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HISTORY OF KNITTING BEFORE MASS PRODUCTION



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History of Knitting before Mass Production

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Cover illustration
Silesian knitted carpet from 1674
National Museum in Wrocław

Table of contents

I. Introduction / 5–12

II. The Beginnings of Hand Knitting / 13–19

1. Knitting or Knotless Netting / 13–15
2. Knitwear in the Early Middle Ages / 15–19

III. The First Technical Upheaval in European Knitting in the Thirteenth Century and the Appearance of Guilds / 20–23

IV. Hand-Knitting Production in the Sixteenth–Eighteenth Centuries / 24–46

1. Knitting in Italy and Spain / 24–25
2. Knitting in the British Isles / 25–28
3. Knitting in France / 28–33
4. Knitting in Switzerland and in the Netherlands / 33–34
5. Knitting in Central Europe / 34–41
6. Knitting in Eastern and Northern Europe / 41–46
7. Knitting outside Europe / 46

V. Diffusion of the Knitting Machine in England and France from the End of the Sixteenth to the End of the Eighteenth Century / 47–66

1. Vicissitudes of William Lee's Device / 47–49
2. Diffusion of the Knitting Frame in the British Isles / 49–53
3. Diffusion of the Knitting Frame in France from the Middle of the Seventeenth Century to the End of the Eighteenth Century / 53–66

VI. Diffusion of the Knitting Machine and Manufactures in Southern, Central, Northern and Eastern Europe from the End of the Seventeenth to the End of the Eighteenth Century / 67–98

1. Italian, Spanish and Swiss Knitting / 67–69
2. Knitting Production in the Netherlands / 70
3. Bohemian, Austrian and Hungarian Knitting / 71–77
4. Knitting in Different German Countries / 77–87
5. Machine Knitting in Scandinavia / 87–88
6. Machine Knitting on the Lands of the Former Polish Republic and Silesia and West Pomerania / 88–93
7. Machine Knitting in Russia, the Ukraine and the Baltic Countries / 93–97
8. Knitting in Rumania and in the Countries of the Balkan Peninsula / 97
9. The Hosiery on Knitting Frames outside Europe / 98

VII. Techniques of Hand- and Machine-Knitting Production / 99–118

1. Production Premises / 99–100
2. Treatment of the Raw Material and Spinning / 100–101
3. Hand-Knitting Technique / 101–105
4. Machine-Knitting Technique / 105–108
5. Technical Development of the Knitting Machine in the Eighteenth Century / 108–112
6. Finishing of the Knitwear / 112–117
7. Productivity Norms in Hand and Machine Knitting / 117–118

VIII. Consumption of Knitted Garments in Europe in the Sixteenth–Eighteenth Centuries / 119–145

1. Assortment of Hand- and Machine-Knitted Products / 119

Headgear	/ 119–125
Knitted Garments	/ 125–130
Hand Coverings	/ 131–136
Leg Coverings	/ 136–142
Other Products	/ 142
2. The Use of Knitted Garments in Different European Countries	/ 143–145
IX. (I. Turrau with K.G. Ponting) Knitted Masterpieces	/ 146–162
Introduction	/ 146–154
Catalogue	/ 154–162
A. Silesian	/ 154–157
B. Alsatian	/ 157–160
C. German	/ 160–162
X. Peasant Knitting	/ 163–174
1. Research Problems	/ 163–164
2. Tools and Patterns used in Popular Knitting	/ 164–166
3. Knitted Fabrics in European Popular Costume	/ 166–172
4. Peasant Knitting outside Europe	/ 172–174
XI. Conclusion	/ 175–180
Footnotes	/ 181–211
List of Illustrations	/ 212–214

I Introduction

The aim of the present book is to fill the gap in the history of the textile industry. The history of English knitting has already been elaborated; in other countries, however, interest has been limited to the production of certain regions only or discussion has centred on particular collections of relics. There has been no research done into the knitting of southern, central and eastern Europe. Therefore, we shall discuss the problem of knitting production, beginning with Coptic and Arabian articles, passing on to the introduction of knitting with five needles instead of two, somewhere around the thirteenth or beginning of the fourteenth century, and finally to the blossoming of hand knitting in the fifteenth and sixteenth centuries and the invention of the simple knitting machine in 1589. This tool-type frame, the most perfect of all, became very popular in England and France during the seventeenth century and in a majority of European countries between the end of the seventeenth and beginning of the nineteenth century. But it was the invention of the circular knitting machine at the beginning of the nineteenth century which led to factory mass production and in the twentieth century brought hosiery into serious competition with woven fabrics.

