommerskollegium*, presented 1738-05-09). FUH, R. 2682, fol. 271. RA.

⁵³ ‘mycket benägen’. Backman, Christian, Proposal to *Urskiljningsdeputationen*, January 1741 (circulated to *Handels och manufakturdeputationen*). FUH, R. 2766, no. 15. RA.

⁵⁴ Probate inventory, Christian Backman, 1750-03-14. SRr, 1:a avdelning, F1A:147, pp. 265–286 (3000–3210). SSA. Arkiv Digital AB. This sum equals a sum of 4,000 dlr. smt. mentioned by Backman in his letter to the king in 1737.

⁵⁵ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1765, pp. 5–8, 10–11; 1766, pp. 29–30. KB.

Maister, or Schröder. In some cases, they lasted over time, which also gave artisans the possibility of shaping them by acting tactically. This is evident when dealing with Engberg's second journey.

Making Use of Connections over Time

Even if Engberg's position was a different one in 1754, he still needed the support from his patron in order to set out for England a second time. This enabled him to make this journey into a family affair, bringing with him two of his children. In 1756, the cutler described how he and the children had made a stop at Alströmer's home in Alingsås on their way to Göteborg. There, they had asked for the councillor's 'protection'. Alströmer gave his approval for the journey and arranged for their passage. He also offered them 'good addresses to his friends in London'. These, Engberg argued, had been helpful regarding both practical matters and financial support.⁵⁶

By making use of his connections with Alströmer, Engberg could also act as an intermediary man himself during this journey, by arranging to send other young artisans to England. In a protocol from *Kommerskollegium*, in 1754, it is noted that he had sent a letter from Newcastle to one commissionaire, Ehrenfalck, arguing that several boys could 'be helped into profitable workshops' through his arrangements in signing their contracts. Since Engberg by then was on his way back to Sweden, he had stressed how his son was to remain in England and 'provide for them'. Ehrenfalck also received a letter from Alströmer, who in his turn argued that he could arrange for the passage of two boys to London.⁵⁷

These letters sparked intense discussions between *Kommerskollegium* and proprietors at various manufactories. The *öfwerDirecteur* Ehrenpreus at the gun factory in Huskvarna recommended two of his journeymen, but was refused since these were found to be too 'advanced'. Instead, he was told to propose some younger apprentices who could better 'embrace and gain skills'.⁵⁸ Head master Daniel Falk at the knife works in Viskafors had better success. In a letter to Alströmer, Falk proposed three boys who were inclined to learn finer steelmaking.⁵⁹ *Kommerskollegium* gave its approval and it was decided that contacts should be made with Engberg, who in turn was to

⁵⁶ 'aprotection'; 'god adresse til sine wänner i London'. Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fol. 375. RA.

⁵⁷ 'blifwa förhulpne uti nyttige wärckstäder'; 'draga omsorg för dem'. *Kommerskollegium*, Secret protocol, 1754-09-04. KkH, A1aa:2. RA. According to the protocol, Engberg's letter was dated in Newcastle on 16 August 1754, and Alströmer's dated in Alingsås on 30 August 1754. None of these letters have been found.

⁵⁸ 'för sig komne'; 'antaga och winna färdighet'. *Kommerskollegium*, Secret protocol, 1755-06-02. KkH, A1aa:2. RA.

⁵⁹ Falk, Daniel, (Copy of) Letter to Jonas Alströmer, Borås, 1755-06-19 (circulated to *Kommerskollegium*). KkH, A1aa:2. RA.

arrange for having the boys ‘getting into work and advancing’.⁶⁰ Most probably, it was these boys that Engberg spoke of in 1756 when arguing that he had paved a good way for them to come over to England. Only one had left Sweden, but Engberg stressed how there were opportunities for others to make similar journeys. The arriving boy had been handed over to a cutler named Robert Shepherd, and Engberg mentioned that he was ‘finding himself quite well.’⁶¹

As will be discussed below, Engberg also helped other travelling Swedish artisans during his second stay in England. By doing this, he procured for himself a position as a valuable intermediary agent within the manufacturing system. Alströmer occupied a similar — but also different — position, serving as a middle-man within the network linking Engberg to various Swedish institutions and metal works.⁶²

At the same time as journeys opened up possibilities for craftsmen, they were also under observation by state institutions in Sweden. Contacts made before and during the journeys thus served a dual function: both enabling freedom of action for the traveller and maintaining a certain degree of control for the supervising authorities. This is illustrated by *Manufakturkontoret*’s instructions for Carl Lehnberg, student in the art of grinding optical glasses, from 1749. In this case, the Office elaborated both the general expectations and specific directions for his journey in Europe. Geographic references were given, and it was noted how the student should inform the Office of his whereabouts. Upon his return to Sweden, Lehnberg had to ‘give a detailed and clear report’ about the journey.⁶³

Sending artisans abroad was thus an intricate balancing of public expectations, skills and aptitude, possible benefits, and risks. Public funding, institutional arrangements, and the support from patrons were critical aspects of setting out as a craftsman. In this way, artisans’ voyages were integrated into the political *strategies* for the domestic manufacturing trades. Still, making a journey was also a matter of acting tactically in order to *bring movements about*. This tension between tactical performances and strategic conditions is further evident regarding the most important feature of being an artisan on the move — getting into the practical processes of work.

⁶⁰ ‘sysselsättjas och befordras’. *Kommerskollegium*, Secret protocol, 1755-07-30. KkH, Alaa:2. RA.

⁶¹ ‘berättar sig må ganska wäl.’ Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fol. 379. RA.

⁶² The connections between Engberg, Alströmer, and head master Falk at Viskafors are important. The latter was a former junior official in *Kommerskollegium*, who was trained in cutlery making by Engberg in Stockholm. He later came to work both at the works in Vedeväg and Viskafors. See further chapters 6 and 7.

⁶³ ‘ingifwa en utförlig och tydlig berättelse’. Lehnberg, Carl, Report to *Manufakturkontoret*, October 1751 (*Underdån ödmjuk berättelse om min resa utomlands, till att lära de utländske Optiske Glassliperier och Glasstillverkningar*), fols. 1–3 (Copy of original instruction, dated in Stockholm, 12 May 1749). MkA, De:1, vol. 177 (no. 7). RA. See also Amelin (1999), pp. 162–163.

5.3 Entering Workshops and Interweaving Practices

There are no travel diaries left from Engberg's journeys. He was ordered, by *Kommerskollegium*, to hand in an account of his undertakings abroad after his first journey, but no such writing has been found.⁶⁴ Still, Engberg did describe his second journey in his proposal submitted to the Diet in 1756. There he also mentioned some of the places he visited during the first journey. This text is compared here with protocols from *Kommerskollegium* and with other sources dealing with these journeys. The result is a discussion centred around two critical aspects of travelling as a craftsman during the eighteenth century.

First, both of Engberg's voyages indicate how *systemic observation* and the *practising of skills* were interwoven. Artisans' journeys brought together different practices of work with their specific skills. Also, craftsmen were expected to make observations on wider networks of exchanges. This complex nature of travelling also meant that knowledge and skills were registered and mediated in various ways. Metal-making practices were imitated on the move.⁶⁵ Secondly, making journeys was far from a straightforward business, especially if the intention was to obtain techniques and knowledge considered as worthy of protection by other parties (craftsmen, institutions, or even nations).⁶⁶ This risk of getting caught as a 'spy' was sometimes palpable. Foreign manufacturers or institutions could also make attempts to recruit Swedish artisans on the move, which shows that these journeys sometimes were of (potential) mutual benefit. Entering workshops demanded *tactical* performances related to the exhibition of skills and aptitude, the ability to imitate techniques, and the possibilities of joining fellow travellers.

These journeys were also connected to a changing context of metal manufacturing in Sweden. While Engberg's first journey was linked to the emerging manufacturing system, the second journey was more oriented towards practising crafts and techniques that were considered as still lagging behind in Sweden (such as the making of cementation steel). Still, the two journeys were also connected by the fact that they integrated the *making* and *using* of steel with improvements regarding the organisation of cutlery making.

Cutlery Skills and Knife Steel: England and Europe 1735–1738

Engberg's first journey was supported and encouraged by Alströmer, and motivated by the idea of improving domestic cutlery making. Engberg was expected to acquire sufficient skills in order to train other artisans and to set

⁶⁴ *Kommerskollegium*, Protocol, 1739-07-13. KkH, A1aa:109, p. 280. RA. C.f. section 5.4.

⁶⁵ C.f. Hilaire-Pérez (2002); Hilaire-Pérez and Verna (2006), p. 539. This can also be related to the discussion on multiple forms of embodiment in knowledge circulation. See Roberts (2012), pp. 50–56.

⁶⁶ C.f. Harris (1998); Amelin (1999), pp. 54–55, 186–189.

up a manufactory of his own. However, by linking different European metal-making communities, this journey brought about *circulation* of knowledge and skills perhaps in a more comprehensive way than expected.

Writing in 1756, Engberg described how he began his first journey to England in 1735 by working — probably in London — for a cutler named Mr. Hough, making knife blades. He then worked with the making of forks, and continued on to Sheffield and Birmingham to practise ‘the forging of various types of cutlery.’ Before leaving England, he also spent some time travelling in the mining districts. In total, he remained in England for two and a half years.⁶⁷

The cutler referred to in Engberg’s text was most likely John How, the same manufacturer who had been visited by Kalmeter in 1725. During his visit at the works in Southend, Kalmeter noted that the workers only made knife blades, which were later hafted in London. He also described the process of work as divided into several tasks — forging, filing, grinding, and tempering — each having its specific workers. Mr. How’s smiths also used backstiff steel from Solingen, which is another common denominator with Engberg’s journey.⁶⁸

By using other sources, we can further trace Engberg’s undertakings in England. In May 1736, his journey was brought up for discussion in *Kommerskollegium*. The intention, as stated, was that the cutler should ‘obtain the English method and touches of diverse forms of finer forging, and plant it here [in Sweden]’. For this, he had been given 2,000 dlr. smt. However, through Alströmer, Engberg had also asked for extra support, in order for his brother Morten to join him in England. This, he had argued, would make his journey ‘so much more profitable for the Kingdom’. The Board gave its approval.⁶⁹ Some months later, in October, the Board noted how Alströmer had received a letter from Engberg, in which the cutler requested a ‘smith boy’ from Göteborg. The boy was to be sent over to England in order to be trained.⁷⁰

These early protocols relate to the discussion above about the importance of forming networks and making use of contacts while being on the move. This is further illustrated by later correspondence. In May 1737, a letter from

⁶⁷ ‘allehanda ägg Jerns smide.’ Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fol. 372. RA.

⁶⁸ *Henrik Kalmeters resa*, vol. III, pp. 755–759. M.249. Handskriftssamlingen. KB. C.f. section 4.4. John How died in 1737, and the family’s business then went into a decline. See Moore (1999), p. 200, 207.

⁶⁹ ‘inhämta den Engelska methoden och handgrepen uti åtskillig slags fint smide, och den samma här fortplanta’; ‘för Riket så mycket nyttigare’. *Kommerskollegium*, Protocol, 1736-05-08. KkH, A1aa:102, p. 1306. RA.

⁷⁰ ‘smed gässe’. *Kommerskollegium*, Protocol, 1736-10-18. KkH, A1aa:103, pp. 942–943. RA. This letter was referred to as dated in Paris on 22 July 1736. This does not mean that Engberg was in the French capital at this time. He was referred to as still being in England in May the following year. One possibility is that Engberg made a shorter trip to Paris, but such an idea cannot be confirmed by other sources. More likely, the letter was sent *via* Paris.

Alströmer and Clason explained how Engberg was planning his journey back home. Nevertheless, there were still some things for him to ‘observe’ in England. Engberg wanted to visit the different ‘trading towns’ with their iron manufactories. On the cutler’s behalf, Alströmer and Clason asked for additional money. Partly, it was noted, this was since Engberg could not make a living for himself in these towns — ‘As he has done here in London’. Partly, it was because Engberg had spent most of his money on the maintenance of his brother. In a brief note attached to this letter, the towns of Sturbridge, Sheffield, Birmingham, and Wolverhampton are mentioned as destinations for obtaining skills regarding the tempering of files (see Figure 5.1).⁷¹ This request was approved by *Kommerskollegium* in June the same year and Engberg received another 600 dlr. kmt. in support. He was instructed to visit the same towns, but only briefly, in order to ‘completely inform himself regarding iron forging, but especially about the tempering of files’.⁷²

Figure 5.1 Travel destinations for the tempering of files

Sturbridge, Sheffield
 Birmingham,
 Woolverhampton
 B. at förändrad giöra sig
 under Erning om fyllseförordning

Source: Jonas Alströmer, London, 1736–1739. KkH, EVIaa:231. RA. (Photo: Henrik Lithner, Riksarkivet).

⁷¹ ‘opmärka’; ‘upstäderna’; ‘Såsom han har gjort här i London’. Alströmer and Clason, Letter to *Kommerskollegium*, London, 1737-05-13. RA.

⁷² ‘giöra sig fullkommeligen underrättad om jernsmidet, men i synnerhet uti fiählårdningen’. *Kommerskollegium*, Protocol, 1737-06-07. KkH, AIaa:104, pp. 1516–1517. RA.

This correspondence throws light upon the tension between *systemic observation* and the *practising of skills*. *Kommerskollegium* offered instructions about specific places to be visited by Engberg. He was to involve himself in practices valuable for a cutler: blade making, forging, tempering, and the making of files. Regarding other features, he was considered more of an observer, and his movements back and forth on the British island also suggest that he made observations on the English metal trades in a more comprehensive way. He perceived manufactories, towns, and mining districts in their entirety. This duality — practical know-how and the perception of a wider system — would be of importance for Engberg when returning home.

While shaping the connections with *Kommerskollegium* and Alströmer, Engberg also seems to have joined fellow travellers while being on the move. In his letter to the Board in 1735, Alströmer mentioned how Engberg had expressed hopes of travelling ‘in company with Messrs. Swab and Psilanderhielm’, who were at that time on their way to England after touring the Continent.⁷³ Swab never mentioned if Engberg had joined them during their English journey, but Hamren later noted that the cutler had travelled with ‘the Head of Mining District Mr. Swab’.⁷⁴ Also, in his eulogy of Erik Stockenström, Nils von Rosenstein noted that the official had encountered Engberg during his European journey — and assisted him in ‘enhancing his experience’.⁷⁵ This indicates that the artisan and the officials travelled together for some time in England. In that case, this is a good example of how the movements of Swedish travellers intersected in Europe during the mid-eighteenth century.

The journey in England also required other tactical actions by Engberg. In order to obtain cutlery-making skills, language barriers had certainly to be overcome and the risks of getting caught as an industrial ‘spy’ had to be avoided. These two features were in turn related to the most prevalent problem. In order to understand the English knife and finer steelmaking, an artisan like Engberg had to do more than gain access and observe. This hinged rather on the difficult art of involving oneself in processes of work. Discussing the benefits of Engberg’s journey in 1738, Hamren stressed how this was exactly what the cutler had done. He had succeeded in ‘working in the English workshops’, and thereby obtained ‘several for us useful knowledges

⁷³ ‘i föllie med herrar Swab och Psilanderhielm’. Alströmer, Letter to *Kommerskollegium*, Stockholm, 1735-07-03. RA.

⁷⁴ ‘Hr Bergmästaren Svab’. Hamren, Olof, Proposal to *Handels och manufakturdeputationen*, 1738. FUh, R. 2682, fols. 482–483. RA.

⁷⁵ ‘öka sin erfarenhet’. von Rosenstein, Nils (1838). ‘Äreminne öfver Riksrådet, Grefve Erik von Stockenström, uppläst i Kongl. Vetenskaps-Akademien, den 26 Maj 1790’ [originally from 1790], in von Rosenstein, Nils, *Samlade skrifter, D. 1*. Stockholm, p. 158. As noted in section 2.4, Swab, Psilanderhielm, and Stockenström travelled together in England in 1735 and 1736. Leaving England, Swab and Stockenström continued their journey in France and Germany, before arriving in Sweden in the autumn of 1736. See *Svenskt biografiskt lexikon, Band 33*. (2007–2011), pp. 549–550.

in many kinds of metal making'.⁷⁶ This is also confirmed by the discussion above, at least regarding London (where Engberg and his brother worked).

This critical aspect of practising skills is also evident in other artisans' writings. Regarding the making of instruments for watchmaking, Christian Backman described how he had opportunities to both 'observe and try my hands at it' during his stay in London.⁷⁷ According to Ekström, Backman had also succeeded in practising the forging of iron and steel during six weeks at one metal works in Lincolnshire.⁷⁸ However, getting into foreign manufacturing workshops was also considered a dangerous task, as described by manufacturer J.P. Smith in 1738. In order to procure materials and workers for his steelworks in Tyresö, Smith sent his brother back to England no less than three times. During the third journey the brother was arrested and imprisoned.⁷⁹ Upon actually entering workshops, artisans also had to persuade other practitioners to train or inform them. This was not so easily done. In the case of the grinding of optical glasses in London, Amsterdam, and Berlin, Carl Lehnberg described how 'the few who know something about it, are quite reticent and secretive about their knowledge.'⁸⁰

The *circulation* of skills was hence not performed in a straightforward fashion; practical know-how could not just be gathered and then disseminated. This might explain why these journeys seem somewhat erratic. Often, careful plans had to be changed as opportunities opened up, or if the risk of getting caught was too instant. Apart from professional skills, artisans needed to act tactically, making use of changing preconditions in order to provide themselves with temporary advantages.

This potential for *tactics* can also be related to the ambition of a protectionist state administration. Artisans could choose (of own their free will) to remain abroad, taking employment in foreign workshops. In such cases, the financial support provided by the state would become useless. Soon after returning from his first journey, Engberg expressed a wish to go back to England in order to recruit workers. As stated in a protocol from *Kommerskollegium* in March 1739, his patron Alströmer had dissuaded the cutler from making such a journey, since there was a substantial risk that 'he would be persuaded to remain there'.⁸¹ This indicates how artisans' journeys were

⁷⁶ 'kommit uti de Engelska wärkstäder at arbeta'; 'flere oss högtnyttige wettenskaper wid mångfaldige metal arbeten'. Hamren, Proposal to *Handels och manufakturdeputationen*, 1738, fol. 482. RA.

⁷⁷ 'bese och lägga därwid handen'. Backman, Missive to King Fredrik I, Stockholm, September, 1737, fol. 271. RA.

⁷⁸ Ekström (1750), p. 25.

⁷⁹ Smith, John P., Proposal to *Handels och manufakturdeputationen*, June 1738. FUH, R. 2682, fols. 58–59. RA. Relating to Harris' discussion it can be noted that it was the enticement of artisans that was the most serious offense in this case. C.f. Harris (1998), pp. 7–10.

⁸⁰ 'de få som weta något deruti, äro ganska förbehållne och hemlige uti sin wettenskap.' Lehnberg, Report to *Manufakturkontoret*, October 1751, fol. 4. RA.

⁸¹ 'han torde blifwa öfvertald att blifwa qwar der ute'. *Kommerskollegium*, Protocol, 1739-03-22. KkH, A1aa:108, p. 944. RA.

related to intersecting *strategies* and *tactics*, which in turn integrated the spheres of policing, manufacturing, and travelling.⁸²

Still, if artisans continued their journeys (more or less according to ‘plan’), they could integrate places and practices which were separated by vast distances. This is evident regarding Engberg’s further journeys. Leaving England for the Continent, he passed through regions frequently visited by Swedish travellers during the period. The Low Countries and France certainly offered the cutler possibilities of encountering numerous skills.⁸³ Being directly linked to Engberg’s journeys, Swab and Stockenström passed through these areas both before and after their tour in England, and Alströmer had visited some of them a decade earlier.

The last stop for Engberg on the Continent must be discussed more thoroughly. Making a stop in Solingen, he came into contact with the making of backstöff and butscher steel. *Manufakturkontoret* reported in 1741 that these types of steel were ‘indispensable’ for the forging of cutlery. Making them was treated as an art that so far only had been known at one place in Europe (Solingen), and it was mentioned how Engberg had ‘acquired this knowledge in secret, not without risks’.⁸⁴

As discussed in section 4.4, both Rinman and Angerstein later reported about these steelmaking techniques when travelling through the same region. Almost ten years before Rinman’s journey, Engberg was, however, able to acquire the practical skills demanded in these welding procedures. Knowing that he also had visited England and Holland before arriving in Germany, this indicates an intricate form of interweaving knowledge practices and spaces of metal making through moving. Probably, Engberg first learned the *making use* of German knife steel in England, but not necessarily in the cutlery-making district around Sheffield. One other likely place was London. Later, he learned the *making* of the same kinds of steel in Solingen. When returning home, Engberg used these combined skills to promote himself as a prominent cutler in service of the state and the domestic metal trades.

These aspects of practising skills on the move are further demonstrated by Engberg’s second journey to England in 1754. Also this time, he involved his family. However, some differences can be noted, which are relevant if related to a changing context of domestic metal manufacturing. Most notably, this applies to the making of cementation steel.

⁸² A similar perspective is advanced by Amelin (1999) in discussing the journeys made by some Swedish instrument makers during the period, which were also closely connected to scientific institutions, above all *Kungliga Vetenskapsakademien*.

⁸³ See further section 5.4. Engberg was referred to as making ‘Dutch sawblades’ after his return to Sweden.

⁸⁴ ‘oundgängelige’; ‘icke utan mycket äfwentyr i hemlighet inhämtat denne wettenskapen’. *Manufakturkontoret*, Report to *Sekreta utskottet*, January, 1741, p. 157. RA.

The Quest for Blistered Steel: England Revisited 1754–1755

When he arrived in England in 1754 together with his two children, Engberg seems to have been well aware of the risks of coming back. In his proposal from 1756, the cutler argued that he had presented himself not as a Swede, but as a ‘subject of another kingdom’. He was, however, able to make use of old contacts from his first journey. These, he argued, had shown him ‘greater Love and friendship than I expected’. Some caution was needed also in these cases. Engberg told his former acquaintances that he had abandoned the smith’s trade and instead settled as a goldsmith. Arguing that he had taught his son to be a smith, he expressed his hopes that the son now also could have the opportunity of getting further trained. This way of acting tactically seems to have been successful, and Eric Jr. was accepted for training. Later, the son also worked in London for a prominent instrument maker in order to learn how to make surgical field equipment.⁸⁵

Engberg also acted as an intermediary for other travelling artisans. Again, these journeys involved a network of persons and institutions. In 1755, *Kommerskollegium* and the War Office (*Krigskollegium*) regularly discussed the movements of two journeymen, instrument maker Christopher Ketscher and gun smith Nils Rusk. They had both practised in Paris and were on their way to England. *Kommerskollegium* expressed its hopes that the former could come into contact with Engberg in London. The cutler was requested to take care of Ketscher and direct him to places where he could be trained in polishing, ‘in which the English surpass the French’ according to the Board.⁸⁶ As was the case for Engberg’s first journey, Ketscher was given directions while being on the move. Together with Rusk, he was later requested by *Krigskollegium* to visit the ‘Factory-towns’ Birmingham, Wednesbury, Wolverhampton, and Salisbury. There, he was to acquire skills in the tempering and purification of steel items.⁸⁷

⁸⁵ ‘ett annat rikets undersäte’; ‘större Kärlek och vänskap än jag mig förestälte’. Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fols. 375–378. RA.

⁸⁶ ‘hwarutinnan de Ängelske öfwerträffa de Franske’. *Kommerskollegium*, Draft of letter (*Angående Smeds gesällen Ketscher*), Stockholm 1755-06-02. KkH, BlA:137, RA. C.f. *Kommerskollegium*, Secret protocol, 1755-06-02. RA. This letter was probably intended to pass through Alströmer. The councillor is not addressed in this draft, which only mentioned one ‘N.N’. Recalling the fact that communication with Engberg largely passed via Alströmer, we can, however, assume that this was the case here as well. A similar letter was sent to the commission secretary at the embassy in London, Arnold Wynantz: *Kommerskollegium*, Letter to Arnold Wynantz (*ang: de Smeds Gesällen Ketscher*), Stockholm, 1755-06-02. DiplA, I:366. RA. Wynantz confirmed having this letter just over a month later. See *Kommerskollegium*, Protocol regarding trade and manufacturing, 1755-07-22. KkH, AIab:7, pp. 283–284. RA.

⁸⁷ ‘Fabrique-Städerne’. *Krigskollegium*, Letter to Arnold Wynantz, Stockholm, 1756-04-31. DiplA, I:366. RA. Salisbury was known for the making of scissors. See Schröder, Samuel, *Dagbok rörande Handel, Näringar och Manufakturere m.m. Ut i Danmark, Holland, England, Frankrike och Tyskland. Under verkstälde resor, åren 1748–1751 förd af Samuel Schröder*, vol. II, fol. 459. X.303. Handskriftssamlingen. KB.

The fact that Swedish institutions made considerable efforts to contact Engberg about these two journeymen can be related to the discussions about the risks connected with sending artisans abroad. In 1749, *Krigskollegium* wrote to the Swedish commission secretary in London, Arnold Wynantz, regarding Rusk. By then, he had travelled in Europe for three years without contacting the Office. Wynantz was ordered to make inquiries about Rusk's whereabouts — so that he would not be enticed to 'establish and remain abroad'.⁸⁸ The involvement of Engberg in this matter was thus another way for the state to keep track of travelling young craftsmen, so that money and skills were not wasted. Artisans' journeys were thus related to wider networks of correspondence and information. Other examples of this important feature are offered in Schröder's diaries. In 1761, the *Directeur* noted how he had been informed about one metalworker named Petter Winberg. The latter had by then worked in London for several years making copperware. Schröder involved *Manufakturkontoret*, and Winberg was offered 441 dlr. kmt. for returning to Stockholm.⁸⁹

Returning to Engberg's undertakings, it can be noted that he and his son also made a tour on their own in order to practise the making of steel as well as finer items. Engberg later described how they had visited a steelworks near Newcastle. After some time, he had gotten a chance to 'try my hands' at the making of cementation steel. He had accepted the offer, and was given permission to 'manage on my own 9 successively burnt Steel furnaces', a process that required twelve weeks. In doing this, he observed several important things. Although he only listed them briefly, they are nevertheless proof of the importance of observing by practising. Engberg noted the specific iron bars being used, as well as the materials used for covering them in the chests. Moreover, he observed the process of cementation, and argued that 'the cutting, the putting in, the burning, the taking out and the sorting of the Steel did not escape my attention'. He carefully wrote descriptions of all this and his son later made corresponding drawings.⁹⁰

This knowledge later made it possible for Engberg to point to areas needing 'correction' within Swedish steel production. Steelmaking was treated as dependent upon several connected processes, where the managing of the furnace was considered just as important as the selection of bars and the later sorting procedure. In Newcastle, Swedish bar iron was used for making steel and Engberg argued that he had succeeded in bringing home bits of cement-

⁸⁸ 'utrikes nedsätta och qwarblifwa'. *Krigskollegium*, Letter to Arnold Wynantz, Stockholm, 1749-07-18. DiplA, I:366. RA. Rusk was one out of five gun-making journeymen searched for by the Office. The remaining four came from the gun factories in Huskvarna and Örebro.

⁸⁹ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1761, pp. 92–96. KB. Schröder's informant was Johan L. Robsahm, who also travelled in England at this time. C.f. section 4.4.

⁹⁰ 'lägga hand'; 'med egen utgård maniera 9 efter hwarannan utbrände Stålugnar'; 'stympningen, inläggningen, fyrningen, uttagningen och sorteringen af Stålet undslapp nu icke min upmärksamhet'. Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fols. 376–377. RA.

ed steel ‘with the hammered Stamp of the Swedish Ironworks’. This would make it possible for Swedish steelmakers to get the same types of iron.⁹¹

Engberg and his son also involved themselves in other practices, which were observed and imitated. In Swallowwell, near Newcastle, and in Sheffield, the son learned about the shaping and tempering of files. Engberg also came across an instrument for better polishing. Moreover, together they had constructed a rolling mill with which ‘various metals could be rolled into ferrules and many more other pieces.’ Finally, Engberg had acquired knowledge about the furnaces and the work processes used when making cast goods from ‘scrap and old pig iron’, and he argued that similar works could be founded in Sweden. During her brother and father’s journeys, Brita Lisa Engberg stayed in London where she trained in the making of casings. According to her father, this craft was closely related to the manufacturing of cutlery and instruments, since items became more saleable when marketed with a matching casing.⁹²

Rather than viewing these practices as separated spheres of production, I view them as connected by *tactics* and movements. Engberg and his children made themselves (and others) informed of metal making in an integrative way by using several forms of mediation and *imitation*. This is apparent also when comparing with other contemporary journeys. Instrument maker Ketscher was trained in both Paris and London as well as in metal-making communities thought of as specifically suitable for his craft. Also Lehnberg visited urban workshops in London, Paris, Berlin, and Amsterdam, where he learned about instrument making and optical detail work. As stated in his report to *Manufakturkontoret*, he also visited provincial manufactories and glassworks in England, France, and Germany, and informed himself about the extracting and processing of raw materials.⁹³

The journeys of metal-making artisans during this period were multifaceted practices. They connected various forms of manual labour and skills with perceptions of taste and ideas about materials. Even more so, they integrated *systemic observations* of the metal trades with the *tactical* performances of entering workshops and practising metal making. Still, these voyages were not vast expeditions of knowledge gathering *per se*, which ended with arriving home. Rather, knowledge and skills were to be both of personal and public utility. Journeys were continued and used in different ways.

⁹¹ ‘med den påslagne Swenske Bruks Stämpelen’. Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fol. 378. RA.

⁹² ‘hwarjehanda metaller kunna utwalsas til hållkar och många handa andra ämnen.’; ‘skrot och gammalt tackjärn’. Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fols. 378–379. RA. The casting technique was also emphasised by Qvist Andersson in the report from his English journey, where he discussed so-called ‘Scrap Furnaces’. See Qvist Andersson, Bengt, *Anmärkingar uti Hwarjehanda förefallande Ämnen Samlade på Resan i England åren 1766 och 1767*, pp. 40–43. BbM, D14. KTHB.

⁹³ Lehnberg, Report to *Manufakturkontoret*, October 1751. RA.

5.4 *Grounding* and Promoting Knowledge and Skills

This section brings to light foremost the argument outlined above about artisans' journeys being more complex than 'one-way' transfers. Instead of viewing the idea that voyages were finished upon the return to Sweden, I discuss them as continuous movements of people, knowledge, and skills. By comparing Engberg's two journeys, this section shows how changing notions of material qualities went hand in hand with ideas of organising work. This is also illustrated by comparing the arguments of Engberg and Schröder, both of whom had vast experiences of the metal trades in Europe and Sweden during the mid-century. Still, while Schröder had observed manifold kinds of metal making, Engberg had the advantage of actually doing the work (he had 'tried his hands' at it). This expands the ideas of 'corrections' within the Swedish metal trades, as discussed by Rydén, in that it offers an example of intersecting *strategies* and *tactics*.⁹⁴

This discussion demonstrates the importance of practitioners and practices of work within this development. Recalling one of the critical points brought up in chapter 1, this is done in contrast to much previous research about steelmaking and metal manufacturing, tending, as it did, either to focus on isolated places, or on the achievements of officials, savvy 'entrepreneurs', or recruited foreign experts. In keeping with Hilaire-Pérez and Verna's discussion, and with Raj, I show how artisans acted as important intermediaries in the *circulation* of metal-making techniques. Knowledge and skills, as well as materials and artefacts, were in this way always matters of interpretation and alteration when *grounded* in different local contexts.⁹⁵

This somewhat erratic nature of skills and practices does question Mokyr's description of 'useful knowledge'. Likewise, it nuances the image of craft skills as spatially bounded (to the workshop) and as secretly transmitted from master to apprentice. In line with Pamela Smith, I rather suggest that knowledge and skills were matters of collaborative enquiries, wider transmissions, and sometimes even public demonstration.⁹⁶ They were also related to a *strategic* context of manufacturing. Artisans used their experiences for promoting themselves to local or national institutions, and during the Diets, but they were also under the close scrutiny of the different boards.

English Knives and German Steel: Continuing the First Journey

When in 1738, Hamren wrote about Engberg's first journey, he emphasised the links between setting up cutlery workshops according to the 'English way' and the further 'spread' of skills. He argued that it was of benefit to the Kingdom 'to have an adept Artist, who from his workshop can show such a

⁹⁴ C.f. Rydén (2013a).

⁹⁵ See Hilaire-Pérez and Verna (2006), pp. 545–546; Raj (2007). See also Roberts (2012).

⁹⁶ Smith (2007), pp. 37–44. See also Hilaire-Pérez (2007), pp. 137–146; Pérez (2008).

good piece of work, as any foreign [one]'. Still, he concluded, even greater was the advantage 'of quickly having some 1000 more.'⁹⁷

The plan for spreading skills was, however, not restricted to workshop-based training. Rather, Engberg's experiences were to be shared in a more direct way, through continuing the journey in the Swedish provinces. This is evident in the first privilege for Engberg, issued by *Kommerskollegium* in May 1739. In this letter, the incorporating of the cutler into the manufacturing trades was linked partly to his journey, partly to his skills in cutlery and steelmaking, and partly to the possibilities of using him further for 'the spreading of his knowledge' around the Kingdom.⁹⁸ This intermediary role had in fact been stressed by Engberg as well when questioned by the Board earlier that year. After returning to Göteborg in Sweden, he had passed through Borås on his way back to the capital. There he had found the metal making to be 'very neat' and often including entire families. Engberg said that he could 'inform them about better and more comfortable Machines, as well as the correct way of handling the Steel'.⁹⁹ As noted by Hamren when travelling in the same area in 1742, this idea was not followed through.¹⁰⁰

Hamren had also launched plans himself regarding the spread of the steelmaking techniques that Engberg had acquired in Solingen. In 1738, he described how the cutler already had shared his skills at the steelworks in Gravendal. Hamren's opinion was that additional journeys should be made to the works at Trollebo and Davidshyttan, where arrangements could be made to enable exports of steel. He stressed the fact that knife steel could not be made in England, despite a promised premium of 1000 pounds sterling. Moreover, making these journeys would compensate for the large sum required to set up a workshop for Engberg in Stockholm.¹⁰¹ Confirming this, *Manufakturkontoret* later noted how the making of backstiff steel had been successfully introduced at Gravendal.¹⁰² When questioned by *Kommerskolle-*

⁹⁷ 'at äga en witter Konstnär, som utur sin wärkstad kan framwisa ett så godt stycke arbete, som något utländskt'; 'at med hast kunna få några 1000de dylika.' Hamren, Proposal to *Handels och manufakturdeputationen*, 1738, fol. 483. RA.

⁹⁸ 'utspridandet af des wettenskaper'. *Kommerskollegium*, (Copy) of letter regarding the privileges for master Engberg, Stockholm, 1739-05-21 (circulated to the Stockholm *Hallrätt*). HMR, EIII:1, fols. 458-460. SSA. This copy was made at the *Hallrätt* when renewing Engberg's privileges in July 1746. The original decision regarding these privileges was taken by the Diet and communicated in a royal letter on 14 May 1739.

⁹⁹ 'mycket wacker'; 'dem gifwa underrättelse till bättre och beqwämare Machiner, samt Stålets rätta handterande'. *Kommerskollegium*, Protocol, 1739-01-30. KkH, A1aa:108, pp. 148-149. RA.

¹⁰⁰ *Olof Hamréns reseberättelser från södra Sverige 1742*, p. 165. MkA, De:1, vol. 176. RA. Instead, two peasant smiths had been sent to be trained in Stockholm. See further section 6.3.

¹⁰¹ Hamren, Proposal to *Handels och manufakturdeputationen*, 1738, fols. 484-485. RA. All these steelworks were located in Dalarna: Gravendal south of Fredriksberg, and Trollebo and Davidshyttan close to the town Hedemora.

¹⁰² *Manufakturkontoret*, Report to *Sekreta utskottet*, January, 1741, p. 157. RA. Sources regarding these journeys have not been found.

gium in July 1739, Engberg also stressed that he had brought steel back with him to Stockholm after visiting the steelworks.¹⁰³

Still, again it must be noted that this ‘spread of skills’ was a process of intersecting *strategies* and *tactics* that was shaped over time. This is made evident by a multitude of letters and protocols regarding the steel and cutlery making at the Vedevåg manufactory, including correspondence between the works’ supervisor, David Haberman, and the boards in Stockholm. This material, scattered in *Kommerskollegium*’s and *Manufakturkontoret*’s archives, elucidates Engberg’s intermediary position, but also the divergent plans for the further spread of his skills. In total, the Stockholm cutler made two journeys to Vedevåg, for six weeks in the autumn of 1739 and eight weeks in the spring of 1740.

Engberg had promoted his skills in making welded steel after returning from his journey. When questioned by *Kommerskollegium* in March 1739, he stressed that he made three different kinds, with one ‘being very similar to the Steyermarkian one’. In turn, the Board told Engberg to contact Haberman at Vedevåg in order to assist the workers there.¹⁰⁴ As noted in later protocols, Engberg was, however, not interested in travelling to the large works before being assigned a place in Stockholm where he could set up his workshops. The Board instead argued that the cutler could do better if he settled at a provincial manufactory. Sending Engberg to Vedevåg, it was thought, would convince him to make such a decision. Still, as will be further discussed in the next chapter, Engberg succeeded in delaying his further journey until a building plot was secured for him in the capital.¹⁰⁵

An agreement was finally made, and Engberg spent his first six weeks at Vedevåg. Once there, he encountered certain obstacles. Reporting to *Manufakturkontoret*, he stressed how steel forges and workshops had to be rebuilt and provided with new tools, the water-powered works needed to be upgraded, and ‘incompetent’ craftsmen were to be dismissed and replaced by others. The major problem was, however, the bad finances of the works, which did not permit long-term investments. Engberg’s suggestions had not been met with enthusiasm by Haberman.¹⁰⁶

These obstacles may have been the reason for the detailed list of instructions given by *Manufakturkontoret* before Engberg’s second journey to Vedevåg. This time, Haberman and his clerk were also ordered to give

¹⁰³ *Kommerskollegium*, Protocol, 1739-07-13, p. 295. RA.

¹⁰⁴ ‘kommer mycket nära emot det Steyermarkiska’. *Kommerskollegium*, Protocol, 1739-03-23, pp. 965–966. RA. Steyermark steel was made at Vedevåg, and the works also housed an extensive cutlery making. These features made it an appropriate place for sharing these skills.

¹⁰⁵ *Kommerskollegium*, Protocols, 1739-07-13; 1739-08-25. KkH, A1aa:109, pp. 280–298, 947–951. RA. C.f. section 6.1.

¹⁰⁶ ‘odugeliga’. Engberg, Eric, Report to *Manufakturkontoret*, Vedevåg, 1739-12-18 (presented 1739-12-22). MkA, D, vol. 165 (no. 157). RA.

Engberg ‘all the required assistance’.¹⁰⁷ The cutler was prompted to further ‘instruct the artisans in the English way of making knives’, and to assist with the re-arrangement of workshops and the improvement of the grinding mill. If the time was not sufficient for teaching the artisans, Engberg and Haberman should agree on sending one journeyman to be trained in Stockholm. Engberg was also to instruct the smiths in the making of tools for the tobacco plantations, knives for bookbinders, steel wire, and ‘Dutch Sawblades’. The latter items were connected to Engberg’s patron, Alströmer. The wire was to be used at the councillor’s textile works in Alingsås (probably for making combs), and models for the sawblades had been offered to Engberg by Alströmer.¹⁰⁸ Again, this illustrates how patronage relations included services and favours over time.

Engberg as well could benefit from sharing his skills at Vedevåg. Regarding the making of backstoft and butscher steel, it was noted how the cutler not only should instruct the smiths in ‘the correct art and skills’. He was also received a promise to take steel back to Stockholm. A similar point was made regarding the making of anvils and tools. Furthermore, the cutler was permitted to select two more boys to be trained by him in the capital.¹⁰⁹

Instructing the Vedevåg workers proved once again to be difficult. In June 1740, Engberg informed *Kommerskollegium* about the progress made at the works. He argued that the craftsmen worked with ‘about the same capability as the foreigners’ regarding the making of steel and cruder items. The cutlery production had, however, not been improved to the same extent. Still, Engberg continued, ‘the young ones who previously only forged 3 dozen blades in one day now forge 4 to 5 dozen’.¹¹⁰ As proof of his undertakings at the works, he presented the Board with tools and knives which were ‘steeled in the English way’.¹¹¹

Engberg’s visits at Vedevåg illustrate how different types of knowledge and skills, belonging to the same circulatory movement, were *grounded* in localised practice. By following an artisan on the move, we have seen how the furthering of a publicly funded Swedish manufactory was linked to a European context of metal making. This was not a straightforward transmission. Engberg delayed the process and, at Vedevåg, the new skills and ideas

¹⁰⁷ ‘all nödig handräckning’. *Manufakturkontoret*, draft of ‘Instruction for the cutler master Engberg’, Stockholm, 1740-03-20. MkA, Ba, vol. 122, p. 675. RA.

¹⁰⁸ ‘undervisa handvärkarna uti knifsmidet på Engelska sättet’; ‘hålländska Sågblader’. *Manufakturkontoret*, draft of ‘Instruction for the cutler master Engberg’, Stockholm, 1740-03-20, pp. 667–674. RA.

¹⁰⁹ ‘rätta konsten och handlaget’. *Manufakturkontoret*, draft of ‘Instruction for the cutler master Engberg’, Stockholm, 1740-03-20, pp. 671–675. RA.

¹¹⁰ ‘i temmelig jämn godhet med de utländska’; ‘kunna de unga i stället at de i förstone smidde allenast 3 dussin klingor om dagen nu smida 4: a 5 dussin’. *Kommerskollegium*, Protocol, 1740-06-03. KkH, A1aa:110, pp. 2546–2547. RA.

¹¹¹ ‘med stål bländade på det Engelska sättet’. *Kommerskollegium*, Protocol, 1740-06-05. KkH, A1aa:110, pp. 2586–2587. RA. In the protocol from June 3, this steel was referred to as ‘mixed’ (*melerat*), which indicates that the items had been made from knife steel.

seem to have been negotiated and even resisted. Still, this case indicates the beginning of a *skills-trajectory* that will be followed in the next chapters, with further emphasis being put on the organisation of cutlery making and improvements in steelmaking. One important aspect of this trajectory was the movements of artisans, materials, and artefacts that connected the *contact zones* Vedevåg and Stockholm. From the beginning, this process involved intersecting *strategies* and *tactics*. These features can be further emphasised by studying Engberg's second journey to England.

The Arguments of a Retiring Manufacturer

Coming back to Sweden from England in 1755, Engberg used his practical experiences to promote himself at the coming Diet. He made comparisons between British and Swedish metal-making practices, and connected them to a systemic perception of the metal trades. The possible improvements brought up by Engberg were also aligned with the 'corrections' identified by Schröder during the same Diet, as discussed in section 4.3.

In his text from 1756, Engberg argued that one critical aspect for improving domestic metal manufacturing was a better use of the 'Material storehouse' that Sweden possessed. He promoted the use of mineral coal from Skåne and high-quality bar iron from the ironworks in Uppland. This, he stressed, would allow Sweden to produce both fine crude steel and cementation steel.¹¹² The cutler also used his new-won knowledge to identify alterations to be made in the steel production. Two main problems were identified. The carburisation process lagged behind due to mistakes made when selecting the iron and when processing it. Also the sorting of the finished steel was deficient. Here, Engberg referred to the barrelling procedure where the steel was 'broken into pieces, and shuffled together, packed in Barrels'.¹¹³

Like Schröder, Engberg linked the deficient steelmaking to problems in the latter stages. The result of poor sorting was that hardly any metal-making artisan could carry out his work properly. This, he argued, could be avoided if the steel instead was 'specifically prepared and marked' for different crafts, so that each craftsman could get the type of steel appropriate for him to 'exercise and improve his Skills'. This was the reason for Engberg bringing home steel from England.¹¹⁴

Steelmaking was not the only area emphasised by Engberg. Again in accordance with Schröder's discussion, he argued for improvements in the organisation of work within the metal trades: 'Failures that occur in the

¹¹² 'Material förrådet'. Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fol. 381. RA.

¹¹³ 'i stycken sönderlagit, och hopablandat, i Kärill inpackat'. Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fol. 377. RA.

¹¹⁴ 'särskilt beredes och märkes'; 'öfwa och upbringa des Handalag'. Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fol. 378. RA.

processing by unskilled hands could and should always be corrected and eventually less tolerated’, he stressed, ‘but Piecework is what we should try to bring into completion’.¹¹⁵ This was to be supported by giving young Swedes the opportunity of travelling to England in order to be trained in the best workshops, and learn how to work ‘from and into the hands of each other.’ Engberg thought that this, in turn, would promote the export of metal wares from Sweden. For the domestic market, however, he stressed that ‘we should to start with at times be content with training samples and such pieces, that become of less taste and liking, considering they are made by inexperienced hands’.¹¹⁶ In linking the qualities of metal goods and the processing of steel with piecework and the further spread of skills, he also legitimised his second journey to England:

Therefore, I have always had great desire and inclination to learn the finer English Steelmaking, which is done with Swedish Iron, [and] which indeed is intended for all Steel items, Files, Instruments and all such manufacturing, which demands firm and hard Steel, without being iron-blended.¹¹⁷

Recalling that Engberg and his son had practised in all these crafts when travelling in England, the discussion above points to the importance of viewing skills and practices as being linked on the move. It also indicates how these journeys are better seen as both *made* and *used*. The steel now favoured by the cutler differed from the techniques that he had brought with him back to Sweden after his first journey. The knife steel was made to be iron-blended and cementation steel was (ideally) not. Engberg’s arguments can also be related to Rinman’s preference for cementation steel for use in metal works (see section 4.4). This further illustrates the links between material qualities and the ideas of a workshop-based division of labour, as emphasised both by officials and artisans.

In his proposal, Engberg also related his two visits to England to a notion of change. He stressed that the second journey had been undertaken not only because of his desire to serve the Swedish realm, but also from a wish to identify how the British metal trades had developed during the two decades

¹¹⁵ ‘Fehl som skie i arbetningen af owana händer kunna och böra altid hjelpas och efter hand mindre tålas’; ‘men Styckearbetet är hwad wi hufwudsakeligen böra söka bringa till sin fullkomliga gång.’ Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fol. 381. RA.

¹¹⁶ ‘utur och i hand på hwarannan.’; ‘böra wij i början understundom åtnöja os med lärospår och sådant arbete, som blifwer af mindre smak och tycke, i anseende til arbetningen i owana händer’. Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fols. 374–375. RA.

¹¹⁷ ‘Hwarföre jag alltid haft stor lust och åhåga at få lära den fina Ängelska Stålbränningen, som skier af Swänst Järn, hwilket är egenteligen för alla Stålsmiden, Filar, Instrumenter och all sådan tilwärdning, som fordrar fast och hårdt Stål, utan at wara järmblandat.’ Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fol. 375. RA.

that had passed since his first journey.¹¹⁸ He was not only referring to ‘corrections’ as carried out in the ‘top-down’ fashion like Schröder. Rather, he was able to compare practices of work in a spatial *and* a temporal sense.¹¹⁹

There were other differences between Engberg and Schröder as well, which are evident when comparing the texts that they submitted to the same Diet. The two authors spoke from divergent positions. Engberg finished his proposal by asking *Handels och manufakturdeputationen* for an annual pension for his efforts. This, he argued, would make it possible for him to further use his knowledge — by assisting metal works and by training his son in the cutler’s trade. To emphasise the sacrifices he had made for the public, he stressed that it was his continual devotion to ‘the upbringing of the Art’ that had made him struggle with ‘the scantiest of livelihoods’.¹²⁰ This request for compensation was acknowledged by Schröder, who argued that Engberg should be given a pension of 500 to 600 dlr. smt. annually, so that he could manage his workshop and assist other artisans. In the same text, Schröder also promoted financial support for file maker Roth, manufacturer Schnack, and the immigrated English smith Eduard Staunton.¹²¹

These applications were recognised by *Handels och Manufakturdeputationen* and *Sekreta utskottet*, and Engberg was granted the annual pension. He was also awarded 10,000 dlr. kmt. in order to compensate him for his second journey. This was done with the assurance that Engberg *quid pro quo* would continue to share his skills with artisans around the kingdom. The Delegacy emphasised particularly the cutler’s skills in making good cementation steel, which was treated as a scarce commodity. Stockholm file maker Roth was referred to as an example. It was noted how he had to ‘travel himself to the Steelworks’ in order to sort out his desired steel. Such obstacles could be avoided with Engberg’s assistance.¹²² The Delegacy thus legitimated the cutler’s self-promoting proposal, and thereby his position as a go-between within the metal trades. The protectionist *strategies* of the state intersected with the *tactics* of an ageing practitioner.¹²³

Journeys were thus *used* by artisans as a way to navigate within a changing manufacturing system. As evident in Schröder’s diaries, they were closely related to the possibilities of getting premiums for setting up work-

¹¹⁸ Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fol. 380. RA.

¹¹⁹ This is evident also in section 7.3, dealing with Engberg’s return to Vedeväg in 1758.

¹²⁰ ‘Konstens upodlande’; ‘knappaste utkomst’. Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fols. 381–382. RA.

¹²¹ Schröder, Proposal to *Handels och manufakturdeputationen*, regarding finer metal making, March 1756, fols. 1121–1123. RA. In the latter cases, the supports were intended for setting up workshops. Roth and Schnack had also submitted proposals to the Delegacy.

¹²² ‘sielf resa til Bruken’. *Secrete Handels och manufakturdeputationen*, (copy) of Protocol, Stockholm, 1756-05-18 (circulated to *Sekreta utskottet*, approved 1756-06-14). FUH, R. 3052, fols. 129–134. RA.

¹²³ Chapter 7 deals thoroughly with the trajectories of Schröder and Engberg during the 1750s and 1760s, including the latter’s intermediary role after returning from his second journey.

shops in Stockholm or, alternatively, for assisting others in constructing larger metal works. Still, these processes also included the exhibition of skills. This was especially the case if the craftsman in question was young or less known to the authorities. Before being supported with money, they had to make samples that could be shown to the boards or the *Hallrätt*. When metalworker Winberg came back to Stockholm from England in 1761, he was advised by Schröder to make some copperware samples to be exhibited at the Diet. He made two coffeepots which were presented by Schröder at *Handels och manufakturdeputationen*. A premium was then given to Winberg, in order for him to procure tools and a temporary workshop.¹²⁴

Still, not all artisans were successful in promoting their skills. When the scissor-making journeyman Carlsberg came back from England in 1766, Schröder quickly applied for premiums on his behalf. This request was, however, denied. Later, the *Directeur* noted that Carlsberg's father resisted the idea of his son managing a workshop of his own, because of the risk that he would 'immerse himself in debt'. At the father's suggestion, young Carlsberg was instead sent back to England in order to be further trained.¹²⁵

This section has shown how artisans' journeys were *continued* in Sweden. In analysing Engberg's two journeys, I have shown how these were important points in a trajectory in which the organisation and practical arrangements of cutlery making intersected with the *making* and *using* of steel. By showing how ideas of 'the English way' and piecework were connected to the making of welded knife steel and, eventually, cementation steel, this trajectory has also been related to the notion of changes within the Swedish manufacturing system from the mid-1730s to the late 1750s. Comparisons with other artisans illustrate how journeys and the skills acquired abroad by artisans were negotiated and linked to the potentials of setting up manufacturing workshops. Movements thus also created a potential for social mobility. This will be further discussed in the following two chapters. Still, as pointed out by other studies on the metal trades, these 'mobile' artisans were not always of Swedish origin.

5.5 Instructing the Ignorant Swedes?

Writing to *Handels och manufakturdeputationen* in 1741, the immigrated French manufacturer Noel Louis Lémaître described his undertakings during the previous years. In order to set up a 'box-making works' in Stockholm, he had made an 'expensive journey' to recruit foreign craftsmen, who in turn

¹²⁴ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1761, pp. 96–97. KB. For a while, Winberg worked in Engberg's workshops. See further section 6.4.

¹²⁵ 'fördjupa sig i gäld'. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1766, pp. 57–58; 1767, pp. 7–11, 16. KB.

could instruct young Swedish workers.¹²⁶ A few years later, in 1744, *Kommerskollegium* described the utility of recruiting a German grinder and maker of cloth shearers' scissors named Caspar Coby. In granting him privileges, the Board noted that he was free to practise his craft for a ten-year period. In return, Coby had agreed on 'teaching and training one Native Swede'. It was argued that this deal also served the textile manufacturing, which were guaranteed scissors that previously had been imported.¹²⁷

When compared to the discussions regarding Engberg's journeys, these two brief examples show how foreign craftsmen were recruited to Sweden to perform the same duties as those that were expected of travelling Swedish artisans. They were to set up workshops and train apprentices in different skills. Both types of artisan mobility were supported in the manufacturing privileges, as well as subsidised by public means. The recruitment of foreign artisans was seen as necessary, but not always of great benefit however. In a letter from 1735, in which he also recommended Engberg to *Kommerskollegium*, Alströmer argued that the employment of manufacturers from other nations was expensive and uncertain.¹²⁸

An illuminating example of this is Schröder's discussion of the English smith Eduard Staunton. He was one of the workers recruited by Schröder and Angerstein to Vedeväg in 1754. After falling out with his employees, he was instead encouraged to move to the metal works in Duvnäs, and later to Vira, where similar problems occurred. Staunton then settled in Stockholm, but Schröder concluded that he was not suitable to teach any apprentices.¹²⁹ Moreover, techniques and inventions promoted by recruited artisans or mechanical practitioners were not always useful. In 1763, a German 'artist' named Lohman was paid to travel to Stockholm in order to improve domestic file making. However, his invented machine was found to be of little use when tried in file maker Roth's workshop. As described by Schröder, Lohman did not know much about the craft at all.¹³⁰

Still, these examples render a very one-sided image. On other occasions, the employment of skilled labour from other nations seems to have resulted in improvements. Such recruitments were prioritised tasks both for Schröder during the 1750s and 1760s, and later for Rinman in Eskilstuna *Fristad* during the 1770s. In the former case, some of the immigrated workers came to be employed at the provincial knife works.¹³¹

¹²⁶ 'dosefabrique'; 'kostsam utresa'. Lémaître, Noel Louis, Report to *Handels och manufakturdeputationen*, March 1741. FUH, R. 2767, fols. 1010–1014 (no. 113). RA.

¹²⁷ 'lära och tillöfwa en Infödd Svensk'. *Kommerskollegium*, (Copy of) decision regarding privileges for master Caspar Coby, Stockholm, 1744-03-06 (circulated to the Stockholm *Hallrätt*). HMR, EIII:1, fols. 330–332. SSA.

¹²⁸ Alströmer, Letter to *Kommerskollegium*, Stockholm, 1735-07-03. RA.

¹²⁹ Schröder (1925b), pp. 51–53. As noted above, the *Directeur* also applied for monetary support for Staunton at the Diet of 1755–1756. See also section 3.1.

¹³⁰ 'konstnär'. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1763, pp. 16–18. KB.

¹³¹ This is further discussed in chapter 7, mainly related to the cutlery making at Tunafors.

However, within this context, the role of travelling Swedish artisans has been largely overlooked. This is partly due to the (to some extent correct) belief that the Swedish manufacturing trades lagged far behind those in England, France, and Germany. Partly, it is based on a reluctance to dig deeper in the rich material scattered in the archives of older Swedish institutions. The resulting assumption among researchers has often been that ‘transfers’ were carried out *one way* and *top-down*: from centre to periphery and through the arrangements of state authorities.

Travel diaries kept by state officials such as Schröder, Angerstein, and Rinman are indeed valuable, but they must be complemented by sources describing the *makings* and *movements* of ordinary people. The journeys undertaken by Engberg and other artisans indicate the value of such a practice-oriented approach. The movements of foreign craftsmen, officials, and Swedish artisans were all integrated parts within a context of manufacturing where skills, ideas, materials, and artefacts were *grounded* — negotiated and used in new and combined ways — in different *contact zones*. These movements connected metal-making communities within and beyond the borders of the Swedish realm. The links between circulatory processes and the organisation of metal-making practices are further discussed in the following two chapters.

5.6 Conclusion

The aim with this chapter has been to analyse artisans’ journeys and the *circulation* of skills and knowledge during the mid-eighteenth century. To do this, I have used as the main examples the two European voyages made by Stockholm cutler Eric Engberg, during the late 1730s and the mid-1750s. Importantly, this chapter and the following ones should not be seen as separated from the preceding chapters. The making of foreign journeys was connected to a larger politico-economic and material context in change. This relates to the interest in this investigation in *strategies* and *tactics*.

Artisans’ journeys offer good examples of the connections — and differences — between *systemic observation* and the *practising of skills* on the move. Artisans were expected to acquire knowledge and techniques in different metal-making communities — often separated by vast distances — and to become informed about the metal trades on a larger scale. I have emphasised how this required *tactics* in order to enter workshops, get involved in processes of work, and convince others to share their skills. It also created potentials for innovative practices of *imitation* and mediation. In addition, artisans had to involve themselves in networks of information, make acquaintances on the move, and keep in contact with patrons and institutions.

These aspects of craftsmen’s journeys are of particular interest when compared to the descriptions of foreign workshops, communities, or larger

systems written by officials on the move. Both types of movement were important to the protectionist Swedish state, with its expanding manufacturing system. They gradually shaped both specific trajectories of knowledge and skills and the wider context of manufacturing and policing. The links between Engberg and Schröder are enlightening regarding this feature.

The analysis in the sections above also demonstrates how artisans' journeys should not be seen as limited to the act of being away. The setting-out on a voyage was related to the forming of patronage relations, but also to making contact with state institutions and intermediaries both in Sweden and abroad. In this sense, my results relate to Amelin's observations regarding the making of mathematical and optical instruments during the same period.

Still, I have also emphasised how journeys could be continued after the return to Sweden, as exemplified by Engberg's longer visits at Vedevåg. This suggests a view of skills and knowledge as repeatedly *grounded* and negotiated in different, but connected, *contact zones*. In line with Lindqvist's and Klingnéus' arguments, these were not uncomplicated processes. This chapter and the following ones do, however, question the idea of top-down transfers and artisans' resistance, by highlighting the impact of adaptations, reconfigurations, and the interplay of *strategies* and *tactics* over time.

Journeys were also used by artisans for promoting themselves within the manufacturing system. This illustrates the connections between movements, social mobility, and the *circulation* of knowledge and skills. The links between voyages and the setting up of manufacturing workshops, especially in Stockholm, have also been noted in other studies. Still, this investigation comprehensively analyses the networks involved in these processes. This relates to Sonenscher's emphasis on the fluidity, variation, and negotiations of artisanal work, as related to a wider politico-economic context.

In line with recent discussions on pre-industrial European manufacturing, this investigation also expands this idea by relating change to the connections between movements, materiality, and knowledge-making. Engberg's journeys illustrate how changing perceptions regarding the organisation of metal-making practices were connected to a wider (international) context of *making*, *using*, and *trading*. Most notably, they were linked to interwoven alterations regarding steelmaking and the making of cutlery. This can in turn be related to the ideas of 'corrections', as argued for by Schröder.

This chapter has begun to trace a *skills-trajectory* that stretched from the 1730s to the 1770s. The journeys of Engberg function as important points of entrance into various practices of eighteenth-century cutlery making. The following two chapters further explore the practical meaning — or the *making* — of 'the English way' and piecework, as it was connected to mobility, to the use of materials and artefacts, and to differing ways to organise work. The next chapter is directly connected to the first of Engberg's journeys, while chapter 7 explores practices that were linked to the second one.

CHAPTER 6

Making Cutlery in the ‘English Way’: Workshops and the *Metal Bazaar*

Let me begin this chapter with the tale of an unsuccessful early-modern business venture. In July 1766, one year after his death, the probate inventory for Eric Engberg revealed how his debts far exceeded the assets of his household; the former were in total a stunning 22,792 dlr. kmt. Several small debts to various persons were listed, but the major part of the sum was a loan from *Manufakturkontoret*, amounting to 19,450 dlr. kmt.¹ The image of a heavily indebted manufacturer is reinforced by a close analysis of how this loan had accumulated. The account books of *manufakturfonden* make it possible to follow manufacturers and debts over time. This is also the case for Engberg. Table 6.1 shows how Engberg’s debt (here in dlr. smt.) grew from the late 1730s into the late 1750s.

Table 6.1 *Eric Engberg’s debt in dlr. smt.*

	Specification	Sum	Repaid/ with- drawn	Total
1739	Advance payment	3,577	2000 (premium)	1,577
1740	Ditto	3,662	-	5,239
1741	For a grinding machine	301	-	5,541
1745	Invention premium	400	-	5,941
1747	Loan, for steel	434	40	6,335
1748	Loans, for materials	600	98	6,837
1749	Ditto	400	-	7,237
1750	Loans, for a property	698	-	7,936
1755	Balancing of previous advance	100	-	8,036
1757	-	-	100	7,936
1760	<i>Total debt</i>			7,936

Source: *Manufakturkontoret*, Account books for *manufakturfonden*, 1739–1760. MkKam, C:a, vol. 225–246. RA. Note: I have only included the years when new loans were taken or when repayments were made, affecting Engberg’s total debt.

¹ Probate inventory, Eric Engberg, 1766-07-23. SRr, 1:a avdelning, F1A:207, fols. 609–612 (6130–6160). SSA. Arkiv Digital AB. The assets of the Engberg household were in total 12,291 dlr. kmt., with the two courtyards in the quarter *Trädgården* together valued at 10,800 dlr. kmt.

The loans listed in Table 6.1 were directly related to Engberg's business in Stockholm. They were given for setting up workshops, procuring mechanical devices and materials, and for investing in new properties. While *Manufakturkontoret* was the creditor for some of the early and larger loans, other actors emerged as well — individuals and institutions like *Kommerskollegium*. In the latter cases, bills were handed in to *Manufakturkontoret* which endorsed them and covered the costs. The account books from the 1750s stated that Engberg's debt was to be reduced by ten percent if he supplied proof of his production (a manufacturing premium).² The cutler never did.

These two features — large debts and problems regarding production and sales — seem to confirm the traditional view of the manufacturing industries. Recalling Heckscher's forceful conclusion, it can be argued that Engberg's works was just one expression of the failures in a manufacturing sector characterised by regulation, ineffective premiums, a corrupt lending policy, and substandard goods. The interest in experimentation and new techniques was by no means attuned to the market.³ Engberg and many others seem to have built castles in the air, supported by the protectionist institutional network.

Still, there are good reasons for nuancing this image. The previous chapters have indicated the promise of investigating metal-making spaces and practices, by analysing the connections between the organisation of work and the *circulation* of skills and knowledge. In this chapter, I proceed from this approach by emphasising metal making in Stockholm. The aim is to investigate the construction of urban manufacturing workshops at mid-century, with a focus on metal works set up in the 'English way'. The main example used in the analysis is the cutlery works of Eric Engberg.

The *skills-trajectory* discussed in the last chapter is thus further explored by highlighting the connections between workshops, the urban space, movements, and flows of trade. This is also done in relation to the discussion in section 3.2, where I argued that eighteenth-century Stockholm was a *metal bazaar*. This concept captures the fluidity, flexibility, and diverse ways of organising work in the capital's metal trades, as described by Schröder in his diaries. Urban manufacturing was characterised by diverging divisions of labour and varying patterns of employment.

Here, I take steps into the daily activities of the *bazaar*. In so doing, I relate to Raj's discussion on *contact zones* and *grounding*. The chapter emphasises how urban manufacturing spaces were shaped by, and produced, knowledge with different trajectories; skills, ideas, and practices were appropriated by people connecting to and making use of a wider material

² See e.g. *Manufakturkontoret*, Account book for *manufakturfonden*, 1752. MkKam, C:a, vol. 238, pp. 377–378. RA. C.f. chapter 7 where I refer to such verifications regarding the production at larger knife works. This was one way for proprietors to get reductions of loans.

³ Heckscher (1949a), pp. 487–490; Heckscher (1949b), pp. 615–621. For a similar discussion on the guild crafts, see Söderlund (1949), pp. 85–87.

and social context.⁴ I have again chosen to employ a thematic approach, although all sections treat the links between spaces, people, movements, and work. The chapter also has a generally chronological structure.

The first two sections deal with the negotiation of places and the alterations of workshops. They relate to Sennefelt's discussion on how the changed meanings of places in the capital were connected to movements and the interplay of *strategies* and *tactics*.⁵ As shown in section 6.1, the construction of workshops demanded a balancing of privileges, ideas about production, and the *strategies* of political authorities. Making spaces for metal making were lengthy processes which often saw initial plans changing.

Section 6.2 is about the arranging of workshops in the 'English way'. I show how these processes were linked to the *imitation* and adaption of mechanical devices and the alteration of places over time. Metal workshops in the capital often depended on imports, and artisans had to act tactically in order to bring movements about. With reference to Alder, it was in spaces like these that objects, materials, and practices were made political and (to some extent) objective. Artefacts as well as skills were negotiated in relation to a broader context of manufacturing policies.⁶

Section 6.3 continues this discussion, but with a focus on divisions of labour and altered forms of workshop-based training. In this context, the role of the family and household is also emphasised. This section explores the implementation of piecework in Engberg's cutlery works during the 1740s and 1750s. By comparing with other artisans, I also show how the organisation of work differed between different trades and over time. Moreover, the materiality of the 'English way' is highlighted by a discussion on the combined *use* of steel and other materials. In line with Pamela Smith, this discussion suggests a nuanced perspective of craft knowledge.⁷

Metal-making artisans in Stockholm also experienced harsher times, as is shown in the closing section. I relate Engberg's business to the competition from provincial knife works, focusing on the departures of workers during the 1750s. Instead of speaking in terms of 'decline', however, I suggest a perspective that incorporates notions of workshop cycles, workforce mobility, and creative uses of space.⁸ This is also discussed by emphasising the *tactics* related to the managing of workshops over time. This section is the only one that proceeds beyond the timeframe used in chapter 5, including the 1760s and 1770s.

⁴ C.f. Raj (2007), p. 13, 21. See also Roberts (2012).

⁵ Sennefelt (2011). See also de Certeau (1984), pp. 117–118. As noted in chapter 1, de Certeau used this distinction to differentiate between *places* and *spaces*. This discussion also relates to Ling's conclusions regarding houses in early-modern Stockholm as places for a variety of work-related tasks, encounters, and conflicts. See Ling (2016), pp. 180–204.

⁶ Alder (2010), pp. 87–89, 98–103, 153–154.

⁷ Smith (2007), pp. 37–44. See also Evans and Withey (2012), pp. 541–544, 549.

⁸ C.f. Sonenscher (2012), pp. 99–100, 138–139; Davids and De Munck (eds.) (2014).

One critical argument here is that urban manufacturing enterprises can be seen in a wider perspective if followed closely over time. The low volumes of production observed for Engberg's workshops must be related to other processes. This chapter especially points to the importance of training and the *circulation* of skills and knowledge as linked to innovative reconfigurations of processes and products.

In order to approach these different aspects of urban metal manufacturing, a number of different archives have been used. Protocols and letters from *Kommerskollegium* and *Manufakturkontoret* are employed. These are complemented by verifications of transactions from *manufakturfonden* (the supporting documents for the account books referred to above), by reports and protocols from Stockholm *Hallrätt*, and by texts submitted by artisans to the Diets. I have also used digitalised sources from the Stockholm City Archives that concern probate inventories, head tax records, and housing data. When combined, these sources make it possible to trace a trajectory over time. Throughout the chapter, comparisons are made with other artisans, many of whom were in frequent contact with both Engberg and Schröder. The result is an analysis on what eighteenth-century artisans actually did do, how they did it and, importantly, in relation to what.

6.1 Places for Manufacturing: Plans and Negotiations

The first Stockholm *Hallrätt* report from 1740 referred to several metal works set up in the 'English way'. Some of the responsible artisans had made journeys abroad before being privileged for constructing workshops in the capital. One of these artisans was Eric Engberg.⁹ However, his cutlery works was not the first one in Sweden to be privileged by *Kommerskollegium*. In a list, the Board mentioned seven such establishments from the first half of the eighteenth century, including Engberg's works.¹⁰

Engberg was ordered to make visits to larger manufactories after returning home from his first journey abroad in 1738, but this was not the only way in which he would make use of his experiences. Alströmer insisted that the cutler should set up a works of his own for training other artisans. Hamren later argued, in 1738, that the construction of this works in the 'English way' demanded that Engberg was not restricted by any guild statutes. As a manufacturer, the cutler would have better access to 'a good, well-situated and spacious place' in the capital. To do this, he was in need of 6,000 or 7,000 dlr. smt. from public means.¹¹ One year later, Engberg

⁹ Stockholm *Hallrätt*, Report 1740, part II, pp. 119–127. HMR, BIII:1. SSA.

¹⁰ KkH, DVIIIa:2, (*Lit:K*). RA. Among these were knife works as well as ones for razors and scissors.

¹¹ 'en god, wälbägen och rymlig plats'. Hamren, Olof, Proposal to *Handels och manufakturdeputationen*, 1738. FUH, R. 2682, fols. 483–486. RA.

obtained privileges from *Kommerskollegium*, stating that he was free to practise his craft without coming under the jurisdiction of any guild.¹²

The process of finding a suitable location for a cutlery works was, however, marked by negotiations between Engberg and various political institutions. As discussed in the previous chapter, it was also related to different plans to make sure that Engberg's skills were spread to the provinces. Comparable examples are provided by other artisans who also made attempts to set up larger workshops in Stockholm during this period. In line with de Certeau, this reflects different *strategies* as related to *tactics* — altering the meaning of places by various ways of *making use*.¹³ Relating to Sennefelt, this section shows the importance of intersecting spatial 'boundaries' and attempts to establish 'thresholds'.¹⁴ Here, I discuss three features referred to by artisans in these negotiations: water power, visibility, and accessibility.

Plans for Workshops: Water Power, Visibility, Accessibility

When questioned in *Kommerskollegium* in March 1739 about his plans, Engberg argued that he had no permanent workplace — confirming the picture of an unsettled craftsman proposed in chapter 5. Meanwhile, as stated in the protocol, he was 'busy from 3 to 4 o'clock until 8 and 9 in the morning repairing old knives, and similar pieces' in a workshop on *Fredsgatan*. These items were later finished in his home. His intention was, however, to set up a 'cutlery works' which was to be managed by his two brothers.¹⁵

This plan was debated during the following months, a process involving Engberg, *Kommerskollegium*, and *Manufakturkontoret*. When questioned by the Board in July, Engberg expressed a wish to set up a workshop that included a horse-powered grinding machine. The Board instead saw Vedevåg or Eskilstuna as appropriate destinations for Engberg, because of the better access to water power. This encouraged Engberg to elaborate his plans. A few weeks later, it was noted that the cutler had applied for access to a plot near *Södersluss* — connecting the central and southern parts of the capital — where there was enough space for a water-powered works.¹⁶

These ideas were also communicated by Engberg to *Manufakturkontoret*. In a letter, he argued that his old workshop was 'too small and far too unsuitable'. His intention was to make himself worthy of the economic support

¹² *Kommerskollegium*, (Copy) of letter regarding the privileges for master Engberg, Stockholm, 1739-05-21 (circulated to the Stockholm *Halvrätt*). HMR, EIII:1, fols. 458–460. SSA.

¹³ de Certeau (1984), pp. 34–39, 117–118.

¹⁴ Sennefelt (2011), pp. 179–180.

¹⁵ 'sysselsatt dageligen ifrån kl. 3 å 4 til 8 och 9 om morgonen med gamla knifwars lagande, och dylikt arbete'; 'wårck af knifsmide'. *Kommerskollegium*, Protocol, 1739-03-23. KkH, AI:aa:108, pp. 963–964. RA. Engberg himself had plans to assist the artisans at Vedevåg. C.f. section 5.4.

¹⁶ *Kommerskollegium*, Protocols, 1739-07-13; 1739-08-09. KkH, AIaa:109, pp. 290–298, 830–834. RA.

that had been offered to him during his stay abroad, by training apprentices in finer forging and knife making. The new cutlery works was also intended to supply Stockholm with metal wares. In order to achieve this, water power was needed. The works also had to be close to the port: ‘not too far away, for each and every one who could require my work.’ The place near *Södersluss* met both requirements: located only a short walk from the port (*Skeppsbron*) and the iron weigh. Engberg asked *Manufakturkontoret* to send an instruction on his behalf to the local magistrate.¹⁷

While promoting this idea, Engberg also had plans for a place located next to *Packartorget*. After it had been inspected, in late August, this courtyard was considered too expensive. *Kommerskollegium* decided that further requests should be made only about *Södersluss*. However, when discussing this matter with the town-architect, Johan E. Carlberg, the plans changed yet again. Carlberg strongly rejected the Board’s proposal, with reference to a number of practical difficulties.¹⁸ The issue was now handed over to *Manufakturkontoret*, which instead proceeded with Engberg’s alternative plan.

As will be discussed below, the installation of grinding devices was perceived as one critical feature when setting up workshops according to the ‘English way’. The plans for such metal works in Stockholm thus connected spatial rearrangements with new ideas about the organisation of work. They were, however, also centred upon notions of visibility and accessibility. Plans similar to Engberg’s were produced by other metal manufacturers. In 1741, watchmaker Backman asked the Diet about access to a building near *Norrbro* in central Stockholm, where he could accommodate his watchmaking works. This house, he argued, was situated ‘by the big street’ and ‘conveniently for all those who need my service.’ It also had access to running water, which facilitated the construction of a grinding mill.¹⁹

Engberg and Backman thus wanted their works to be visible features in the street scene and to be accessible for potential customers. Their texts suggest an interrelationship between the spheres of *making*, *dealing*, and *making use*.²⁰ Access was oriented towards using movements within the urban space. Still, setting up workshops in the capital were matters involving intricate negotiations over time. Plans could be altered or even rejected.

¹⁷ ‘alt för liten och aldeles otienlig’; ‘ey woro för långt utur vägen, för en hwar som mitt arbete kunde behöfwä.’ Engberg, Eric, Letter to *Manufakturkontoret*, Stockholm, (presented) 1739-08-28. MKA, D, vol. 165 (no. 63). RA.

¹⁸ *Kommerskollegium*, Protocols, 1739-08-22; 1739-08-23; 1739-08-25; 1739-08-28. KkH, Alaa:109, pp. 907–909, 942–951, 961–967. RA.

¹⁹ ‘wid stora gatan’; ‘beqwämt för alla dem som behöfwär min tjenst.’ Backman, Christian, Proposal to *Urskiljningsdeputationen*, January 1741 (circulated to *Handels och manufakturdeputationen*). FUH, R. 2766, no. 15. RA. The house in question was the *Grefwe Pehr*’s house, which at the time housed the Royal Library. See Ronnestam (2013), pp. 45–46.

²⁰ Still, none of the texts mentioned the possibility of letting a trader or merchant handle the sales, as was later promoted by Schröder (see section 3.2). C.f. Söderlund (1943), pp. 223–225.

Negotiating Places: Manufacturers and Spatial *Strategies*

Regulative texts and writings by leading cameralists like Berch stressed how towns were the most important parts of the domestic economy. Urban space was the home for trade and manufacturing, and it could be altered in order to promote different economic activities. I have also shown how metal manufacturing expanded in Stockholm during the 1740s. Many new workshops were constructed during this period. These processes were, however, often extended over time due to negotiations between different actors. Succeeding in getting access to a suitable place for setting up a workshop was of vital importance in order to *make oneself* a manufacturer.

In order to have his works constructed, Engberg needed support and funding from state institutions as well as approval from local authorities. In October 1739, he received a premium of 2,000 dlr. smt. Taken from *manufakturfonden*, this sum was partly considered as a delayed reward for his journey, and partly it was meant to cover the building costs at the courtyard next to *Packartorget*.²¹ In June the following year, a first plan for a stone building was handed in by *Manufakturkontoret* to the *Ämbets- och Byggningskollegium*.²² The Office later reported that this process had been difficult, because of ‘the removal of everything, which could have impeded the Title deed of this purchase’.²³ Engberg’s project for *Södersluss* had not been realised, but the securing of a courtyard meant that the construction of a cutlery works now could begin. It was at this point that Engberg also agreed to make the first journey to Vedevåg. The spreading of skills was thus related to the cutler’s *tactics* in promoting himself as a Stockholm manufacturer.

For some years *Manufakturkontoret* was the formal owner of the courtyard, but in April 1745 the property rights were transferred to Engberg.²⁴ Still, the negotiations continued, with Engberg expanding his plans for the works. A drawing with ‘alterations and improvements’ of his filing workshop was approved by the Town-architect Carlberg in July 1746 (see Figure 6.1). Some years later, in 1750, Engberg succeeded in having *Manufakturkontoret* support him with another 2,000 dlr. kmt. This sum was intended for buying an adjacent courtyard, expanding the space even more.²⁵ In contrast to the first funding for setting up his works, this later sum was added to the cutler’s debt.

²¹ Engberg, Eric, Verification of premium from *manufakturfonden*, Stockholm, 1739-10-03. MkKam, C:c, vol. 282, fol. 190. RA.

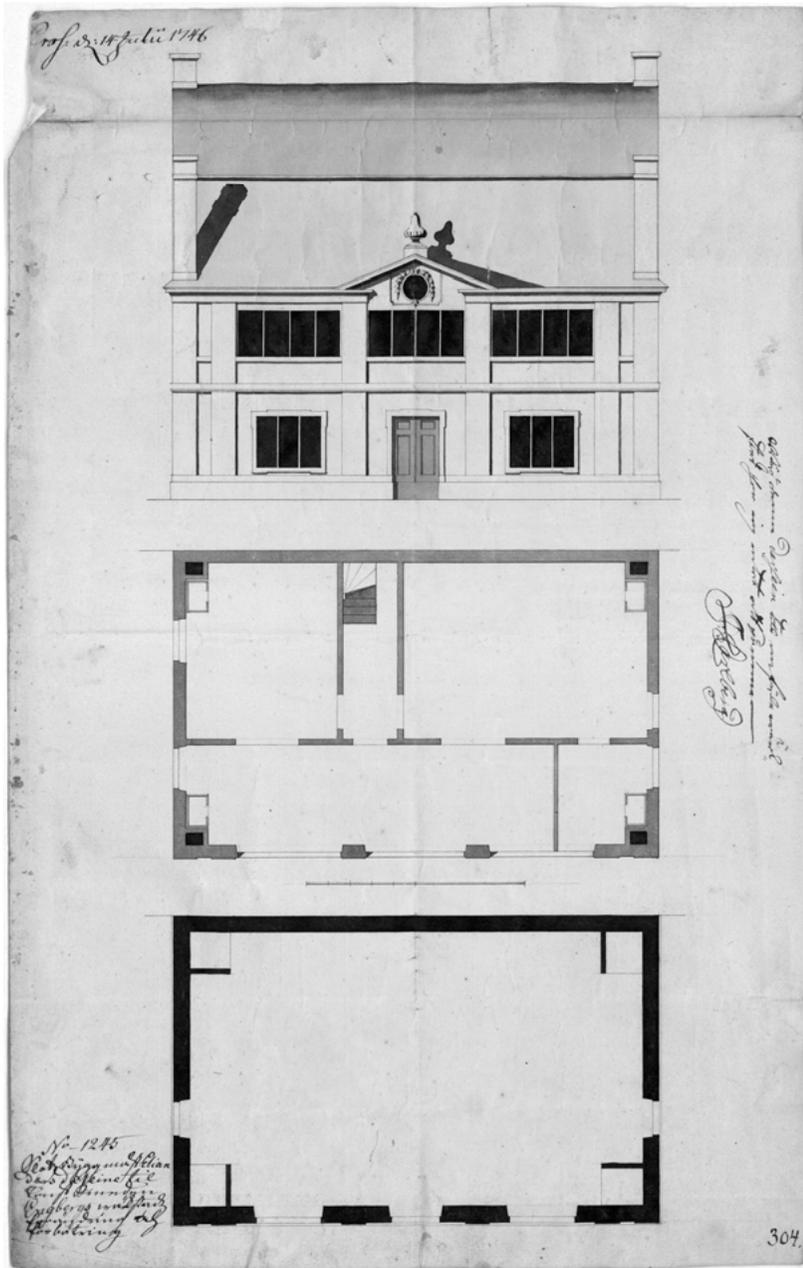
²² *Ämbets- och Byggningskollegium*, Protocol, 1740-06-12. ÄmB, AI:29, pp. 805–806. SSA.

²³ ‘undanrödjandet af alt det, som kunnat hindra Lagfarten med detta Kiöpet’. *Manufakturkontoret*, Report to *Sekreta utskottet* (circulated to *Handels och manufakturdeputationen*), January, 1741. FUh, R. 2766, pp. 160–161. RA.

²⁴ *Manufakturkontoret*, Protocols, 1745-03-11; 1745-04-11. MkA, A:a, vol. 51, pp. 313–314, 472. RA.

²⁵ Engberg, Eric, Verification of loan from *manufakturfonden*, Stockholm, 1750-07-07. MkKam, C:c, vol. 319, fol. 367. RA. The account book from 1750 listed a loan of 666 dlr. smt. for a property. See MkKam, C:a, vol. 236, p. 346. RA. This sum equals 2,000 dlr. kmt.

Figure 6.1 Plan for Engberg's filing workshop, 1746



Source: Original drawing by Slotzbyggmäst: [Claes] Eliander, 1746. Stadsbyggnadskontorets kartor och ritningar, BN 1746:304. SSA. (Photo: Jarmo Sundman, Stockholms stadsarkiv). Note: This building is listed in the archive as being built in the quarter *Bergsklippan* on *Kungsholmen*. No other sources have been found that support this reference. Schröder later noted that Engberg's filing workshop was located at the same courtyard as his other workshops (see below).

Thus, constructing the cutlery works was a matter of recurrent negotiations between Engberg, *Manufakturkontoret*, and the local authorities in Stockholm. All aspiring manufacturers were not as successful in securing a place for setting up a metal works. Watchmaker Backman applied for access to a suitable building already in 1738. Upon being denied, he instead set up provisional workshops in a building on *Lilla Nygatan*. This was an intolerable situation, Backman later argued, since working in rented rooms prevented long-term investments in expensive devices and construction.²⁶

If proper premises were found, other problems could appear. Johan E. Schnack described, in 1756, how his rental contracts on several occasions had been cancelled because of ‘the noise I cause by an incessant filing and hammering.’²⁷ He asked *Manufakturkontoret* for a financial support, but the Office argued that this would serve as a ‘harmful precedent’ for other craftsmen. The proposal was denied.²⁸ Still, as described by Schröder, Schnack’s case later gained the backing of *Handels och manufakturdeputationen*. He was supported with 9,000 dlr. kmt. in order to procure a courtyard on *Norrmalm*, with rooms that could be ‘adapted for proper workshops.’²⁹

Access to place was far from uncomplicated for metal-making artisans in mid-century Stockholm. Moreover, getting access was only the first step in a long process. This is evident in the case of metal works set up according to the ‘English way’. The changed plans regarding places for their construction also meant that divergent solutions had to be found regarding the introduction of mechanical devices. This puts further focus on artisans’ ability to act tactically in making use of networks and trading flows.

6.2 Constructing Workshops in the ‘English Way’

Early descriptions of the ‘English way’ of making metal wares were primarily concerned with the links between space and the organisation of work. As argued by Hamren, workplaces set up in this manner consisted of several specific workshops equipped with machines and tools suitable for the tasks at hand. This made possible a task-based organisation of work which ideally saved both time and money.

In this section, I discuss how such works were set up in Stockholm during the 1740s. Taking Engberg’s cutlery works as the main example, I show how

²⁶ Backman, Proposal to *Urskiljningsdeputationen*, January 1741. RA. This building was referred to as the ‘Post house’ (*Påsthuset*). C.f. Ronnestam (2013), pp. 43–46.

²⁷ ‘det buller som en ständig filning och hamring som iag förorsaka.’ Schnack, Johan E., Proposal to *Handels och manufakturdeputationen*, January 1756. FUH, R. 3075, fols. 1096–1097. RA.

²⁸ ‘skadeligit praejudicat’. *Manufakturkontoret*, Statement on Schnack’s proposal, submitted to *Handels och manufakturdeputationen*, February 1756. FUH, R. 3075, fols. 1100–1101. RA.

²⁹ ‘apterande til behörige verkstäder.’ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1756, pp. 151–155. KB. C.f. section 5.4.

these processes relied upon spatial alterations and *imitations* in localised practice. The construction of a works in the ‘English way’ demanded that artisans made use of wider networks, which linked urban manufacturing spaces to places visited during journeys. Different material aspects of metal making were actively mediated, validated, and negotiated over time.³⁰ The *making of space* was a matter of *tactics*. Thus, and in contrast to the image offered in previous Swedish research, I stress the role of Stockholm as a place for early attempts with a workshop-based division of labour, preceding the larger projects at provincial metal works during the 1750s.

Putting Idea into Practice: A Works with Connected Rooms

When arguing that the main feature of metal works set up according to the ‘English way’ during this period was the connection of several workshops, it is important to show what these workplaces looked like when their construction was completed. Schröder described, in 1755, how Engberg had a two-floor ‘Works-facility’. By using this term, the *Directeur* emphasised how the building contained several workshops adapted for different tasks belonging to the cutlery-making craft: ‘The said works now consists of a large forging workshop with three hearths and a grinding works driven by a horse mill, as well as Polishing wheels that are driven by tread’. On the upper floor, he continued, was ‘a large filing and finishing Workshop with its specific Machines and Tools, except for the Master’s own workshop which is in a separate room.’³¹

When compared with other cutlery works from the same period, similar types of spatial organisations can be noted. Jacob Schmals’ works in Norrköping, set up in the ‘English way’ in 1746, contained one workshop for the making of blades and one for lathing. Schmals had procured tools and devices for all the different processes of cutlery making: bellows, anvils, hammers, and files for the making of blades, stones and wooden wheels for grinding and polishing, as well as lathing chairs, metal spindles, saws, and drills for the making of hafts.³²

³⁰ C.f. Alder (2010), pp. 87–88; Pérez (2008); Berg (2002).

³¹ ‘Fabriques inrättning’; ‘Den samme består nu af en stor smedjeverkstad med tre härdar och et Slipwerk som drifwes med hästqvarn, jemte Polerskifwer som drifwes med tramp’; ‘en stor filare och finicerare Werkstad med tillhörige Machiner och Werktyg, utom Mästarens egen werkstad som är et särskilt rum.’ Schröder, Samuel, Report to *Kommerskollegium* (presented 1755-01-28), pp. 134–135. KkH, FIV:50, no. 197. RA.

³² Schmals, Jacob, (Copy of) missive to *Manufakturkontoret*, Stockholm, 1746-01-23 (later circulated to *Handels och manufakturdeputationen*); Schenbom, Anders and Nyman, Petter, (Copy of) survey of Schmals’ knife works, Norrköping, 1748-03-02 (circulated to *Manufakturkontoret*, 1751-03-18). FUH, R. 3076, fols. 18–19, 21–23 (*Afskrift N. 3* and *Afskrift N. 5*). RA. The survey of the works was done by order of Norrköping *Hallrätt*. These texts were submitted to a proposal regarding compensation which Schmals claimed to be entitled to. See Schmals, Jacob, Proposal to *Handels och manufakturdeputationen*, July 1756. FUH, R. 3076, fol. 1. RA.