Knitting is a branch of textiles which most closely connects production with consumption, since this technique was used for producing ready-made clothing. Knitting offers the possibility of modelling flexible space forms of varying sizes. Globular or cylindrical shapes of human silhouette would be difficult to cover with clothes made from cloth or pieces of felt, which would limit movement. For this reason, coverings, and particularly the head, hand and leg coverings, were made in the beginning with sprang technique, knotless netting or crocheting. Those three textile techniques, however, never went beyond the limits of women fancy-work or, nowadays, elements of artists' work. Only knitting on two to five needles led to the invention of the knitting machine, and, in the nineteenth century, to mass production. In the felt industry, headgear or whole garments had to be moulded or cut and sewn from pieces of felt, while knitting either needles or machine made it possible to produce ready-made garments, coverings for hands, feet or head. Owing to this, there was a very close link between knitting and the demands of fashion. The pressure of these demands not only contributed to the early invention of the machine, but also to its constant improvement and later modification. Thus, studies on the history of knitting reveal a relationship between the technical possibilities of production and the requirements of consumption, between technology and fashion. This problem constitutes an important subject in the investigations of a historian of material culture.

Knitting appeared from the need for close-fitting and at the same time elastic coverings for the head, hands and feet. It developed first in the Mediterranean countries and later in central and particularly northern Europe, in the Baltic countries. The demand for knitted articles became increased greatly in the late

Middle Ages. An immense increase in demand was brought about by the rise in fashion of stockings which became a standard item worn along with breeches in men's attire, first worn in south and west European countries. Mass production of stockings led to the invention and introduction of the knitting machine. The technical complications of this machine and its high cost were the reasons why in many European countries it was used mainly by state sponsored joint-stock companies or by private businessmen in centralized manufactures connected sometimes with other textile manufactures. This small tool-type machine also constituted the equipment of craft workshops, of domestic producers who worked in the output system depending on trade capital or of workers in dispersed manufactures. Wherever machines were imported together with raw material and foreign specialists, the knitting machine could be found in centralized manufactures. The existence of knitting establishments equipped with machines in the seventeenth and eighteenth centuries, proves the acceptance of French fashion in that particular European country and considerable differentiation between the branches of textile production. Thus, the history of European knitting not only brings to light unpublished material concerning the relationship between production and consumption, but also illuminates the socio- technological problem of the production.

Encyclopaedic definitions of knitting are in general of little precision. They describe it as a technique of obtaining a row of stitches from a single thread.¹ More precise definitions are given in specialized studies, particularly in that by I. Emery. Among the different textile techniques consisting of stitch formation, she singles out knitting on needles and crocheting. Needles generate rows of perpendicular stitches, while the crochet horizontal or sideways ones.² We are not concerned with knotless netting, a technique producing fabrics very much like hosiery in appearance.³ Knitting is considered to be a textile technique consisting in the formation of rows of elastic stitches from a thread of unlimited length, using either two or more needles, or later a machine. We are not concerned with crocheting, used rather for making decorative items and thus of little importance in the knitted garment industry. In current literature on the subjects of the history of knitting those statements most open to discussion are presented in H.E. Kiewe's book. Even the woven textures of *kaunakes* type are considered to be knitted goods and the author claims to have seen these items represented on ancient carvings, in texts of the Old Testament and in Celtic etymology. The lack of analysis of concrete sources has led the author to fantastic conclusions hence this work cannot be reckoned as scientific literature. Among other general works the numerous papers of Braham Norwick from New York are worth mentioning. The author is interested not only in knitting as textile technique but also in other raw materials. Also the book of M. Grass provides some general information. Much better documented are some publications of Scandinavian specialists concerning not only one country in particular but all this part of Europe. After the symposium in Österbottens Museum in Finland in 1984 the problem of knitting as Scandinavian tradition from the sixteenth century was discussed in the papers of thirteen specialists from Sweden, Norway, Denmark, Finland and Iceland,⁴ the question of the peasant hand knitting remaining as the centre of common interest.

Writings on the subject of knitting begin to appear in the middle of the eighteenth century. The Age of Enlightenment is characterized by interest in new techniques, the knitting machine introduced into production was at that time the most complex tool-type machine. Its description in Diderot's encyclopaedia is the first one and is repeatedly cited in subsequent literature on the subject.⁵ The earliest English studies were influenced by the social situation: the struggle of knitters working on machines for better working conditions. Books written by Henson 1831,⁶ and Felkin 1867,⁷ are characterized by excellent knowledge of English legal procedures and statistical data, vital to the fight in which these two historians and at the same time industrial workers were involved. They have provided us with a great deal of information about the invention and gradual introduction of the knitting machine, and have described in detail its construction and its most minute technical improvements. Moreover, they noticed the close interrelationship between knitting production and the demand for a particular type of product, often dictating the widening of production possibilities according to current fashions. These matters were many a time to escape the attention of later historians of the textile industry.