Comparisons can also be made to other crafts. A report from 1740 stated that the watchmaker Backman, despite being denied the building he desired, had ‘equipped and prepared a complete workshop, with its sections and rooms’.³³ Backman himself later argued that a correctly constructed watchmaking works never could ‘emulate the English ones’ unless it consisted of at least nine professions. Each of these was in need of one or several rooms equipped with specific devices, like forges or moulding furnaces.³⁴

Metal works set up in the ‘English way’ were thus constructed by linking several workshops. This was often done by artisans (like Engberg) who owned larger houses, or courtyards, also including dwelling rooms. The boundaries between spaces for working and living were thus blurred. Moreover, as in the case of getting access to suitable places, the equipping of workshops often took a long time. This is made evident by studying the construction of Engberg’s works during the 1740s.

Connecting Here and There: Circulating Tools and Devices

Thanks to the rich material left in *Manufakturkontoret*’s archive, it is possible to follow the long process of setting up a works like Engberg’s. During the construction process, Engberg made use of contacts established during his first journey. The ‘English way’ was imitated and adapted by the innovative use of materials, objects, and space. When questioned in *Kommerskollegium* in March 1739, Engberg argued that one of the reasons for him not yet getting started with his works was that he had left the tools he required back in England, thinking that they were banned from import. Specifically, he needed anvils for making new knives.³⁵ In a note to *Manufakturkontoret* the same year, Alströmer reported that the cutler also was in need of bellows, stones and a wheelwork for a grinding mill, as well as steel and wood.³⁶

Through Alströmer’s arrangements, these devices, tools, and materials were later purchased in London as listed in an invoice from October 1739: two cutler’s anvils and one for razors, twelve hammers for knife blades and two for razors, two seven-foot grindstones, one hand mill for rolling silver, two types of bellows, and a box with different kinds of files and rasps.³⁷ These purchases were approved by *Kommerskollegium* despite import prohibitions issued for several of the goods. The Board decided to view them as ‘samples and models’ to be used both in Engberg’s works *and* during his

³³ ‘apterat och tilredt en fullkoml. uhrmakare wärkstad, med sine afdelningar och loger’. Stockholm *Hallrätt*, Report 1740, part II, pp. 119–120. SSA.

³⁴ ‘emulera med de Engelske’. Backman, Proposal to *Urskiljningsdeputationen*, January 1741. RA.

³⁵ *Kommerskollegium*, Protocol, 1739-03-23, pp. 962–963. RA.

³⁶ Alströmer, Jonas, Letter to *Manufakturkontoret*, Stockholm, 1739-09-07. MKA, D, vol. 165 (no. 71). RA.

³⁷ Invoice for goods and materials for Eric Engberg, London, 1739-10-16 (presented to *Manufakturkontoret* 1739-11-08). MKA, C:c, vol. 282, fol. 122. RA.

visits at Vedevåg.³⁸ With the Board's approval, the cutler's requirements were shipped from London and arrived at Stockholm in August 1740, and they were later signed for by Engberg to the value of 2,632 dlr. kmt.³⁹

The imported goods were used for the creation of the cutlery works. In 1740, it had been equipped with six hearths and one grinding mill, but the workshops were far from complete.⁴⁰ The following year, *Manufakturkontoret* stressed that Engberg was in need of an additional machine from England for his grinding mill. When set up, this device was to be 'powered by horse inside the forge, similar to the English manner as described by Engberg'.⁴¹ Again, Alströmer assisted Engberg with the import, this time through his brother-in-law Johan Clason in London. An invoice arrived by letter from Clason in July 1741. The complex 'engine' was worth 880 dlr. kmt. (21:14 £), and had to be 'taken to pieces' in order to be fitted in the ship's hold.⁴² Figure 6.2 shows the original invoice, with all the 55 parts — such as the cog wheel, spindles, and gudgeons — and their respective prices. The shipping was arranged for by the Stockholm merchant Claes Grill, and the engine arrived in Stockholm in August the same year.⁴³

Similar imports have been described by Lindqvist in his discussion on Mårten Triewald's attempts with constructing the Newcomen engine at the Dannemora mine during the late 1720s.⁴⁴ As argued here, these processes illustrate how mechanical devices, objects, and materials were *circulated* and *grounded*. Engberg used his network in order to procure the things necessary for organising a works according to the 'English way'. This process involved state institutions and Engberg's patron Alströmer, as well as Swedish merchants and the trading office in London. Engberg and Alströmer also succeeded in acting tactically in having some devices declared as 'models', thereby circumventing the import regulations. Not being gauges, dies, or jigs, as dealt with by Alder, they can be seen as 'mediating devices' used in order to organise production in accordance with the experiences of English cutlery making.⁴⁵ Relating to Roberts' discussion, these objects were 'embodying' specific types of knowledge and skills.⁴⁶

³⁸ 'profwer och modeller'. *Kommerskollegium*, Protocol, 1740-01-08. KkH, AIaa:110, p. 70. RA.

³⁹ MkKam, C:c, vol. 282, fols. 122–123; vol. 284, fol. 66. RA.

⁴⁰ Stockholm *Hallrätt*, Report 1740, part II, p. 126. SSA.

⁴¹ 'drifwas med häst inne uti sielfwa smedjan, likmätigt det af Engberg wid handen gifne Engelska maneret'. *Manufakturkontoret*, Report to *Sekreta utskottet*, January, 1741, pp. 161–162. RA.

⁴² Clason, Johan & Comp:s, Invoice and bill of lading, London, 1741-06-29 (extract of letter dated in London, 1741-07-03). MkKam, C:c, vol. 288, fol. 83. RA. See also Alströmer, Jonas, Letter to *Manufakturkontoret*, 1741-08-31. MkKam, C:c, vol. 288, fol. 81. RA.

⁴³ Invoice of freight, Helsingör, 1741-08-03; Bill of lading, *The Abigal*, London, 1741-06-29. MkKam, C:c, vol. 288, fols. 86–87. RA.

⁴⁴ See Lindqvist (1984), pp. 253–254.

⁴⁵ Alder (2010), pp. 146–153. C.f. chapter 7.

⁴⁶ Roberts (2012), pp. 51–52.

Figure 6.2 Invoice for Engberg's grinding engine, 1741

N^o 1. London the 29 June 1741.

✓ 85

*Invoice of One Egg wheel with arms and Shaft,
Two Trundle heads with iron spindles and a bag of
iron & Brass work, made here and by order and for
acc^t. of Jonas Alstrom Esq^r. shipped on board the
Abigail, Capⁿ. John Horey viz:*

<i>For a New Egg wheel with arms & Shaft and 2 pair of Trundle heads to D^o</i>	<i>£ 10. - -</i>
<i>4 Hoops Weighing 24^{lb}. at 6d^s</i>	<i>- 12 -</i>
<i>8 Plates & 16 Screws W^g. 13 1/2^{tt} at 8d^s</i>	<i>- 9 -</i>
<i>2 Large Turned spindles & 4 large Gudgeons 4 Hoops, 8 Wedges and a Screw Staple weighing 1. 3. 12 at 22^d 1/2^{tt}</i>	<i>6. 18. 8.</i>
<i>9 Straps for the spindels and Gudgeons W^g. 36^{tt} at 1/2^d 1/2^{tt}</i>	<i>2. 2 -</i>
<i>for Turning & fitting the 9 Straps.</i>	<i>- 18 -</i>
<i>Customhouse Ticket and Searchers fees.</i>	<i>- 5. 6.</i>
<i>Shipping charges</i>	<i>- 5 -</i>
<i>Small charges</i>	<i>- 4. 6.</i>
	<hr/> <i>£ 21. 14. 2.</i>

John Reason & Company^s

in L. C. A. 223.

Source: MkKam, C:c, vol. 288, fol. 85. RA. (Photo: Henrik Lithner, Riksarkivet).

Again, comparisons can be made to watchmaker Backman. In 1737 he listed the materials, tools, and devices which were required for his watch-making works. In addition to the instruments that Backman had collected himself during his journey in England, he mentioned eighteen types of

clocks (from England) to be used as models.⁴⁷ The Stockholm *Hallrätt* reported in 1740 how Backman had brought home ‘curious and expensive Instruments and machines’ to be used in his works.⁴⁸ Rather than viewing these workshops as created out of any dilettantish technical interest, I argue that the imports and arrangements discussed above point towards the intricate art of *imitation* — connected to artisans’ journeys and the emerging networks of the manufacturing system. If anything, these practices seem to have been characterised by a mix of curiosity and practical utility.⁴⁹

This is evident when placing the imports side by side with other procurements. Engberg not only relied on imports when constructing his works. He also used his contacts at Vedevåg, from whence he was provided with building materials during the early 1740s (paid for by *manufakturfonden*). The bills signed by *Directeur* Samuel Billinggren are particularly important. He later rented the Vedevåg manufactory, but was involved in the works’ warehouse in Stockholm at an early stage.⁵⁰ In 1741, he was paid for having provided Engberg with larger quantities of nails and iron goods.⁵¹

Workshop practices in Stockholm were thus related to provincial communities through networks that linked the different branches of the domestic metal-making industries. As in Engberg’s case, these connections often included services and favours over time. Another example is Olof Beckelin, who manufactured both tools and watch springs. In 1759 he succeeded in having merchant Johan Abraham Grill support him with money. This advance was used by Beckelin for setting up an English-style steel furnace at *Långholmstullen* on *Södermalm*. As noted by Schröder, the manufacturer later travelled to Grill’s ironworks in Österby in order to train the smiths and to construct a similar furnace.⁵²

Moreover, in order to set up metal workshops, artisans had to act tactically in relation to changing preconditions within the urban space and within the wider manufacturing system. In the cases of metal works constructed in the ‘English way’, a good example of this feature is the installation of grinding devices.

⁴⁷ Backman, Christian, Missive to King Fredrik I, Stockholm, September, 1737 (circulated to *Kommerskollegium*, presented 1738-05-09). FUH, R. 2682, fols. 269–275. RA.

⁴⁸ ‘curieuse och mycket kostbare Instrument och machiner’. Stockholm *Hallrätt*, Report 1740, part II, p. 119. SSA.

⁴⁹ C.f. Hilaire-Pérez (2007), pp. 139–146; Pérez (2008), pp. 26–27.

⁵⁰ In 1743, Billinggren signed an inventory of goods from Vedevåg sold via the warehouse in Stockholm. This inventory was submitted as complementary document to a report about Vedevåg and Kvarnbacka, addressed to the *Handels och Manufakturdeputationen* serving at the Diet of 1746–1747. See FUH, R. 2901, fols. 447–463. See also Rönnow (1944), p. 164.

⁵¹ Billinggren, Samuel, Invoices for Eric Engberg, Stockholm, 1740-10-29 and 1741-03-26. MkKam, C:c, vol. 288, fols. 12–13. RA.

⁵² Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1759, pp. 54–56; 1760, pp. 35–40. KB. Johan Abraham Grill was half-brother to Claes Grill, and involved in the same merchant company during the 1740s and 1750s. See *Svenskt biografiskt lexikon, Band 17*. (1967–1969). Stockholm, *Grill, Johan Abraham* (article by Högberg, S.), pp. 284–285.

Grinding Devices and the *Tactics* of Altering Places over Time

The discussion on workshops in Stockholm and the alteration of places can be summed up by exploring the establishment of grinding mills. On the one hand, adapting these devices to an urban space offered challenges to metal manufacturers. On the other hand, choices made regarding grinding equipment reflect the ambitions to combine spatial rearrangements with new ideas on how to organise manual work.

As noted in section 5.2, Engberg used a separate water-powered grinding mill in *Norrström* during the mid-1730s.⁵³ When questioned by *Kommerskollegium* in July 1739, he instead argued that his intention was to set up ‘one horse-Machine in the middle of the workshop and two fires by each gable.’⁵⁴ The Board argued that this made the cutlery more expensive than if water power had been used. Engberg seems to have changed his mind, although he rejected the Board’s idea of moving to a provincial manufactory. His plan for *Södersluss* can be seen as a compromise; a water-powered cutlery works *within* the urban space.⁵⁵ When he instead was provided with a courtyard without access to streaming water, a different solution had to be applied.⁵⁶ Engberg now returned to his original plan.

Engberg’s importation of a grinding engine was linked to the idea of making metal wares in the ‘English way’. In order to better understand this connection, an application by file maker Roth to *Handels och manufakturdeputationen* in 1756 can be used for guidance. Like Engberg, Roth had travelled abroad (probably also to England). He was privileged by the Stockholm *Hallrätt* in 1746 for making files in the ‘English way’.⁵⁷ Ten years later, he had recruited more workers and wanted to expand his workshop. For this he needed a new horse-powered grinding mill, arguing that ‘it is impossible for people to power the grindstone for such a multitude of files that henceforth will be made’. In order to set up this device, Roth needed more space, and asked to be advanced money in order to buy his neighbour’s courtyard.⁵⁸

The installation of horse mills in some Stockholm workshops at mid-century can thus be seen as related to the lack of water power or suitable building plots. Still, they also reflect how spatial arrangements and the adap-

⁵³ According to Ronnestam (2013), p. 71, several such mills were built on floating platforms in *Norrström* during the period of interest here.

⁵⁴ ‘en häst-Machine mitt uti wärckstaden och twenne eldar wid hwar gafwel.’ *Kommerskollegium*, Protocol, 1739-07-13, pp. 290–291. RA.

⁵⁵ *Kommerskollegium*, Protocols, 1739-07-13, pp. 293–294; 1739-08-09, pp. 830–831. RA.

⁵⁶ The Town-architect Carlberg doubted if a water-powered works constructed by *Södersluss* could be effective, due to the uneven water level. See *Kommerskollegium*, Protocol, 1739-08-28, pp. 961–967. RA.

⁵⁷ Stockholm *Hallrätt*, (Copy of) privileges for Johan F. Roth, Stockholm, 1746-04-24. HMR, E:III:1, fol. 448. SSA.

⁵⁸ ‘omögeligit är för människor at draga slipstenen åt en sådan myckenhet fihlar som hädan efter kommer at förfärdigas’. Roth, Johan F., Proposal to *Handels och manufakturdeputationen*, February 1756. FUh, R. 3075, fols. 1102–1103. RA.

tion of mechanical devices were related to the implementation of piecework.⁵⁹ As noted above, Schröder observed in 1755 how Engberg had erected his grinding mill on the bottom floor of his works, next to the forge. This would have enabled a smoother flow in the initial stages of production.

In contrast, it was water-powered mills that came to be the preferred solution at provincial metal works founded at mid-century, often with access to water streams. As described by Hamren in 1742, Petter Wirgman had installed hand-driven rolling and pressing machines in his works in Göteborg. However, in order to better utilise water power in the production, it had been decided to move the works some 40 kilometres to Alingsås. This would result in both lower wages and a ‘quicker and more plentiful production’, according to Hamren.⁶⁰ The construction and improvement of grinding mills was a prioritised task also for Schröder during the 1750s, especially at the larger knife works. Ideas about piecework on a larger scale were thus continuously connected to the alteration of places and the *imitation* and adaption of devices.

This section has explored the construction of workshops in the ‘English way’ in mid-eighteenth-century Stockholm, with a focus on the making of space. Still, the discussion of the ‘English way’ must also integrate people and their skills. In Engberg’s case, the organisation of work was linked to training and the idea of spreading skills within the manufacturing system.

6.3 Sharing and Organising the ‘English Way’

This section focuses on how metal works set up in the ‘English way’ in Stockholm during the mid-century were organised with regard to people, tasks, skills, and materials. The cutlery works gradually constructed by Engberg during the 1740s illustrates combined alterations of processes and products. Attempts with piecework were connected to the use of functional steel varieties and other materials.⁶¹ By comparing with other artisans and crafts, I also emphasise how the ‘English way’ took on diverging appearances when put into practice. This can be discussed by taking notice of Marx’s discussion on different ways of organising manufacturing workshops. Still, and in line with recent studies, there are good reasons to stress a more complex view: one which relates workshops to a changing politico-economic context, but also highlights specific matters such as workforce mobility. I will particularly discuss the recruitment and training of apprentices. This was

⁵⁹ This can be compared to Nyström (1955), p. 275. He argued that the manufacturing trades did not see any examples of ‘machine equipment’ that ‘required buildings to be constructed in specific ways’; quotation, my transl. C.f. section 4.1.

⁶⁰ ‘skyndsammare och ymnogare tilverkning’. *Olof Hamréns reseberättelser från södra Sverige 1742*, pp. 117–118. MkA, De:1, vol. 176. RA. C.f. section 3.1.

⁶¹ C.f. Berg (2002); Evans and Withey (2012).

a feature that often distinguished manufacturing workshops from the guild system. We must not forget, however, the importance of the ‘manufacturing household’. This matter is discussed here in relation to movements and connections within and beyond the urban space.

The Manufacturer’s Mission: Training and the Spread of Skills

Hamren recognised how the spatial plan for Engberg’s cutlery works was related to ideas of an altered organisation of work and training. In detail, he described how this was to be done. Working under the protection of the manufacturing privileges, Engberg could ‘accept as many workers and Apprentices as he can and wants to employ, and also pay and promote them according to their diligence and dexterity.’ The cutler should recruit ‘skilled subjects’ from provincial communities, who were already ‘used to applying hammer and file’. These apprentices were to be quickly trained, ‘each one in his peculiar task’, and then sent back in order to educate yet other smiths. Hamren spoke of four areas where this could be of value: the processing of steel, the correct use of tools, the organisation of work, and the right ways of tempering, grinding, and polishing.⁶²

This plan was in accordance with the manufacturing privileges. Engberg was authorised to employ a large number of workers, thereby breaking with the traditional patterns of employment enforced by the guilds. Hamren’s discussion can also be related to the idea of a ‘*mother works*’ (like Vedevåg): Engberg’s cutlery works was to contribute to the spread of skilled workers. In line with these ideas, Engberg asked *Kommerskollegium*, in 1739, for permission to recruit boys from the Borås area and from Finland. The Board made further inquiries into this matter by sending letters to several county governors. Still, the lack of a suitable workplace prevented Engberg from getting started with training these apprentices. Later the same year, two of the boys had been handed over to other artisans.⁶³

It was only after the construction of Engberg’s new workshops that the recruitments of employees took off. In some cases they came from places pointed out by Hamren, and in other cases from manufactories visited by Engberg during his journeys. When questioned by *Kommerskollegium* in May 1741, Engberg said that he employed his two brothers, one old journeyman, and six apprentices. Two of the boys came from Polhem’s works in Stjärnsund and two from Vedevåg. The remaining two came from Borås, and

⁶² ‘antaga så många arbetare och Läregåssar han kan och gitter sysselsätta, samt de samma efter deras flijt och qwickhet aflöhna och befordra.’; ‘skicklige ämnen’; ‘wana at föra hammare och fihl’; ‘hwar och en uti sitt besynnerlige giöromähl’. Hamren, Proposal to *Handels och manufakturdeputationen*, 1738, fols. 486–487. RA.

⁶³ *Kommerskollegium*, Protocol, 1739-07-13, pp. 280–281, 291. RA.

were referred to as ‘getting along quite well’.⁶⁴ More apprentices were recruited from the same places during the following years. In 1744, *Manufakturkontoret* noted how the brothers Olof and Anders Wittenberg had been sent up to Stockholm from the Borås area through the arrangements of Engberg’s patron Alströmer.⁶⁵ Most of these employees were trained in a traditional way — for a longer period. Others received a quicker training in accordance with Hamren’s plan. This included other manufacturers. In 1745, Engberg was paid by *Manufakturkontoret* for having instructed Petter Wirgman about machines that could be used in different metal crafts.⁶⁶

Employees were also recruited in more unplanned ways and after extensive negotiations. In 1740, Stockholm *Hallrätt* dealt with a trial against the Vedevåg apprentice Johan Zihlfeldt. Engberg was called upon as a witness during this trial, but the cutler had by then already met Zihlfeldt at Vedevåg. Leaving the works without permission, the apprentice had travelled to Stockholm where he had illegally managed a small workshop. The *Hallrätt* asked if Engberg could employ him, but the cutler argued that it was better for the young boy to move back to Vedevåg.⁶⁷ Apparently he then changed his mind and Zihlfeldt was accepted for training. In 1750, Engberg listed him as a master.⁶⁸ Zihlfeldt had thus succeeded in changing his position within the manufacturing system by moving and acting tactically.

The recruitment of workers to the cutlery works was, however, also a conflictual matter that involved guilds as well as owners of other metal works. In 1739, Engberg was cautioned not to interfere with the business of the goldsmiths’ guild. Two years later, *Kommerskollegium* denied him permission to employ a goldsmith journeyman.⁶⁹ Similar tensions are evident in the renewed privileges for Engberg, from 1746, which gave him substantial freedoms, but also warned him not to entice artisans from other metal works.⁷⁰

⁶⁴ ‘arta sig tämmeligen wäl’. *Kommerskollegium*, Protocol, 1741-05-19. KkH, AIaa:112, pp. 1897–1901. RA. Travelling through the Borås area in 1742, Hamren noted that two peasant smiths were in Stockholm at the time to be instructed by Engberg. These were to return the following summer. See *Olof Hamréns reseberättelser från södra Sverige 1742*, p. 163. RA.

⁶⁵ *Manufakturkontoret*, Protocol, 1744-11-19. MkA, A:a, vol. 50, pp. 1498–1502. RA.

⁶⁶ *Manufakturkontoret*, Protocols, 1745-05-13; 1745-06-10. MkA, A:a, vol. 51, pp. 633–634, 742–743. RA. Wirgman managed a metal works in Alingsås. See sections 3.1 and 6.2.

⁶⁷ Stockholm *Hallrätt*, Protocols, 1740-01-18; 1740-03-13; 1740-03-17. KkAdv, Da:757. RA.

⁶⁸ Engberg, Eric, Verification addressed to Stockholm *Hallrätt*, regarding employed workers, Stockholm, 1750-09-15 (circulated to *Manufakturkontoret*). MkKam, C:c, vol. 319, fol. 550. RA. Probably, Zihlfeldt was included in the agreement made between Engberg and the supervisor Haberman at Vedevåg in 1740. C.f. section 5.4. The fact that Zihlfeldt was listed as master in 1750 does not mean that he remained with Engberg until this year. Most likely, he left during the mid-1740s. See further section 7.1.

⁶⁹ *Kommerskollegium*, (Copy) of letter regarding the privileges for master Engberg, Stockholm, 1739-05-21, fols. 458–460. SSA; *Kommerskollegium*, Protocol, 1741-06-20. KkH, AIaa:112, pp. 2554–2555. RA.

⁷⁰ *Kommerskollegium*, (Copy) of renewed privileges for Eric Engberg, Stockholm, 1746-07-22 (circulated to the Stockholm *Hallrätt*). HMR, EIII:1, fols. 456–457. SSA.

Despite these issues, the recruitment of apprentices continued during the late 1740s. For a manufacturer like Engberg, training them was not only linked to work-related tasks. Eventually, it also brought possibilities of getting premiums (*lärlingspremier*), given according to the stages of progression. Financial support was thus given *over time* for each worker under instruction.⁷¹ In 1750, Engberg applied to the Stockholm *Hallrätt* for premiums related to the training of 21 employees: two masters, ten journeymen, one clasp knife smith, and eight apprentices. He had also instructed two junior officials from *Kommerskollegium*, Daniel Falk and Erik Magnus Wetterblom. For training these workers, he received (in total) 8,800 dlr. kmt. from *manufakturfonden*.⁷²

Progression was also a matter of open negotiations in workshop practices which brought together artisans from different crafts. In 1748, both Engberg and watchmaker Backman partook in the examination of an apprentice working for file maker Roth. This test was described by the *Hallrätt* as being performed at Roth's works.⁷³ There is thus good reason to argue that the training of apprentices in metal workshops was connected to perceptions of skills and advancement prevailing within a traditional craft system. Nonetheless, these processes also took new forms.⁷⁴ The acceptance of many more workers and the emphasis on a task-based (and sometimes quicker) training were important features in this respect, as was the access to premiums. Financial support was, however, often not enough. In 1750, Engberg argued that premiums could not compensate the drawbacks caused by 'the maintenance of each apprentice, and the costly Materials he wasted the first 3 to 4 years'.⁷⁵ Training many workers in the 'English way' of making cutlery was thus an expensive project.

In accordance with Wallis, it can be argued that one way to partly manage the costly processes of training was to involve apprentices in active labour.⁷⁶ In Engberg's case, it can be noted how a piecework organisation, matching the spatial arrangements of his workshops, gradually resulted in a division of *both* training and labour. This organisation of work was related to the aim of producing quality cutlery. As noted by Engberg himself in 1756, a 'fully

⁷¹ The decision to give Engberg such premiums was taken in 1748 by *Manufakturkontoret*. As will be further dealt with below, this was done related to other forms of economic support. See *Manufakturkontoret*, Protocol, 1748-05-09. MkA, A:a, vol. 54, pp. 1236–1250. RA.

⁷² Engberg, Verification addressed to Stockholm *Hallrätt*, regarding employed workers, Stockholm, 1750-09-15; Engberg, Eric, Verification regarding premium for instructing Daniel Falk and Erik Magnus Wetterblom, Stockholm, 1750-05-02; Engberg, Eric, Receipt of premiums, Stockholm, 1750-09-22. MkKam, C:c, vol. 319, fol. 203, 549, 550. RA.

⁷³ Stockholm *Hallrätt*, Extract of protocol, 1748-11-23. MkKam, C:c, vol. 313, fol. 810. RA.

⁷⁴ This can be compared to Heckscher's and Nyström's conclusions. See Heckscher (1949a), pp. 488–489; Nyström (1955), pp. 220–229.

⁷⁵ 'hvar lärlinges underhåll, och de kostsamma Materialier han de 3 a 4 första åren upkladdat'. Engberg, Eric, Missive to *Manufakturkontoret*, Stockholm, 1750-09-20. MkKam, C:c, vol. 319, fols. 547–548. RA.

⁷⁶ Wallis (2008), pp. 845–851. See also De Munck and Soly (2007), pp. 8–23.

developed Piecework’ was the reason behind the ‘perfection and lower price’ of English metal wares.⁷⁷

Processes: Dividing Work by Connecting Tasks

When comparing different metal works set up in Stockholm during the 1740s and 1750s, it is hard to find *one* ‘English way’. The ideas on how to implement piecework took diverse shapes in practice. This indicates a more complex view of the manufacturing workshop than the one proposed by Marx, but it also complicates the traditional view on metal making in the capital.

The spatial arrangements in Engberg’s cutlery works were accompanied by attempts to divide the work into different tasks. As reported by Stockholm *Hallrätt*, in 1740, this organisation was beginning to unfold, with work being divided into four main processes. The report also illustrates the connections between work and training. Engberg himself employed three apprentices in blade making. His brother Simon made hafts together with a German journeyman. In the fork making, the cutler employed one journeyman and six apprentices. Finally, special pieces (like ferrules and caps) were made by one ‘Silver worker’.⁷⁸

The number of employees varied during the first half of the 1740s. Most probably, this can be related to the quicker training (of some workers) and temporary employments. During the latter half of the decade, the number of workers increased. This was accompanied by a further division of the cutlery making process into specific tasks, as can be noted by studying the recruitment of new apprentices. In September 1748, Engberg accepted three boys for training. His own son was signed on to be trained for eight years in ‘Knife making and finishing work’. Göran Qvarnström was also to be trained in finishing, but for six years. Finally, Gillis Lenberg was registered to practise in the making of forks, also for six years.⁷⁹ Others, like the junior officials Falk and Wetterblom, were also trained in supervisory duties, both in *practising* the craft and in *managing* a metal works.⁸⁰ As will be discussed in chapter 7, many of Engberg’s workers later came to be employed with specific tasks, or as supervisors, at provincial knife works.

⁷⁷ ‘fullkomligt Stycke arbete’; ‘fullkomlighet och lindrigare pris’. Engberg, Eric, Proposal to *Handels och manufakturdeputationen*, May 1756 (*Engberg, om årl: pension*). FUH, R. 3077, fol. 374. RA.

⁷⁸ ‘Silfwer arbetare’. Stockholm *Hallrätt*, Report 1740, part II, p. 126. SSA.

⁷⁹ ‘Knifsmidet och finiserare arbetet’. Stockholm *Hallrätt*, (Copy) of protocol regarding apprentices for Engberg, Stockholm, 1748-09-15 (circulated to *Manufakturkontoret*). MkKam, C:c, vol. 313, fol. 704. RA.

⁸⁰ Engberg, Verification regarding premium for instructing Daniel Falk and Erik Magnus Wetterblom, Stockholm, 1750-05-02. RA.

Table 6.2 *Engberg's cutlery works, 1740–1751*

	Masters ¹	Journeymen	Apprentices	Other	Total
1740	1	2	9	1	13
1741 ²	2	1	6	-	9
1742	1	1	9	3	14
1743	1	1	9	-	11
1744 ³					11
1745	-	4	8	-	12
1746	-	4	8	-	12
1747	-	3	10	2	15
1748	-	6	10	-	16
1749	-	9	7	2	18
1750	1	9	9	2	21
1751	1	9	9	2	21

Source: Stockholm *Hallrätt*, Reports 1740, part II–1751. HMR, BIII:1–2. SSA; *Kommerskollegium*, Protocol, 1741-05-19, pp. 1897–1901. RA. Note: ¹= Excluding Eric Engberg, ²= Number given by *Kommerskollegium*. ³= This year, the *Hallrätt* listed the total number of employees.

This way of organising cutlery making can be compared with other works later set up according to the ‘English way’. When Jacob Schmals founded his cutlery works in Norrköping, he promised to let his apprentices be instructed in one of four skills: blade making and forging, filing, tempering, grinding, and polishing, fork making, or the making of hafts.⁸¹ Schmals also recruited one supervising clasp knife smith from Stockholm. He was to work for a piece wage and train the young boys — each in one of the tasks only.⁸² A later list of Schmals’ employees indicates that attempts had been made with organising work in a way similar to Engberg’s works: the manufacturer employed smiths and clasp knife makers, as well as workers committed to filing, grinding, lathing, and hafting.⁸³ Although not exactly the same, the records dealing with Engberg and Schmals exemplify two attempts with organising cutlery making according to the principles of piecework. Most likely, Engberg also had workers employed with some of the tasks referred to in Schmals’ case — such as grinding and filing.

Comparisons can also be made with other metal works in Stockholm set up in the ‘English way’ during the same period. As shown, a common denominator for these was the connecting of several workshops. Still, the practical organisation of work differed. Some, like file maker Roth, only

⁸¹ Schmals, (Copy of) missive to *Manufakturkontoret*, Stockholm, 1746-01-23, fol. 18. RA.

⁸² Schmals, Jacob and Åhman, Petter, (Copy) of contract, Stockholm, 1746-07-31. FUH, R. 3076, fol. 47 (*Afskrift Lt: Z*). RA.

⁸³ Norrköpings *Hallrätt*, (Copy) of list of workers in Schmals cutlery works, Norrköping, 1748-03-04. FUH, R. 3076, fol. 46 (*Afskrift Lt: P*). RA.

employed a handful of workers.⁸⁴ Others, like watchmaker Backman, had many more employees. As reported by Stockholm *Hallrätt* in 1740, Backman employed three journeymen and nine apprentices who repaired clocks, one carpenter, two smith journeymen, and one tutor for the boys in mathematics and drawing.⁸⁵ Two years later, he had 23 employees. Then a decline followed, and the works was abandoned in 1746.⁸⁶

The diverging developments for Engberg's and Backman's works can be analysed by taking note of the crafts in question. In Marx's terms, cutlery making can be seen as comprising a number of connected tasks, of which *most* were traditionally performed by a single cutler (together with his journeymen and apprentices). In Engberg's works, each task was done by a master or a journeyman working together with a group of apprentices, and with Engberg as a supervisor. This was facilitated by the use of a few important mechanical devices, the recruitment of many workers, and the interweaving of training and work. Watchmaking, in contrast, can be seen as a combination of a range of crafts, with artisans that used many different skills. This is evident in Backman's case. Such a works would not only have been more difficult to set up, with a variety of devices to be used by each of the employed craftsmen, training workers in each craft would also have been a more laborious and expensive process.⁸⁷

Engberg's and Backman's works thus differed in practice, despite similar intentions: the spatial connectedness of workshops and the implementation of piecework. This observation can be related to the fact that they are examples of manufacturing branches that later took off in diverging directions. Watchmaking largely remained a Stockholm-based industry.⁸⁸ This craft included a number of watchmaking works. Still, these were connected to a subcontracting network, with parts being made in smaller, specialised, workshops.⁸⁹ Cutlery making, in turn, saw a different development during the 1750s, when it was subjected to attempts with piecework at provincial knife works. Nevertheless, the organisation of work differed also between these

⁸⁴ Schröder (1925b), p. 39. See also Stockholm *Hallrätt*, Reports 1747–1776. HMR, BIII:2–10. SSA.

⁸⁵ Stockholm *Hallrätt*, Report 1740, part II, p. 120. SSA.

⁸⁶ Stockholm *Hallrätt*, Reports 1742/1743–1747. HMR, BIII:1–2. SSA.

⁸⁷ C.f. Marx (2000), pp. 482–486. As noted above, Engberg employed a 'silver worker', which can indeed be regarded as one specific craft.

⁸⁸ Clocks were made at other places as well, such as in the area around the town Mora in Dalarna, and in Stjärnsund. See e.g. Isacson and Magnusson (1987), pp. 70–71. Still, the making of more exclusive clocks and watches was largely based in the capital.

⁸⁹ C.f. section 3.2. Ronnestam mentioned how the process of making a clock could include up to sixteen different craftsmen, each one performing his particular task, before the clock was finished by the master watchmaker. See Ronnestam (2013), pp. 110–114. In his analysis of London trades, Riello discussed how such more flexible networks most notably applied to the making of highly specialised commodities, of which clocks and watches are good examples. See Riello (2008), pp. 253–257. See also Sonenscher (2012), pp. 210–243.

workplaces. The single large cutlery-making workshop was far from the most common solution.

Speaking of these crafts as illustrating different possibilities for a division of labour, in line with Marx, is valuable to some extent, but it renders a far too simplistic image.⁹⁰ Engberg's and Backman's works must also be related to a wider context of manufacturing, including differing spatial and material prerequisites. As we have seen, the cutler succeeded in getting access to a courtyard of his own where he could accommodate his workshops. He was also given support for recruiting workers and setting up devices. Backman, on the contrary, worked in rented rooms and without possibilities to make the arrangements that he wished for. The watchmaker also complained a number of times that he had not been given the financial support that had been promised to him.⁹¹ Placing work processes and divisions of labour into such a wider perspective offers a better idea of why the 'English way' took diverging forms when implemented in practice.

Despite the differences dealt with here, there are also similarities between Engberg and Backman. As noted by Ronnestam, Backman's principal merit was that he *trained* many of the Stockholm-based watch and clockmakers that Schröder later referred to.⁹² This observation confirms the links between ideas of the 'English way', the division of tasks, and workshop-based training. The two metal works compared here illustrate how the spheres of *knowing* and *doing* intersected. Engberg and Backman were not only skilled craftsmen in the sense of making metal wares, but also when it came to putting ideas into practice through training. These processes were also related to innovative uses of materials and to changing notions regarding finishing.

Products: The Materiality of the 'English Way'

Various scholars have recently dealt with eighteenth-century manufacturing by relating innovations in processes and products to changes regarding social mobility, demand, and taste.⁹³ This section focuses primarily on the manufacturing process. Doing this, however, it emphasises the *consumption* of materials. This relates to the perspective held by Evans and Withey, in stressing the functionality of certain metals when used.⁹⁴ Knowing exactly what was made in an eighteenth-century cutlery works in Stockholm is of course difficult. Still, this matter can be discussed by exploring the procure-

⁹⁰ C.f. Marx (2000), pp. 490–503. Watchmaking would, according to this perspective, be more associated to a *heterogeneous* division of labour, while cutlery making can be related to the idea of organising work *serially*.

⁹¹ Backman, Proposal to *Urskiljningsdeputationen*, January 1741. RA; Stockholm *Hallrätt*, Report 1740, part II, p. 119. SSA.

⁹² Ronnestam (2013), p. 49, 117. A similar case, although he did not operate his workshops in the 'English way', was the instrument maker Ekström. See Amelin (1999). C.f. section 3.2.

⁹³ Roche (1996); Berg (2002); Hilaire-Pérez (2007); Riello (2008); Sonenscher (2012), p. xv.

⁹⁴ Evans and Withey (2012).

ments of raw materials, brief accounts at production, and attempts at vending. The ‘English way’ of making cutlery was an art of *imitation*. It integrated new finishing techniques, the use of new steel varieties, and new ways of organising work and training.

In section 6.2, I described how Engberg made use of his contacts in Sweden and England in order to procure devices and tools from London. The cutler also imported materials, brought to Sweden on the same ship. In the invoice from October 1739, it is noted that Engberg had ordered 30 bars of backstoft steel and 25 bars of butscher steel, 41 ivories, and one large piece of ebony.⁹⁵ If added to the fact that Engberg employed a silver worker, this gives a picture of one possible item made in his works: table cutlery with hafts of either ebony or ivory, with silver details.⁹⁶ Partly confirming this, when questioned by *Kommerskollegium* in May 1741, Engberg said that he made ‘only Table knives and forks, with other fine pieces of steel and iron’.⁹⁷

Table cutlery finished in this way was also used in some Stockholm homes during the period in question. The probate inventory of instrument maker Ekström listed table knives with squared ebony hafts and silver ferrules valued to 2 dlr. kmt. apiece, and forks with a similar finish valued to 1 ½ dlr. apiece.⁹⁸ Similar cutlery wares were, however, also common among the imports from England during the 1730s, as proven by merchant Peter Westman’s account books.⁹⁹ Although scanty, examples like these provide an insight into the connected spheres of *making*, *using*, and *trading*.

The notion of specific finishes can be extended to include a discussion on divisions of labour and skills. The raw materials used by Engberg probably also facilitated a more distinct organisation of work — especially for the making of table cutlery. As described by Kalmeter, in 1725, the backstoft steel, with iron placed in the middle, were particularly suitable to use in a knife works. It facilitated the forging process as well as later stages of production — with workers dedicated to specific tasks.¹⁰⁰ Engberg also used mineral coal instead of charcoal. The former allowed for a higher and more consistent heat in the hearth, which probably also facilitated the forging and tempering processes. Again, the cutler relied on imports from England.¹⁰¹

⁹⁵ Invoice for goods and materials for Eric Engberg, London, 1739-10-16, fol. 122. RA.

⁹⁶ Another possible finish would have been cutlery with pressed silver hafts. C.f. Sigurdsson (1982), p. 27; Bengtsson (1963), pp. 46–48.

⁹⁷ ‘allenast Bordknifwar och gafflar, med annat fint arbete i stål och järn’. *Kommerskollegium*, Protocol, 1741-05-19, p. 1898. RA.

⁹⁸ Probate inventory, Daniel Ekström, 1755-07-16 to 1755-07-23. SRr, 1:a avdelning, vol. F1A:162, fols. 770–800 (630–930). SSA. Arkiv Digital AB.

⁹⁹ *Journal, 1731*. MkA. Peter Westmans arkiv, C:489. RA. These accounts repeatedly referred to table knives and forks with ivory hafts or with silver ferrules. C.f. section 3.2.

¹⁰⁰ *Henrik Kalmeters resa*, vol. III, pp. 753–759. M.249. Handskriftssamlingen. KB.

¹⁰¹ In November 1740, Engberg was provided with 50 barrels of mineral coal through arrangements with merchant Maister. See Maister, William, Invoice for Eric Engberg, Stockholm, 1740-11-03. MkKam, C:c, vol. 284, fol. 70. RA.

The processing of materials, most notably steel, was also linked to notions of skills and progression in training. When questioned, in 1741, about the daily work in his forge, Engberg maintained that ‘one boy, who has become reasonably skilled, in one day, shapes 4 to 5 dozen 4 inch [knife blades], and about 4 dozen 6 inch Ditto Blades’.¹⁰² Cutlery making was, however, not only about deftness. It demanded knowledge about the qualities of materials, such as the properties of steel when heated. This is evident in the trial against young Zihlfeldt in 1740. In one *Hallrätt* protocol, it was noted how he had brought several types of steel with him from Vedevåg to Stockholm. Still, he could not distinguish between them and several bars had broken when being worked. In order to determine the different types, Engberg was entrusted to partake in the ‘assaying’ of the steel, which was done by working with it ‘in the fire’.¹⁰³

In terms of Alder’s discussion, this illustrates how rules and practices were bound to different unique artefacts.¹⁰⁴ This does not mean, however, that we should fall into the trap of thinking that skills and knowledge were exclusively tacit and secret. As is evident both in the trial against Zihlfeldt, and in Schröder’s recurring descriptions from steel tests in Stockholm, craft skills were often collaborative matters of observation, *imitation*, and discussion. The workshop, as well as the *Hallrätt*, were spaces where *making* and *knowing* intersected, referring back to Pamela Smith.¹⁰⁵

The use of knife steel also illustrates the links between Engberg’s journeys, the *grounding* of steelmaking techniques, and attempts with organising metal-making practices. During the mid-1740s, Engberg was continually provided with larger quantities of backstoft steel — but now from Vedevåg.¹⁰⁶ In chapter 7, it will be evident how the techniques of *making* and *using* this steel later were further circulated to other provincial works.

Despite all these procurements, the production in Engberg’s own works seems to have been uneven. In 1739, he was told by *Kommerskollegium* to get his workshop and production into order: ‘Because the repairing and pieces that he now does, is not genuine work.’¹⁰⁷ However, this problem continued even after Engberg had been given support to set up his new workshops. In 1741, the cutler argued that the main reason for this was the

¹⁰² ‘en gosse, som någorlunda för sig kommit, om dagen, slå 4 a 5 dussin 4 tums, och innemot 4 dussin 6 tums Dito Blad’. *Kommerskollegium*, Protocol, 1741-05-19, pp. 1898–1899. RA. As noted in section 5.4, Engberg made a similar comment when remarking on the Vedevåg-artisans’ progression in making knives in the ‘English way’ in 1740.

¹⁰³ ‘proberingen’; ‘i elden’. Stockholm *Hallrätt*, Protocol, 1740-03-13. RA. Engberg also assisted in the valuation of the steel and the metal wares found in Zihlfeldt’s workshop. See Stockholm *Hallrätt*, Protocol, 1740-03-17. RA.

¹⁰⁴ C.f. Alder (2010), pp. 97–98. See also chapter 7.

¹⁰⁵ Smith (2007), pp. 37–44.

¹⁰⁶ Billinggren, Samuel, Invoice regarding deliveries of steel in December 1743 and May 1745 to master Engberg, Stockholm, 1747-09-30. MkKam, C:c, vol. 309, fol. 577. RA.

¹⁰⁷ ‘Ty det arbete som han nu gör med lagande samt plocktals, är ej något reelt.’ *Kommerskollegium*, Protocol, 1739-07-13, p. 295. RA.

incomplete grinding mill.¹⁰⁸ The *Hallrätt* reports from the latter half of the 1740s indicate a rising output. In 1743, Engberg had made cutlery for 3,000 dlr. smt. Two years later, a sum of 2,566 dlr. was listed, and in 1746 the cutlery works produced table knives and pen knives worth 1,666 dlr. Production then increased. In 1747 the sum was 6,000 dlr. Later reports from 1749 and 1751 noted sums of around 4,000 dlr.¹⁰⁹ For the remaining five years of this period, however, no production at all is listed.

The reports do not indicate if (or where) these goods were sold. They only reveal the prices set by the *Hallrätt* when inspecting the finished wares.¹¹⁰ Apparently, Engberg had problems with getting his goods sold. Writing to *Manufakturkontoret* in November 1747, he stressed that expensive materials and the maintenance of his household and workers had made him poor. He applied for a smaller loan and, in return, he promised to deliver two or three dozen table knives per week to the Office.¹¹¹ The deal was struck and Engberg made a first delivery the following month.¹¹²

A similar deal was later made between Engberg and the newly founded *Jernkontoret*. In September 1749, Eric Stockenström described to the association's council how Engberg was in 'lack of prompt sales', which in turn made it impossible for him to cut his prices. The plan was that *Jernkontoret* should arrange for having the goods vended through a putting-out fund.¹¹³ As dealt with above, the cutler had by then also been given access to premiums. *Manufakturkontoret* saw these combined supports as related to Engberg's efforts in training apprentices and other manufacturers — in his workshops and at Vedevåg.¹¹⁴ The fund was accepted, and Stockenström became responsible for supplying Engberg with materials.¹¹⁵ Engberg made three deliveries of cutlery during the following years. The largest one, made in November 1750, contained 24 dozen table knives and forks worth in total 1,440 dlr. kmt.¹¹⁶ The goods were again hard to sell. As noted by Boëthius and Kromnow, they were sold with no profit.¹¹⁷

¹⁰⁸ *Kommerskollegium*, Protocol, 1741-05-19, pp. 1897–1901. RA.

¹⁰⁹ Stockholm *Hallrätt*, Reports 1740, part II–1751. HMR, BIII:1–2. SSA. In the report from 1743, the numbers given are for one and a half year.

¹¹⁰ See e.g. Nyberg (1992), pp. 248–253.

¹¹¹ Engberg, Eric, Application to *Manufakturkontoret*, 1747-11-05. MkKam, C:c, vol. 309, fols. 699–700. RA. The cutlery wares were to be sold by the Office, and the income used for pay off the loan. C.f. the small repayments made in 1747 and 1748, as listed in Table 6.1.

¹¹² *Manufakturkontoret*, Protocol, 1747-12-08. MkA, A:a, vol. 53, pp. 1754–1755. RA.

¹¹³ 'brist af snarlig afsättning'. *Jernkontoret Fullmäktige*, Protocol, 1749-09-14. JkFA, AIaI:2, pp. 370–373. RA.

¹¹⁴ *Manufakturkontoret*, Protocol, 1748-05-09. MkA, A:a, vol. 54, pp. 1236–1250. RA.

¹¹⁵ See MkKam, C:c, vol. 313, fol. 703; vol. 315, fol. 30. RA

¹¹⁶ Receipt regarding deposit by *Jernkontoret* for Engberg's putting-out fund, Stockholm, 1750-11-12. JkFA, GIa3:3, p. 184. RA. Stockenström was assisted by Harald Urlander, manufacturer, deputy in *Kommerskollegium*, and brother-in-law to the owner of the Gusum works, Eric Westerberg. See Boëthius and Kromnow (1947), p. 492; Forsberg (1953), pp. 108–111.

¹¹⁷ Boëthius and Kromnow (1947), p. 492. Engberg delivered his goods to an accountant at *Jernkontoret* who in turn handled the further vending.

The putting-out fund added to Engberg's large debt. As such, it can be seen as increasingly tying him to the interests of the state bureaucracy, or directly to the ambitions of powerful men like Stockenström. Still, there were probably personal links between Engberg and Stockenström, who had travelled together in Europe during the 1730s. Thus, we can also speak of the importance of making use of connections and networks over time. If seen in this way, arrangements like these in fact point to the potential for an artisan like Engberg to manoeuvre within the system.¹¹⁸ The deal with *Jernkontoret* brought possibilities for him to continue with his business, but also to train a large number of apprentices.

The problems of getting inventories sold must thus be seen in a wider perspective, where features such as training processes are added. Engberg was apparently seen as a valuable actor within the metal trades because of his skills in instructing others. In this way, his works can be seen as much as a *contact zone* for the *circulation* of cutlery-making skills and knowledge, as it was a place for manufacturing. This suggests a nuanced view on the cycles of urban workshops. Two additional and related aspects of importance here are the notions of a mobile household and the creative use of space.

Houses and Households: Spaces for *Makings* and *Takings*

By studying head tax and parish records from mid-century Stockholm, the changing composition of the Engberg household can be explored over time. Arriving home from his European journey, Engberg gradually set up his cutlery works, which also meant that the family moved with the business. In 1740, they had settled in the quarter *Trädgården* and the household consisted of nine persons. In addition to Engberg himself, his wife Brita, and their oldest child (Eric Jr.), both Eric's mother and his brothers shared the household. The latter two were listed among the employees together with another journeyman, one apprentice, and one maid.¹¹⁹

There are no similar records available for the remaining part of the 1740s. It is probable that the Engberg household was growing during this period. This is confirmed by a tax register (*kronotaxeringslängd*) from 1748, in which 16 journeymen and boys are listed (a number corresponding to the *Hallrätt* report from the same year). These are referred to as 'free', which meant that they were manufacturing workers exempted from tax.¹²⁰ It also

¹¹⁸ This discussion can be related to the differing perspectives offered by Nyström (1955), especially pp. 311–313, and Nyberg (1992).

¹¹⁹ Head tax record, 1740, Stockholm, *Norrmalms östra övre m.fl. kvarter*. ÖfU, G1BA:17:3, pp. 51–52 (59–60). SSA. Arkiv Digital AB. The number of employees given by this source is lower than the one given in the *Hallrätt* report from the same year (13). C.f. Table 6.2. Perhaps this is an indication of temporary employment. One alternative possibility is that some apprentices did not live with Engberg.

¹²⁰ Tax register, Stockholm, 1748. ÖfU, G1AA:50 (1748), fol. 556 (21). SSA/SVAR. Available online from: Riksarkivet.

indicates that most of the journeymen and apprentices that Engberg referred to in 1750 shared his household.¹²¹ This year he complained, again, over the fact that his ‘ample householding’ with ‘such a great Number of people’ had resulted in him being close to poverty.¹²² Five years later, the number of household members was 11. Engberg’s two oldest children were not mentioned, probably since they were still in England, but the record listed two journeymen, two apprentices, and one extra labourer and his family.¹²³

In line with research stressing the non-static character of households and work during the period of question,¹²⁴ it can be noted that the Engberg household was defined by mobility. Employees came and went during the 1740s and 1750s, and so did family members. The best example is Engberg himself, but I have also emphasised how his brother Morten, and later his son and oldest daughter, made longer journeys abroad.

This renders a notion of the household, and business, as being somewhat erratic. In relation to Engberg’s recurring absences, the question can be posed who really supervised the cutlery works. This draws attention to other family members, especially Eric’s wife Brita. During her husband’s first journey, Brita took charge of managing the workshop. In the autumn of 1735, soon after Eric had left, she applied to *Kommerskollegium* to be relieved from various levies during his absence.¹²⁵ She also involved herself in the meetings of the cutlers’ guild on behalf of her family when disputes occurred between Eric’s younger brother Simon and the other guild masters.¹²⁶

During the first half of the 1740s, Brita was not left alone to manage the workshops, since both her brothers-in-law now worked and lived with the rest of the family. During her husband’s second journey to England she was, however, again the one responsible for keeping the business going. During this period, moreover, there are no signs of Eric’s two brothers. As stressed by Engberg in 1756, this was a hard time for the family members and workers left in Stockholm. Brita had not been able to deal properly with their maintenance. She had been rescued by friends of the family who had offered her money and victuals.¹²⁷

The making of journeys abroad was thus not only a risky business for the ones who were away. It also entailed hard times for the family members left at home. During these periods, Brita Engberg managed the connected spheres of workshop and household. She also maintained the contacts with

¹²¹ Engberg, Verification addressed to Stockholm *Hallrätt*, regarding employed workers, Stockholm, 1750-09-15, fol. 550. RA.

¹²² ‘widlyftig hushällning’; ‘en så talrik Nummer af folck’. Engberg, Missive to *Manufakturkontoret*, Stockholm, 1750-09-20, fol. 548. RA.

¹²³ Head tax record, 1755, Stockholm, *Jakob*. ÖfU, G1BA:20:4, fols. 108–109 (112–113). SSA. Arkiv Digital AB.

¹²⁴ On ironmaking, see Rydén (1991). For a more general discussion, see de Vries (2008).

¹²⁵ *Kommerskollegium*, Protocol, 1735-11-12. KkH, AIaa:101, pp. 1142-1143. RA.

¹²⁶ *Knivsmedsämbetet*, Protocol, 1736-01-30. Skräarkiv, 32:1, pp. 3–4. SSA.

¹²⁷ Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fol. 380. RA.

the institutional network. This role was repeated during Eric's imprisonment in the late 1750s. This can be seen as one feature which breaks with the picture otherwise offered (the present text is no exception) of metal manufacturing workshops as largely male spheres. Brita's involvement in the business shows how the boundaries between household and workshop were blurred. The two spheres were essentially one. The fact that Engberg's daughter received training in England (to make casings) also indicates that women, at least in some cases, were expected to perform similar work-related tasks as their male kin.¹²⁸

Related to this, it must also be noted that the houses owned by Engberg included other people as well — who rented rooms from him. In the head tax record from 1755, one additional household was listed as living in the same building as Engberg and his family, namely the goldsmith widow Margereta Pähl and her three sons. Engberg now also owned a second house in the same quarter, where two additional families lived. His third property, in the quarter *Oxhuvudet*, housed another two families.¹²⁹

Comparisons can be made with other manufacturers. File maker Roth was supported with a larger premium obtained during the Diet of 1755–1756. As noted by Schröder, he used this for building a new two-floor stone building in his courtyard, in which he installed several workshops. This works-house was enlarged in 1759.¹³⁰ One year later, Roth was listed in the head tax record as owning a large property in the quarter *Putten*. Like Engberg, he had several renters; amongst others, his houses included one silk-weaving workshop.¹³¹

Far from all metal manufacturing artisans in Stockholm owned the houses where they worked and lived, and some of them probably did not work where they lived.¹³² Still, the examples discussed here suggest that some artisans were active on the urban property market. The managing of manufacturing enterprises included a creative use of space. As will be dealt with below, this applies in particular to the renting of rooms to other artisans. Houses and households were thus spaces for *makings* and *takings*.¹³³ In Engberg's case, employees, as well as renters, came and went and all family members were involved in the workshops in different ways over time. This notion of a 'mobile' household is further evident when analysing the development for the cutlery works during the 1750s.

¹²⁸ C.f Berg (1994), pp. 276–279; Lindström (2011); Lindström (2012).

¹²⁹ Head tax record, 1755, Stockholm, *Jakob*, fols. 108–109 (112–113); Head tax record, 1755, Stockholm, *Normalm övre halva och västra övre yttre*. ÖFU, G1BA:20:2, fol. 175 (180). SSA. Arkiv Digital AB.

¹³⁰ Schröder (1925b), p. 39.

¹³¹ Head tax record, 1760, Stockholm, *Klara västra övre och yttre samt Kungsholmen*, ÖFU, G1BA:21:3, fols. 203–204 (53–54). SSA. Arkiv Digital AB.

¹³² As has been discussed in sections 3.2 and 3.3, many metal workshops in Stockholm during this period were smaller ones managed by artisans who rented rooms or houses.

¹³³ This can be related to the discussion offered by Ling (2016), pp. 180–188.

6.4 Decline? Departures, Misfortunes, and Competition

Decline is perhaps not an entirely suitable term when describing Engberg's cutlery works during the 1750s and 1760s, despite the tendencies of stagnation for the Stockholm metal trades during the latter decade. As Sonenscher noted, an eighteenth-century urban workshop is perhaps better discussed in terms of cycles of varying lengths, also including diverging divisions of labour over time. We have seen that one of the purposes with Engberg's works, at least on the part of state institutions, was training and the spreading of skills. Thus, it is not that surprising that a large number of employees also left him during the first half of the 1750s. The cutler stressed, in 1756, how these workers were proof of his devotion to serve the public. He mentioned that 11 of them had left for the works in Gusum, Borås, Carl Gustaf Stad, Tunafors, and Tyresö.¹³⁴

The fact that a majority of the large workforce left during this period also had negative effects for Engberg's business. The provincial works came to offer a severe competition for all cutlers in the capital. Below, I discuss these departures as well as the *tactics* related to the continuous managing of the business throughout the late 1750s and 1760s. The cutlery works remained within the Engberg family after Eric's death and this period also saw some of his old workers coming back to the capital.

Leaving the Master's Workshops for the Swedish Provinces

Leaving a manufacturing workshop — even after the training time was ended — was not an informal affair and it came under much scrutiny. The employer and the *Hallrätt* had to give their permission, and specific travel documents had to be provided by local authorities if the journey was longer.¹³⁵ This is well exemplified by the departures of Engberg's workers. In June 1747, a *Hallrätt* protocol dealt with the departure of Johan Lenning. He was enrolled for training by Engberg in 1741 and had gradually advanced, becoming a journeyman and then a master cutler in May 1747. The *Hallrätt* noted that he was completely trained in 'English knife making, as well as the making of hafts'. Still, he was not to remain with Engberg. Instead, he left for the Carl Gustaf Stad manufactory in Eskilstuna in order to 'expand' his craft.¹³⁶

This is the earliest proof of a worker leaving Engberg, but far from the last. Many of them left during the early 1750s, often in smaller groups. The explanation for this is that they also were recruited in groups to the newly

¹³⁴ Engberg, Proposal to *Handels och manufakturdeputationen*, May 1756, fol. 373. RA.

¹³⁵ In the case of Stockholm, by *Överståthållarämbetet*. See Ronnestam (2013), p. 68.

¹³⁶ 'Engelska knifsmidet, så wäl som skaftmakeriet'; 'utwidga'. Stockholm *Hallrätt*, (Copy of) protocol, 1747-06-22 (circulated to *Manufakturkontoret*, presented 1747-08-12. MkKam, C:c, vol. 309, fols. 478–479. RA.

founded provincial knife works. Since these journeys took place between workplaces that were part of the manufacturing trades, premiums for relocation were offered to the leaving workers and paid for by *manufakturfonden*. This type of arrangement can be exemplified by the departure of Anders Biörk, Torsten Ingström, and Petter Malmborg. They left for Borås in June 1752, receiving 200 dlr. kmt. each for making this move.¹³⁷

The 15 individuals listed below only constitute about one half of the total number of workers employed by Engberg during the late 1740s and early 1750s. The fates of the other half remain largely unknown. Still, the list tells quite a lot when related to the discussion in chapter 3 on the rise of specialised knife and metal works in the Swedish provinces. If we add the numbers given by the *Hallrätt* reports (see Table 6.3), it can also be noted how these departures followed two cycles. A majority of the workforce left during the years 1751 to 1753, in most cases for the works in Tunafors, Viskafors, and Gusum. The workforce then slowly increased during some years, but then another smaller group of workers left during the late 1750s.

Figure 6.3 Workers leaving Engberg during the 1740s and 1750s

	Title (year)	Leaving	Moving to
J. Lenning	Master (1747)	ca. 1747	Eskilstuna
J. Zihlfeldt ¹	Master (1750)	?	Gränna
E.M. Wetterblom	Junior official	Oct. 1751	Vedevåg
D.N. Falk	Junior official	Oct. 1751	Vedevåg
O. Wittenberg	Journeyman (1750)	June 1752	Norrköping → Gusum
A. Wittenberg	Journeyman (1750)	June 1752	Norrköping → Gusum
A. Biörk	Journeyman (1750)	June 1752	Borås
T. Ingström	Journeyman (1750)	June 1752	Borås
P. Malmborg ²	?	June 1752	Borås
P. Malineus	Journeyman (1750)	July 1752	Vedevåg → Eskilstuna
C. Frisk	Journeyman (1750)	April 1753	Eskilstuna
J. Graffman	Journeyman (1750)	April 1753	Eskilstuna
G. Qwarnström	Apprentice (1750)	ca. 1754	Gusum
P. Fristadius	Apprentice (1750)	ca. 1757	Uggletorp
O. Klingnius	Apprentice (1754)	ca. 1758	Uggletorp

Source: MkKam, C:c, vols. 309; 313; 319; 323; 327; 329; 331. RA; Schröder (1925a); Schröder (1925b). Note: ¹= J. Zihlfeldt probably left Engberg during the mid-1740s. ²= P. Malmborg was not listed by Engberg in 1750, probably because he travelled on his craft in Germany. C.f. section 7.1.

¹³⁷ Verification of premium for relocation, Stockholm, 1752-06-20. MkKam, C:c, vol. 327, fol. 415. RA.

Table 6.3 *Engberg's cutlery works, 1751–1762*

	Masters	Journeyman	Apprentices	Other	Total
1751	1	9	9	2	21
1752	-	1	5	-	6
1753 ¹	-	1	3	-	4
1754 ²	-	2	2	-	4
1755	-	2	2	1	5
1756	-	2	1	-	3
1757	-	2	3	2	7
1758	-	2	3	2	7
1759	-	1	2	-	3
1760	-	1	2	-	3
1761	-	2	1	-	3
1762	-	1	-	-	1

Source: Stockholm *Hallrätt*, Reports 1751–1762. HMR, BIII:2–6. SSA. Note: There are no *Hallrätt* reports for the years 1753–1754. For these years I have used: ¹= Parish catechetical meeting, 1753, *Jakob och Johannes*. Jakob och Johannes, AIa:6, pp. 88–89 (51). SSA. Arkiv Digital AB. ²= Schröder (1925a), p. 135.

Viewing these departures from a wider perspective, they can be related to the increasing competition caused by the provincial knife works. This had negative effects for Engberg, as well as for the cutlers' guild in the capital. Schröder noted, in 1759, how the last guild workshop in Stockholm — managed by the widow of a late master — was in decline. Like Engberg, the guild had by then seen many workers leaving for the provinces. Here, Schröder made an interesting point in reasoning about supply and demand in the capital as related to a wider market:

Despite the founding of several knife works around the Kingdom, it is necessary that one or several Cutlery workshops are maintained here in Stockholm, for the sake of the finer pieces which are ordered, as for the making of blades, for Silver and porcelain hafts, and the repairing of old pieces¹³⁸

This discussion points to the vulnerability of smaller cutlery workshops in Stockholm in the face of the expanding provincial works. At the same time, I have also emphasised the importance of urban manufacturing in a development where the *circulation* of workers and skills, new ideas on how to organise work, and the state's attempts to 'correct' workshop practices increasingly intersected. These processes included other Stockholm artisans as well, such as file maker Roth and manufacturer Schnack. As in Engberg's

¹³⁸ 'Alldenstund, oackadt knif Fabriker i Riket äro inrättade, nödigt är, at en eller annan Knifmedswerkstad här i Stockholm wid makt hålles, så wäl för det finare arbetets skull, hwilket beställes, samt bladers förfärdigande, til Silfwer och porcelains skaft, som för gammalt arbetes lagande'. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1759, p. 4. KB. Note the emphasis on silver and porcelain hafts, which relates to the discussion above about the specific finishes of Engberg's goods.

case, during the 1750s their workshops came to employ boys from provincial manufactories who were later sent back after being trained in the capital.¹³⁹

Schröder continued his discussion by relating this development to Engberg's business. He described how the imprisonment of the experienced cutler had caused in his works to suffer severely.¹⁴⁰ Still, despite numerous misfortunes and the increasing competition, Engberg's works was continued during the late 1750s and 1760s. Again, the role of Brita Engberg must be emphasised. By acting tactically, she ensured that the works was kept running as well as remained within the family.

Misfortunes and the *Tactics* of Managing an Urban Workshop

The departures of workers were accompanied by several misfortunes striking the Engberg family. Brita Lisa Engberg died in 1756. Two years later, her brother Eric — probably intended to take over his father's workshops — was struck dead by a broken grindstone. These deaths caused a loss of skills according to Schröder.¹⁴¹ Engberg's imprisonment, in 1759, made these wretched times even worse. Again, the responsibility for the workshops was left to his wife. This was a harsh time for Brita. The same year, she complained to the *Hallrätt* about her two apprentices who were not complying with her 'admonitions of correction'. The *Hallrätt* informed Johan Hallenius at Tunafors about this matter and he promised to arrange for the young men to be employed at his works.¹⁴²

Still, Brita also acted tactically in order to procure an income for herself and the remaining members of the household. This was done by temporarily leasing rooms and workshops to other craftsmen. Such agreements had been made also before Engberg's imprisonment. The goldsmith Peter Wessley had set up a workshop in one of Engberg's houses in 1757, after returning from London, where he worked for a year together with his son.¹⁴³ With Engberg absent, Brita continued to house yet other artisans. In July 1759, such an agreement was made with instrument and tool maker Petter Hultsten, who had witnessed his own workshop on *Södermalm* being destroyed in a fire. Schröder noted in his diary how Hultsten, 'with his people', rented rooms and a forging workshop from Brita.¹⁴⁴ In 1761 a similar deal was made with metalworker Petter Winberg, who was by then back in Sweden after working in London.¹⁴⁵

¹³⁹ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 291–292; vol. III, 1762, pp. 18–20. KB. In these cases, Schröder noted the links to the Carl Gustaf Stad manufactory.

¹⁴⁰ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1759, p. 5. KB.

¹⁴¹ Schröder (1925b), p. 40.

¹⁴² 'förmaningar til rättelse'. Stockholm *Hallrätt*, Protocol, 1759-02-12. HMR, AI:1. SSA.

¹⁴³ Schröder (1925b), p. 72.

¹⁴⁴ 'med sitt folk'. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1759, pp. 123–124. KB. See also Schröder (1925b), p. 42.

¹⁴⁵ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1761, p. 97. KB. C.f. section 5.4.

These examples illustrate the tactics of the *metal bazaar*, by pointing to the importance of using connections and networks in order to keep business going. Leasing rooms to other artisans provided Brita with an income that could not be expected from the cutlery works. The cases discussed here also demonstrate how Engberg's houses continued to be a space where people met and where metal-making practices were overlapping. The cutlery works was one *contact zone* which both shaped, and was shaped by, people's movements and the *grounding* of skills and knowledge.

Engberg was probably released from his imprisonment during 1762. In November that year, he was listed among the other members of the household as partaking during a parish catechetical meeting.¹⁴⁶ Still, both Eric and Brita were now ageing, and in 1763 the works had only one journeyman and three apprentices.¹⁴⁷ Eric died two years later, and Brita now handed the workshops over to her son-in-law, the farrier smith Anders Söderbom.¹⁴⁸

A Finale in the *Metal Bazaar*

Returning again to the notion of workshop cycles and workforce mobility, it can be noted that Engberg's workshops continued to exist for another decade after his death. This period also saw several of the provincial knife works struggling with the worsening conditions after the economic crisis and the shift of power at the Diet of 1765–1766. Some of the workers that had been trained by Engberg returned to the capital. During the same period, Schröder was busy promoting his plans for the *Fristad*. Still, the capital's metal trades continued to play an important part in the *Directeur's* diaries.

The production of cutlery was continued when Söderbom took charge of the workshops in 1765. He employed a handful of workers during the 1760s and 1770s, and had a quite even annual output.¹⁴⁹ Still, Söderbom does not seem to have been involved in the production. One year after the death of his father-in-law, he was appointed to be the Royal farrier. As described by Schröder, the cutlery works had to be managed instead by a journeyman.¹⁵⁰

Söderbom also involved himself in conflicts with other cutlers, some of whom had worked for Engberg earlier. In 1766, Schröder commented on

¹⁴⁶ Parish catechetical meetings, 1762-01-27; 1762-11-18, *Jakob och Johannes*. Jakob och Johannes, A1a:9, fol. 28 (33), 86 (92). SSA. Arkiv Digital AB. Engberg was not listed in the first of these records, indicating that he was released sometime between late January and November.

¹⁴⁷ Stockholm *Hallrätt*, Report 1763, HMR, BIII:6, p. 295. SSA.

¹⁴⁸ This is explicitly stated in a will signed by Brita Fogel, in September 1772, which was appended to her probate inventory from April 1776. See *Stockholms stads Justitiekollegium (Förmyndarekammaren)*, (Copy) of Protocol, 1772-09-08. SRr, 1:a avdelning, F1A:240, fols. 391–392 (3990–4010). SSA. Arkiv Digital AB.

¹⁴⁹ See Stockholm *Hallrätt*, Reports 1765–1776. HMR, BIII:7–10. SSA. For the years 1768–1770, there were no reports.

¹⁵⁰ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1766, p. 49. KB.

several occasions on the vagabond-existence of the two former Gusum workers Anders Wittenberg and Georg Qwarnström. When the large knife works ran into problems, they moved first to Norrköping and then on to Stockholm.¹⁵¹ Wittenberg started by working for Söderbom, but the two men quickly came into conflict regarding the payments for the former's work.¹⁵² The following year, Schröder noted how Wittenberg and Qwarnström instead had been working together. As stated in the diary 'the former preferably forged and the latter worked with hafting and finishing.'¹⁵³

This is an illustrative example of how the cycles of metal workshops in Stockholm were related not only to networks in the urban space, but also to wider movements in a changing manufacturing system. As noted above, Wittenberg had been recruited from the Borås area by Alströmer in 1744 to be trained by Engberg. He then left to work at Gusum during the expansive years of the early 1750s. Like other artisans leaving the larger knife works during the crisis of the 1760s, he made his way back to the capital. In 1771, he was referred to in the *Hallrätt* report as having his own workshop.¹⁵⁴

Wittenberg's workshop was one among a handful of small cutlery enterprises being founded in the capital during this period. Some of these artisans produced a variety of metal wares, such as tools, knives, and instruments. Others made more specialised items. Metalworker Isac Trybom was recognised by Schröder for making finer rolled silver hafts in 'the English way'.¹⁵⁵

Cutlery making was also included as part of larger enterprises. Instrument maker Anders Wahlbom expanded his business by moving to a new stone building on *Ladugårdslandet* in 1764. He was also given support to install a new grinding mill.¹⁵⁶ Later beginning to make knives, he came into conflict with the cutlers' guild. Schröder noted how the local authorities had joined forces with the guild masters, and Wahlbom was forbidden to make cutlery. Here, the *Directeur* made an interesting remark, in 1768, with reference to the changing view on new manufacturing workshops promoted by the Diet. He argued that Wahlbom 'should be free to practise and operate his trade wherever he wants and as good as he can'. He also encouraged the manufacturer to appeal his cause to *Kommerskollegium*.¹⁵⁷ During the following years, Wahlbom expanded his business and in 1771 he had 17 employees producing metal goods for 11,985 dlr. smt.¹⁵⁸

¹⁵¹ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1766, pp. 23–25, 31. KB.

¹⁵² Stockholm *Hallrätt*, Protocols, 1766-12-10; 1766-12-11. HMR, A1:8. SSA.

¹⁵³ 'den förre förnämligast smidde och den senare skaftade och finicerade.' Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1767, p. 13. KB.

¹⁵⁴ Stockholm *Hallrätt*, Report 1771. HMR, BIII:8. SSA.

¹⁵⁵ 'Engelske wiset'. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1763, pp. 9–10; 1769, pp. 12–14. KB. For a brief discussion on Trybom, see Bengtsson (1963), pp. 46–48.

¹⁵⁶ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1764, pp. 4–6; 1767, p. 5. KB.

¹⁵⁷ 'bör äga frihet samma näring idka och drifwa hwarest han åstundar och bäst han kan och gitter'. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1768, pp. 6–8, 17. KB.

¹⁵⁸ Stockholm *Hallrätt*, Report 1771, HMR, BIII:8. SSA.

The cutlery works near *Packartorget* was slowly phased out. It was definitely abandoned when both Brita Engberg and Anders Söderbom died in 1776. By discussing the continuation of the works during the 1760s, however, this section has shown how cutlery making was developing in the capital in spite of the economic crisis, conflicts with metal-making guilds, and an incipient competition from the *Fristad* in Eskilstuna. The capital was still a vital *contact zone* for the metal trades.

Moreover, goods made by Engberg continued to be circulated during this period — sometimes over vast distances. In his presidency speech given to *Kungliga Vetenskapsakademien* in 1770, Clas Alströmer described his journeys in Europe during the years 1760–1764, which had been undertaken with a special interest in wool manufacturing. In Spain, he had let the Spanish try wool scissors brought from Sweden and adapted for this specific task by Engberg.¹⁵⁹ The Engberg-Alströmer circle can thus be seen as completed in a material sense. The project that involved them both from the late 1730s unto the mid-1750s was continued on a larger scale at provincial knife works. The setting up of these works came to involve Engberg, his former workers, and the *Directeur* Schröder.

6.5 Conclusion

The aim of this chapter has been to investigate the construction of urban manufacturing workshops at mid-eighteenth century, with a focus on metal works set up in the ‘English way’. The primary example has been Engberg’s cutlery works, which has been followed from the late 1730s unto the mid-1770s. In so doing, I have also continued to explore the *skills-trajectory* outlined in the previous chapter. The links to Engberg’s first European journey have been emphasised, but the discussion has also dealt with changes in the social and material organisation of work, processes of training, and *tactics* related to the managing of a workshop over time.

Comparisons have frequently been made between Engberg and other manufacturers. In so doing, this chapter relates to the discussion in chapter 3, which emphasised the importance of Stockholm on a general level. By making use of Engberg’s trajectory, I have analysed processes by which people and practices connected in the *metal bazaar*. In line with Sonenscher, urban manufacturing stands out as characterised by diverging ways of organ-

¹⁵⁹ Alströmer, Clas (1770). *Tal, om den fin-ulliga får-afveln, hållet för kongl. vetenskaps akademien, vid præsidiij nedläggande, den 25. april 1770. Af Clas Alströmer, assessor i kongl. commerce-collegio, ledamot af botan. societeten i Florentz. På kongl. vetenskaps academiens befallning*. Stockholm: Salvius, pp. 35–36. Clas Alströmer was Jonas Alströmer’s third son.

ising work, complex networks for knowledge and information, and workforce mobility. With reference to Raj, Stockholm has been discussed as a *contact zone* where knowledge, skills, and artefacts were *grounded* and further *circulated*.

Making space for metal manufacturing in the capital has been dealt with by taking notice of intersecting *strategies* and *tactics*. Artisans who were not tied to guild statutes involved themselves in protracted negotiations regarding access to suitable places for workshops. These processes often involved numerous local and national institutions, and included notions about visibility and accessibility as well as the use of water power. As demonstrated by Engberg's and Backman's cases, however, plans were often changed or dashed in the political bureaucracy. The access to building plots for setting up workshops also made an impact on the use of devices and the potentials to alter places in accordance with new ideas on how to organise work. Metal works set up according to the 'English way' were associated by the fact that they were constructed by connecting several workshops. Engberg's imports from England illustrate how mechanical devices were adapted in order to be used for performing specific tasks, thereby facilitating a division of labour.

Moving further, I have analysed the social organisation and materiality of the 'English way' of making metal wares. Engberg's cutlery works brought together alterations and *imitations* related to processes and products. The implementation of piecework was linked to the use of diverse and functional materials, and above all new types of steel. By comparing with other metal works, this chapter has also shown how the 'English way' could differ when implemented in practice. This observation can be related to ones made in recent inquiries on urban space and manufacturing in early-modern Europe. Stockholm was a space where flexible and alternative ways to organise metal manufacturing developed during the mid-eighteenth century.

Metal workshops in the capital were truly *contact zones* in their own right: spaces where objects, materials, and knowledge intersected and were adapted by artisans. Notably, they were the sites for training and further *circulation* of skills and techniques. In Engberg's case, we have seen how apprentices were recruited from larger manufactories and from rural areas, and involved in the 'English way' of making cutlery. Training was performed in parallel with work and it was as such integrated with attempts to divide work spatially and in tasks. These processes connected urban workshops to an expanding manufacturing system in Sweden, but also to a wider European context of metal making.

The importance of training is also illustrated by the workers *leaving* Engberg in larger numbers during the 1750s, above all moving to the knife works in Eskilstuna, Borås, and Gusum. On the one hand, this was one of the intentions with Engberg's works. On the other hand, it meant that the works was less well equipped to compete on the domestic market. Still, these hard times also brought forth new *tactics* in order to keep business going. This

involved a creative use of both space and social networks over time, as illustrated by the leasing of rooms or workshops to other artisans. Here, I have especially pointed out the role of Engberg's wife, Brita. Women were thus in some cases actively involved in managing workshops and manufacturing enterprises.

So to the observation made in the introduction to this chapter: were Engberg and contemporary manufacturers building castles in the air? Yes, if we only focus on features that have traditionally been recognised. The goods made by Engberg were hard to sell; they were expensive and probably not in high demand on the domestic market. Like many others, Engberg relied on loans, premiums, and putting-out supplies for keeping business going.

Such a picture is, however, not entirely accurate regarding the everyday activities and practices in which these actors were involved. This chapter has emphasised the 'options and alternatives' for artisans in the capital, to use Nyberg's terms.¹⁶⁰ The making of workshops in the 'English way' in Stockholm tells us something more about eighteenth-century metal manufacturing. These practices were shaped by, but also influenced, reconfigurations and negotiations of skills, ideas, and materials related to new ways of organising work. The discussion above has also indicated how these processes were connected to innovative ways of adapting to the fluctuations of an unstable economy, especially during the 1760s.

The diverse forms of metal manufacturing are further evident when tracing Engberg's former workers. The next chapter constitutes the final part of the *skills-trajectory* explored here. I continue to analyse the negotiations of practices and skills that gradually shaped cutlery making in Sweden during the second half of the eighteenth century — up until the founding of Eskilstuna *Fristad*.

¹⁶⁰ Nyberg (1992), p. 353.

CHAPTER 7

Grounding Cutlery Making: Piecework and Provincial Knife Works

In June 1752, *Handels och manufakturdeputationen* dealt with improvements of domestic finer metal making. In particular, the Delegation's account discussed three applications for founding knife works in Tunafors, Gusum, and Viskafors. Johan Hallenius, owner of Tunafors, wanted the exclusive right, for ten years, to set up a knife works run according to the principles of piecework, and the freedom to construct water-powered workshops 'for the saving of manual force'. For this, he needed a loan of 100,000 dlr. smt. and premiums for exported cutlery. He also stressed that the regulations regarding the import of metal wares had to be reinforced. The proprietor of Gusum, Eric Westerberg, had similar plans. He also applied for a large sum of money in advance and various sorts of premiums, which would enable him to implement cutlery making 'according to the French or English way.' The third application came from a merchant in Borås, Petter Hall. He had informed the Delegation that he was to set up a knife works, with accompanying water-powered works, in Viskafors together with his companions. He did not wish for any particular financial support, unless, that is, Hallenius and Westerberg were granted the large sums they had applied for.¹

Only Hall's application was approved by the Delegation. The benefit in this case was that cutlery making 'according to the English way with Piecework' could be operated without large public expenses: 'whereby the private gain and profit for the Fabricant in continuing the works becomes closely connected to the public advantage'. The works in Viskafors also benefitted from the possibilities of employing cheap labour from the nearby countryside. Further illustrating the links between the organisation of workshop practices and the policies of the manufacturing system, the Delegation pointed out the guidelines regarding premiums for cutlery making. A lower premium (six percent) was to be given for goods made by manual labour and a 'correct' piecework organisation. If water-powered works were employed in

¹ 'til besparande af handkrafter'; 'efter Franskt eller Engelskt sätt.' *Handels och manufakturdeputationen*, Account to *Sekreterats utskottet* regarding the improvement of domestic cutlery making, June 1752. FUH, R. 2963, fols. 387–390. RA. One of Hall's companions was Lars Graf, mentioned in section 3.1. This account has also been discussed in section 4.3.

the production, which was considered to lower the prices on metal wares, the premium was raised to 15 percent. The most valuable form of manufacturing was the one directed towards export. In such cases, premiums corresponding to 25 percent of the goods' value could be given.²

With Halls application approved, the Delegacy handed over the decision regarding the other two applicants to be dealt with by *Sekreta utskottet*. With its approval, Hallenius and Westerberg were also able to begin to set up their knife works.³ The quest for large-scale cutlery making in Sweden had begun. The three works did not only have the intention to implement piecework in common. They also all recruited workers from Engberg in Stockholm in order to do so. By using Schröder's diaries, combined with other sources, it is possible to follow these artisans and workplaces over time. This chapter thus continues to explore the *skills-trajectory* dealt with above. The aim is to analyse the *negotiation* and *grounding* of cutlery-making skills at the three places mentioned above, and the part played by these processes in the development towards the founding of Eskilstuna *Fristad* in 1771.

The discussion below moves beyond notions of specific forms of organisation — such as 'factory systems' and 'putting-out systems'. With the conclusions from the previous two chapters in mind, it also nuances the idea of a transition from failing manufactories towards small-scale workshops and a 'proto-industrial' metal making.⁴ I draw upon the perspectives advanced by Berg and Sonenscher, in emphasising a varying manufacturing landscape over time and across space.⁵

The sections below highlight the role of state authorities and their goal to introduce large-scale manufacturing. This is done by investigating practices of work and the negotiations of skills, ideas, objects, and materials. This relates to Alder's emphasis on knowledge about manufacturing as socially produced, and, hence, on the active roles of 'knowledge-makers'.⁶ The undertakings of travelling officials (in this case Schröder) are emphasised, but so is also the vital part played by artisans. The traditional image of 'transfers' is questioned. Instead, I draw attention to the circulatory movements that shaped cutlery-making practices in Sweden during the 1750s and 1760s.

The first section deals with the diverging trajectories of Engberg's former workers. While some of them became involved in further attempts with piecework and 'English-style' cutlery making, others managed smaller

² 'på Engelska sättet med Styckearbete'; 'hvarigenom Fabrique Idkarens egen förmåhn och winning af werkets widmachthållande blifwer med det allmännas båtнад så nära förknippade'. *Handels och manufakturdeputationen*, Account to *Sekreta utskottet* regarding the improvement of domestic cutlery making, June 1752, fols. 391–393. RA. The emphasis on premiums for finer metal making coincided with it being tied to *Kommerskollegium* during the early 1750s, and thereby further integrated into the manufacturing system. C.f. section 2.2.

³ *Sekreta utskottet* approved these applications on 23 June 1752.

⁴ C.f. Boëthius and Kromnow (1968), pp. 368–375; Isacson and Magnusson (1987).

⁵ Berg (1994); Sonenscher (2012).

⁶ Alder (2010), p. 10, 56–65, 129–132.

workshops. In keeping with Lissa Roberts' perspective, this shows the importance of a comparative approach where diverging geographies of skill are mapped out in order to approach the relations between materiality, manual skills, and ideas of production over time.⁷

Section 7.2 deals with divisions of labour at Tunafors, Viskafors, and Gusum. Schröder's role is emphasised through focusing on spatial arrangements and task-based organisations. Still, these processes also included a variety of local adaptations of artefacts, materials, and practices. Moreover, the *imitation* of metal goods is discussed by relating to Alder's emphasis on the links between mediating devices, the standardisation of objects, and new ways to organise work.⁸ Cutlery manufacturing during the 1750s makes evident how diversification and attempts at standardisation went hand in hand.

The third section continues this focus, but from a different angle. It shows how the trajectories of two intermediary actors intersected at these knife works, although not in a direct sense. In 1758, Engberg took part in a survey of Tunafors, Vedevåg, and Gusum arranged by *Manufakturkontoret*. Here, he encountered some of his old workers and some of the techniques that he had brought with him from his journeys abroad. In doing this, moreover, Engberg was involved in evaluating the quest to improve domestic cutlery making encouraged by Schröder. 'Corrections' were thus not only a matter for state officials. Artisans took part in the shaping of metal-making practices, not only by rejecting new ideas or techniques.

Closing this chapter, and the investigation of the metal trades in Sweden during the period 1730–1775, we move towards the 'construction' of Eskilstuna *Fristad*. This final section, again relating to one of Alder's concepts, deals with the potential for a *manufacturing tolerance* during the 1760s and early 1770s. Piecework (as promoted at the knife works) was not implemented in the *Fristad* community during the period of interest here. Rather, the production came to rely on traditional ways for organising craft work.⁹

Discussing the developments during the 1750s and 1760s, however, shows how this was a complex process. The *Fristad* saw continuous negotiations regarding metal-making practices, related to the use of 'thick things' — objects embodying certain strategic ideas.¹⁰ It was also subjected to further plans with a workshop-based division of labour. Metal making was being put under increasing control by the state and its supervisors, through the ordering of space and more systematic approaches towards work. Here, the role of Sven Rinman is emphasised. Such a discussion adds to previous research on how the *Fristad* attracted putters-out with interests in the metal trades. Thus, the *liberty* promised to artisans was circumscribed by several compromises.

⁷ C.f. Roberts (2007a), pp. 189–195; Roberts (2007c), pp. 216–217.

⁸ See Alder (2010), pp. 128–153.

⁹ See Hörsell (1983), pp. 50–53; Isacson and Magnusson (1987), pp. 95–97; Magnusson (1988), pp. 129–131. See also the discussions in chapters 1 and 4.

¹⁰ C.f. Alder (2010), pp. 16–19, 146–153.

The *Fristad* is of interest here not because it denotes a ‘definite path’ towards industrialisation, nor because it was the beginning of something totally new. Rather, it is the gradual development of cutlery-making practices — related to a changing manufacturing system — that is under investigation. I have shown how Engberg’s journeys and the setting up of a cutlery works in Stockholm were important parts of this process. By following Engberg’s former workers, this chapter makes clear how the many alternative paths can make an impact, even if they are not followed through. They illustrate how the *tactics* of everyday metal making intersected over time with the state’s *strategies* and attempts to control manual labour.

In order to investigate these cutlery-making practices, I have employed a number of different sources. In section 7.1, I continue to use *Manufakturkontoret*’s archive, and the verifications of the payments from *manufakturfonden*. Above all, however, this section builds on the notes taken by Schröder during his visits at the knife works. These are often rich regarding descriptions of the social and material aspects of production, without including value judgements or comments regarding ‘corrections’. Examples of the latter kind of reasoning are instead used in the second section. Using the same types of sources, I explore the spatial, material, and organisational alterations made or planned at Tunafors, Viskafors, and Gusum. The third section is built on the documents submitted by the deputies inspecting Tunafors, Vedevåg, and Gusum in 1758.¹¹ These detailed texts dealt with workshops and workers, but also with the negotiations at the works during the inspections. In section 7.4, finally, I use written documents kept by Schröder relating to the organisation of the *Fristad*, and accounts dealing with workshop practices in the metal-making community written by Rinman during the mid-1770s.¹² However, I will start by exploring the trajectories of the workers who left Engberg’s cutlery works during the early 1750s.

7.1 The Diverging Trajectories of Engberg’s Workers

The training of apprentices in Engberg’s cutlery workshops was related to the idea of making possible the dissemination of skills. The cutler also instructed a great number of workers in his craft, who then left him during the 1750s. A majority of them was employed at the provincial knife works founded after the Diet of 1751–1752.¹³ In this section, I trace these workers, but also the specific processes they were involved in. They were trained to

¹¹ One of these is also referred to in chapter 4: Münchenberg, Samuel, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. MkA, De:1, vol. 176. RA. The other one is an unsigned protocol for the inspection at Tunafors: Survey of Tunafors, 1758-02-06 (submitted to *Manufakturkontoret*, 1758-04-24). MkA, De:1, vol. 176. RA.

¹² See Bergsrådet S. Schröderstiernas Papper, vol. 1. ESA; Rinmanska arkivet, S-O. TMA.

¹³ This has also been noted by Forsberg (1953) and Hellberg (1920).

perform different tasks, something that made many of them well-suited to be pieceworkers at larger metal works. Still, some of them were not employed at these places after leaving Stockholm. By discussing three divergent paths, I show how alternative ways to organise cutlery manufacturing emerged in Sweden during the 1750s. Adding to this observation, the three rising knife works also differed regarding the spatial and social organisation of work.

The ‘English Way’ at Gusum, Tunafors, and Viskafors

Among the persons leaving Engberg during the 1750s were ten workers who were recruited to the knife works in Gusum, Tunafors, and Viskafors (see Figure 6.3). At all these places, and largely because of the repeated suggestions made by Schröder, a workshop-based division of labour was gradually introduced during the following years. Still, the ways in which this was done differed at the three works.