In the later period, England's maintains its leading position in studies on the beginnings of knitting and the development of machine production. J. Norbury presented an interesting though not well documented hypothesis about Arabian knitting on frames.⁸ The oldest relics have been described by A. P. Kendrick, C. J. Lamm, S. M. Levey and J. P. Wild.⁹ L. Bellinger from the United States has examined one of the oldest relics, and recently K. D. Burnham of Canada has considerably shifted the dating of the beginnings of knitting by establishing that the first Coptic relics were products of knotless netting.¹⁰ The beginnings of machine knitting are the second field of interest of English and Anglo-Saxon historians of knitting. F. A. Wells presents the development of this technique in England, while much new archival material from the central region of England is provided in the works of S. D. Chapman.¹¹ Important archival information has been given in a popularized scientific book by M. and A. Grass.¹² Recently largescale archival investigation is being carried out by the Pasold Research Fund.

Research undertaken by K. G. Ponting and P. Lewis in west European archives and museums, concerning the William Lee's stocking frame, brought new discoveries, as did the research of N. B. Harte, I. C. M. Barnes, P. Croft, C. Gulvin and T. Rath in their histories of knitting and hosiery in differing parts of England and Scotland. The research of English specialists also includes the most important French knitting regions of the eighteenth century such as Lower Champagne and Lower Languedoc.¹³ After this detailed research the new synthesis of the knitting and hosiery history in the British Isles should be elaborated.

M. Dubuisson, the foundress of the Museum of Knitting in Troyes, has elaborated a brief synthesized study and catalogue of the collection.¹⁴ Important supplementary material is provided by catalogues from Nîmes and Le Vigan which present the largest collections of knitted articles from the second largest centre of production after Champagne.¹⁵ R. d'Harcourt in his work on early Peruvian textiles described similar but different techniques similar to knitting and concluded that the latter did not exist in the American cultures.¹⁶ Studies

by historians of economic development in the sphere of the history of knitting are scattered in regional journals and only Troyes has been discussed in a separate book.¹⁷ The article by P. M. Bondonio describes the development of stocking production during the time of Colbert.¹⁸

There are also studies dedicated to the history of hand knitting in Dourdan at the time of Henry IV¹⁹ and the introduction of the machine in the South of France,²⁰ in Rouen, Orléans,²¹ Nantes²² and finally Compiègne.²³ Machine production of hosiery played such an important role in France in the seventeenth and eighteenth centuries that some place was devoted to it in studies on the history of economic development and the history of the working class.²⁴ Many French works discuss rather some particular questions such as the history of knitted liturgical gloves,²⁵ Alsatian knitted carpets and the distribution in Europe of the affiquet, a tool used as a prop when working with two needles, its use being a reflection of the degree of development of hand knitting in different countries.²⁶ For this reason a complete history of French knitting awaits elaboration as so far only particular topics or those having a contributory character have been dealt with.

It is difficult to find recent publications dealing with French knitting history. I would like to mention here the doctor's thesis of J. Poisat prepared in the Economic Faculty of Lyon II University. The first part is dedicated to the history of French knitting, while the second part is concentrated on the history of hosiery in the region of Roanne in the years 1880-1973. The historical introduction numbers 125 pages although the author does not seem to be acquainted with the literature of the history of French knitting. He does not seem to have used the numerous notes of my book published in 1979 about the history of European knitting nor other information provided by the catalogue of the excellent library in the Musée Historique des Tissus in Lyon. No sources in any language other than French are mentioned; therefore I suppose he was not able to use numerous articles published both in *Textile History* and in *Bulletin de Liaison de Centre Internationale d'Etude des Textiles Anciens*, those two being the most important reviews contributing to the studies on the European (including French) knitting history. Short introductions in technical hand-books about knitting often give outdated and inaccurate information, but are nevertheless used in this doctor's thesis. The author is not able to give the modern date for the beginning of knitting and fails to mention the knitting and knotless netting in Coptic and Arabian times. Neither does he show much interest in the earliest craft of knitting in Paris; the earliest information of this craft reaches back to the year 1268 but the author gives the date 1527. He fails to record the large craft production of hand knitting in France from the early sixteenth century and the specialized knitting of carpets in Alsace. Only one of the three knitted carpets from Colmar is mentioned. The author is more interested in the invention of the knitting frame but fails to notice the recent research about William Lee and the diffusion of his machine. He only offers some information published long ago about the diffusion of knitting and knitting made in France from the second half of the seventeenth

in France. In the second part of the book the author relates the history of hosiery in Roanne and its region from 1880 up to 1973. He offers new information about important French mills and the conditions of the workers' life. We can also find here some mention of the hand knitting production of the region making use of needles, crochet-needle and special laths which were employed in peasant knitting of some European countries such as Bohemia, for example. It is a pity that the author did not limit himself to the history of knitting and hosiery in Roanne in the last hundred years. So my short review of the French knitting history in the chapters four and five of the present book constitutes the only synthesis of this subject. I did not mention in my Polish edition of the present book the study of S. Ferchiou on the fabrication of caps in modern Tunisia, a very important work for the guild knitting history.²⁷