Three of Engberg’s former workers were employed at Gusum. The two brothers Wittenberg had arrived in 1752, followed by Georg Qwarnström some two years later. When Schröder visited Gusum in January 1754, he described thoroughly how the cutlery making was spatially divided, yet organisationally connected. Working in a newly built forge, Anders Wittenberg forged and tempered the knife blades and forks together with one apprentice. Filing and finishing were done in a second building. Four locally recruited workers filed and cleaned the blades and forks in one workshop, while Olof Wittenberg, the journeyman Qwarnström, and five apprentices finished the table cutlery in a second workshop. A third building contained two additional workshops. One of them was supervised by a master who made moulded metal hafts and pieces of silver, metal, and nacre, together with his son and one apprentice. Wooden hafts were made in the same building by yet another worker. The knife works also included a grinding mill by the Gusum stream and one lathing workshop located outside the works.¹⁴

Cutlery making at Gusum was thus divided so that pieces were forged and filed in separate workshops. Hafts and silver pieces were in turn delivered from workers in the third building. All items were then finished in the same workshop. Still, divisions of labour also existed within the workshops. Regarding the filing, Schröder noted how ‘each one of the workers is employed with filing or cleaning his distinct piece.’¹⁵

Later the same month, Schröder arrived at Eskilstuna and inspected the Tunafors metal works, which employed three other of Engberg’s former workers. However, these cutlers performed their work in a spatially different

¹⁴ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 63–73. KB. See also Forsberg (1953), pp. 111–112.

¹⁵ ‘hvar och en af arbetarne sysselsätts med sitt särskilte ämne at fila elr skura.’ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, p. 67. KB.

way when compared to the ones at Gusum. Carl Frisk was the inspecting master at the works, but he also supervised one large cutlery workshop operating with a division of tasks. One journeyman forged the knives and forks with the assistance of one apprentice, but Frisk tempered all blades himself. The journeymen Peter Malineus and Jonas Graffman, in turn, worked with the filing together with one apprentice each. Schröder noted how work was divided between them so that the former filed the knives and the latter filed the forks. Hafts were made by one additional worker, while Frisk later finished all items. In contrast to Gusum, a majority of the tasks were thus performed in the same workshop. Grinding and polishing were the only tasks that were carried out in a separate building — a new water-powered mill. The work of grinding master Frisk's cutlery was divided between the filer Malenius and one other journeyman. In total there were seven cutlery workshops at Tunafors during Schröder's visit, including the grinding mill.¹⁶

The last of the three knife works visited by Schröder was Viskafors. The *Directeur* had written to the head master Daniel Falk in 1753, sharing some of his observations from the visit in Sheffield a few years earlier. He had described to Falk 'how the workshops should mutually depend on each other' and how all of them in turn should be associated to a grinding mill.¹⁷ When Schröder later visited Viskafors, he noted how the cutlery making was located in one two-floor building. On the ground floor there was one large forge with four hearths (see Figure 7.1) and four additional rooms. On the second floor there were six rooms used for workshops or chambers.¹⁸

Four of Engberg's former employees worked in this building. Torsten Ingström forged, filed, and tempered blades and forks together with two apprentices. Petter Malmborg was assisted by one boy, being particularly employed with the making of clasp knives. Anders Biörk finished the table cutlery, but he also forged from time to time. Lastly, head master Falk worked with the finishing of pen knives and smaller clasp knives together with three boys. The masters ground and polished their own pieces in a separate building by the river. Ingström, Malmborg, and Biörk had arrived from Stockholm in 1752, later followed by Falk. Schröder also noted that Malmborg had travelled on his craft in Germany.¹⁹

Again, the spatial arrangements at Viskafors differed from those at the other two knife works, although there were similarities with Frisk's large cutlery workshop at Tunafors and with Engberg's cutlery works in Stockholm. In their early phases, the three works thus show how the 'English way' was being altered in different localities.

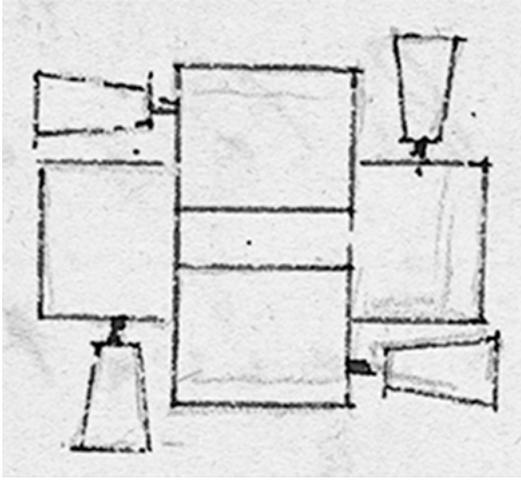
¹⁶ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 93–107. KB.

¹⁷ 'huru verkstäderna böra säs emellan af hwarandra dependera'. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1753, pp. 24–26. KB.

¹⁸ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 242–244. KB.

¹⁹ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 246–248. KB. C.f. section 6.4.

Figure 7.1 The forge at Viskafors



Source: Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, p. 244. KB.
(Photo: Andrea Davis Kronlund, Kungliga biblioteket).

The introduction and use of new devices, combined with the recruitment of more workers, came to further affect the diverging ways in which these workplaces developed during the mid-1750s. These processes illuminate Schröder's role in arranging for 'corrections'. The expansions at Gusum and Tunafors are also well-documented in other sources. This makes it possible to follow cutlery making more in detail. Still, not all of Engberg's workers moved to the knife works. Some were employed at large manufactories, while others founded workshops of their own. This illustrates how workers trained in the Stockholm cutlery works were spreading into the Swedish provinces. The context for cutlery manufacturing was diversifying.

Alternative Paths for Provincial Cutlery Making²⁰

Master Johan Lenning was one of the first workers to leave Engberg's works during the late 1740s, for the Carl Gustaf Stad manufactory. When Schröder went there in January 1754, he described how Lenning worked in a large workshop where he made several kinds of table knives, with the assistance of two apprentices. Schröder also noted how the proprietor of the works, Fredrik Rothoff, had plans to close down this workshop because of the competition from the knife works.²¹ The same year, as noted in section 3.1, Schröder recommended Rothoff to specialise the production at Carl Gustaf Stad. Cutlery was not among the chosen items.

²⁰ These three cases are not referred to in the following sections, but function as comparative examples here, in setting the stage for discussions on piecework and cutlery making.

²¹ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 131–132. KB.

Schröder later described, in 1757, how Lenning had gotten himself into debt to Rothoff. The main reason for this, the *Directeur* argued, was the deficient division of labour in the cutler's workshop, which resulted in a slow pace of work and expensive wares.²² The following year, on advice from his patron, Lenning travelled to Stockholm. There, he trained for half a year in grinding and polishing with the instrument maker Christopher Ketscher.²³ As noted by Hellberg in his book on the Eskilstuna works, Lenning later returned to Carl Gustaf Stad in order to supervise a new grinding mill.²⁴ The cutler had thus altered his position within the increasingly competitive context of metal manufacturing by moving between Stockholm and Eskilstuna.

Another of Engberg's workers who chose an alternative path was the former Vedeång apprentice Johan Zihlfeldt. After leaving his master's workshops, he moved to Gränna to practise his craft. In 1752, he received a financial support from *manufakturfonden* to be used for setting up a grinding mill in his workshop.²⁵ Two years later, Schröder visited Gränna and noted how the grinding devices had been installed within a flourmill. He described how master Zihlfeldt worked together with three apprentices. While Zihlfeldt was skilled in finishing, Schröder noted that 'he is much lacking regarding forging, grinding, and polishing.'²⁶

In contrast to Lenning at Carl Gustaf Stad, however, Zihlfeldt kept his business going despite the competition from the larger knife works. In an application for manufacturing premiums from 1757, he listed a variety of cutlery made at his works, including knives and scissors with silver details.²⁷ Schröder later noted how the bulk of these metal wares were sold locally at market-fairs around Gränna.²⁸

Both Lenning and Zihlfeldt worked in smaller workshops (if compared to ones at the knife works) and without implementing piecework. Attempts at setting up a larger cutlery works were, however, made by yet another person who had been trained by Engberg — the former junior official Eric Magnus Wetterblom. He left Engberg's works in 1751, together with Daniel Falk. Although in particular instructed in the ways to set up a metal works, they

²² Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1757, pp. 147–149. KB.

²³ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1758, pp. 26–27. KB. This case also illustrates the intersection of skills and artisans over time. Ketscher had been taken under Engberg's wing when travelling in England during the mid-1750s. C.f. section 5.3.

²⁴ See Hellberg (1920), pp. 250–251. This mill was constructed in 1757 to use for file making. Schröder later noted, in 1768, how this craft was no longer practised at the works. See Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1768, pp. 35–36. KB.

²⁵ Zihlfeldt, Johan, Verification of loan from *manufakturfonden*, Gränna, 1752-07-26. MkKam, C:c, vol. 327, fol. 529. RA.

²⁶ 'uti smidningen, slipningen och poleringen fattas honom mycket.' Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 274–276. KB. This indicates that he was trained mainly in finishing during the years he worked for Engberg.

²⁷ Zihlfeldt, Johan, Application for manufacturing premiums, Gränna, 1757-07-18. MkKam, C:c, vol. 339, fol. 957. RA.

²⁸ Schröder (1925b), p. 16.

started by working together at Vede våg. In 1752, they made cutlery wares that were sent to be sold in Stockholm by shopkeeper Magnus Wahlbom.²⁹

When Falk left Vede våg to become head master at Viskafors, he did so without his companion. Schröder reported, in 1755, how Wetterblom instead had received privileges for constructing a metal works in Uggletorp, near Linköping. There he planned to make various types of cutlery, tools, and household utensils. A former inspector from Vede våg named Dahlstrand had been involved as Wetterblom's new associate.³⁰ In 1760, Schröder mentioned how disputes had arisen between the two, and that Dahlstrand had withdrawn from the project. Wetterblom continued to supervise the works for some years, and directed the production towards the making of razors. He also recruited workers from his old 'teacher' Engberg: master Petter Fristadius, who died after working only a short time at Uggletorp and left the supervision of a filing workshop to journeyman Olof Klingnius.³¹

Wetterblom was later involved in setting up another metal works during the 1760s, in Drottningholm. Above all, this works came to supply the adjacent Royal Castle with metal goods. When Schröder surveyed the place in 1761, he noted that it consisted of four cutlery workshops with 11 workers and one additional engraving workshop. In order to facilitate the grinding process, Schröder argued that the works should be equipped with a horse-powered mill (as at Engberg's works).³² In 1766, the *Directeur* again visited Drottningholm and described how work was divided between finer polished items, cruder ones, and knives. Two years later, however, Wetterblom told Schröder about his plans to abandon the works, only keeping two journeymen for the needs of the castle.³³ The project for a metal works at Drottningholm had failed.

These three cases illustrate alternative practices of cutlery manufacturing during the 1750s and 1760s, compared to the three knife works. They show how the 'English way' was *grounded* related to the movements of people in the Swedish provinces. Knowledge and skills were locally adapted and reconfigured in different ways over time and across space. Lenning's case shows how cutlery workshops at large manufactories were sometimes closed as a result of competition. Thus, not only Stockholm artisans were affected

²⁹ Wahlbom, Magnus, Verification of sales for Mr. Falk and Wetterblom, 1752-08-27. MkKam, C:c, vol. 327, fol. 588. RA. As noted in section 3.2, Wahlbom was described by Schröder as an important actor regarding the vending of metal wares. Similar proofs of joint production can be observed for the following year. See Hallenius, Claes, List of manufactured goods 1753–1755, Vede våg, 1755-09-13. MkKam, C:c, vol. 334, fols. 1915–1918. RA.

³⁰ Schröder (1925a), p. 35.

³¹ Schröder (1925b), p. 28. These workers left Engberg during the late 1750s. See Figure 6.3.

³² Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1760–1761, pp. 72–77. KB.

³³ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1766, p. 46; 1768, p. 14; 1770, p. 33. KB. As described by Catrine Arvidsson, Wetterblom had by then invoiced the royal family several times for pieces made for the China Castle (in the castle garden). The royals never paid for this work. See Arvidsson (1998), p. 147.

by the more severe competition during this period. Zihlfeldt managed better in practising his craft, although in a smaller scale and with stronger connections to a local market. Finally, Wetterblom's two largely failed projects demonstrate the uncertain foundations of the manufacturing system — in keeping with the discussions in the previous chapters. Still, they also point to the importance of movements within this system. Both these aspects will now be further discussed by 'revisiting' the knife works in Viskafors, Tunafors, and Gusum.

7.2 Schröder on the Move: 'Corrections' and *Grounding*

Schröder frequently returned to the three knife works during the years following his first visits in 1754. I have argued that these tours were linked to the state's ambitions to promote domestic metal refinement. Schröder's diaries also suggest connections between the supervision of Swedish works and his experiences of the British metal trades. The *Directeur's* overall agenda for the knife works included a work order based on the principle of 'from hand to hand', which in turn was linked to a careful 'householding' and advances regarding raw materials, tools, and mechanical devices.

The previous chapters have also shown that these were not the first attempts to improve the making of cutlery and metal wares. Rather, a more gradual development has been suggested, by stressing the impact of artisans' journeys and the construction of metal works in the 'English way' in Stockholm during the 1740s. Here, the links between Engberg's cutlery works and the provincial knife works illustrate the complexity of a changing manufacturing system. Still, as argued by Rydén, Schröder promoted a division of labour in a more extensive manner with an interest in both practices of work and the flows of a wider system.³⁴ Other scholars have used the *Directeur's* reports and diaries in order to describe the developments at different works, including the attempts with piecework (or paced work).³⁵ Yet, no comprehensive and comparative analysis of these cutlery-making practices has been undertaken. Here, I use the concepts mediation, adaption, and *imitation* in order to explore the 'corrections' suggested by an intermediary official.

Improving Manual Work: Devices, Tools, and Materials

As in the case with Engberg's cutlery works in Stockholm, it is important to relate the attempts to 'correct' the organisation of work at the knife works to accompanying introductions of mechanical devices and the use of materials. This was repeatedly dealt with by Schröder in his diaries. One process which

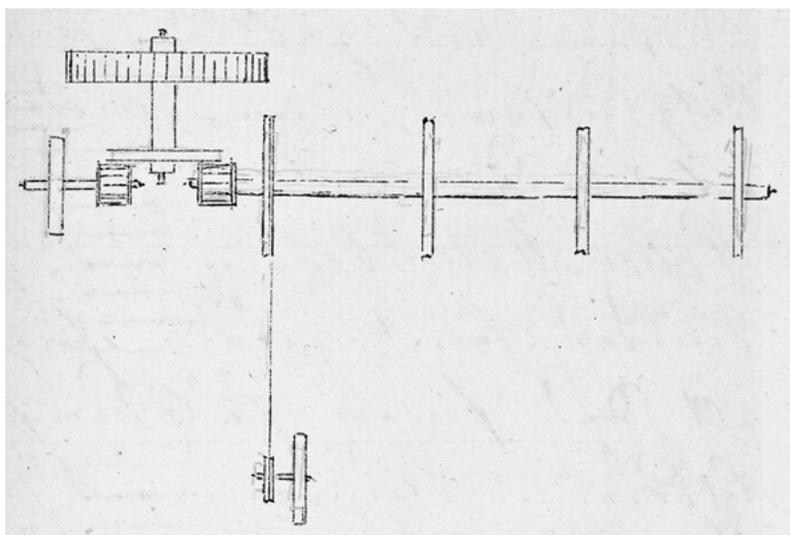
³⁴ Rydén (2013a).

³⁵ Hellberg (1920), pp. 207–230, 241–254; Forsberg (1953), pp. 107–122.

was under scrutiny was grinding and polishing. In this case, the influences from England were apparent when Schröder commenced his surveys.³⁶

All three knife works were set up close to streams which made it possible to operate the grinding mills with water power. At Gusum, grinding and polishing were conducted in a small building that contained only one grindstone and one wheel at the time. Schröder argued that the former task was working quite well, with English stones being used, but that the latter task required better wheels and a careful use of the polishing materials.³⁷ In Tunafors, the water mill was to be completed ‘in the English manner with several stones’. The plan was for polishing to take place on the second floor of the building, with the ground floor for filing and finishing. To help with this, Schröder had given the owner Hallenius a drawing of an English mill. The *Directeur* also expressed his hopes that one worker could be specially employed with these tasks.³⁸ The best example of a mill set up in the ‘English manner’ was the two-floor building in Viskafors. Grinding took place on the ground floor, with one large and four smaller stones (see Figure 7.2), while the second floor was equipped for polishing and lathing.³⁹

Figure 7.2 The grinding mill at Viskafors



Source: Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, p. 245. KB. (Photo: Andrea Davis Kronlund, Kungliga biblioteket).

³⁶ As has been mentioned in section 4.2, Schröder had observed in detail the ways in which grinding mills were constructed during his visit in Birmingham.

³⁷ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 72–74. KB.

³⁸ ‘på Engelska wiset med flera stenar’. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 105–108. KB.

³⁹ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 244–245. KB.

At all three works, grinding mills were spatially separated from the other workshops. This did not mean that grinding and polishing were disconnected from other tasks. On the contrary, Schröder viewed the upgrading of the mills as one way to enable work ‘from hand to hand’. As the projected mill in Tunafors reveals, filing and finishing were planned to be carried out in the same building as the polishing, which point to the attempts to link these tasks spatially. Making use of several stones and wheels also meant that more items could be processed in a shorter time. This, in turn, required that workers were recruited to be employed exclusively with these tasks.

Schröder promoted improvements regarding other processes as well. In particular, he was concerned about the filing, or, more correctly, how to reduce the need for it. Tunafors and Gusum had special workers employed for filing, and this process was also divided into more specific tasks. The files used at these works came mainly from the same manufacturer: file maker Roth in Stockholm. In 1753, Schröder noted how Roth was supplied with cementation steel made at Carl Gustaf Stad.⁴⁰ His files were later used at the other works in Eskilstuna, Tunafors, for the making of cutlery. This illustrates how manufacturing practices were connected by the *circulation* of metals in altered forms.

Still, it seems as though the domestic supply of files could not meet the growing demand from the many metal works. The solution was to decrease the use of files. As noted by Schröder during his visit to Viskafors in 1754, this objective could partly be reached through careful work and the employment of file makers at the works.⁴¹

In part, the filing could be replaced by the use of mechanical devices. When visiting Tunafors the same year, Schröder described how Hallenius had installed a drop hammer in master Frisk’s workshop: a device used for the (complete) making of forks and for ornaments on knife blades. The use of a drop hammer and dies resulted in alterations regarding both work processes and finishes. The *Directeur* argued that pieces formerly made by a ‘much laborious filing’ could now be made ‘better and more consistent, because all pieces are, one could say, shaped in one form.’⁴² Similar devices were later put into use at Gusum. In 1757, Schröder noted how master Wittenberg’s forge was equipped with a stamp for the knives and various types of dies for the forks. The filing and finishing workshop was in turn

⁴⁰ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1753, p. 3, 43. KB. As noted in section 6.4, Roth also trained workers who were employed with file making at Carl Gustaf Stad.

⁴¹ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, p. 255. KB.

⁴² ‘filning med mycken möda’; ‘bättre och jämnare, som alla ämnen, så til sägandes, stöpas uti en form.’ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 95–96. KB. This is confirmed by a verification of a premium for journeyman Petter De Bour at Tunafors, signed by Hallenius in July 1754. According to this missive De Bour, who worked in master Frisk’s workshop, was ‘the first who has started with forging all kinds of Blades in Dies.’ (‘den förste som börjat smide alla sorter Blad i Säncken.’). See Hallenius, Johan, Verification of premium for Petter De Bour, Stockholm, 1754-07-06. MkKam, C:c, vol. 331, fol. 554. RA.

supplied with a new lathing chair for the making of ornaments on forks. This latter task was facilitated by the use of dies.⁴³

The use of dies and stamps can be related to cutlery models that were circulated by Schröder. These devices not only facilitated certain processes, resulting in more consistent goods, they were also seen as further enabling piecework. In terms of Alder's discussion, these mediating (indeed disciplining) types of devices can be seen as constituting the 'outcome', and not the 'precondition', of conflicts in early-modern manufacturing workshops. Far from deskilling the artisans, they should rather be seen as artefacts that were developed and used where and when the potentials for clashes between strategic ideas and craft skills were the greatest. In so doing, however, new skills were introduced which were more related to 'impersonal rules'.⁴⁴

These alterations were supplemented by a close scrutiny of the materials used, in particular the steel. Descriptions from Gusum and Tunafors indicate that artisans made use of the different types of steel brought to Sweden by their old master Engberg. Still, the knife steel was complemented by various other varieties, and the steel was processed by the use of different combinations of fuels. At Gusum, Anders Wittenberg forged with a mix of charcoal and mineral coal, and used backstoft steel and spring steel from the Graninge steelworks. He was, however, unsatisfied with that steel, and Schröder noted how the blades were not solid enough.⁴⁵ Master Frisk at Tunafors used backstoft steel from Vedevåg when making his table knives. Other cutlery wares required steel from the works in Nykvarn, Carl Gustaf Stad, or Wik. Schröder also noted how the journeyman De Bour only used mineral coal when forging for Frisk.⁴⁶

As in the proposals of both Schröder and Engberg to the Diet in 1755–1756, the making of steel was closely related to the improvement of cutlery making. Visiting Gusum in 1754, Schröder commented on how a commissionaire in Stockholm should provide the works with good quality steel; backstoft steel was to be used for table knives, and butscher steel for kitchen knives and Dutch knives. Carving knives and pen knives in turn required other kinds of knife steel. If the steel was not good enough, the commissionaire was responsible for 'letting it be re-welded one or several times'. Later, Schröder arranged for steel to be sent to Gusum from the works in Graninge, Vedevåg, and Carl Gustaf Stad.⁴⁷

⁴³ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1757, pp. 49–50. KB.

⁴⁴ Alder (2010), pp. 146–149.

⁴⁵ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 64–66. KB.

⁴⁶ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 94–95. KB. Palm mentioned how the workers at Viskafors obtained their steel from Göteborg, from Stockholm, and from Vedevåg. It is thus likely that similar varieties were used also in this case. The steel was welded at the nearby finery forge in Gravenfors before it was used by the cutlers. See Palm (2005), p. 144.

⁴⁷ 'låta det en eller flere gånger omgarfwa'. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 77–78, 293. KB.

The introduction of new grinding mills, drop hammers, and dies, together with the procurement of quality steel, were important areas of improvement encouraged by Schröder. They were alterations of the ‘English way’ carried out in a top-down fashion, but also by *imitation* and reconfiguration in different local contexts. Moreover, these dimensions were interwoven by one principal area of ‘correction’: the division of labour. Also in this case, the practical arrangements made came to differ between the three knife works.

People, Space, and Skills: The Householding Order

One major issue for Schröder during his early inspections at the knife works was the high costs of labour, which in turn resulted in expensive cutlery wares. When visiting Viskafors in 1754, he informed both the owners and masters about how quality goods with a lower price depended on a ‘correct’ organisation of work. In order to achieve this, changes had to be made: ‘the work should from now pass through many hands and the masters should not be employed with all the skills that are demanded for completing a Knife or fork’, Schröder argued. He gave suggestions on how work should be divided between the masters, who were also going to take on more apprentices.⁴⁸

Supplying the works with workers was, however, another major problem, which required specific strategies. Proprietor Westerberg at Gusum had ensured that his workers got married, which was thought to prevent them from moving on and to support a rising population. Moreover, Schröder found the nearby pin works to be a ‘useful school’ for the expanding cutlery making, ‘from which skilled boys can be moved, when they have become too big to be used at the former, but are accustomed to [working with] diligence and deftness.’⁴⁹ Yet other strategies were employed at Tunafors. In 1755, Schröder noted that some new workers had been recruited from Vedevåg, and two clasp knife makers had been hired from England. Apart from these experienced craftsmen, Hallenius had also recruited eight boys from the Orphanage in Stockholm (*Stora Barnhuset*).⁵⁰ These workers came to be involved in a larger reorganisation of work at Tunafors during the mid-1750s.

Schröder thought that more workers and a ‘correct’ division of labour would result in a better householding — and thus lower costs — at the three knife works. One feature that complicated this plan was the patchworks of payments that existed at these places. At Gusum, some workers were paid annual wages and some had weekly ones. The owner’s plan, Schröder noted,

⁴⁸ ‘arbetet hädan efter må gå igenom flera händer och ej hwar och en af mästarna sysselsättas med alla de handlag som til en Knifs eller gaffels förfärdigande fordras’. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 250–256. KB.

⁴⁹ ‘nyttig skola’; ‘hwarifrån skickelige ämnen kunna antagas, sedan de blifwit för stora at nyttias wid den förra, men imedlertid want sig til flit och händighet.’ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 75–76. KB.

⁵⁰ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1755, pp. 25–27. KB.

was to pay all workers per piece ‘as quickly as each and every one’s increasing skills permit.’⁵¹ Similar challenges existed at Tunafors.⁵² The difficulties with lowering the costs of production also depended on the fact that the knife works were relatively new, something Schröder commented upon when he visited Viskafors in 1754. It had not been possible to cut the masters’ salaries. Each of them was paid by the dozen and, he noted, ‘almost for the same price as their former master Engberg makes for his work in Stockholm.’ The head master Falk was also paid an extra annual wage.⁵³ Here we see one probable reason as to why these workers left Engberg during the 1750s: promises of higher wages.

Despite these initial problems, the recruitment of workers to the knife works accelerated during the following years. In January 1756, the Stockholm *Hallrätt* listed 29 apprentices who had been recruited to Tunafors during the three preceding years. A majority of these had been signed up for training for between five and seven years.⁵⁴ One year later, another 45 boys were listed as recruited to the works. This time, they were divided in two major categories: 20 in the ‘first skill’ (in some cases referred to as training in specific tasks) and 25 in the ‘second skill’ or as ‘assistant apprentices’.⁵⁵ Similar recruitments were made at Gusum. The Norrköping *Hallrätt* reported, in November 1756, that an inspection had been made at the knife works in order to determine how many new apprentices were trained in the ‘English manner of work’ and — more importantly — in what ‘skills’. It was noted how the making of table cutlery alone consisted of ‘Seventy Nine specific operations of work’. The report also listed 20 apprentices, recruited from 1753 to 1755, and their respective skills.⁵⁶

These recruitments were accompanied by spatial alterations and changes regarding the organisation of work. There were, however, differences between the three works with regard to these features. In 1757, Schröder visited all of them again and commented on the changes that had been made.

⁵¹ ‘så fort som hwars och ens tilltagande skickelighet det tillåter.’ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, p. 75. KB.

⁵² Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 108–109. KB.

⁵³ ‘nästan efter samma pris, som deras forna mästare Engberg får i Stockholm för sitt arbete.’ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 248–249. KB.

⁵⁴ Stockholm *Hallrätt*, Extract of protocol regarding apprentices at Tunafors, 1756-01-14. MkKam, C:c, vol. 336, fols. 363–364. RA. This extract was circulated to *Manufakturkontoret* in order to serve as a proof for Hallenius’ application for premiums in March 1756. See the same volume, fol. 364. This connection between recruitments and premiums is also evident in the case below with the apprentices at Gusum.

⁵⁵ ‘första handlaget; ‘andra handlaget’; ‘hielplärlingar’. Stockholm *Hallrätt*, Extract of protocol regarding apprentices at Tunafors, 1757-02-22. MkKam, C:c, vol. 339, fols. 1350–1351. RA. C.f. section 7.3.

⁵⁶ ‘Engelska arbetsättet’; ‘handalag’; ‘Siuttijo Nijo särskilte arbetsdelar’. Norrköping *Hallrätt*, Report from survey (in 1756-11-09) of the knife works in Gusum, Norrköping, 1756-11-12. MkKam, C:c, vol. 337, fols. 1851–1854. RA. An application for premiums for the training of these apprentices was submitted to *Manufakturkontoret* by Eric Westerberg and approved in December 1756. See the same volume, fol. 1854.

New workers had been recruited also at Viskafors, many of whom were apprentices, and the total number of employees was 19. Still, improvements had not been made regarding the organisation of work, and the need for changes was again brought up by the *Directeur*. The work process had to be further corrected, and the grinding and polishing should be improved. More apprentices were to be trained by each master, and the workshops should be equipped with better tools. Finally, models were to be used in order to promote the manufacturing of saleable goods, instead of the artisans putting their effort into ‘too much expensive work’, according to Schröder.⁵⁷

More comprehensive changes had been made at Gusum. The total number of workers had risen to 26, and the work had been further divided between the making of blades and forks. This was accompanied by the introduction and use of dies and stamps. The filing and finishing workshop had been moved to another building, where one room had been equipped for the making of forks. The work in these two workshops, Schröder argued, was ‘as much divided between the workers as it possibly could be, so that each and every one has his specific skill to practise.’ The *Directeur* also noted that the grinding process needed to be improved. In order to solve this problem, he offered a drawing of a mill constructed in ‘the English way’ to the owner Westerberg. Such a workshop was built later the same year.⁵⁸

Of the three works, it was Tunafors which had seen the most rapid expansion. Spatial rearrangements had been made, with a new large cutlery workshop being constructed in 1754.⁵⁹ Further changes took place when the two English clasp knife makers, Jacob Roberts and George Leathley, were recruited through the arrangements of Reinhold Angerstein.⁶⁰ As later stated by *Handels och manufakturdeputationen*, their role was to promote the implementation of piecework. This was to be done by training apprentices so that ‘this art can be planted, in Swedish youngsters, and hence rooted and expanded in this Country.’ For this purpose, the owner Hallenius had also been granted extensive premiums both for the maintenance of the English masters and for the many apprentices he had recruited.⁶¹

⁵⁷ ‘för mycket kostsamt arbete’. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1757, pp. 187–203. KB.

⁵⁸ ‘så mycket möjligt fördelt arbetarne emellan, så at hwar och en får idka sitt wise handlag.’; ‘det Engelske sättet’. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1757, pp. 48–54. KB; Schröder (1925b), p. 21.

⁵⁹ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, pp. 288–289. KB.

⁶⁰ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, p. 306. KB. Of interest here, Engberg mentioned in 1756 that two English journeymen had been recruited for Hallenius by him and Angerstein. See Engberg, Eric, Proposal to *Handels och manufakturdeputationen*, May 1756 (*Engberg, om årl: pension*). FUH, R. 3077, fol. 373. RA. The English workers arrived in Göteborg in December 1754. See Schröder, Samuel, Verification to *Manufakturkontoret*, Stockholm, 1755-03-08. MkKam, C:c, vol. 333, fol. 359. RA.

⁶¹ ‘denne konsten kan blifwa fortplantad, på Swenska ynglingar, och fölgakteligen här i Landet rotad och utwidgad.’ *Secrete Handels och manufakturdeputationen*, (Draft of) Protocol, 1756-02-11 (circulated to *Sekretä utskottet*). FUH, R. 3051, fols. 306–308. RA.

Schröder described, in 1755, how several workers had been handed over to the recruited masters, and that workshops were equipped for the ‘English way of work’. This resulted in further improvements. The forging technique was enhanced, with much of the filing being excessive, and the *Directeur* stressed how ‘the blades are henceforth delivered [directly] from the forge to be ground.’ The production increased, which in turn demanded a more intense forging. Some workers came to work exclusively with this task, while others instead were employed with grinding or finishing. Schröder referred to this organisation as a ‘*Satzverk*’.⁶²

As will be discussed below, there are doubts if the planned training of apprentices at Tunafors was successful. Still, the reorganisation of work is in any case evident, and it was extensively described by Schröder in 1757. More than 30 different workshops were listed, including the ones for cruder wares, and a new grinding mill had been constructed. In total, there were 79 cutlery-making artisans, being divided between the making of table knives, forks, clasp knives, and scissors. These processes were also separated into specific tasks, such as forging, filing, and finishing. One example was master Frisk, who was now assisted by five apprentices and worked *solely* with the finishing of table knives. Several of his former workers supervised workshops of their own.⁶³

Table 7.1 *Cutlery workers at Tunafors, 1757*

	Masters	Journeymen	Apprentices	Total
Forging (table knives)	1	-	6	7
Forging (clasp knives)	1	1	2	4
Filing	1	1	4	6
Finishing (table knives)	2	3	12	17
Finishing (clasp knives)	2	6	13	21
Making sheets ¹	1	-	2	3
Making springs ¹	-	1	1	2
Making forks	1	1	3	5
Making scissors	2	-	4	6
Sawing ²	-	1	-	1
Lathing ²	1	-	1	2
Pressing ²	1	-	-	1
Grinding	2	-	2	4
<i>Sum</i>	<i>15</i>	<i>14</i>	<i>50</i>	<i>79</i>

Source: Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1757, pp. 160–163. KB. Note: The exact number of workshops for each task was not given by Schröder. ¹= Tasks related to the making of clasp knives. ²= Tasks related to the making of hafts.

⁶² ‘det Engelske arbetssättet’; ‘komma Bladerne hädan efter at gå ifrån smidian til slipning.’ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1755, pp. 27–36, 44. KB. See also section 4.3. C.f. Hellberg (1920), pp. 217–219.

⁶³ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1757, pp. 160–163. KB.

Schröder also stressed that changes had been made regarding ‘the general householding’ at Tunafors, so that masters and journeymen were paid per dozen or piece. The production was organised according to a putting-out system, where materials were provided to the smiths at a certain price. These in turn made pieces for the cutlers, who handed over the finished goods to the proprietor. All the workshops were owned by Hallenius, but some of the artisans had built their own outbuildings.⁶⁴

The rearrangements at Tunafors were not exclusively the result of the temporary employment of two English clasp knife makers. Rather, by studying Schröder’s diaries, it can be noted that a division of labour was gradually introduced during the 1750s. Here, the material, spatial, and organisational aspects discussed above were all important in their interweaving. The fact that several of the workers had been trained in piecework cutlery making at Engberg’s works was significant, as was the role of Schröder in promoting ‘corrections’. Through the recurrent *grounding* of skills, ideas, and practices, cutlery making came to be increasingly divided. Still, the organisation of work also differed in practice between the three knife works. This is further dealt with below, by emphasising the diverging developments of cutlery making at Tunafors and Gusum. Related to this, it is important to observe how the manufacturing of cutlery wares at these places took shape during this period. Here, we can note both an increasing diversification and signs of standardisation.

Diversification and Standardisation: Models and *Imitation*

When visiting Gusum in 1754, Schröder offered models of French and English knives to Eric Westerberg. The proprietor promised to let these samples be ‘imitated’. Later the same year, Schröder returned and viewed pen knives made according to the English models. These were taken to Stockholm, together with samples of table knives, to be exported. Before leaving, he offered yet other models to Westerberg.⁶⁵ The same year, the *Directeur* also handed on models of French scissors to the supervisor at Tunafors, Lars E. Hallenius.⁶⁶ Models like these can be related to the use of other devices at the knife works, like drop hammers, dies, and stamps. They became mediating devices which were circulated by Schröder in order to improve production. Being used and negotiated, the goods made by using them had, to use Alder’s terms, ‘political qualities’.⁶⁷

⁶⁴ ‘den allmänna hushållningen’. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. II, 1757, pp. 164–165. KB.

⁶⁵ ‘eftergiöra’. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, p. 81, 278–279. KB.

⁶⁶ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1754, p. 290. KB. Lars E. Hallenius was the nephew of the owner of Tunafors, Johan Hallenius.

⁶⁷ See Alder (2010), pp. 87–89, 153–154, 229.

We can further explore this matter by studying lists of metal wares submitted by proprietors to *Manufakturkontoret* or to the *Hallrätter* in order to get premiums. In October 1755, Johan Hallenius listed the cutlery made at Tunafors during the past year, in some cases on a monthly basis. Master Frisk and his journeymen had made over 76 dozen table knives with wooden hafts, as well as ones with hafts of ebony and silver details. The English workers (Roberts and Leathley), in turn, had made clasp knives with hafts of nacre, tortoiseshell, or ebony. Johan and Peter Ullman had made clasp knives and hunting knives, but instead used horn for the hafts. Finally, several sorts of scissors were listed. In sum, Hallenius itemised goods valued to 14,049 dlr. kmt. He was entitled to a 15 percent premium, according to the standards referred to above, and this gave him in return 2,107 dlr. kmt.⁶⁸

An even more extensive inventory had been handed in by Eric Westerberg to the Norrköping *Hallrätt* in February the same year. The workers at Gusum had made cutlery for a total value of 15,952 dlr. kmt. from July 1754 to January 1755. Among these goods were table cutlery, pen knives, carving knives, plating knives, and Dutch knives. Regarding the finishes, the frequent use of ebony, silver, and ivory can be noted. Some of the goods had been made according to different *fashions*, such as the ‘English fashion’, ‘rounded fashion’, or ‘carving knife fashion’ (for table knives). The batches of cutlery listed by Westerberg were also marked with initials. By comparing to Forsberg’s discussion of the proprietor’s contacts with retail traders in Swedish towns, many of the batches can be identified. For example, one box of cutlery valued at 568 dlr. kmt., inspected at the *Hallrätt* in November 1754, was intended for trader Daniel Dahlgren in Norrköping (D:D). In early December the same year, a similar box with goods valued at 816 dlr. kmt. was to be transported to Stockholm and Nathanael Westerberg (N:W).⁶⁹

These examples can be related to the use of models. They illustrate how the spheres of policing, trading, and manufacturing were linked by the *circulation* and *imitation* of artefacts. The production at works like Tunafors and Gusum suggests a diversifying context for cutlery making. By comparing the goods made at different cutlery works it can, however, be noted that they in many cases had similar finishes.⁷⁰ The lists submitted by proprietors and artisans thus also illustrate how cutlery manufacturing was becoming more standardised on a competitive domestic market.

⁶⁸ Hallenius, Johan L., Inventory of cutlery, Tunafors, 1755-10-30 (affirmed by the Stockholm *Hallrätt*, 1755-11-19, and submitted to *Manufakturkontoret* 1755-11-24); Hallenius, Johan L., Verification of manufacturing premium, Stockholm, 1755-11-24. Mkkam, C:c, vol. 334, fols. 1970–1971. RA.

⁶⁹ ‘Engelsk facon’; ‘rund facon’; ‘tälgknifs facon’. Westerberg, Eric, Inventory of cutlery, Gusum, 1755-02-04 (submitted to *Manufakturkontoret*, 1755-02-28). Mkkam, C:c, vol. 333, fols. 299–303. RA. See also Forsberg (1953), pp. 117–120.

⁷⁰ Cutlery wares similar to the ones referred to in the examples above were made also by Johan Zihlfeldt in Gränna and at Vedevåg, but in smaller quantities. Both Westerberg and Hallenius repeatedly submitted similar inventories during the mid- and late 1750s.

Again, the links to Engberg's cutlery works in Stockholm are strong. As noted by Forsberg, Eric Westerberg stressed in 1760 that his cutlery, finished with ebony and silver, was both of better quality and could be bought for a better price than was the case for the same types made by Engberg.⁷¹ The quest for particular finishes also included further movements between workshops in the capital and provincial works. In March 1755, Schröder visited the metalworker Lindeman's workshop together with Hallenius. Lindeman provided them with a smaller quantity of rolled silver, but Hallenius was also permitted to take the rolling device with him in order to have it 'imitated'.⁷²

The knife works were also competitors regarding exports (or at least attempts thereof). In April 1757, Westerberg signed an inventory of cutlery wares, valued at 537 dlr. kmt., which were to be exported from Norrköping to Riga.⁷³ As described by Palm, similar exports were made from Viskafors to Denmark, Germany, Russia, and China.⁷⁴ In section 3.2, I discussed how corresponding attempts with shipping metal wares were made during the same period from other works, involving Schröder and the Model house in Stockholm. Yet, these attempts were few and the potential for establishing more stable sales seems to have been limited.

Still, the *circulation* of finishing techniques, models, and wares connected Swedish cutlery works with a wider context of trade and taste. The movements of artisans and officials, and the *grounding* of new skills and artefacts, were important aspects of this development. Cutlery-making practices at the larger knife works were, however, not completely transformed in line with *Manufakturkontoret's* strategic plans, nor with Schröder's ideas of 'correction'. Rather, they were *contact zones* where skills and knowledge were adapted and used in different ways. Importantly, they were in this sense also spaces open for *tactics* and negotiation. This is evident in the writings submitted by the deputies sent out in 1758 to inspect some of these works — a survey that also involved Engberg.

7.3 Enter Eric Engberg: Inspections and Negotiations

During the winter of 1758, *Manufakturkontoret* decided to send three board members to inspect Hallenius' manufactory in Tunafors.⁷⁵ Attached to this group were also the Office's chief commissioner, Anders Lissander, and Eric Engberg. The group was to investigate if Hallenius was entitled to the

⁷¹ Forsberg (1953), pp. 120–121.

⁷² 'eftergiöra.' Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. I, 1755, p. 15. KB.

⁷³ Westerberg, Eric, Inventory of cutlery to be exported to Riga, Gusum, 1757-04-15 (verified by the Norrköping *Hallrätt*, 1757-04-19). MkKam, C:c, vol. 339, fol. 1241. RA.

⁷⁴ Palm (2005), p. 144.

⁷⁵ These were, as stated in the report, a priest named Werander, a Royal secretary named Palein, and the clerk (Samuel) Münchenberg. The latter also wrote and signed the report.

premiums he had applied for regarding the training of apprentices. It was also expected to suggest a correct scheme for the skills used in cutlery making, which could be applied when calculating premiums.⁷⁶ This second task required that the deputies prolong their journey, with additional visits to the works in Vedevåg and Gusum.

The documents handed in to *Manufakturkontoret* show cutlery making as negotiated in practice. These metal works were spaces where official *strategies* and everyday *tactics* intersected. Further, Engberg's participation illustrates how skills and knowledge were reconfigured over time in relation to movements. Visiting Tunafors and Vedevåg, the cutler encountered some of his old workers and was re-introduced to the techniques he had brought with him to Sweden after his first European journey some twenty years earlier. The inspections can also be linked to Engberg's second journey, in that they in a coherent way dealt with the implementation of piecework in relation to the *making* and *using* of steel. The trajectories of Schröder and Engberg intersected, with the latter also acting as intermediary on behalf of the state. The artisan suggested 'corrections' in the official's grand project.

Workshop Inquiries and Artisans' *Tactics* at Tunafors

The deputies arrived at Eskilstuna on 5 February 1758. The following day, they surveyed all the cutlery-making workshops, with associated facilities and water-powered works. In total the report listed 22 workshops which employed 80 workers who practised different tasks, referred to as 'skills' (*handalag*). During the inspection, these manufacturing processes were negotiated, with Engberg making suggestions for improvements.⁷⁷

The making of table cutlery was divided between 11 workshops. The forging was managed by four apprentices who were all trained in piecework. Engberg complained that the blades were not compact, something he saw as an outcome of poorly executed welding of iron and steel. It also depended on the use of incorrect tools, and he told the workers and Hallenius to use more suitable hammers. The latter responded that his workers used tools according to the 'working method' instituted by the English masters he had previously employed. Instead, he stressed that the deficient blades were the results of inferior backstiff steel sent from Vedevåg. This encouraged Engberg to carry out further investigations with other pieces of this steel. He borrowed rounded hammers from his former worker Carl Frisk, and then forged and broke the steel; he found it to be of good quality.⁷⁸

⁷⁶ Münchenberg, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. RA.

⁷⁷ Münchenberg, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. RA.

⁷⁸ 'arbets methode'. Münchenberg, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. RA.

In a second workshop, two workers shaped, filed, tempered, and straightened the blades. In order to spare the files, all the blades delivered to this workshop were ‘strongly annealed’. According to Engberg, this resulted in them being difficult to temper properly. Referring to his experiences of English cutlery making, he argued that they should be forged in such a way that the filing became unnecessary. The blades then only needed to be tempered and ground. Hallenius was told to correct also this procedure. Similar comments were made by the cutler when inspecting the grinding mill. The workshop was indeed found to be in decent condition, with work being properly divided. Still, Engberg commented on the importance of having the stones rotating in a more straight fashion. Therefore he made three models that were left ‘on display’ for the workers.⁷⁹

Next in line to be surveyed was the finishing of table knives, forks, and pen knives. Hafts were made in four workshops, and the goods were then finished by master Frisk and his three apprentices. The deputies noted that the making of forks in particular had been divided into different skills. After being forged, they were shaped and filed in one workshop, and then passed on to another to be finished. The forks were then tempered by Frisk, since this required ‘a particular knowledge and training’. Still, the report stated that it would be better if a specific worker was recruited to do this task.⁸⁰

The deputies continued their inspection with the making of clasp knives, which was divided between nine workshops. Again, Engberg made comments during these surveys. Regarding the initial processing, he promoted the use of cementation steel in line with his experiences from England. Still, more serious problems were identified regarding the organisation of work. It was discovered that the workers also made cruder wares. In the deputies’ view, this prevented a correct training of the apprentices. The reason for this, Hallenius argued however, was that an apprentice first had to be trained in making cruder pieces, before it ‘with certainty could be determined for which sort of skill he is most suitable and apt’.⁸¹

As illustratively described in the report, this opened up a potential for *tactics* among the artisans. During the night before the inspection took place, Engberg had observed how one workshop had been rearranged. Instead of springs and blades for clasp knives, the workers were making doors for tiled stoves. One of the forges had also been changed, and was now used for the making of window fittings. These workshops were closely inspected the

⁷⁹ ‘hårdt glödgade’; ‘til eftersyn’. Münchenberg, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. RA.

⁸⁰ ‘en särskildt wetenskap och öfning’. Münchenberg, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. RA.

⁸¹ ‘med säkerhet må kunna utrönas til hwilket slags handalag han är bäst tienlig och fallen’. Münchenberg, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. RA. One of the workshops for the finishing of clasp knives was referred to as the ‘English workshop’, set up by one of the English masters mentioned above.

following day. The artisans were questioned, and described in detail how they had been alternating between different crafts after arriving at the works. When confronted by this, Hallenius admitted that he knew about this problem. He argued that his goal to expand the works with regard to different skills had been complicated by the lack of people, by sickness, and by deaths. He had thus been forced to employ whichever worker was available, and to allow a certain degree of alternation of tasks. The deputies noted how this sometimes was unavoidable — since artisans had to make a living for themselves. Still, they concluded that a worker who alternated too much between different tasks would in the end ‘spoil his proper skill.’⁸²

There were several discrepancies between the depictions offered by Hallenius in his applications for premiums and the ways in which work actually were performed at his works. This is evident in the protocol kept by the investigating group during the inspection. Hallenius had recruited 74 apprentices for training. However, only 44 of these were found to be employed with cutlery making. Moreover, the deputies could only observe eight ‘skills or pieceworks’. If a correct organisation with piecework had been carried through, it was noted, the number of skills should be 10, or at most 12, each with one apprentice trained in the ‘first skill’. This was far from the case. Some workshops had many apprentices who were trained in the same skills, and in others the tasks were ‘more or less mixed together’. The deficient training was in turn linked to the lack of skilled masters. Except for master Frisk, the protocol stressed that no journeyman or master at the works was skilled enough.⁸³ In conclusion, this meant that Hallenius had received more premiums than he was entitled to.

Comparing Skills: Tunafors, Vedevåg, and Gusum

Leaving Tunafors for Vedevåg, the deputies made further inquiries in the connected spheres of steelmaking and cutlery manufacturing. Regarding the former, the group wanted to investigate Hallenius’ complaints about the Vedevåg steel. Engberg had brought with him backstiff steel from Tunafors which was compared with other samples. New tests were made, and the steel was found to be of good quality.⁸⁴ The cutlery making at the large manufactory, in turn, occupied artisans in 15 different workshops. In a brief summary, Anders Lissander stressed how the making of table knives indeed

⁸² ‘skämma sitt rätta handlag.’ Münchenberg, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. RA.

⁸³ ‘handlag eller styckearbeten’; ‘mer eller mindre blandade’. Survey of Tunafors, 1758-02-06 (submitted to *Manufakturkontoret*, 1758-04-24). RA. Of the remaining 30 apprentices, nine made cruder wares, one had drowned, one was sick, and 19 were missing during the inspection.

⁸⁴ Münchenberg, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. RA.

was divided into different tasks. The making of clasp knives was, however, still done ‘in the old Schmalkaldian way’, employing whole families who worked with all the different tasks. The deputies’ report, in turn, stated that this way of organising work did not differ from that of guild workshops.⁸⁵

With the experiences from Tunafors and Vedevåg, the investigating group wanted to proceed in their quest of scrutinise Swedish cutlery making and continued their journey to Gusum.⁸⁶ Arriving at the works, they started by informing themselves about the supply of iron and steel.

Four workshops were then surveyed. As was the case with Tunafors, work had been divided between workers employed with specific skills. In the forge, the welding and finer forging of blades and forks were done by artisans working in groups of three (with dies being used in the latter process). In a second workshop, one master and three apprentices made finer knives and forks of silver. Westerberg argued that the lack of skilled workers made it impossible to divide this process into more than two skills. A more developed work order had been implemented in the third workshop, employing 18 workers who all did their specific tasks. Some shaped the blades, while others filed, tempered, and polished forks. Yet others drilled and lathed the hafts. A hafter then attached the different parts, before sending the cutlery to be ground.⁸⁷

A total of 16 skills were listed at Gusum, and the number of apprentices was 21. Westerberg stressed that his ambition was to divide the work even further, into at least twenty additional skills. The main reason for doing this, he argued, was that ‘as long as one type of work which requires various tools remains within the hands of one person, it is not carried out with the speed and perfection, that is needed for a widespread sale’. The switching between tools and tasks only confused the artisan, and this, the proprietor concluded, ‘makes his hand unsteady, tardy and imperfect.’⁸⁸

The organisation of work thus differed between Tunafors and Gusum. At the former there were many smaller workshops, while a majority of the tasks at the latter were carried out in a handful of larger ones. The work processes also differed, with workers being employed with specific ‘skills’. These differences were further accentuated during the 1760s. Even so, there were

⁸⁵ ‘på gamla Schmalkaldiska foten’. Lissander, Anders, Summary of inspections, Stockholm, 1758-03-04; Münchenberg, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. MKA, De:1, vol.176. RA. This can be compared with Polhem’s comment on work being performed in the ‘German way’. See section 4.3.

⁸⁶ It was not mentioned if Engberg followed the other deputies to Gusum. The group was divided in order to enable inspections also at other works (not committed to cutlery making).

⁸⁷ Münchenberg, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. RA. Clasp knives were finished in a similar way.

⁸⁸ ‘så länge en viss sort arbete hwilket fordrar flere särskildte wärktyg är uti en enda persons hand, så går arbetet hwarken med den skyndsam- eller fullkomlighet, som fordras til en wig afsättning’; ‘gör hans hand ostadig, senfärdig och ofullkomlig.’ Münchenberg, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. RA.

also similarities between the two works. The improvement of cutlery making was linked to the promises of piecework, accompanied by spatial reorganisations and the altered uses of tools and materials. This can be compared with cutlery making at Vedevåg, which was not divided to the same extent.

Summing up the experiences from their journey, the deputies offered three general remarks regarding cutlery-making skills. All tasks that were not done by hammer or that forced the artisan to work ‘partly with a light and partly with a heavy hand’ were to be divided whenever possible. Moreover, processes that required more ‘carefulness’ were to be separated from ones which did not. Finally, complex processes should be divided since ‘the use of each and every tool demands its specific skill’. One example mentioned was filing, which caused ‘a confused mix, for the individual artisan, as well as for the workers standing on both sides of him by a filing-bench’.⁸⁹

The emphasis on piecework is further obvious in the discussion on the separate skills the deputies suggested be included in cutlery making. They addressed the manufacturing of different items and gave guidelines regarding how to organise work for each of them. The report suggested 42 skills, divided between the making of table knives, forks, clasp knives, Dutch knives, carving and hunting knives, pen knives, and razors.⁹⁰ Figure 7.3 depicts the ten separate skills involved in the making of *regular* table knives.

Figure 7.3 Skills for the making of regular table knives

	Description of skill
1	Forging iron pieces (for tangs)
2	Forging blades, including welding of tangs and steel
3	Finer forging with dies
4	Shaping of blades by hammer and file
5	Tempering and straightening blades
6	Grinding, polishing, and cleaning blades
7	Sawing, drilling, and rasping hafts
8	Lathing hafts
9	Mounting the hafts with silver- or brass-details, cruder filing
10	Attaching hafts and blades with resin, finer filing, and polishing

Source: Münchenberg, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. RA.

⁸⁹ ‘dels med lätt och dels med tung hand’; ‘granlaghet’; ‘hwart och ett wärktygs bruk fordrar sitt wissa och särskildte handalag’; ‘en oredig sammanblandning, så för arbetaren sielf, som de andra å bägge sidor om honom wid en filbänk stående arbetare’. Münchenberg, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. RA. This can be compared with Fougereux de la Bondaroy’s comment quoted in section 4.2.

⁹⁰ Münchenberg, Report about Tunafors, Vedevåg, and Gusum, submitted to *Manufakturkontoret*, 1758-05-12. RA.

These sources reveal how knowledge, skills, and artefacts were negotiated in practice. Exploring the deputies' inspections as parts of a trajectory makes it possible to relate them to a wider context of circulatory processes. We can see how cutlery-making workshops during the period in question were not just spheres of tacit knowing and artisanal secrets. Rather, they were spaces where *strategies* and *tactics* intersected and shaped both the perceptions and ideas about metal making and the practices of work.

Many of Schröder's suggestions for 'correction' regarding manual work at the knife works had not been carried through. In other cases, strategic ideas had been altered by artisans (and proprietors) acting tactically in changing their working conditions. Still, the ideas of piecework were promoted by the deputies in a way similar to the comments repeatedly made by Schröder. By concentrating on work processes as something possible to divide into 'skills', the deputies' report can be seen as an even further-reaching attempt to implement the 'English way' in a top-down manner.

This section has also emphasised Engberg's role as an intermediary actor within the manufacturing system. There are similarities between the report, with the descriptions of the cutler's doings during the inspections, and the way that he promoted his second journey. Also, Engberg's participation in the delegacy tells us something more when related to Schröder's provincial tours. Their trajectories intersected — although they in fact never met at the knife works referred to above. They were both actively involved in a wider *skills-trajectory*. By exploring these movements and practices, we can better understand the recurring changes leading up to the founding of Eskilstuna *Fristad*. Working processes, manual skills, and ideas on how to improve the organisation of work were negotiated in relation to the social, spatial, and material prerequisites of different communities, but also to a wider changing economic context. In the closing section, these aspects are further discussed by exploring the making of a *manufacturing tolerance* during the 1760s.

7.4 *Manufacturing Tolerance: A Fristad in-the-making*

Despite various types of premiums and large loans from public means, Tunafors and Gusum fell into a decline in the 1760s. As has been discussed in section 3.3, the former saw a falling number of workers while knife making at the latter was discontinued in 1767. Although not dependant on public funding to the same extent, also Viskafors languished (and was finally abandoned in 1773). This crisis for the knife works coincided with the economic downturn, the political turbulence, and a critique of the large manufactories. Ideas about artisan independence and the urban concentration of metal making were increasingly stressed. The *Fristad* was in its making. This section analyses this development by focusing, first, on reorganisations of work at Tunafors during the 1760s. These illustrate how the general political

discussion during this period was accompanied by negotiations between artisans, proprietors, and officials in localised practices. I also compare the developments at Tunafors with those at the Gusum works. The latter saw a different organisational alignment before its closure in 1767.

The ‘English way’ of making cutlery was not followed through in Eskilstuna *Fristad*, at least, that is, in the sense of having larger works organised according to the principles of piecework and with an extensive division of ‘skills’. Previous research has argued that this development was in contrast to Schröder’s plans for the community. Inspired by his visits in Birmingham, he saw liberty as linked to the potential for a ‘correct’ division of labour.⁹¹ One could thus view the *Fristad* as an evidence of a failed attempt to implement piecework in the Swedish metal trades.

Such an approach is, however, not entirely correct. With the discussions in the previous two chapters in mind, I argue rather that the process leading up to the founding of the *Fristad* indicates how the ‘English way’ was altered yet again. It shows how metal-making practices were constantly being changed through the intersections of *strategies* and *tactics*. Again relating to Alder’s discussion, we can speak about selections and adaptations.⁹²

Indeed, the *Fristad* shows similarities with the metal trades in Birmingham and Sheffield during the latter half of the eighteenth century, as described by Berg: a ‘workshop-dominated economy’ reliant upon manual skills, but also comprising varying degrees of independence.⁹³ Still, there were also differences. The Swedish state was continuously interested in arranging for a division of labour. This was done related to spatial rearrangements, and to the introduction and use of mechanical devices. These matters are evident in writings by Sven Rinman, on-site *Directeur* for the metal trades and later supervisor of the metal-making community. As argued here, the process leading to the foundation of the *Fristad* illustrates the shaping of a *manufacturing tolerance*.⁹⁴

Conflicts and Re-arrangements of Work during the 1760s

The deputies sent out by *Manufakturkontoret* in 1758 to inspect Tunafors suggested further attempts to implement piecework. Still, their report also included numerous examples of the difficulties of organising work in this way. The strategic plans of the state and of proprietors were being altered in workshop practice. During the years following the inspection, other problems appeared at the works. Again, these can be seen as linking the spheres

⁹¹ Magnusson (1988), pp. 99–106, 129–131. See also Rydén (2013a).

⁹² See Alder (2010), p. 237.

⁹³ Berg (1994), pp. 262–269; quotation from p. 267.

⁹⁴ C.f. Alder (2010), pp. 148–149.

of work and everyday life to a wider economic context as well as to different strategic attempts at control.

The early 1760s saw conflicts arising at Tunafors between the masters and the supervisor Lars E. Hallenius. The core issues of these conflicts, also salient in Schröder's critique, were the putting-out system and the workers' dependence on their patron.⁹⁵ In December 1761, the masters sued Hallenius and legal proceedings were instituted at Eskilstuna *Hallrätt*.⁹⁶ In a letter, the artisans argued that the supervisor had forced them to accept their payments in materials and victuals, often of poor quality, instead of paying them in cash. This, in turn, meant that journeymen and apprentices could not be paid according to their contracts, something that provoked disturbances. Hallenius had sided with the masters' employees. In some cases he had even moved apprentices from one master to another at his own discretion. The masters also stressed how some of them had been 'obliged to do unusual work'. All this had led to them to become increasingly indebted to their patron.⁹⁷

Hallenius was represented in court by his clerk, Arvid Kihlberg. In contrast to the masters' complaints, he argued that Hallenius had paid them properly in cash and offered good prices in the works' warehouse. The real problem was the artisans' lack of 'diligence and sobriety'. The masters were ordered to show their personal account books (*motböcker*), which revealed that all of them were more or less in debt to the supervisor. No improprieties were found regarding the payments to the masters.⁹⁸ The *Hallrätt* ruled in favour of Hallenius and Kihlberg.⁹⁹

Still, the masters' complaints seem to have had some effect, as noted by Schröder during a visit to Tunafors in 1763. The works employed 150 workers and changes had been made regarding the general organisation. While the work proceeded in a similar manner as before, Schröder described how several workshops had been leased to masters who were 'managing them on their own account.' In particular, it was the increasing number of journeymen which had forced Hallenius to take action. Instead of having artisans leaving the works, he had made arrangements for them to 'start up on their own'.¹⁰⁰

⁹⁵ C.f. Magnusson (1988), pp. 94–95. See also section 2.5.

⁹⁶ Eskilstuna *Hallrätt*, Protocol, 1761-12-08. HrE, no. 1. ULA.

⁹⁷ 'pålagde at görra owanligt arbette'. Löfgren, Petter, Öberg, Gabriel, and Arnström, Anders, Letter to Eskilstuna *Hallrätt*, 1761-12-04 (read out in the *Hallrätt*, 1761-12-08). HrE, no. 1. ULA. These three masters spoke on behalf of the other artisans.

⁹⁸ 'flit och nyckterhet'. Kihlberg, Arvid, (Undated) letter to Eskilstuna *Hallrätt*, (submitted during the legal proceedings, 1761-12-08); Eskilstuna *Hallrätt*, Protocol, 1761-12-08. HrE, no. 1. ULA.

⁹⁹ See Eskilstuna *Hallrätt*, (Draft) of communication to *Kommerskollegium*, 1762-03-04. HrE, no. 2. ULA.

¹⁰⁰ 'drifwa dem för egen räkning.'; 'etablera sig sielfwa'. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1763, pp. 3–5. KB. As noted in section 3.1, a similar attempt to improve 'the general householding' was made at the neighbouring works of Carl Gustaf Stad in 1757 on Schröder's suggestions.

During the following years, Tunafors was troubled by the economic crisis, with a lack of both funds and sales. Hallenius had to sack many of his workers, with the total number of artisans dropping from 141 in 1764 to 78 in 1768. In order to proceed with the same type of manufacturing, the proprietor kept most of the workshops, but Schröder noted how ‘they are not operated in the same manner as before’.¹⁰¹ He also included a list of workers and workshops in his diary, which makes it possible to analyse this process in more detail. At the time of the deputies’ inspection in 1758, the number of cutlery-making artisans at Tunafors was ca. 80, working in 22 different workshops. Ten years later, there were only 47 artisans left, employed in the same number of workshops.

As noted in Table 7.2, many of the same tasks were performed in the workshops, but the majority of the workers were now masters working with a small number of journeymen or apprentices each. The only workshop which employed more than four workers was the grinding mill. Work had thus been reorganised, with smaller workshops and with a division of tasks existing between them. This is in contrast to the early plans to implement cutlery making according to the ‘English way’, first by Engberg and later by Schröder at the three knife works, which were built around the idea of connecting processes of work spatially and, thereby, achieving a division of labour within the workshops.

Table 7.2 *Cutlery workers at Tunafors, 1768*

	Masters	Journeymen	Apprentices	Total ¹
Forging (table knives)	2	1	3	6 (2)
Forging (clasp knives and springs)	1	-	1	2 (1)
Finishing (table and carving knives)	3	3	2	8 (5)
Finishing (clasp knives)	6	5	2	13 (6)
Making forks	1	-	1	2 (1)
Making scissors	3	-	1	4 (2)
Making hafts	1	-	1	2 (1)
Sawing	1	-	-	1 (1)
Lathing	1	-	1	2 (1)
Pressing	2	-	-	2 (1)
Grinding	4	-	1	5 (1)
<i>Sum</i>	25	9	13	47 (22)

Source: Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1768, pp. 44–47. KB. Note: ¹= In brackets are the total number of workshops, as mentioned by Schröder, for each of the tasks.

¹⁰¹ ‘de ej drifwas med samma form som förut’. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1768, pp. 40–42. KB.

The organisation of work at Tunafors clearly has more in common with a workshop-based economy than with a large manufacturing workshop.¹⁰² Still, the same period also saw further attempts at other works with larger workshops and a spatial connectedness of work processes. In 1762, Schröder described how the knife works at Gusum had expanded. In total, there were 35 workers employed in four workshops. The new forge contained nine hearths and was operated with ‘a decent working order’. Also, one additional two-floor building with new workshops was being equipped.¹⁰³ Some years later, however, Schröder noted how Westerberg as well had been forced to sack many of his workers for the same reasons as Hallenius at Tunafors.¹⁰⁴

I have discussed how several workers from Tunafors, Gusum, and Carl Gustaf Stad returned to Stockholm during the crisis years of the mid- and late 1760s in order to find new places to work. Some of them also set up workshops in the capital. Still, the problem with the decline of the larger works called for further actions. Here, it is important to note that the departure of workers from the provincial metal works coincided with the more intense debates on liberty. In 1766, Schröder described how *Kommerskollegium* had particularly addressed this matter: ‘partly the sacking of workers, partly their permitted or illicit departures.’¹⁰⁵

What we see here is an intricate context of manufacturing taking shape, and involving a variety of practices. The reorganisations of work at Tunafors during the late 1760s were accompanied by steps towards smaller workshops and artisan proprietorship.¹⁰⁶ The same period saw artisans — many of whom were trained to be pieceworkers — leaving the troubled larger metal works. The plans for liberty and urban manufacturing, launched by officials such as Schröder and Westerman, indeed comprised references to British manufacturing towns. They must also, however, be linked to the perceptions of a changing and diverse Swedish context for metal making.

Schröder’s and Westerman’s projects also included ideas of — in the latter’s words — a ‘rational Economy and division of labour’.¹⁰⁷ The plans for implementing piecework were thus not abandoned. They were linked to the promotion of artisan independence and competition, but also to a desire for further supervision and control. This interest in organising the *Fristad* ‘from above’ resulted in the state actively paying attention to spatial arrangements and work processes. Documents written by Rinman during the

¹⁰² This has also been stressed by previous investigations discussing the Eskilstuna works. See e.g. Isacson and Magnusson (1987), pp. 91–93.

¹⁰³ ‘god arbetsordning’. Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1762, pp. 29–31. KB.

¹⁰⁴ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1766, pp. 23–27. KB.

¹⁰⁵ Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1766, pp. 11–13. KB.

¹⁰⁶ C.f. Hellberg (1920), pp. 228–230; Ohlsson (2001), pp. 39–40. Magnusson (1988), pp. 98–99, noted rather the strong grip of the putting-out system.

¹⁰⁷ ‘förnuftig arbets Oeconomie och fördelning’. Johan Westerman’s report to the Diet of 1765–1766. FUH, R. 3338, fol. 8. RA.

1770s illustrate the continuous shaping of the organisation of work, as related to skills, ideas, artefacts, and materials.

The Making of a *Fristad*: An Epilogue

Eskilstuna *Fristad* became a community shaped by the recurring negotiations and *grounding* processes of the previous decades. It was also a space where *strategic* ideas about the domestic manufacturing trades continually intersected with the *tactics* of workers and of other persons with interests in metal making. The dynamics of this *contact zone* are discussed here by exploring the connections between liberty, putting-out systems, and state ambitions for control during the first half of the 1770s.¹⁰⁸

As noted in chapter 3, the *Fristad* attracted workers from the incorporated parts of Carl Gustaf Stad, and later from other manufactories in the nearby provinces such as Vedeväg and Vira. Several craftsmen from Tunafors also moved to the neighbouring community. Ohlsson has argued that the latter group did not include any cutlers. The reason for this was that they were pieceworkers — used to performing specific tasks.¹⁰⁹

When comparing head tax records from the 1770s and 1780s with the listed artisans in Schröder's diaries, it can, however, be noted that several cutlers moved from Tunafors to work in the *Fristad*.¹¹⁰ One example is Julius Hallenius. In 1768, he worked at Tunafors with finishing and had three employees. Later, in the *Fristad*, he manufactured various kinds of knives and employed about a dozen workers. Hallenius was an exception when it comes to the number of employees. As seen in Table 7.3, most of the 15 cutlery workshops listed in 1785 were smaller ones where masters worked with a few apprentices and journeymen. In some crafts, like the making of clasp knives, the masters often worked alone. As was the case with Tunafors during the late 1760s, a division of labour seems to have existed between the workshops, according to the goods made. Still, the workshops were listed based on the main items produced, which might indicate that the production was more diverse.¹¹¹

¹⁰⁸ This section particularly links up with Magnusson's discussion on the *Fristad* as a conflictual — but diverse — space for metalworking during the nineteenth century. See Magnusson (1988).

¹⁰⁹ Ohlsson (2001), pp. 106–107, 137–138.

¹¹⁰ See Schröder, *Dagbok rörande Directeurs-Sysslan*, vol. III, 1768, pp. 44–47. KB; Head tax record, 1779, Eskilstuna *Fristad*, Eskilstuna, 1778-10-24. EFoA, H1, no. 10. ULA.

¹¹¹ List of workers and production in the *Fristad*, 1785. EFoA, H1, Various papers, no. 17. ULA. A somewhat different number of cutlers is given by Ohlsson (2001), pp. 113–114.

Table 7.3 *Cutlery manufacturers in the Fristad, 1785*

	Main item	Employees	Owned house	Rented	Other ¹
E. Rydberg	Scissors	4	1	-	-
O. Liman	Scissors	2	1	-	-
P. Hellsberg	Table knives	4	1	-	-
JC. Krebs	Table knives	1	1	-	-
A.M. Erichson	Table knives	0	-	1	-
R. Bergström	Clasp knives	3	1	-	-
A. Wessman	Clasp knives	0	-	1	-
O. Bergström	Clasp knives	0	-	1	-
P. Hjort	Clasp knives	0	-	-	1
M. Magdelo	Table and clasp knives	4	1	-	-
S. Wessman	Table and carving knives	0	-	1	-
Jul. Hallenius	Table and carving knives	11	1	-	-
P. Lind	Table and carving knives	4	-	1	-
O. Hellberg	Hafts	0	-	1	-
F. Sharff	Razors	6	1	-	-
15		39	8	6	1

Source: List of workers and production in the *Fristad*, 1785. ULA. Note: ¹= P. Hjort was referred to as living with his father-in-law.

Table 7.3 also shows how the ownership conditions differed among the cutlery manufacturers. This is in keeping with Hörsell's observations regarding the *Fristad* artisans. Many of them owned properties, while others rented houses (or a share in one), with the first group employing more workers than the latter.¹¹² In line with this more general trend, it can be noted that eight cutlery manufacturers owned houses in *Fristaden* or in the old town of Eskilstuna. Of the remaining seven, a majority rented shares in houses. The latter group included all the artisans who worked alone.¹¹³

'Liberty', in terms of property owning, was thus not equally distributed among the artisans. This is further evident when taking into account that the *Fristad* also attracted individuals with other interests in the metal-making community. The owner of Tunafors, Johan Hallenius, actively took part in moving workers to the neighbouring community. In 1771, he signed an agreement with *Jernkontoret* which stated that he was to guarantee the construction of buildings in the *Fristad* in which artisans from Tunafors could settle with their families and employees. The contract included details about how the associated forging workshops were to be built and equipped.¹¹⁴ In August the following year, the buildings were inspected and Hallenius was

¹¹² Hörsell (1983), pp. 54–55. The number of employees among property-owning artisans was ca. three, while on average only one worker was employed by the artisans who rented houses.

¹¹³ List of workers and production in the *Fristad*, 1785. ULA.

¹¹⁴ (Copy of) contract between Johan Hallenius and *Jernkontoret*, Stockholm, 1771-11-14. Bergsrådet S. Schröderstiernas Papper, 34:3, vol. 1, Fascikel 2, no.3. ESA.

paid a sum of 18,000 dlr. kmt.¹¹⁵ This was only the beginning of the Hallenius family's involvement in the *Fristad*. At an early stage, Lars E. Hallenius began leasing buildings to artisans. From 1773, he was also the major force in the first company which, through a putting-out system, supplied the craftsmen with materials and then sold the finished metal wares.¹¹⁶

Magnusson has discussed how the persistency of the putting-out system, together with the artisans' poverty, in many cases obstructed the expansion of craft enterprises. The strong position of some putters-out was, however, also challenged by artisans and by the supervising authorities. Metal making in the *Fristad* was not static, although the putting-out system was difficult to break down. These tensions are also evident in Schröder's writings. As noted in chapter 2, he indeed perceived the benefits of having merchants who assisted the *Fristad* artisans. At the same time, he strongly criticised adverse putting-out contracts.¹¹⁷

The active involvement of the state, and especially Rinman, in the rising community can be seen against this conflictual background.¹¹⁸ Still, it also reflects the shaping of a *manufacturing tolerance*. By exploring the developments at the knife works, I have shown how this was a gradual process that included negotiations of manual skills related to the promotion of 'corrections'. The ambitions to introduce piecework brought together spatial rearrangements and the use of mediating or 'thick' devices — artefacts embodying ideas of a 'correct' organisation of work. Rinman's accounts, drawings, and reports from the *Fristad* do, however, suggest a more systematic approach towards workshop practices. They illustrate both the support of artisans' liberty and further attempts to control manual work.

This link is demonstrated by Rinman's recurrent suggestions for reconstructions, spatial alterations, and the introduction of mechanical devices. One of the intentions with the urban concentration of workers was that they could benefit from a common access to grinding mills and finery forges (*tjänsteverk*).¹¹⁹ Figure 7.4 shows the plans for the new finery forge in the *Fristad*, made in 1781 by Rinman. Drawings like this one created a practice-oriented spatial layer of control to the structured urban plan earlier designed by Schröder. Using Alder's words, they can be viewed as attempts made to 'organize the workshop on both procedural and social levels.'¹²⁰

¹¹⁵ Hierpe, Anders, Survey of buildings built by Johan Hallenius, 1772-08-08. Bergsrådet S. Schröderstiernas Papper, 34:3, vol. 1, Fascikel 2, no. 4. ESA.

¹¹⁶ This company (*Fristads Handels Contoir*) was founded with support from *Jernkontoret*. Hallenius was later followed by Birger Fredrik Rothoff, proprietor of Carl Gustaf Stad, who expanded his putting-out company during the early nineteenth century. See Hellberg (1920), p. 279; Hörsell (1983), p. 54; Magnusson (1988), pp. 217–223; Ohlsson (2001), pp. 109–110.

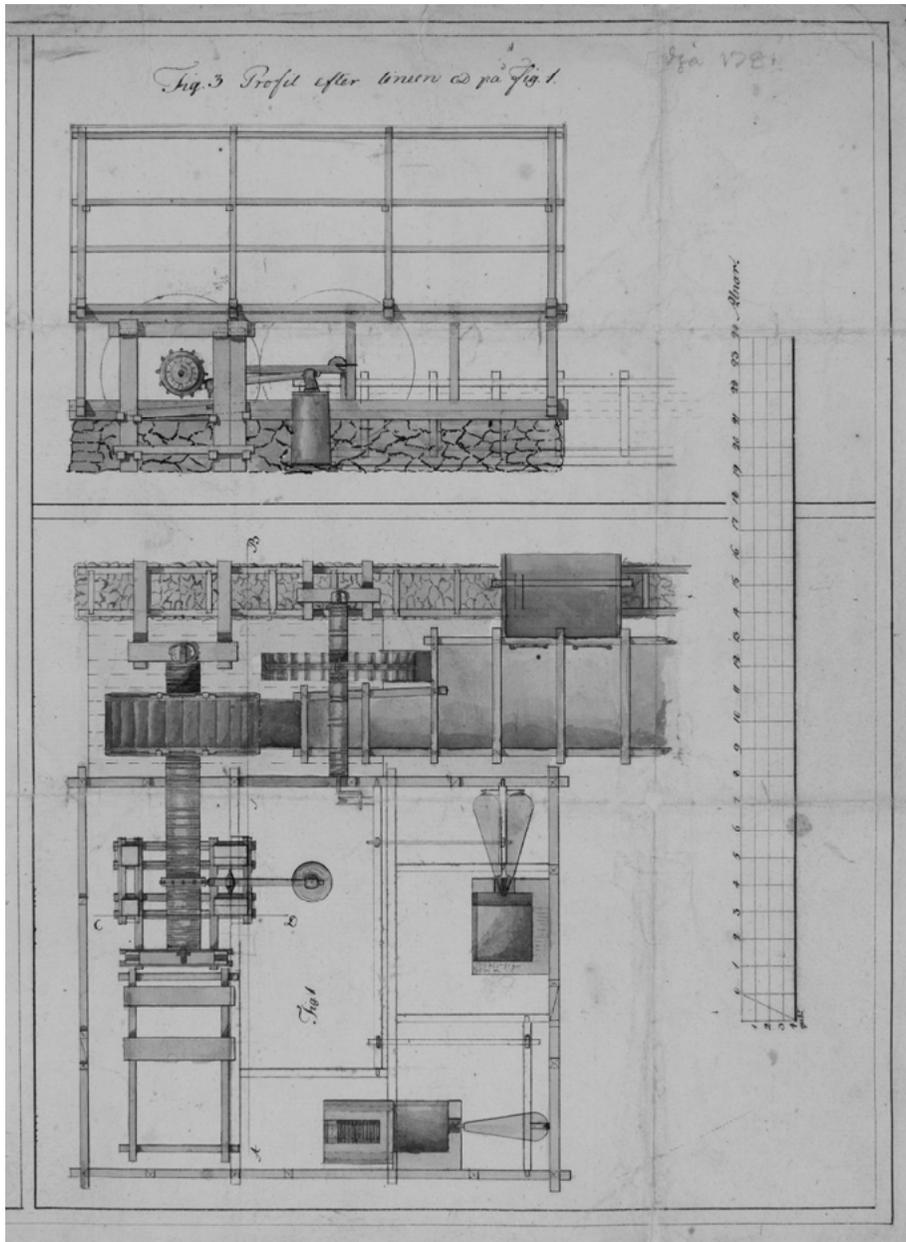
¹¹⁷ Magnusson (1988), p. 102, 217–226. See also Ohlsson (2001), pp. 110–111.

¹¹⁸ As described by Magnusson (1988), pp. 225–226, Rinman was particularly involved in assisting the artisans to sell their metal wares for better prices than the putter-out Hallenius.

¹¹⁹ See also Magnusson (1988), pp. 126–129.

¹²⁰ Alder (2010), p. 138.

Figure 7.4 The new finery forge in the *Fristad*, 1781



Source: Original drawing by Sven Rinman, 1781. Rinmanska arkivet, S-O (S-O58:a).TMA. (Photo: Anna Gerdén, Tekniska museet).

The spatial design for workshops in the *Fristad* was accompanied by further attempts to implement piecework. Most notably, as dealt with also in previous research, this was related to the state's interest in improving the

making of sword blades. Both Rinman and Schröder promoted this project. In 1775, the former was involved in the recruitment of German artisans from Solingen, who were to be employed in a blade-making works (*klingsfabrik*) in the *Fristad*. Workshops were rebuilt for this purpose, but it was hard to convince the Germans to stay. Some of them had left within a decade.¹²¹ Nevertheless, the attempts made to improve the blade making illustrate one critical aspect of *manufacturing tolerance*: its connections to ‘thick things’ and their uses in practices of work.¹²²

Rinman systematically recorded the processes with setting up workshops for the recruited smiths, in some cases on a day-to-day basis. The construction of the new ‘German’ grinding mill for grinder Johan Petter Moll, in 1776, can be followed in detail. Rinman noted the devices and materials being transported to the *Fristad*, including stones from both Dalarna and from England. He also recorded the payments for day labourers working with the construction, and for the artisans involved in making equipment for the mill.¹²³ A similar account was kept for Johan Clemens Krebs’ cutlery workshop. Again, Rinman noted the how the *making* of this workshop involved a variety of artisans. Tools and devices were delivered from other workers in the *Fristad* and from Tunafors; some of them were ground by Moll before being used by Krebs.¹²⁴

In other cases, such as the blade-making brothers Dinger, a wider division of labour can be discerned in the accounts. In May and August 1776, Rinman noted how the Dingers were provided with welded steel from Dalarna, and on 1 August, payments were made for the further processing of this steel. The brothers forged a total of 103 sword blades from it. These were later tempered by the cutler Krebs and ground by Moll, before being shipped to Stockholm.¹²⁵

These artisans were also involved by Rinman in tests with steel and iron to be used in the *Fristad*. The attempts with arranging for a ‘correct’ organisation of work were connected to alterations regarding the use of materials. In 1774, Rinman complained about the fact that metals of good quality were not yet available for the artisans. Those who made table knives used ‘weak and brittle Blistered steel’, he argued, when they should use more compact welded steel. Artisans who made razors were confronted by similar problems, but in this case the use of British crucible steel was promoted. In order

¹²¹ See Ohlsson (2001), pp. 115–226; Hörsell (1983), pp. 51–52. Rinman did not, however, travel to Solingen and Remscheid himself. This task was assigned to Carl Bernhard Wadström, then junior official in *Bergskollegium*.

¹²² C.f. Alder (2010), pp. 146–147.

¹²³ Rinman, Sven, Account for the German grinding mill, 1776. Rinmanska arkivet, S-O, Fristadsräkningar för år 1776. TMA.

¹²⁴ Rinman, Sven, Account for the cutler Master Krebs. Rinmanska arkivet, S-O, Fristadsräkningar för år 1776. TMA.

¹²⁵ Rinman, Sven, Account for the German blade making. Rinmanska arkivet, S-O, Fristadsräkningar för år 1776. TMA.

to deal with these issues, Rinman stressed how *Jernkontoret* should arrange for having iron and steel available for purchase. The supervisor himself was then to assist the artisans in selecting the best varieties.¹²⁶

Two years later, he reported to *Bergskollegium* about tests, conducted by the German workers, with blade steel. He reviewed the qualities of different types of steel in detail, but also linked them to different methods of work and manual skills. Describing the steel from Graninge, which repeatedly had broken during the tests, he noted that the Germans were not familiar with ‘the correct ways of tempering such a hard type of Steel.’¹²⁷

These cases illustrate the attempts made by Rinman to merge the theory and practice of metal making in a more systematic way. This was done in line with the arguments in his *Anledningur til kunskap*. The same book stressed the combined need for artisan independence and further supervision (with the latter being based on practical experience).¹²⁸ Metal making in the *Fristad* indeed came to be reliant on manual skills and in most cases operated in small workshops. Still, we have also seen how workshop spaces became the targets for creating a ‘common language’ shared by artisans and supervisors. Moreover, the efforts made by the state to implement piecework within the urban community resulted in officials, like Rinman, gaining access to practices of work. The scrutiny of materials, devices, and tools suggests how some processes were subordinated to more ‘objective’ rules.¹²⁹

It is this paradox that makes it appropriate to speak of a *manufacturing tolerance*. Related to notions of a continuous putting-out system, the attempts to order and control discussed here suggest another way by which artisans’ liberty was circumscribed by compromises. At the same time, as stressed by Magnusson, the *Fristad* indeed came to see innovative achievements by some manufacturers.¹³⁰ The observations in this chapter link in with the image of a conflictual, but also dynamic, context for metal making.

By exploring how the ‘English way’ of making cutlery was adapted and reconfigured over time, this chapter and the two previous ones have also suggested that this was a gradual process. Critical here were the *circulation*, *grounding*, and *negotiations* of skills, knowledge, and artefacts which connected metal-making practices in Sweden, and beyond, during the mid-eighteenth century. Related to this, I have also shown how the intersecting movements of people — both state officials like Schröder and artisans like Engberg — were critical to the changing manufacturing system.

¹²⁶ ‘skiört och bräckeligt Bränstål’. Rinman, Sven, Proposal to *Jernkontoret*, Eskilstuna, 1774-02-23. Bergsrådet S. Schröderstiernas Papper, 34:3, vol. 1, Fascikel 2, no. 10. ESA.

¹²⁷ ‘en så hård Stålaris rätta handtering uti hårdningen.’ Rinman, Sven, Proposal to *Bergskollegium* regarding steel for blade making, 1776. Rinmanska arkivet, S-E:31. TMA.

¹²⁸ C.f. section 2.5.

¹²⁹ C.f. Alder (2010), pp. 136–162.

¹³⁰ See e.g. Magnusson (1988), pp. 154–158, 227–234.

7.5 Conclusion

The aim with this final chapter has been to investigate the *negotiation and grounding* of cutlery-making skills at three larger provincial knife works during the 1750s and 1760s, as well as in Eskilstuna during the 1770s. Thus, I have continued to explore the *skills-trajectory* discussed in the previous two chapters. We have seen how the ‘English way’ was adapted in different local contexts, and how this process included Engberg, his former workers, other artisans and proprietors, as well as the officials Schröder and Rinman.

I have approached this development by exploring circulatory movements and intersections connected to practices of work. The discussion has related to Berg’s and Sonenscher’s critical stance towards traditional notions of specific forms of manufacturing. The sections above have centred on the state-supported attempts to implement piecework during the 1750s and 1760s, with a specific attention to the intermediary role of Schröder. By comparing the developments at the three knife works, however, I have illustrated how strategic ideas on the ‘correct’ ways to organise work took different shapes when implemented in localised practice. This has been further demonstrated by also emphasising alternative ways to organise cutlery workshops.

The result is a nuanced and practice-oriented perspective on the development towards Eskilstuna *Fristad*. Indeed, the turbulent years of the 1760s saw an increasing emphasis on liberty, urban manufacturing, and competition. At Tunafors there was a trend towards smaller workshops and artisan proprietorship. This can also be related to the notion of an increasing number of small manufacturing workshops in Stockholm during the same period. However, this process cannot be understood simply as a transition from (failing) large-scale manufacturing enterprises towards small-scale proto-industries. In particular, this is the case if the Stockholm metal trades are also added into the picture offered in this chapter. Nor is it correct to speak of Eskilstuna *Fristad* as the result of a one-way transfer of ideas from England. Here, this chapter has expanded Rydén’s idea of a ‘sequence of translations’, by showing how the attempts with organising work in the ‘English way’ involved movements and alterations over time and across space.

This also renders a better understanding of why piecework, as it had been promoted at the knife works, was not implemented in Eskilstuna *Fristad* during the period in question here. This was not because it was viewed as a total failure, nor because all artisans in the *Fristad* rejected it with reference to their profession. Previous research has stressed the impact and tensions of a continuing putting-out system. To this I have added a notion of a *manufacturing tolerance* being shaped over time. With reference to Alder, this term has been used in order to illustrate how more general political discussions on liberty and the division of labour were related to negotiations and conflicts about skills and ‘thick things’. In section 7.2, I discussed how the promotion

of piecework included the *circulation* and *imitation* of mediating devices and models. These artefacts reflect the shaping of workshop-based processes as related to a wider system. As shown by the deputies' report from Tunafors in 1758, these plans were also altered in workshop practice. The strategic ideas for cutlery making were constantly interacting with the everyday *tactics* of artisanal work.

Rinman's writings from the 1770s indicate a more systematic approach towards metal-making practices. His day-to-day accounts from the *Fristad*, together with his drawings and designs for workshops, suggest how some working processes were increasingly put under control. The attempts to introduce a workshop-based division of labour in the *Fristad* were largely a failure, but they also resulted in the state gaining further access to workshop practices. The *Fristad* community included compromises involving artisans, putters-out, and state supervisors. It was a *contact zone* shaped by negotiations and conflicts — both in the local context and within the wider manufacturing system. The 'liberty' promised to artisans did indeed offer some the possibilities to develop their production, without being restrained by a guild framework or by the regulative policies on trade and manufacturing. Many others, however, were increasingly tied to poverty and indebtedness. In discussing intersecting *strategies* and *tactics*, this chapter and the two previous ones have suggested that the dynamic and conflictual culture of artisanal production stressed by Magnusson should not be seen as restricted to the incipient industrialisation of the nineteenth century.

CHAPTER 8

The *Making* of Metal Making Revisited

On 15 July 1760, Eric Engberg wrote a letter from his imprisonment at *Bohus fästning*, addressed to Patrik Alströmer — the oldest son of Jonas Alströmer and heir to the textile industries in Alingsås. In this letter, Engberg was ‘humbly asking’ Alströmer the younger to send him some knives — probably in need of repair — ‘so that I will have something to do with my hands, because time is fairly slow here at the fortress.’¹ In a concentrated form, this brief letter points to some of the main features that were investigated in this dissertation. I dealt with metal objects and with people making things with their hands, but also with a complex social interplay. I discussed power and subordination, but also the manipulations that shaped these relations over time. Lastly, I explored a context that seems static, or at least ‘fairly slow’. At the same time, all the preceding chapters highlighted changes. The *making* of metal making was scrutinised by studying these dimensions.

The aim of this investigation was to *explore how skills, knowledge, and artefacts were circulated and grounded in the Swedish eighteenth-century metal trades (from ca. 1730 to 1775), and to analyse how these processes were related to different ways of organising practices of work*. This originated from an interest in the macro- and micro-levels of an eighteenth-century Swedish society in transition, with a focus on the connections between localities of production and a broader context of policies, knowledge-making, and movements. In this, I was influenced by recent studies from the fields of global history and the history of science and technology that have in different ways shaped the perspective on manufacturing and the transmission of skills and knowledge in pre-industrial societies.

Metal manufacturing was the specific subject for the analysis. This form of early-modern production has periodically been examined by Swedish scholars. Previous studies were largely concerned with discussions either about developments at larger works, emphasising relations with the agrarian economy, or the later rise of proto-industrial metalworking in specific regions or towns (Eskilstuna, in particular). Still, there are several areas of

¹ ‘ödmiukast anhålla’; ‘at jag kan få något för händer, emedan tiden är ganska långsam här på fästningen.’ Engberg, Eric, Letter to Patrik Alströmer, Bohuslän, 1760-07-15. Alströmerska brevsamlingen, G:6 18, nr. 3866. UUB.

metal making that have been underexplored, especially when compared with recent trends in research on early-modern iron and textile making.

This investigation was concerned with adding an important, and previously missing, perspective. It evolved around three related areas: the spatiality and chronology of metal manufacturing, the organisation of work, and the question of skills and ‘transfers’. I used the term *metal trades* in discussing the diverse forms of state-supported finer metal production that existed outside the guild system during the eighteenth century. The three research questions that guided the analysis were designed to make inquiries into a context where metals and metal wares were *made, used, and traded*.

First, the analysis concentrated on mobility, connections, and knowledge practices during the mid-eighteenth century, with inspiration taken from Kapil Raj and Lissa Roberts. I asked: how were skills, knowledge, and artefacts *circulated* and *grounded* within the metal trades during the period in question, and in what ways did these processes influence different metal-making communities (*contact zones*) over time? The concepts *circulation* and *contact zone* were used to clarify the links between localities of production, people’s movements, and the flows of materials and artefacts. By using the term *grounding*, I analysed local adaptations and reconfigurations of skills and knowledge as related to processes of organising metal making.

Secondly, I highlighted the connections between the ordering state and artisanal practices in a new way. Instead of adopting an image of exploitation and resistance, this investigation emphasised different ways of knowing and acting that constituted the social life of metal making. This was done by asking: how were different *contact zones* and practices of work shaped by the intersections of attempts to regulate, order, and control (*strategies*) and the *tactics* of everyday metal making? The term *strategies* was used in order to explore the attempts made by the Swedish state to establish an overview and supervision within the manufacturing system during the mid-eighteenth century. The latter term, in contrast, was applied to grasp the ways in which people manipulated knowledge, materiality, and places in everyday life. Importantly, *strategies* and *tactics* were not viewed as separated. In line with Michel de Certeau, I focused instead on their interplay.

With this investigation evolving around the first two research questions, I was also able to ask: why were ideas on how to organise metal-making practices adapted and reconfigured in the specific ways they were over time? This question is hard to answer fully. Here, I chose to focus mainly on one branch of the metal trades, namely cutlery making, and to explore its connections with a wider context. Specifically, I emphasised the implementation of piecework at cutlery works and workshops — often referred to as done according to the ‘English way’ in eighteenth-century sources. Parallels were drawn to Ken Alder’s discussion of negotiations and the shaping of

manufacturing tolerance.² By doing this, I offered insights that allow early-modern manufacturing to be dealt with in a way that moves beyond ideas of linearity, while at the same time emphasising the impact of gradual changes.

This dissertation has strongly rejected notions of transfers being carried out ‘one-way’ or ‘top-down’. Instead, I embraced the perspective advanced by the authors of *The Mindful Hand*: knowledge production and material production are seen as interwoven dimensions, including overlaps between scientific, political, and artisanal practices across space.³ The methodological approach used here, based on following different trajectories, has been related to this perspective. Two trajectories were followed more closely. The undertakings of state official Samuel Schröder and the cutlery manufacturer Eric Engberg were analysed in their own right as well as related to a changing Swedish — and indeed European — context of metal manufacturing. The result was the mapping and analysis of a *skills-trajectory* from the 1730s to the mid-1770s: the ‘English way’ of making cutlery wares. This approach elucidated the dynamic relationship between movements and different localities. It also related to recent research on developments in ‘leading’ European nations such as Britain, France, or the Netherlands, suggesting a broadened debate on matters such as *knowledge circulation* and *imitation*.

In the following sections, I discuss the findings from the previous chapters in an integrated way by returning to the research questions and answering them. Initially, I deal with *circulation* and *grounding*, followed by *contact zones*. These two sections relate to the first research question. Following this, I address the intersections of *strategies* and *tactics*, by answering my second question. The third question is integrated in all these sections. Finally, the closing section focuses on the methodological approach. It takes a forward-looking perspective, while also dealing with the findings of this investigation related to a wider research context.

8.1 *Circulation and Grounding*: The Dynamics of the Metal Trades

In several ways, this investigation explored the *circulation* of skills and knowledge related to finer metal making, specifically to cutlery making. Above all, I approached this matter by discussing people’s movements, including both officials’ and artisans’ journeys in Sweden and Europe. This mobility was related to adaptations and reconfigurations of ideas and techniques, and to accompanying *imitations* and different uses of artefacts and materials. The latter processes were dealt with in terms of *grounding*. Relating to Raj, the preceding chapters have emphasised the ‘mutability’ of

² Alder (2010), pp. 146–156.

³ See Roberts and Schaffer (2007).

practices, knowledge, and objects, as well as of individuals, localities, and a wider manufacturing system.⁴

Circulating knowledge was a critical aspect of the state's *strategies* from the 1730s onwards. In this sense, the European journeys undertaken by Swedish officials were of great value as they provided information about a wider context of metal making. As evident in Schröder's case, travel accounts included descriptions of wide networks of trade as well as detailed snapshots from various metal-making practices. This information was, in turn, used by the state to regulate the domestic manufacturing trades.

Knowledge was also gathered about domestic metal making. During the mid-century, the roles of institutions such as *Kommerskollegium*, *Bergskollegium*, and *Manufakturkontoret* were vital in this respect. Schröder's journeys as *Directeur* demonstrated how state institutions used reports about metal manufacturing to 'correct' practices of work. There was an observable tendency towards producing detailed descriptions of workshops and work processes, accompanied by attempts to implement a division of labour within the metal trades. The Swedish state was both curious and utilitarian in its ordering; the supervision of the manufacturing trades connected a protectionist policy and emerging Enlightenment ideals.

The mobility and journeys of state officials have attracted the attention of other scholars discussing mining and metal making. In the present investigation, I have chosen to further explore the direct involvement of the state in circulating 'thick things' — objects that embodied and mediated certain strategic ideas about the improvement of manufacturing.⁵ Above all, I emphasised Schröder's role in procuring devices and materials for artisans and metal works as well as in handing out models of metal wares to be imitated. This was also evident in Sven Rinman's later reports from the *Fristad*. The active role of officials, often related to supervisory journeys, connected practices of making, using, policing, and trading.

The state also involved artisans in the plans to improve domestic manufacturing. The recruitment of foreign labour has been discussed, although often briefly, in research studies on larger manufactories, and a few investigations have emphasised the journeys of Swedish artisans in Europe. Nevertheless, this dissertation has, in an inclusive way, put artisan mobility in focus when analysing the metal trades.

The expansion of the manufacturing system was accompanied by an increasing, yet ambivalent, interest in workforce mobility. Mobility was strictly regulated, although it was encouraged when considered beneficial for the spreading of skills. The recruitment of foreign craftsmen was supplemented early on by state-sponsored foreign tours by Swedish artisans. Especially, England became the target for such journeys due to its extensive

⁴ See Raj (2007), pp. 20–21, 225–226.

⁵ C.f. Alder (2010), pp. 16–19, 146–147.

metal trades. Using Engberg's travels as the main examples, I have emphasised how metal-making practices were integrated on the move. Artisans made systemic observations, visited workshops, and performed work-related tasks during their tours. In doing all this, they used numerous forms of mediation and techniques. In Engberg's case, it was also possible to discuss the connections between movements and a changing context of manufacturing. By comparing the cutler's journeys, ideas about the 'English way' or piecework were demonstrated as developing in relation to a diversifying steelmaking.

Artisans' travels were also analysed as something more than just 'being away'. I discussed how Engberg was encouraged to prolong his first journey to provincial steelworks and manufactories in Sweden in order to share his skills with other artisans. These movements brought about practices of *imitation*, with knowledge and skills being actively *grounded* in different metal-making communities. I also emphasised the negotiations related to these processes, with some techniques and ideas being difficult to implement in localised practice. This was demonstrated by the less successful attempts made by Engberg to share his skills in making cutlery at Vedevåg. His visits at the large manufactory still resulted in additional flows of new types of steel and processing techniques during the 1740s and 1750s.

Processes of *circulation* and *grounding* were also emphasised when exploring the implementation of piecework in urban workshops and at provincial knife works. With respect to Stockholm, I stressed how the construction of workshops in the 'English way' was related to journeys and to numerous forms of *imitation*. They were also associated with new ideas about the organisation of work and training, something that brought about additional movements of people between different metal-making communities. These overlapping forms of mobility were emphasized when discussing Engberg's cutlery works. He used a wide network in order to procure materials, mechanical devices, and tools from England and the Swedish provinces. The implementation of piecework, however, also involved the recruitment of apprentices from manufactories and rural areas during the 1740s. The cutlery works was a space for varying forms of training and instruction over time.

The latter processes were related to the further 'spread' of knowledge and skills within the manufacturing system. Many of Engberg's employees left the capital during the 1750s in order to work at provincial knife works. Tracing these workers, in chapter 7, revealed how the 'English way' was reconfigured in localised practice.⁶ The works at Tunafors, Gusum, and Viskafors were spaces where the trajectories of artisans and officials intersected. They were also connected by the *circulation* of ideas and techniques that were

⁶ With reference to Roberts, these movements also revealed 'geographies of skill' as being shaped over time. See Roberts (2007a); Roberts (2007c).

embodied in individuals as well as in artefacts and materials. Drawings of grinding mills, quality files, and functional knife steel were in this way jointly linked to the implementation of piecework at the knife works.⁷

The crisis years of the 1760s instead saw many workers leaving provincial metal works and manufactories; in some cases they moved back to the capital. Workshop cycles in the *contact zone* of Stockholm were thus formed by people's movements within, and beyond, the manufacturing system. By locating these patterns and practices of mobility, I highlighted critical factors behind the adaptations to temporary shifts, as well as to greater turbulence, within the early-modern production landscape and economy.⁸

In this respect, this dissertation has contributed an important perspective on the existing research on metal making in Sweden, and, indeed, a more dynamic view of the early-modern manufacturing trades. The 'English way' was shaped over time, involving networks of people with different agendas and a variety of practices. It was definitely related to numerous movements between Sweden and England, with notions of work carried out 'from hand to hand' and of specific finishing techniques. Still, as evident in the case of cutlery making, this also included *imitations* of German steel and the use of materials and models from more distant places. The 'English way' was, to a large extent, a 'Swedish way', although with connections to a diversifying European context of manufacturing.

The focus here on *circulation* has, in this way, enabled a move beyond the ideas of 'transfers' and 'industrial espionage' promoted in previous Swedish studies.⁹ Instead, I have emphasised numerous forms of movement and the mutability of practices over time. As noted previously, these processes were not necessarily free from conflict or carried out in a straightforward fashion. Thinking this would be naïve; piecework, after all, was not implemented in Eskilstuna *Fristad* during the 1770s. Rather than resorting to the idea of a failed 'transfer', I have instead focused on the impact of local adaptations and reconfigurations. This enabled a discussion of the ways in which different circulatory processes influenced metal-making communities and ideas on how to organise work over time.

8.2 *Contact Zones* and the Organisation of Work: The *Metal Bazaar* and the *Free Town*

This investigation embraced a different spatial and temporal approach to eighteenth-century metal making when compared to previous Swedish studies. Some scholars have indeed explored both wider and workshop-based

⁷ C.f. Roberts (2012), pp. 50–56.

⁸ This is in line with the perspective proposed by Davids and De Munck (2014), pp. 22–31.

⁹ C.f. Lindqvist (1984); Amelin (1999).

forms of division of labour over time.¹⁰ Still, eighteenth-century finer metal making has largely remained associated with the idea of the large manufactory. In contrast to this, the preceding chapters connected the developments in urban workshops with provincial metal works, by following the circulatory movements of people, skills, and practices. I highlighted the role of Stockholm within the metal trades. This was done with inspiration from Michael Sonenscher, by emphasising the dynamics of the *metal bazaar*.¹¹ My perspective also has clear analogies with studies by scholars such as Liliane Hilaire-Pérez and Karel Davids and Bert De Munck, who have recently dealt with early-modern European towns as creative and flexible, yet sometimes conflictual, spaces for manufacturing.¹²

I have also drawn on Maxine Berg's critique, moving beyond questions of scale or specific forms of manufacturing.¹³ Instead, I focused on how metal making was carried out in practice. This included an interest in the active roles of both state officials and artisans. When related to research exploring the wide networks of ironmaking or the varying ways of organising proto-industrial handicrafts, this investigation contributed another vital layer to understanding early-modern Swedish metal industries, above all the later developments in Eskilstuna *Fristad*.

The mid-eighteenth century metal trades were varied. With support from state regulations and restrictive policies on domestic and foreign trade, finer metal making expanded in the Swedish provinces from the 1730s to the 1760s. A rising number of metal works and manufactories were created during this period. I have demonstrated how diverging organisations of work developed in different *contact zones*. Some workplaces had strong ties to a surrounding agrarian context, while others were founded in towns. Provincial works also differed regarding scale. Many smaller works or workshops were found together with several larger manufactories, like Vedevåg and Stjärnsund. The former were often specialised in making one or a few types of metal wares.

Cutlery making exemplified this diversity. Extensive state-sponsored ventures arose in the 1750s, expanding this branch of finer metal making. Chapter 7 scrutinised in particular the developments at the three knife works in Tunafors, Gusum, and Viskafors, all supported by special privileges. On Schröder's suggestions, attempts were made at these places to implement piecework. This did not result in cutlery making being performed in the same way. The knife works differed in terms of spatial arrangements and the practical processes of work. This was further illustrated by also exploring alternative paths for provincial cutlery making during the same period.

¹⁰ See e.g. Klingnéus (1997), pp. 92–119.

¹¹ Here, references have been made to Sonenscher's discussion on a 'bazaar-like economy'. See Sonenscher (2012), pp. 22–29, 40–41, 130–140.

¹² Hilaire-Pérez (2007); Pérez (2008); Davids and De Munck (eds.) (2014).

¹³ See Berg (1994), pp. 70–76.

Integrating Stockholm into this discussion further elaborated this picture. A rising number of workshops, connected to the manufacturing system, were founded in the capital during the mid-century. The urban context was gradually diversified with new forms of metal making being put into practice. In many cases, new workplaces were set up by foreign artisans or by Swedish craftsmen who had travelled abroad. This expansion occurred alongside the existence of metal-making guilds, something that also provoked conflicts related to employment or the making of specific metal wares.

It was mainly the group of smaller manufacturing workshops that increased in the capital during the 1740s and 1750s. These were sometimes connected through subcontracting networks, or, in other cases, by more flexible and temporary agreements. The urban space also housed larger workshops, where attempts were made with piecework. Workplaces with more than ten employees, however, were exceptions and the share of extra labour was low. Still, the metal trades in Stockholm benefitted from a position close to various domains for trading. As illustrated in Schröder's diaries, the capital was truly a *metal bazaar*, a space where metals and metal wares were made, used, and further circulated. I also discussed the capital as one *contact zone* where skills and knowledge, related to these practices, were produced, negotiated, and reconfigured. The role of urban space was strongly emphasised by the state. In ordering the domestic trades, Stockholm was thus given a strategic position.

By following Engberg's and Schröder's trajectories, I have shown how urban workshops and provincial metal works were connected by the attempts to implement a division of labour within the metal trades. Measures to introduce piecework in the capital during the 1740s were related to ventures with large-scale manufacturing during the subsequent decades. In Engberg's case, this included the *circulation* of workers, different varieties of steel, and processing techniques. In discussing Schröder's undertakings, I demonstrated how Stockholm was also an important intermediary space for circulating models, materials, and tools to be used at the knife works. This included yet other urban workshops, traders, and institutions like the Model house.

The emphasis on variation and connections enabled a discussion on different factors that influenced the adaption and reconfiguration of the 'English way' over time. The discussions about *contact zones* accentuated the dynamism of human encounters and activities. Still, artisans, officials, and proprietors also acted in relation to different material and physical contexts.

Artisans who aimed to implement the 'English way' in Stockholm had to deal with limited access to suitable building plots, putting limits on the use of devices like grinding mills. Ambitions to expand metal workshops were also probably restricted by the buildings where artisans worked, often not differing from dwelling houses. The fact that metal workshops in the capital rarely employed more than ten workers might have been due to this lack of

space. The potential for expanding businesses also depended on questions of ownership — far from uncomplicated matters in the urban space.

Conversely, operating an urban enterprise on a smaller scale might have facilitated adaption to the economic and political fluctuations of the period. I have also discussed differing craft-specific requirements: some manufacturers did not need a large workforce, while others relied on subcontracting networks. Despite the growing competition from provincial works during the 1750s, and the following crisis of the 1760s, many manufacturing artisans in the capital succeeded in keeping their businesses going. Here, the access to a mobile workforce, trading networks, and political authorities, as well as to other craftsmen and manufacturing industries, must be recognised as key factors. Some urban enterprises were, however, hit hard by the competition from larger works. For Engberg, whose cutlery workshops expanded up until the 1750s, this meant that skilled workers left for the provinces. This puts emphasis on how workshop cycles, including phases of training, affected the adaption of the ‘English way’ over time.

Larger provincial works, in contrast, had different physical prerequisites. They were often located near water streams, with greater possibilities to expand through new buildings. Despite differences regarding the practical organisation of work, there were similarities between the knife works in Tunafors, Gusum, and Viskafors. The attempts at introducing piecework were accompanied by constructions of new grinding mills, as well as alterations in the use of tools and materials. Here, the support from state institutions must be stressed — above all Schröder’s care for ‘correcting’ workshop practices. The three knife works also relied on the recruitment of labour from the outside — initially from Engberg in Stockholm. The patterns of employment later took on different shapes. In the cases of Gusum, but especially Tunafors, this led to reconfigurations of the organisation of work during the 1750s.

Thus, the diverging manners in which the ‘English way’ developed at the knife works can hardly be explained only with reference to local craft traditions. To clarify, well-rooted practices were undoubtedly of some importance for these processes. This was probably one reason for the ‘English way’ being implemented to a lesser extent at Vedevåg. Analysing the developments at different cutlery-making works, however, has rather put emphasis to local adaptations made over time. I have stressed the active roles and mobility of artisans, as well as the impact of gradual reorganisations. This resulted in differing solutions at Tunafors and Gusum during the crisis of the 1760s. Exploring the developments during this period also illustrated the limitations for these competing works on the domestic market, with little potential for exports. These features were crucially important factors in explaining the alterations of the ‘English way’ during this period.

Eskilstuna *Fristad* can be seen as illustrating a break with the alignment of the preceding decades. The economic crisis, accompanied by a wide-

spread critique of monopolistic policies and putting-out systems, certainly played vital parts. Still, this development must also be related to the everyday practices of metal making. Previous research stressed how artisans in the *Fristad* continued to be dependent on a putting-out system and how this, in many cases, restricted the expansions of craft enterprises.

This investigation added to this picture by comprehensively discussing the gradual changes preceding the founding of the *Fristad*. By doing this, the idea of a general transition from large manufactories toward small-scale, proto-industrial, craft work was questioned. Instead, I highlighted the diverse ways of organising work over time and across space. Most notably, an extensive urban metal manufacturing existed — outside the guild framework — in Stockholm during the whole period of interest here. The expansion of the *Fristad* during the 1770s had no strong negative effects on metal making in the capital, although the expansion of the previous decades was slowed down. Stockholm experienced an inflow of workers from troubled, larger works, while new workshops were founded related to crafts that had been practised in the provinces. The capital's metal trades demonstrated the impact of variation, flexibility, and adaptations over time.¹⁴ Whether the Stockholm metal trades later experienced a decline during the 1780s to the 1800s has not been in focus here.

Finally, I have emphasised how the state's attempts at implementing piecework were not abandoned. I dealt with this by stressing how the 'English way' was altered yet again. Despite the largely failing project of a workshop-based division of labour in the *Fristad* during the 1770s, the state came to exercise additional control by ordering the spatiality, materiality, and organisation of the metal trades.

8.3 A System of Everyday Manipulations: The Intersections of *Strategies* and *Tactics*

The conclusions discussed above put emphasis on manufacturing practices as incorporating a constant interplay between different ways of knowing and acting. They also illustrate how the complex and intertwined practices shaped by people were critical aspects of the non-linear developments of pre-industrial production, and, in a wider sense, of historical change.

I approached eighteenth-century Swedish metal making by scrutinising this interplay. To do this, I used de Certeau's concepts *strategies* and *tactics*. The former were not viewed as existing outside people's margin of manoeuvring. Instead, I approached *strategies* as attempts to establish certain ideas, places, or ways of knowing. The manufacturing system and the metal trades

¹⁴ As previously noted, this observation relates to Nyberg's discussion on wool manufacturing in the capital during the same period. See Nyberg (1992).

were explored in chapters 2 through 4 from a perspective of a *strategic stage*, focusing on the state administration and its agents. *Strategies* were related to the implementation of control through regulations, policies, and privileges. They were also evident in the plans to create a spatial order, built around official's movements, as well as the attempts to divide the domestic trades between urban and rural places. Finally, I discussed *strategies* as ways of understanding and describing work processes. This latter aspect was in turn related to the attempts to 'correct' metal-making practices.

Despite these factors, there was always a potential for the men and women involved in manufacturing to manipulate the strategic conditions, alter them, and take advantage of sudden opportunities that opened up. This investigation thus also paid attention to *tactics* and daily practices of *making use*, by discussing movements and the alteration of places, in addition to the active use of social networks, materiality, and ideas about production.

The interwoven qualities of *strategies* and *tactics* were dealt with in chapters 5 through 7, following the trajectories of Engberg and Schröder. By focusing on the *circulation* of skills and knowledge, the wider *skills-trajectory* explored here has shown in a number of ways how change was gradually brought about by people interacting in practice, but also how this was done related to notions about 'correct' ways of organising work.

Repeatedly throughout this investigation, I have discussed how workforce mobility was a matter of intersecting *strategies* and everyday *tactics*. Artisans' journeys in Europe were connected to the ambitions of the Swedish state to expand the domestic manufacturing trades, and to the forming and shaping of patronage relations over time. As illustrated by Engberg's two visits in England, these travels also required a range of *tactics* related to the acquiring and linking together of specific techniques. The 'English way' of making metal wares was thus shaped by the *imitations* of travelling artisans.

Arriving home, artisans also used their experiences to promote themselves within the manufacturing system. In this sense, journeys opened up the potential for social mobility. Presenting skills and knowledge as being of utility for the public was of critical importance to artisans with aspirations to establish themselves as manufacturers. Stockholm was an important *contact zone* in this respect. These processes integrated a number of practices, with negotiations and exhibitions during the Diets, in workshops, at the *Hallrätt*, and at the different state boards. These observations lend support to Hilaire-Pérez's discussions on the links between curiosity, utility, and artisanal culture, as well as to Chris Evans and Alun Withey's findings from the British steel trades, at the expense of Joel Mokyr's idea about the impact of science and intellectual changes for the growth of 'useful knowledge'.¹⁵

The interplay of *strategies* and *tactics* within the Stockholm metal trades was further demonstrated by exploring the establishment of metal works in

¹⁵ Hilaire-Pérez (2007); Pérez (2008); Evans and Withey (2012). C.f. Mokyr (2002).

the ‘English way’ at mid-century. Here, artisans had to deal with changing conditions and lengthy construction processes. Moreover, they often faced opposition from metal-making guilds. By acting tactically, however, they could alter the strategic conditions, shaping spaces for manufacturing. Ideas about the organisation of work were gradually reconfigured in relation to trading networks and in workshop practice, but also in connections among artisans, patrons, and political authorities. Managing an urban works also demanded tactical actions over time in order to keep the business going. I discussed this matter by stressing the creative use of space and contacts in the capital, for example through the leasing of workshops to other artisans.

The image of Stockholm as a complex, yet often conflictual, space for craft work has also been presented by other Swedish scholars. Here, the focus on *strategies* and *tactics* allowed for a thorough view of this context as shaped in a variety of everyday practices. The idea of a *metal bazaar* incorporated a notion of alternative solutions, movements, and negotiations over time. In the case of workshops set up in the ‘English way’, these processes were not limited to the urban space. The *tactics* of Stockholm artisans were also related to the state’s *strategies* for expanding finer metal making in the provinces. I demonstrated this by discussing how the training of workers in Engberg’s cutlery works was related both to the possibilities for premiums and the plans for spreading skills.

Following the workers’ departures from Engberg’s workshops during the early 1750s further elucidated the interplay between *strategies* and *tactics*. The larger knife works can be viewed as places established in accordance with the strategic ideas of the state and of proprietors. At the same time, they were spaces for recurrent manipulations in workshop practice. This interaction was discussed by relating Schröder’s plans for ‘correction’ to sources illustrating how the everyday materiality of cutlery making was reconfigured over time.

The *circulation* and use of mediating devices — or ‘thick things’ — such as dies and models, were connected to the implementation of piecework, but they also reflect the state’s growing curiosity in practices of work and the attempts to establish control. Still, artisans also used the strategic materiality in order to alter their working conditions. This was illustrated by the inspections at Tunafors in 1758, with workshops being changed in order to produce other metal goods. The inspections at the knife works also highlighted the negotiations of metal-making practices that were critical to the ways in which cutlery manufacturing developed during the 1750s and 1760s. Approaching the founding of Eskilstuna *Fristad*, I discussed this process as the gradual shaping of a *manufacturing tolerance*, involving state officials such as Rinman and Schröder, owners of metal works, and artisans like Engberg.

Manufacturing tolerance, as dealt with here, was indeed connected to a wider political and economic context. It was nevertheless linked to an everyday materiality — with negotiations about tools, steel, and workshop spaces.

The plans for piecework promoted during the 1740s and 1750s gave rise to other forms of control. The state gradually gained access to practices of work, as demonstrated by Rinman's detailed day-to-day accounts. Additionally, the spatial layouts of workshops and for *Fristaden* in its entirety were created by the state. The intended liberty for metal-making artisans was thus integrated with an increased potential for control.

This investigation has thus explored finer metal making by emphasising, and relating, different practices where *strategies* and *tactics* intersected. In these overlaps, something different was created which was neither exclusively strategic nor tactical. Concepts like *grounding* and *manufacturing tolerance* were applied in order to understand these processes. In a more straightforward way, I argue that it is in these overlaps that the dynamics of change in early-modern production are made observable.

The actors under scrutiny repeatedly referred to the 'English way' — or work organised 'from hand to hand' — as the 'correct' way; in a sense, this was a smaller version of the well-ordered common household in which people performed different God-given duties. At the same time, tracing the practices in which these actors were involved suggests how this idea was constantly altered in different ways, but without changing the overall perception of order and stability. Thus, I have dealt with a non-linear development, illustrating the tensions between, on the one hand, a mechanistic mentality and, on the other hand, movements and everyday manipulations. This investigation is, in this regard, related to Daniel Roche's discussion of 'how change became possible in a world that saw itself as stable, changeless, and coherent by virtue of ancestral principles and age-old values'.¹⁶

The eighteenth-century Swedish metal trades were thus important neither because of a regulative framework that broke down traditional ways of organising craft work, nor because of ground-breaking inventions by ingenious entrepreneurs with experiences from the British metal trades. Instead, as proposed here, it is the dynamic character of metal-making practices, brought about within the manufacturing system, that are of importance when placing them in a wider perspective of historical change. This perspective links to the complex and conflictual context of craft work emphasised by Lars Magnusson in his investigation of Eskilstuna *Fristad*.¹⁷ I have demonstrated how eighteenth-century metal manufacturing was not always the antithesis of unregulated proto-industries. It illustrates, instead, variations and alternative paths, patterns of mobility, as well as negotiations of manual skills and ideas about the division of labour, which gradually were setting the stage for the developments of metal-making industries during the nineteenth century.

¹⁶ Roche (1998), p. 6. See also Roche (2002), p. 21.

¹⁷ Magnusson (1988).

8.4 The Promises of Following *Trajectories*

This notion of gradual change was largely made possible by the methodological focus of this dissertation. I have mainly relied upon two trajectories in exploring the developments of finer metal making during the mid-eighteenth century. Following Engberg and Schröder was not done with the intention of writing their respective biographies. Rather, I used them to emphasise various metal-making practices and movements over time. These were, in turn, related to a wider context of manufacturing, with comparisons and connections being repeatedly discussed. Still, I have specifically explored and analysed developments relating to one wider *skills-trajectory* from the 1730s to the 1770s: the ‘English way’ of making cutlery wares.

As noted in chapter 1, this approach has its limitations. Following other actors might have contributed to a slightly different understanding of metal manufacturing during this period. Still, by mapping out a wider trajectory, this dissertation has added important metal-making communities (*contact zones*) into the picture of the eighteenth-century metal trades. It has also explored the connections between places that have previously been studied largely in isolation. Above all, I emphasised the metal trades in Stockholm, while also dealing with the relations between urban workshops, provincial metal works, and foreign communities. Ideas related to the organisation of work were discussed as gradually being shaped by circulatory processes and by people using and negotiating the material and social context of cutlery making in different ways. In this sense, the choice to closely follow two individuals enabled a more comprehensive discussion on the ‘expansion’ and ‘decline’ for the manufacturing industries than has been presented in previous research.

This methodological approach has broader implications. It suggests a way for researchers in economic history to query the movements and undertakings of historical actors in early-modern societies without resorting to narrow micro-histories. This especially concerns practices of transmitting knowledge and skills and of organising work. As I have shown, this can include new types of sources, previously seldom used for studying everyday life and practices of work. The archives of the eighteenth-century Swedish Diets and of the state administration are largely uncharted in this respect. I have proposed one way of working with these materials that integrates the broader patterns and the micro-levels of historical change.

Such investigations can also generate incentives for further studying processes, places, and practices in detail. One possible research area inspired by the findings in this text is the role of Stockholm for the development of metal industries during the ‘long eighteenth century’, thus widening the perspective to include a period from the late seventeenth century to the mid-nineteenth century. One related area that needs to be further investigated is the foreign journeys of Swedish artisans. Traditional studies have mainly

focused on the travels of officials, entrepreneurs, and learned men in Europe. My findings suggest that artisan mobility played an integral part in shaping the manufacturing industries.

Thirdly, and related to recent research focusing on the rise of modern consumption, the use of metal wares can be explored in a more comprehensive way than has been done so far. Such investigations could benefit from analysing consumption in a broader sense. As demonstrated here, metals were combined and used for making highly specialised goods for dinner tables, equipment for rising professions, as well as tools and gear for other crafts. Relating to Evans and Withey, the use of metals can also be investigated from a ‘multi-centered’ perspective.¹⁸

This investigation can also stimulate discussions that may interest a wider research context. The findings have been related to recent studies on early-modern European manufacturing. Some of these have taken a broader spatial approach by focusing on matters such as workforce mobility or by undertaking comparative inquiries. Still, this has to a very limited extent included Sweden or Scandinavia. I have shown how similar networks and circulatory practices developed in Sweden during the eighteenth century, and how these linked Swedish metal-making practices to towns and trading sites around Europe. The exploration of *imitations* and reconfigurations related to the ‘English way’ provides a good example of the benefits of thinking in terms of *circulation* and *grounding*, instead of transfers, leaders, and followers.

Most notably, the emphasis here on skills and knowledge can be related to surveys stressing the need for practice-oriented approaches on early-modern craft work and mobility. This investigation has focused on the movements of Swedish artisans. I have, however, also dealt briefly with the recruitment of foreign labour to Swedish metal-making communities. This discussion can be further developed, with connections with other areas in Europe being highlighted over time.

Likewise, the processes of *circulation* analysed here can be further built on by emphasising the people and practices involved in these flows. In closing this investigation, I ask myself questions such as: how was the shipping of devices and materials for manufacturing artisans in Stockholm organised in places like London? In what ways were materials, models, and artefacts procured, and where did they come from? Posing queries like these further explores connections between different spaces and everyday practices in the early-modern world. The rich source material available in Swedish archives can stimulate studies that focus on different, yet related, trajectories that highlight the connectedness of knowledge production and material production during a dynamic period in European history. In doing so, ideas about craft work and manufacturing can be further nuanced through discussions of interwoven spaces for making, using, trading, and knowing.

¹⁸ Evans and Withey (2012), p. 541.

Appendix A

Swedish terms – Glossary

Bergskollegium – Board of Mines (1637–1857).

Hallordning – the regulations for the manufacturing trades (1722, 1739, and 1771).

Hallrätt – the local judicial institution for the manufacturing trades (1722–1846).

Handels och manufakturdeputationen – Delegacy of Trade and Manufacturing. A group comprised of representatives from the four social estates during the Diets, with responsibilities in matters regarding trade and manufacturing.

Jernkontoret – the Iron Masters' Association (1747–).

Kommerskollegium – Board of Trade (1651–).

Krigskollegium – War Office (1636–1866).

Kungliga Vetenskapsakademien – Royal Swedish Academy of Sciences (1739–).

Landshjälpsdeputationen – Delegacy of Land Support. Precursor to *Handels och manufakturedeputationen*, founded during the Diet of 1726–1727.

Manufakturkontoret – Office of Manufacturing (1739–1766).

Manufakturfonden – the manufacturing fund (preceded by *landshjälpsfonden*).

Rikens Ständers Bank (later *Sveriges Riksbank*) – Bank of Sweden (1668–).

Sekreta utskottet – Secret Committee. A powerful organ during the Diets, made up of 100 men from the nobility, the clergy, and the burghers.

Ämbets- och Byggningskollegium – Office for Trades and Constructions, in Stockholm, (1672–1880).

References

Manuscript sources

RA: Riksarkivet, Stockholm (National Archives)

BkH: Bergskollegium, huvudarkivet

D5:14. Smideslängder och stämpelböcker m.m. 1772.

E2a:17. Allmänna bergverksrelationer från flera landsdelar m.m. 1762–1789.

E2i:3. Bergverksrelationer från Nora och Lindes bergmästaredöme. 1723, 1727.

E3:27. Angerstein, Reinhold, *Om Järnwärcken Bägge Sidor Renströmmen, Ifrån Bodensee i Sveitz till Coblentz. Af Reinhold Angerstein År 1758.*

DiplA: Diplomatica Anglica

I:366. Svenska beskickningar till England brev och arkiv, 1561–1809. Kommissionssekreteraren Arnold Wynantz, Brev från Kanslikollegium och andra ämbetsverk. Kommerskollegium, Manufakturkontoret, Krigskollegium, Barnhus- och Hospitaldeputationen, 1748–58.

FUh: Frihetstidens Utskottshandlingar

R.2679. Riksdagen 1738–39. Handels- och manufakturdeputationens betänkanden och handlingar, 1738.

R.2682. Riksdagen 1738–39. Handels och manufakturdeputationens handlingar II, 1738.

R.2684. Riksdagen 1738–39. Handels- och manufakturdeputationen, Riksdagsrelationer.

R.2766. Riksdagen 1740–41. Handels- och manufakturdeputationens handlingar, I.

R.2767. Riksdagen 1740–41. Handels- och manufakturdeputationens handlingar, II.

R.2901. Riksdagen 1746–47. Handels- och manufakturdeputationens handlingar, 1746, III.

R.2963. Riksdagen 1751–52. Sekreta utskottets akter. Handels- och manufakturdeputationens memorial och protokollsutdrag.

R.3051. Riksdagen 1755–56. Sekreta utskottets handlingar, 1756, I.

R.3052. Riksdagen 1755–56. Sekreta utskottets handlingar, 1756, II.

R.3075. Riksdagen 1755–56. Handels- och manufakturdeputationens handlingar, 1756, I.

R.3076. Riksdagen 1755–56. Handels- och manufakturdeputationens handlingar, 1756, II.

R.3077. Riksdagen 1755–56. Handels- och manufakturdeputationens handlingar, 1756, III.

R.3329. Riksdagen 1765–66. Handels- och manufakturdeputationens expeditioner, 1765.

R.3330. Riksdagen 1765–66. Handels- och manufakturdeputationens expeditioner, 1766.

R.3331. Riksdagen 1765–66. Handels- och manufakturdeputationens akter, 1765, I.

R.3332. Riksdagen 1765–66. Handels- och manufakturdeputationens akter, 1765, II.

R.3338. Riksdagen 1765–66. Handelsintendenten Westermans riksdagsrelation.

JkFA: Jernkontoret, Fullmäktiges arkiv

AIaI:2. Allmänna protokoll, 1749.

GIa3:3. Räkenskaper, Huvudböcker före 1756. Journal, 1750.

KkH: Kommerskollegium, huvudarkivet

AIaa:2. Protokoll i sekreta ärenden, 1750–1755. Sekreta protokoll 1755.

AIaa:101. Protokoll, 1735, II.

AIaa:102. Protokoll, 1736, I.

AIaa:103. Protokoll, 1736, II.

AIaa:104. Protokoll, 1737, I.

AIaa:108. Protokoll, 1739, I.

AIaa:109. Protokoll, 1739, II.

AIaa:110. Protokoll, 1740, I.

AIaa:112. Protokoll, 1741, I.

AIab:7. Protokoll i handels och manufakturärenden, 1755, II.

BIA:137. Registratur, 1755, I.

DVIIIa:2. Förteckningar över utfärdade fabriksprivilegier, II, 1723–1781.

EVIaa:231. Skrivelser från konsulter. London 1730–1814. Jonas Alströmer, London, 1730–1739.

FIV:50. Särskilda utredningar och berättelser, 1755–1812, Järnmanufakturverk.

KkAdv: Kommerskollegium, Advokatfiskalens arkiv

Da:757. Rättsprotokoll från orterna. Stockholms Hallrätt, Rättsprotokoll, 1740.

MkA: Manufakturkontorets arkiv

A:a, vol. 50. Protokoll, 1744.

A:a, vol. 51. Protokoll, 1745.

A:a, vol. 53. Protokoll, 1747.

A:a, vol. 54. Protokoll, 1748.

Ba, vol. 122. Utgående skrivelser, 1739–1740.

B:b, vol. 145. Registratur, särskilda samlingar. Strödda koncept, 1742–1755.

D, vol. 165. Brevbok, 1739–1740.

De:1, vol. 176. Inkomna skrivelser, reseberättelser. Berättelser om svenska fabriker 1742–1760.

De:1, vol. 177. Inkomna skrivelser, reseberättelser. Utländska reseberättelser 1746–1763.

De:1, vol. 180. Inkomna skrivelser, reseberättelser. Beskrivningar över uppfinningar.

MkKam: Manufakturkontoret, Kamrerarkontorets arkiv

C:a. Manufakturfondens huvudböcker.

C:c. Manufakturfondens verifikationer.

Peter Westmans arkiv

C:489. Räkenskaper.

RÄs: Riksarkivets ämnessamlingar, Militaria

M:1594. Krigshistoriska samlingen 1500t–1800t. Ryska kriget 1741–1743, Rättegångshandlingar i målet mot generalerna Buddenbrock och Lewenhaupt.

ULA: Uppsala landsarkiv (Uppsala Regional Archives)

Bergmästarämbetet i Nora med flera Bergslag

FIII:4. Handlingar till Manufakturlängder, 1757–1838. Uppgifter till manufakturlängd m.m. 1757–1838. Manufakturlängder 1757.

EFoA: Eskilstuna Fristadssamhällets och ordningsrättens arkiv

AI:1. Protokoll över fristadssamhällets sammankomster. 1774–1832.

H1. Räkenskaper, 1773–1809. Mantalslängder, 1773–1809.

Eskilstuna, Kloster och Fors kyrkoarkiv

Ola:2, no. 353. *Anteckningar ur framl. Fristads Directeuren, Herr. Bergsrådet Samuel Schröderstiernas egenhändigt författade Lefvernes Beskrifning.*

HrE: Hallrätten i Eskilstuna

1. Eskilstuna Hallrättshandlingar, 1758–1846. Hallrättens protokoll, 1758–1799.

2. Eskilstuna Hallrättshandlingar, 1758–1843. Koncept till skrivelser, 1758–1835.

ESA: Eskilstuna stads arkiv (Eskilstuna City Archives)

Bergsrådet S. Schröderstiernas Papper

34:3, vol. 1, Fascikel 1. Handlingar rörande Eskilstuna fristads uppkomst.

34:3, vol. 1, Fascikel 2. Diverse handlingar om Eskilstuna Fristad, 1771–1788.

SSA: Stockholms stadsarkiv (Stockholm City Archives)

HMR: Hall- och Manufakturrätten

AI:1. Hall- och manufakturrättens protokoll, 1759.

AI:8. Hall- och manufakturrättens protokoll, 1766.

BIII. Fabriksberättelser.

EIII:1. Privilegieböcker, I. Privilegier utfärdade 1620–1753.

Jakob och Johannes församling

Död- och begravningsbok, 1736–1884, Elg–F, Del 02.

Kart och ritningsarkivet

Tryckta kartor, Bjurman 1751.

Skråarkiv

32:1. Knivsmedsämberet. Protokoll 1736–1783.

Stadsbyggnadskontorets kartor och ritningar

BN 1746:304.

ÄmB: Ämbets- och Byggningskollegium

AI:26. Protokoll, 1728.

AI:27. Protokoll, 1730.

AI:29. Protokoll, 1740.

Arkiv Digital AB (<https://www.arkivdigital.net/>)

Jakob och Johannes

AIa:6. Husförhörslängd, 1753 [accessed 30 May 2016].

AIa:9. Husförhörslängd, 1760–1766 [accessed 30 May 2016].

SRr: Stockholms rådhusrätt 1:a avdelning

F1A:134. Bouppteckningar, 1744, I [accessed 29 November 2016].

F1A:147. Bouppteckningar, 1750, I [accessed 1 June 2016].

F1A:162. Bouppteckningar, 1755, II [accessed 8 June 2016].

F1A:207. Bouppteckningar, 1766, III [accessed 30 May 2016].

F1A:240. Bouppteckningar, 1776, II [accessed 9 June 2016].

ÖfU: Överståthållarämbetet för uppborärenden

G1BA:12:4. Mantalslängd, 1721, Norrmalms östra övre del [accessed 30 May 2016].

G1BA:13:1. Mantalslängd, 1730, Norrmalms västra nedre och övre del [accessed 30 May 2016].

G1BA:17:3. Mantalslängd, 1740, Norrmalms östra övre m.fl. kvarter [accessed 8 June 2016].

G1BA:20:2. Mantalslängd, 1755, Norrmalm övre halva och västra övre yttre [accessed 21 December 2016].

G1BA:20:4. Mantalslängd, 1755, Jakob [accessed 8 June 2016].

G1BA:21:3. Mantalslängd, 1760, Klara västra övre och yttre samt Kungsholmen [accessed 21 December 2016].

SVAR, Riksarkivets digitala forskarsal

ÖfU: Överståthållarämbetet för uppborärenden

G1AA:33. Kronotaxeringslängder, 1735, Stockholm. Available from: Rikarkivet. <https://sok.riksarkivet.se/bildvisning/A0060267_00001> [accessed 21 December 2016].

G1AA:50. Kronotaxeringslängder, 1748, Jakob, Johannes, Ladugårdslandet, Djurgården, Maria och Katarina. Available from: Riksarkivet. <https://sok.riksarkivet.se/bildvisning/A0060284_00001> [accessed 21 December 2016].

KB: Kungliga biblioteket, Stockholm (Royal Library)

Engeströmska samlingen

C:XVII, 1–12, No. 1. *Bergmästarne Swabs och Stockenströms bref till Bergskollegium angående de Europaeiske Järnwärken, af den 2 Januari 1744, jemte utdrag af Bergs Kollegii bref till K:gen i samma ämne.*

Handskriftssamlingen

M.249. *Henrik Kalmeters resa*, vol. I–V.

X.283. Schröder, Samuel, *Dagbok rörande Directeurs-Sysslan öfver Jern- Stål- och Metall-Fabrikerne i Riket af S. Schröder*, vol. I–III.

X.303. Schröder, Samuel, *Dagbok rörande Handel, Näringar och Manufaktur m.m. Uti Danmark, Holland, England, Frankrike och Tyskland. Under verkstälde resor, åren 1748–1751 förd af Samuel Schröder*, vol. I–IV.

KTHB: Kungliga tekniska högskolans bibliotek, Stockholm (The Library of the Royal Institute of Technology)

BbM: Kungliga tekniska högskolans biblioteks manuskriptsamling, Bergsskolans biblioteks manuskript

D.14. Qvist Andersson, Bengt, *Anmärkingar uti Hwarjehanda förefallande Ämnen Samlade på Resan i England åren 1766 och 1767.*

E.12. Mineralogi och dithörande ämnen. Diverse mineralogie och chemie.

K.12. Rinman, Sven, *Utdrag af beskriningarne öfwer Någre Utländske Jern och Stål Fabriqwer besedde År 1747, af Swen Rinman, Första stycket.*

TMA: Tekniska museets arkiv, Stockholm (the Archive of Tekniska museet)

Rinmanska arkivet

S-E3. Sven Rinman, till Bergskollegium 1776–1789.

S-K. Järn och stål. Diverse handlingar.

S-O. Handlingar rörande Eskilstuna Fristad.

UUB: Uppsala universitetsbibliotek (Uppsala University Library)

Handskriftssamlingen

L.101. Handlingar om Manufakturkontoret och Fabrikerne i Riket.

X.240. Swab, Anton, Undated biographical draft.

X.376. Alströmer, Jonas, *Resa i England 1719, 1720.*

X.384. von Swab, Anton, (Copy of) *Resa till de Tyska Bäckverken 1730.*

Alströmerska brevsamlingen.

G:6 18. Bref till Patrick Alströmer.

Printed Sources

- Alströmer, Clas (1770). *Tal, om den fin-ulliga får-afveln, hållet för kongl. vetenskaps academiën, vid præsidii nedläggande, den 25. april 1770. Af Clas Alströmer, assessor i kongl. commerce-collegio, ledamot af botan. societeten i Florentz. På kongl. vetenskaps academiens befallning.* Stockholm: Salvius.
- Angerstein, Reinhold (2001). *R.R. Angerstein's Illustrated Travel Diary 1753–1755: Industry in England and Wales from a Swedish Perspective*, transl. by Berg, Torsten and Berg, Peter. London: Science Museum.
- Berch, Anders (1747). *Inledning til almänna hushållningen, innefattande grunden til politie, oeconomie och cameral wetenskaperne. Til deras tjänst, som biwista de almänne föreläsningar inrättad, af Anders Berch.* [Electronic resource]. Stockholm. Available from: Kungliga biblioteket. <http://weburn.kb.se/metadata/384/EOD_2426384.htm> [accessed 4 July 2016].
- Biographiskt lexicon öfver namnkunnige svenska män: Första bandet.* (1835). Uppsala: Palmblad, Sebell & c.
- Ekström, Daniel (1750). *Tal, om järn-förädlingens nytta och vårdande; hållit i kongl. vetenskaps academiën vid præsidii afläggning d. 28 apr. 1750. Af Daniel Ekström, matematisk instrument-makare. På kongl. vetenskaps academiens befallning.* Stockholm.
- Fougeroux de Bondaroy, Auguste-Denis. (1772). *L'Art du Coutelier En Ouvrages Communs, Descriptions des arts et métiers, Coutelier Tom III.* [Electronic resource]. Paris: impr. de L-F. Delatour. Available from: Bibliothèque nationale de France. <<http://gallica.bnf.fr/ark:/12148/bpt6k1065608r.r>> [accessed 12 May 2016].
- Hamren, Olof (1738). *Manufacturs-spegel, som genom tillförlåtelige uträkningar och uprichtiga grundsatzer gifwer et fulkommeligit lius om manufacturers och fabriquers rätta art och beskaffenhet, samt oskattbara nytta genom försiktig anläggning. Wälment utgifwen af O.H.* [Electronic resource]. Stockholm. Available from: Göteborgs universitetsbibliotek. <<https://gupea.ub.gu.se/handle/2077/34529>> [accessed 21 December 2016].
- Historical Statistics of Sweden. Part 3, Foreign Trade 1732–1970.* (1972). Stockholm: SCB.
- Kongl. Maj:ts Förnyade Allmänna Manufactur och Handtwärkeri Privilegier. Gifne och Stadfäste Stockholm i Råd-Cammaren then 29. Maii 1739, No. 54.* (1739). Stockholm.
- 'Kongl. Maj:ts Förnyade Hall-Ordning' [from 2 April 1770]. (1777), in Modée, Reinhold G., Lindhielm, Hedvig E., and Foug, Elsa (ed.). *Utdrag utur alle ifrån den 7. decemb. 1718./1791 utkomne publique handlingar. Stockholm. 1-15. 1742-1829=.* [Del 9]. Stockholm: Foug, pp. 332–348.
- Kongl. Maj:ts Nådige Förklaring Öfwer 15.§. i Manufactur Privilegierne angående Jern- Stål- och Metall-warors förpazande Inrikes Städer emellan. Gifwen Stockholm i Råd-Cammaren then 18. September 1747, No. 56.* (1747). Stockholm.
- Kongl. Maj:ts Nådige Förordning, Angående Inrikes Manufactur- och Handtwärkare-warors förpazning och förtullande. Gifwen Stockholm i Råd-Cammaren then 7. Maji. 1742, No. 22.* (1742). Stockholm.
- Kongl. Maj:ts nådige Förordning angående The Utrikes Wahr: och Persedlar, hwilka skola hädanefter til införsel här i Riket aldeles wara förbudne. Gifwen Stockholm i Råd-Cammaren then 19. Maii 1739.* (1739). Stockholm.

- Kongl. Maj:ts nådige Förordning angående Wisze Utrikes ifrån inkommande Warors beläggande med en Consumtions Afgift eller Accis. Gifwen Stockholm i Råd-Cammaren/then 8. Maii 1739. (1739). Stockholm.*
- Kongl. Maj:ts Taxa Hwarefter Stora Siö-Tullen Uppå alla Inkommande Waror Bör Ärläggas och upbåras. Hwarjemte bifogas en Förteckning uppå alla de Wahrer som förbudne äro at i Riket införas. Gifwen Stockholm i Råd-Cammaren den 8. Junii 1739. Stockholm.*
- Kongl. Maj:ts Taxa Hwarefter Stora Siö-Tullen Uppå alla Utgående Wahrer Bör Ärläggas och upbåras, Gifwen Stockholm i Råd-Cammaren Den 26 Aprill 1739. (1739). Stockholm.*
- Kongl. Maj:ts Utfärdade Hall-Ordning, Och Allmänne Factorie-Rätt, För alla Manufacturister uti Silke, Ull- och Linne, samt Handwärfkare och flere, som icke egenteligen under Skrå-Ordningen böra begripas. Gifwen Stockholm i Råd-Cammaren then 21. Maji 1739, No. 46. (1739). Stockholm.*
- Kongl. Maj:ts Ytterligare Alfvarlige Påbud Emot Införslen och försäljandet af hwarjehanda utomlands tillwerkade Metall- Meszings- och Ten-knappar, samt annat både Metall- och Stål-Arbete, som för thetta warit til Införsel förbudit. Gifwen Stockholm i Råd-Cammaren then 26. septembr. 1741, No. 65. (1741). Stockholm.*
- von Linné, Carl (1968). *Nemesis divina: Den gudomliga vedergällningen*, Malmeström, Elis and Fredbärj, Telemak (eds.). Stockholm: Bonnier.
- Perret, Jean-Jacques (1771). *L'Art du Coutelier, Premiere Partie, Descriptions des arts et métiers, faites ou approuves par messieurs de l'Académie Royale des Sciences. Avec figures en taille-douce, Coutelier Tom 1.* [Electronic resource]. Paris: Saillant et Nyon. Available from: Bibliothèque nationale de France. <<http://gallica.bnf.fr/ark:/12148/bpt6k10656043.r>> [accessed 12 May 2016].
- Polhem, Christopher (1743). 'Påminnelse wid Stål-Tilwärfningen, i anledning af 10:de frågan uti 2 Qvart, 1739' [originally from 1740], in *Kongl. Svenska wetenskaps academiens handlingar för månaderna Aprilis, Majus, Junius, 1740, vol. 1.* Stockholm. Reissued in *Kungl. Svenska vetenskapsakademiens handlingar (1739–1974), vol. 1, 1739–1740.* Stockholm: Almqvist & Wiksell, pp. 303–309.
- : (1761). *Commerce-rådet, riddaren och commendeuren af kongl. nordstjerne-orden, Christopher Polhems Patriotiska testamente, eller Underrättelse om järn, stål, koppar, mässing, tenn och bly för dem, som wilja begynna manufacturer i desza ämnen. Jemte en förteckning på: alla desz mekaniska inventioner.* Stockholm.
- 'Rikens Ständers Secrete-handels- och Manufactur-deputations berättelse, angående Swenske Fabriquernes tilstånd ifrån 1751 års början til 1754 års slut' [from 25 May 1756]. (1761), in Modée, Reinhold G., Lindhielm, Hedvig E., and Fougt, Elsa (ed.). *Utdrag utur alle ifrån den 7. decemb. 1718./1791 utkomne publique handlingar. Stockholm. 1–15. 1742–1829=.* [Del 6]. Stockholm: Grefing, pp. 3917–3947.
- Rinman, Sven (1772). *Anledningar til kunskap om den gröfre jern- och stål-förädlingen och des förbättrande, upteknade af Sven Rinman.* Stockholm.
- Rinman, Sven (1788). *Bergwerks lexicon författadt af Sven Rinman. Första delen.* Stockholm.
- Rinman, Sven (1789). *Bergwerks lexicon, författadt af Sven Rinman. Andra delen.* Stockholm.
- Rinman, Sven (1935). 'Berättelse om järnmanufakturverkens och svartsmidets tillstånd uti Östergötland för år 1765', in Malmborg, Gösta (ed.). *Sven Rinmans tjänsteberättelser 1761–1770.* Stockholm, pp. 65–91.

- von Rosenstein, Nils (1838). 'Äreminne öfver RiksRådet, Grefve Erik von Stockenström, uppläst i Kongl. Vetenskaps-Akademien, den 26 Maj 1790' [originally from 1790], in von Rosenstein Nils, *Samlade skrifter, D. 1*. Stockholm, pp. 142–184.
- Salvius, Lars (1741). *Beskrifning öfver Sveriget. 1, första tomen om Upland, af Lars Salvius*. Stockholm.
- Schröder, Samuel (1925a). 'Berättelse om de finare Järn-, Stål- och Metallfabriksverken i riket (under år 1754)', in Malmberg, Gösta (ed.). *Berättelser öfver de finare järn- stål- och metallfabrikerna i Sverige åren 1754–1759*. Stockholm, Part I.
- : (1925b). 'Berättelse om järn-, stål- och metallfabrikerna för åren 1755–1759', in Malmberg, Gösta (ed.). *Berättelser öfver de finare järn- stål- och metallfabrikerna i Sverige åren 1754–1759*. Stockholm, Part II.
- Svenskt biografiskt lexikon, Band 1*. (1918). Stockholm.
- Svenskt biografiskt lexikon, Band 17*. (1967–1969). Stockholm.
- Svenskt biografiskt lexikon, Band 30*. (1998–2000). Stockholm.
- Svenskt biografiskt lexikon, Band 33*. (2007–2011). Stockholm.
- Taxa, hwarefter Ifrån den 1 Julii 1739 de på följande Förteckning, upförde Utrikes Wahror, Som här i Riket inkomma, skola erlägga Afgift Til Manufactur Fonden*. (1739). Stockholm.

Internet Resources

- Angerstein, Reinhold R. *Interiör av manufakturmedjan, Gustavsfors, Dalsland, 1758*. Jernkontoret, bildbank. Available from: Jernkontoret. <<http://www.jernkontoret.se/sv/bildbank1/show/?imageid=501>> [accessed 15 March 2017].
- Fastighetsregister 1675–1875*. Available from: Stockholms stadsarkiv. <<http://stadsarkivet.stockholm.se/hitta-i-arkiven/i-arkiven/fastighetsregister-1675-1875/>> [accessed 10 May 2016].
- Mantalsregister, mantalslängder 1760*. Available from: Stockholms stadsarkiv. <<http://digitalastadsarkivet.stockholm.se/Bildregistrering/Mantalsregister/Default.aspx>> [accessed 10 May 2016].
- Registernyckel för fastigheter 1730 och 1810*. Available from: Stockholms stadsarkiv. <<http://digitalastadsarkivet.stockholm.se/Kartorochritningar/Gatorochkvarterepi7.aspx>> [accessed 10 May 2016].
- Tidigmoderna konkurser*. Available from: Stockholms stadsarkiv. <<http://www.tidigmodernakonkurser.se/index.php/extended>> [accessed 10 May 2016].
- Zoll, Kilian. *Interiör av en klensmedja med flera smeder*. Jernkontoret, bildbank. Available from: Jernkontoret. <<http://www.jernkontoret.se/sv/bildbank1/show/?imageid=2293>> [accessed 13 May 2016].

Literature

- Alder, Ken (2010). *Engineering the Revolution: Arms and Enlightenment in France, 1763–1815* [originally published in 1997]. Chicago: University of Chicago Press.
- Aldman, Lili-Annè (2008). *En merkantilistisk början: Stockholms textila import 1720–1738*. Diss. Uppsala: Acta Universitatis Upsaliensis.
- Amelin, Olov (1999). *Medaljens baksida: instrumentmakaren Daniel Ekström och hans efterföljare i 1700-talets Sverige*. Diss. Uppsala: Uppsala universitet.
- Arvidsson, Catrine (1998). 'Kina Slott 1753–1769 tillkomst och förändringar under byggnadstiden', *Konsthistorisk tidskrift/Journal of Art History*, 67(3), pp. 135–156.
- Ash, Eric H. (2010). 'Introduction: Expertise and the Early Modern State', *Osiris*, 25(1), *Expertise and the Early Modern State*, pp. 1–24.
- Bengtsson, Bengt (1963). *Matsilver förr och nu: en bok från Kulturhistoriska museet i Lund*. Västerås: Ica-förlaget.
- Beretta, Marco (2011). 'Rinman, Diderot, and Lavoisier: New Evidence Regarding Guillaume François Rouelle's Private Laboratory and Chemistry Course', *Nuncius*, 26 (2), pp. 355–379.
- Berg, Lars Otto (1969). 'Hall- och manufakturätten i Stockholm. Anteckningar om dess bakgrund, historia och arkiv', offprint from *Berättelse över Arkivnämndens förvaltning och verksamhet under år 1967*. [Electronic resource]. Stockholm: Stockholms stadsarkiv. Available from: Stockholms stadsarkiv. <<http://www.stockholmskallan.se/Soksida/Post/?nid=19796>> [accessed 23 February 2017].
- Berg, Maxine (1994). *The Age of Manufactures, 1700–1820: Industry, Innovation and Work in Britain*, 2. ed. London: Routledge.
- : (2002). 'From imitation to invention: creating commodities in eighteenth-century Britain', *Economic History Review*, 55 (1), pp. 1–30.
- Berg, Maxine (ed.) (1990). *Markets and Manufacture in Early Industrial Europe*. London: Routledge.
- Bertucci, Paola and Courcelle, Olivier (2015). 'Artisanal Knowledge, Expertise, and Patronage in Early Eighteenth-Century Paris: The Société Des Arts (1728–36)', *Eighteenth-Century Studies*, 48 (2), pp. 159–179.
- Bijker, Wiebe E., Hughes, Thomas P., and Pinch, Trevor J. (ed.) (1987). *The social construction of technological systems: new directions in the sociology and history of technology*. Cambridge, Mass.: MIT Press.
- Boëthius, Bertil (1943). *Magistraten och borgerskapet i Stockholm 1719–1815*. Stockholm: Norstedt.
- : (1955). *Jernkontorets historia, Del 3:1: Jernkontoret och tekniken före götstålsprocesserna*. Stockholm: Jernkontoret.
- Boëthius, Bertil and Kromnow, Åke (1947). *Jernkontorets historia, Del 1: Grundläggningstiden*. Stockholm: Jernkontoret.
- : (1968). *Jernkontorets historia, Del 2:1: L'Ancien régime*. Stockholm: Jernkontoret.
- Bonnell, Victoria E., Hunt, Lynn Avery, and Biernacki, Richard (eds.) (1999). *Beyond the Cultural Turn: New Directions in the Study of Society and Culture*. Berkeley, Calif.: University of California Press.
- Brewer, John (1989). *The Sinews of Power: War, Money and the English State, 1688–1783*. London: Unwin Hyman.

- Buchner, Thomas (2009). 'Perceptions of Work in Early Modern Economic Thought: Dutch Mercantilism and Central European Cameralism in Comparative Perspective', in Ehmer, Josef and Lis, Catharina (eds.). *The Idea of Work in Europe from Antiquity to Modern Times*. Farnham: Ashgate, pp. 191–213.
- Burke, Peter (ed.) (1992). *New Perspectives on Historical Writing* [1. pbk. ed.]. Cambridge: Polity.
- Caracausi, Andrea (2014). 'Textiles Manufacturing, Product Innovations and Transfers of Technology in Padua and Venice between the Sixteenth and Eighteenth Centuries', in Davids, Karel and De Munck, Bert (eds.). *Innovation and Creativity in Late Medieval and Early Modern European Cities*. Farnham: Ashgate, pp. 131–160.
- de Certeau, Michel (1984). *The Practice of Everyday Life. Vol. 1, The Practice of Everyday Life*. Berkeley, Calif.: University of California Press.
- Davids, Karel (1995). 'Openness or Secrecy? Industrial Espionage in the Dutch Republic', *The Journal of European Economic History*, 24 (2), pp. 333–348.
- : (2012). 'Gatekeeping. Who Defined "Useful Knowledge" in Early Modern Times?', in Inkster, Ian (ed.). *History of Technology Volume 31*. [Electronic resource]. London: Bloomsbury Academic, pp. 69–88. Available from: Pro Quest. <<http://ebookcentral.proquest.com/lib/uu/detail.action?docID=1080364>> [accessed 1 July 2016].
- : (2015). 'On Machines, Self-Organization, and the Global Travelling of Knowledge, circa 1500–1900', *Isis*, 106 (4), pp. 866–874.
- Davids, Karel and De Munck, Bert (2014). 'Innovation and Creativity in Late Medieval and Early Modern European Cities: an Introduction', in Davids, Karel and De Munck, Bert (eds.). *Innovation and Creativity in Late Medieval and Early Modern European Cities*. Farnham: Ashgate, pp. 1–33.
- Davids, Karel and De Munck, Bert (eds.) (2014). *Innovation and Creativity in Late Medieval and Early Modern European Cities*. Farnham: Ashgate.
- De Munck, Bert and Soly, Hugo (2007). "'Learning on the Shop Floor" in Historical Perspective', in De Munck, Bert, Kaplan, Steven L., and Soly, Hugo (eds.). *Learning on the Shop Floor: Historical Perspectives on Apprenticeship*. New York: Berghahn Books, pp. 3–32.
- de Vries, Jan (2008). *The Industrious Revolution: Consumer Behavior and the Household Economy, 1650 to the Present*. Cambridge: Cambridge University Press.
- Dosi, Giovanni (1988). 'Sources, Procedures and Microeconomic Effects of Innovation', *Journal of Economic Literature*, XXVI, pp. 1120–1171.
- Elers, Johan (1800). *Stockholm*. 2. Stockholm.
- Edgren, Lars (1987). *Lärning – gesäll – mästare: hantverk och hantverkare i Malmö 1750–1847*. Diss. Lund: Univ., Dialogos.
- Epstein, Stephan R. (2008). 'Craft Guilds, Apprenticeship and Technological Change in Pre-industrial Europe', in Epstein, Stephan R. and Prak, Marten Roy (eds.). *Guilds, Innovation and the European Economy, 1400–1800*. Cambridge: Cambridge University Press, pp. 52–80.
- Evans, Chris (2013). 'Where in the World was Sweden? A Brief Guide for Foreigners', in Rydén, Göran (ed.). *Sweden in the Eighteenth-Century World: Provincial Cosmopolitans*. Farnham: Ashgate, pp. 33–37.
- Evans, Chris, Jackson, Owen, and Rydén, Göran (2002). 'Baltic Iron and the British Iron Industry in the Eighteenth Century', *The Economic History Review*, 55 (4), pp. 642–665.

- Evans, Chris and Rydén, Göran (2006). 'Tankar om teknik, den svenska järnhanteringen och den brittiska industrialiseringen', *Med Hammare och Fackla XXXIX*, pp. 151–180.
- : (2007). *Baltic Iron in the Atlantic World in the Eighteenth Century*. Leiden: Brill.
- Evans, Chris and Withey, Alun (2012). 'An Enlightenment in Steel? Innovation in the Steel Trades of Eighteenth-Century Britain', *Technology and Culture*, 53 (3), pp. 533–560.
- Florén, Anders (1987). *Disciplinering och konflikt: den sociala organiseringen av arbetet: Jäders bruk 1640–1750*. Diss. Uppsala: Acta Universitatis Upsaliensis.
- Florén, Anders and Rydén, Göran (1992). *Arbete, hushåll och region: tankar om industrialiseringsprocesser och den svenska järnhanteringen*. Uppsala: Uppsala universitet.
- Fors, Hjalmar (2003). *Mutual Favours: The Social and Scientific Practice of Eighteenth-Century Swedish Chemistry*. Diss. Uppsala: Uppsala universitet.
- : (2005). 'Patrioter och kosmopoliter i vetenskapen: om Sven Rinman och Torbern Bergmans självbild', in Christensson, Jakob (ed.). *Sjuttonhundralet*. Stockholm: Svenska sällskapet för 1700-talsstudier, pp. 59–75.
- Forsberg, Karin (1953). *Gusums bruks historia 1653–1953*. Stockholm.
- Gerentz, Sven (1951). *Kommerskollegium och näringslivet 1651–1951: minneskrift*. Stockholm.
- Ginzburg, Carlo (1980). *The Cheese and the Worms: The Cosmos of a Sixteenth-Century Miller*. London: Routledge.
- : (2012). *Threads and Traces: True, False, Fictive*. Berkeley, Calif.: University of California Press.
- Harris, John R. (1998). *Industrial Espionage and Technology Transfer: Britain and France in the Eighteenth Century*. Aldershot: Ashgate.
- Hayen, Mats (2007). *Stadens puls: en tidsgeografisk studie av hushåll och vardagsliv i Stockholm, 1760–1830*. Diss. Stockholm: Stads- och kommunhistoriska institutet.
- Hayen, Mats and Nyberg, Klas (2017). 'Konkursinstitutet i Stockholm 1720–1850', in Nyberg, Klas (ed.). *Ekonomisk kulturhistoria: bildkonst, konsthantverk och scenkonst 1720–1850*. Stockholm: Kulturhistoriska Bokförlaget, pp. 37–46.
- Heckscher, Eli F. (1937). 'De svenska manufakturerna under 1700-talet', *Ekonomisk Tidskrift*, 39 (6), pp. 153–221.
- : (1949a). *Sveriges ekonomiska historia från Gustav Vasa. D. 2, Det moderna Sveriges grundläggning, Halvbd 1*. Stockholm: Bonnier.
- : (1949b). *Sveriges ekonomiska historia från Gustav Vasa. D. 2, Det moderna Sveriges grundläggning, Halvbd 2*. Stockholm: Bonnier.
- : (1971). *Svenskt arbete och liv*, 7. ed. Stockholm: Aldus/Bonniers.
- Hellberg, Knut (1920). *Eskilstuna: en svensk märkesstad, D.2*. Eskilstuna.
- Hellman, Lisa (2015). *Navigating the Foreign Quarters: Everyday Life of the Swedish East India Company Employees in Canton and Macao 1730–1830*. Diss. Stockholm: Stockholms universitet.
- Hilaire-Pérez, Liliane (1991). 'Invention and the State in 18th-Century France', *Technology and Culture*, 32 (4), pp. 911–931.
- : (2002). 'Cultures techniques et pratiques de l'échange, entre Lyon et le Levant: invention et réseaux au XVIIIe siècle', *Revue d'histoire et contemporaine*, 49 (1), pp. 89–114.
- : (2007). 'Technology as a Public Culture in the Eighteenth Century: The Artisans' Legacy', *History of Science*, 45 (2), pp. 135–153.

- Hilaire-Pérez, Liliane and Verna, Catherine (2006). 'Dissemination of Technical Knowledge in the Middle Ages and the Early Modern Era: New Approaches and Methodological Issues', *Technology and Culture*, 47 (3), pp. 536–565.
- Hildebrand, Karl-Gustaf (1957). *Fagerstabrukens historia. 1, Sexton- och sjuttonhundratalet*. Uppsala: Almqvist & Wiksell.
- Hinners, Linda (2012). *De fransöske handtverkarne vid Stockholms slott 1693–1713: yrkesroller, organisation, arbetsprocesser*. Diss. Stockholm: Stockholms universitet.
- Hobsbawm, Eric J. (1968). *Industry and Empire: An Economic History of Britain since 1750*. London: Weidenfeld & Nicolson.
- Hörsell, Ann (1983). *Borgare, smeder och änkor: ekonomi och befolkning i Eskilstuna gamla stad och fristad 1750–1850*. Diss. Uppsala: Acta Universitatis Upsaliensis.
- Isacson, Maths and Magnusson, Lars (1983). *Vägen till fabriker: industriell tradition och yrkeskunnande i Sverige under 1800-talet*. Stockholm: Gidlund.
- : (1987). *Proto-Industrialisation in Scandinavia: Craft Skills in the Industrial Revolution*. Leamington Spa: Berg.
- Jansson, Karin Hassan (2013). 'When Sweden Harboured Idlers: Gender and Luxury in Public Debates, c. 1760–1830', in Rydén, Göran (ed.). *Sweden in the Eighteenth-Century World: Provincial Cosmopolitans*. Farnham: Ashgate, pp. 249–272.
- Kaiserfeld, Thomas (2009). *Krigets salt: salpetersjudning som politik och vetenskap i den svenska skattemilitära staten under frihetstid och gustaviansk tid*. Lund: Sekel.
- Klingnéus, Sören (1997). *Bönder blir vapensmeder: protoindustriell tillverkning i Närke under 1600- och 1700-talen*. Diss. Uppsala: Acta Universitatis Upsaliensis.
- Kriedte, Peter, Medick, Hans, and Schlumbohm, Jürgen (eds.) (2008). *Industrialization before Industrialization: Rural Industry in the Genesis of Capitalism* [pbk. reiss., originally published in 1981]. Cambridge: Cambridge University Press.
- Lamberg, Marko (2011). 'Introduction: Mapping Physical and Cultural Space in Pre-industrial Europe', in Lamberg, Marko, Hakanen, Marko and Haikari, Janne (eds.). *Physical and Cultural Space in Pre-industrial Europe: Methodological Approaches to Spatiality*. Lund: Nordic Academic Press, pp. 11–26.
- Landes, David S. (2003). *The Unbound Prometheus: Technological Change and Industrial Development in Western Europe from 1750 to the Present*, 2. ed. Cambridge: Cambridge University Press.
- Levi, Giovanni (1992). 'On Microhistory', in Burke, Peter (ed.) (1992). *New Perspectives on Historical Writing* [1. pbk. ed.]. Cambridge: Polity, pp. 93–113.
- Lindberg, Erik (2001). *Borgerskap och burskap: om näringsprivilegier och borgerskapets institutioner i Stockholm 1820–1846*. Diss. Uppsala: Acta Universitatis Upsaliensis.
- Lindqvist, Svante (1984). *Technology on Trial: The Introduction of Steam Power Technology into Sweden, 1715–1736*. Diss. Uppsala: Uppsala universitet.
- Lindström, Dag (2011). 'Genusarbetsdelning i det tidigmoderna skräväsandet', in Ågren, Maria, Jacobsson, Benny and Ågren, Maria (eds.). *Levebröd: vad vet vi om tidigmodern könsarbetsdelning?* Uppsala: Historiska institutionen, Uppsala universitet, pp. 179–209.
- : (2012). 'Privilegierade eller kringskurna? Hantverkaränkor i Linköping och Norrköping 1750–1800', *Historisk tidskrift*, 2012:2, pp. 218–246.
- Ling, Sofia (2016). *Konsten att försörja sig: kvinnors arbete i Stockholm 1650–1750*. Stockholm: Stockholmia.

- Lönnroth, Johan (2011). 'Before economics', in Sandelin, B. (ed.), *The History of Swedish Economic Thought* [originally published in 1991]. London: Routledge, pp. 1–43.
- Magnusson, Lars (1988). *Den bråkiga kulturen: förläggare och smideshantverkare i Eskilstuna 1800–1850*. Stockholm: Författarförlaget.
- : (1989). *Korruption och borgerlig ordning: naturrätt och ekonomisk diskurs i Sverige under frihetstiden*. Uppsala: Uppsala universitet.
- : (2003). 'Den ekonomiska diskussionen under frihetstiden – ett framlängesperspektiv', in Skuncke, Marie-Christine and Tandefelt, Henrika (eds.). *Riksdag, kaffehus och predikstol: frihetstidens politiska kultur 1766–1772*. Stockholm: Atlantis, pp. 25–38.
- : (2004). *The Tradition of Free Trade*. London: Routledge.
- Malmborg, Gösta (ed.) (1925). *Berättelser över de finare järn- stål och metallfabrikerna i Sverge åren 1754–1759*. Stockholm.
- : (1935). *Sven Rinmans tjänsteberättelser rörande den grövre järnförädlingen 1761–70*. Stockholm.
- Malmström, Carl Gustaf (1899). *Sveriges politiska historia från konung Karl XII:s död till statshvälfningen 1772. D. 4. 2. ed*. Stockholm: Norstedt.
- Markovits, Claude, Pouchepadass, Jacques, and Subrahmanyam, Sanjay (eds.) (2006). *Society and Circulation: Mobile People and Itinerant Cultures in South Asia 1750–1950*. London: Anthem.
- Marx, Karl (2000). *Capital: A Critique of Political Economy, Vol. I* [originally published in 1867]. [Electronic resource]. London: Electric Book Company. Available from: ProQuest. <<http://site.ebrary.com/lib/uppsala/detail.action?docID=2001687>> [accessed 28 April 2016].
- Mokyr, Joel (1992). *Lever of Riches: Technological Creativity and Economic Progress*. New York: Oxford University Press.
- : (2002). *The Gifts of Athena: Historical Origins of the Knowledge Economy*. Princeton, NJ: Princeton University Press.
- : (2011). *The Enlightened Economy: Britain and the Industrial Revolution 1700–1850* [originally published in 2009]. London: Penguin Books.
- Moore, Simon (1999). *Cutlery for the Table: A History of British Table and Pocket Cutlery*. Sheffield: Hallamshire.
- More, Charles (1980). *Skill and the English Working Class 1870–1914*. London: Croom Helm.
- Müller, Leos (1998). *The Merchant Houses of Stockholm, c. 1640–1800: A Comparative Study of Early-Modern Entrepreneurial Behaviour*. Diss. Uppsala: Acta Universitatis Upsaliensis.
- Nordbäck, Carola (2013). 'In Defence of Freedom: Christianity and the Pursuit of Human Happiness in Anders Chydenius' World', in Rydén, Göran (ed.). *Sweden in the Eighteenth-Century World: Provincial Cosmopolitans*. Farnham: Ashgate, pp. 177–199.
- Nordin, Christina (2009). *Oordning: torghandel i Stockholm 1540–1918*. Lund: Sekel.
- Nordin, Jonas (2003). 'Frihetstidens radikalism', in Skuncke, Marie-Christine and Tandefelt, Henrika (eds.). *Riksdag, kaffehus och predikstol: frihetstidens politiska kultur 1766–1772*. Stockholm: Atlantis, pp. 55–72.
- Nyberg, Klas (1992). *Köpes: ull, säljes: kläde: yllemanufakturens företagsformer i 1780-talets Stockholm*. Diss. Uppsala: Uppsala universitet.
- : (1999). *Kommersiell kompetens och industrialisering: Norrköpings ylleindustriella tillväxt på Stockholms bekostnad 1780–1846*. Uppsala: Acta Universitatis Upsaliensis.

- Nyberg, Klas (ed.) (2010). *Till salu: Stockholms textila handel och manufaktur 1722–1846*. Stockholm: Stads- och kommunhistoriska institutet.
- Nyman, Maria (2013). *Resandets gränser: svenska resenärers skildringar av Ryssland under 1700-talet*. Diss. Lund: Lunds universitet.
- Nyström, Per (1955). *Stadsindustriens arbetare före 1800-talet*. Stockholm: Tiden.
- O'Brien, Patrick K. (2006). 'Historiographical traditions and modern imperatives for the restoration of global history', *Journal of Global History*, 1 (1), pp. 3–39.
- Ogilvie, Sheilagh C. and Cerman, Markus (eds.) (1996). *European Proto-Industrialization*. Cambridge: Cambridge University Press.
- Ohlsson, Bror-Erik (2001). 'Städerna', in Ohlsson, Bror-Erik and Magnusson, Ulf (eds.). *Eskilstuna historia D. 2, städerna och landsbygden: från 1500-talet till 1830-talet*. Eskilstuna: Stadsarkivet, pp. 9–182.
- Orrje, Jacob (2015). *Mechanicus: Performing an Early Modern Persona*. Diss. Uppsala: Acta Universitatis Upsaliensis.
- Palm, Lennart Andersson (2005). *Borås stads historia. 1, Stad och omland fram till 1800-talets mitt*. Lund: Historiska Media.
- Pérez, Liliane (2008). 'Technology, Curiosity and Utility in France and in England in the Eighteenth Century', in Bensaude-Vincent, Bernadette and Blondel, Christine (eds.). *Science and Spectacle in the European Enlightenment*. Aldershot: Ashgate, pp. 25–42.
- Polanyi, Michael (1967). *The Tacit Dimension*. London: Routledge.
- Pratt, Mary Louise (1992). *Imperial Eyes: Travel Writing and Transculturation*. London: Routledge.
- Raj, Kapil (2007). *Relocating Modern Science: Circulation and the Construction of Knowledge in South Asia and Europe, 1650–1900*. Houndmills, Basingstoke: Palgrave Macmillan.
- Reith, Reinhold (2008). 'Circulation of Skilled Labour in Late Medieval and Early Modern Central Europe', in Epstein, Stephan R. and Prak, Marten Roy (eds.). *Guilds, Innovation and the European Economy, 1400–1800*. Cambridge: Cambridge University Press, pp. 114–142.
- Riello, Giorgio (2008). 'Strategies and Boundaries: Subcontracting and the London Trades in the Long Eighteenth Century', *Enterprise & Society*, 9 (2), pp. 243–280.
- : (2013). *Cotton: the Fabric that Made the Modern World*. Cambridge: Cambridge University Press.
- Riello, Giorgio and Parthasarathi, Prasanna (eds.) (2009). *The Spinning World: A Global History of Cotton Textiles, 1200–1850*. Oxford: Oxford University Press.
- Roberts, Lissa (2007a). 'Introduction (Geographies of Skill)', in Roberts, Lissa, Schaffer, Simon, and Dear, Peter (eds.). *The Mindful Hand: Inquiry and Invention from the Late Renaissance to Early Industrialisation*. Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen, pp. 189–196.
- : (2007b). 'Introduction (Workshops of the Hand and Mind)', in Roberts, Lissa, Schaffer, Simon, and Dear, Peter (eds.). *The Mindful Hand: Inquiry and Invention from the Late Renaissance to Early Industrialisation*. Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen, pp. 1–10.
- : (2007c). 'Mapping steam engines and skill in eighteenth-century Holland', in Roberts, Lissa, Schaffer, Simon, and Dear, Peter (eds.). *The Mindful Hand: Inquiry and Invention from the Late Renaissance to Early Industrialisation*. Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen, pp. 197–218.

- : (2012). ‘The Circulation of Knowledge in Early Modern Europe: Embodiment, Mobility, Learning and Knowing’, in Inkster, Ian (ed.), *History of Technology Volume 31*. [Electronic resource]. London: Bloomsbury Academic, pp. 47–68. Available from: ProQuest. <<http://ebookcentral.proquest.com/lib/uu/detail.action?docID=1080364>> [accessed 1 July 2016].
- Roberts, Lissa and Schaffer, Simon (2007). ‘Preface’, in Roberts, Lissa, Schaffer, Simon, and Dear, Peter (eds.). *The Mindful Hand: Inquiry and Invention from the Late Renaissance to Early Industrialisation*. Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen, pp. XIII–XXVII.
- Roberts, Lissa, Schaffer, Simon, and Dear, Peter (eds.) (2007). *The Mindful Hand: Inquiry and Invention from the Late Renaissance to Early Industrialisation*. Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen.
- Roche, Daniel (1996). *The Culture of Clothing: Dress and Fashion in the Ancien Régime* [originally published in 1994]. Cambridge: Cambridge University Press.
- : (1998). *France in the Enlightenment*. Cambridge, Mass.: Harvard University Press.
- : (2002). ‘Voyages, Mobilités, Lumières’, *Revue de synthèse*, 123 (1), pp. 17–35.
- Ronnestam, Bo J. (2013). *Fredmans tid: frihetstiden – guldåldern för Stockholms urmakare*. Stockholm: Carlsson.
- Rothschild, Emma (2011). *The Inner Life of Empires: An Eighteenth-Century History*. Princeton, NJ: Princeton University Press.
- Runefelt, Leif (2005). *Dygden som välståndets grund: dygd, nytta och egennyta i frihetstidens ekonomiska tänkande*. Stockholm: Stockholms universitet.
- Rydberg, Sven (1951). *Svenska studieresor till England under Frihetstiden*. Diss. Uppsala: Uppsala universitet.
- Rydén, Göran (1991). *Hammarlag och hushåll: om relationen mellan smidesarbetet och smedshushållen vid Tore Petrés brukskomplex 1830–1850*. Stockholm: Jernkontoret.
- : (1998). ‘Skill and Technological Change in the Swedish Iron Industry, 1750–1860’, *Technology and Culture*, 39 (3), pp. 383–407.
- : (2008). ‘System och föränderlighet i synen på det svenska bergsbruket under 1700-talet’, in Nordin, Jonas (ed.). *Sjuttonhundredatal*. Stockholm: Svenska sällskapet för 1700-talsstudier, pp. 63–81.
- : (2013a). ‘Eskilstuna Fristad: The Beginnings of an Urban Experiment’, in Rydén, Göran (ed.). *Sweden in the Eighteenth-Century World: Provincial Cosmopolitans*. Farnham: Ashgate, pp. 123–144.
- : (2013b). ‘The Enlightenment in Practice: Swedish Travellers and Knowledge about the Metal Trades’, in Dunér, David (ed.). *Sjuttonhundredatal. Nordic Yearbook for Eighteenth-Century Studies*. Stockholm: Svenska sällskapet för 1700-talsstudier, pp. 63–86.
- : (2013c). ‘Viewing and Walking: Swedish Visitors to Eighteenth-Century London’, *Journal of Urban History*, 39 (2), pp. 255–274.
- Rydén, Göran (ed.) (2013). *Sweden in the Eighteenth-Century World: Provincial Cosmopolitans*. Farnham: Ashgate.
- Rönnow, Sixten (1944). *Wedevågs bruks historia: minnesskrift tillägnad brukspatron Helge Norrlander på hans 60-årsdag den 17 mars 1944*. Stockholm.
- Sabel, Charles and Zeitlin, Jonathan (1985). ‘Historical Alternatives to Mass Production: Politics, Markets and Technology in Nineteenth-Century Industrialization’, *Past and Present*, 108, pp. 133–176.

- Sahlin, Carl (1925). Introduction to Malmborg, Gösta (ed.). *Berättelser över de finare järn- stål- och metallfabrikerna i Sverige åren 1754–1759*. Stockholm, pp. V–XII.
- : (1931). *Svenskt stål före de stora götstålsprocessernas införande: historiska anteckningar*. Stockholm.
- Schlumbohm, Jürgen (2008). ‘Relations of production–productive forces–crisis in proto-industrialization’, in Kriedte, Peter, Medick, Hans, and Schlumbohm, Jürgen (eds.). *Industrialization before Industrialization: Rural Industry in the Genesis of Capitalism* [pbk. reiss., originally published in 1981]. Cambridge: Cambridge University Press, pp. 94–125.
- Sennefelt, Karin (2001). *Den politiska sjukan: Dalupproret 1743 och frihetstida politisk kultur*. Diss. Hedemora: Gidlund.
- : (2011). *Politikens hjärta: medborgarskap, manlighet och plats i frihetstidens Stockholm*. Stockholm: Stockholmia.
- Sigurdsson, Irene (1982). ‘Manufakturer i Stockholm år 1740’, in *Stadsvandringar 5*. [Electronic resource]. Stockholm: Stockholms stadsmuseum, p. 9–29. Available from: Stockholms stadsmuseum <<https://stockholmskallan.stockholm.se/post/8189>> [accessed 30 May 2016].
- Smith, Adam (2008). *An Inquiry into the Nature and Causes of the Wealth of Nations*, Sutherland, Kathryn (ed.) [selected ed., reiss., originally published in 1776]. Oxford: Oxford University Press.
- Smith, Cyril S. (1961). ‘The Interaction of Science and Practice in the History of Metallurgy’, *Technology and Culture*, 2 (4), pp. 357–367.
- Smith, Pamela H. (2007). ‘In the sixteenth-century goldsmith’s workshop’, in Roberts, Lissa, Schaffer, Simon, and Dear, Peter (eds.). *The Mindful Hand: Inquiry and Invention from the Late Renaissance to Early Industrialisation*. Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen, pp. 33–58.
- Sonenscher, Michael (2012). *Work and Wages: Natural Law, Politics and the Eighteenth-Century French Trades* [reiss., ed., originally published in 1989]. Cambridge: Cambridge University Press.
- Sundberg, Gunnar (1978). *Partipolitik och regionala intressen 1755–1766: studier kring det botteniska handelsvångets hävande*. Diss. Uppsala: Acta Universitatis Upsaliensis.
- Sunesson, Karl-Henrik (1998). *Jonas Alströmer, en man och hans livsverk*. Frösön: Tecknade bilder förlag.
- Söderberg, Johan, Jonsson, Ulf, and Persson, Christer (1991). *A Stagnating Metropolis: The Economy and Demography of Stockholm, 1750–1850*. Cambridge: Cambridge University Press.
- Söderlund, Ernst (1943). *Stockholms hantverkarklass 1720–1772: sociala och ekonomiska förhållanden*. Stockholm: Norstedts.
- : (1949). *Hantverkarna. D.2, Stormaktstiden, frihetstiden och gustavianska tiden*. Stockholm: Tiden.
- Tribe, Keith (2015). *The Economy of the Word: Language, History and Economics*. [Electronic resource]. New York: Oxford University Press. Available from: Oxford Scholarship Online. <<http://www.oxfordscholarship.com/view/10.1093/acprof:oso/9780190211615.001.0001/acprof-9780190211615>> [accessed 23 February 2017].
- Wakefield, Andre (2009). *The Disordered Police State: German Cameralism as Science and Practice*. Chicago: University of Chicago Press.
- Walldén, Gösta (1955). ‘Manufakturarbetarnas sociala förhållanden’, in Nyström, Per, *Stadsindustriens arbetare före 1800-talet*. Stockholm: Tiden, pp. 314–365.

- Wallis, Patrick (2008). 'Apprenticeship and Training in Premodern England', *Journal of Economic History*, 68 (3), pp. 832–861.
- Wernstedt, Folke (1935). *Järnkrämare i Stockholm 1651–1890: historiska och biografiska anteckningar*. Stockholm.

Non-published Literature

- Murhem, Sofia and Ulväng, Göran, *forthcoming*. 'To Buy a Plate: Retail and Shopping for Porcelain and Faience in Stockholm During the Eighteenth Century', in Ilmakunnas, Johanna and Stobart, John (eds.). *A Taste For Luxury in Early Modern Europe: Display, Acquisition, and Boundaries*. London: Bloomsbury Academic.

Acta Universitatis Upsaliensis
UPPSALA STUDIES IN ECONOMIC HISTORY
Editors: Lars Magnusson & Mats Morell

Volumes 1–9 are part of the series *Ekonomisk-historiska studier*, Scandinavian University Books, which were published in 1965–1973 by Esselte Studium, Stockholm.

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