In Switzerland a book has been published on the knitting manufactures established in Saxony by the Huguenot emigrants.²⁸ The question of Austrian knitting has been particularly well studied.²⁹ In other German-speaking countries, especially Prussia, the best-researched era concerns the time of the popularization of machine knitting by the Huguenot emigrants.³⁰ G. Schmoller published a good source of information about textile guilds in Strassburg up to the seventeenth century.³¹ K. Schlabbow described the knitted goods discovered in Lübeck.³² The much-quoted work of C. Aberle, which forms part of the compiled monograph on the history of knitting, contains, by and large, inaccurate and outdated information and quotes some statements mainly from Great French Encyclopaedia without mentioning the source.³³

The Scandinavian literature has within it important achievements in the history of knitting. M. Hald was the first to distinguish the knotless netting technique and give a basic technical interpretation of the material excavated in Denmark.³⁴ She wrote about the knotless netting or looped needle netting technique and showed some phases of development of this technique. I return to this important question in the first chapter. A Norwegian, O. Nordland, classified in detail the types of knotless netting starting from the oldest archaeological relics up to the rural handicrafts. The detailed and not always clear definitions of this author are somewhat controversial, but indirectly his book is also of great importance to the history of knitting. In Herning, Denmark, there is a Museum of Knitting which is the second in Europe after Troyes in Champagne. The history of the Jutland production centre has been traced by H. P. Hansen.

The Danish knitting history has been much contributed in the last eleven years. M. Ploug published a book about 137 knitted waistcoats relics in Danish museums dating mainly from the nineteenth century. L. Warburg gave numerous papers about Our Lady as knitter and some small knitting tools and relics. Another Danish vast study about the stocking gives some historical information. The history of Swedish rural knitting has been published by I. Wintzell. It supplies additional information to the monograph on knitting technique by A. M. Nylen.³⁵

Norwegian literature provides a study on the set of eight knitted waistcoats

and nineteenth centuries. One of the authors of this book A. Kjellberg also wrote two papers about knitting history in Norway. E. E. Gudjonsson published the short knitting history in Iceland. Two conferences about the history of Scandinavian knitting organized in 1984 and 1986 in Finland and Sweden advanced the state of this research.³⁶

As refers to the other countries there are no technical publications available. W. Bodmer in the history of Swiss textiles provides some data about the development of knitting in that country. Dutch knitting has a monograph on the largest Jansen factory preceded by an historical introduction.³⁷ There are no books available pertaining to the early development of Italian knitting. The rich museum collections have not been studied, while information on productions is scattered among historical monographs of particular towns. The stockings collection in the Museo Franceschi in Milan is simply a collection of remembrances of famous personalities.³⁸ There are no publications pertaining to Spanish knitting except for a few mentions in museum catalogs and books on the history of economic development.³⁹ Historical and ethnographical articles provide material on Czech and Slovak knitting. N. Bažantová and D. Stehlíková published a big paper about the gloves of saint Adalbert from the fourteenth century. J. Staňková shows the peasant knitting in Bohemia and A. Špiess analyses the knitting guilds in Slovakia.⁴⁰ Information concerning the development of Russian knitting has been elaborated by me on the basis of museum relics.⁴¹ I have also written a history of Polish knitting.⁴² The present book provides some additional material on this subject.

Owing to the unavailability of information on the history of knitting in many European countries, the material for this book was drawn from three types of sources: 1) material, i.e., relics in the form of knitted products and the tools; 2) iconographic, and 3) written.

The material sources were searched for in the museums of most European countries. In the classification of the oldest relics great difficulties were encountered in differentiating knitted products from knotless netting ones. Most of these products are found in church treasures or museums, exhibited through a glass pane, thus being inaccessible to technological analysis. Access was much easier for various products from the sixteenth-eighteenth centuries, i.e., different types of headgear such as caps, berets, hats or nightcaps, as well as stockings, drawers and trousers, gloves and mittens, waistcoats, doublets, overcoats, skirts, mantles, children's dresses, belts and suspenders. For comparative purposes rural hand-knitted products from the last century have also been investigated. Different production tools and the finish of the knit goods were also taken into account. The oldest of the preserved machines come from the early eighteenth century. An attempt has been made to follow later modifications in their construction and the structural differences connected with, for instance, the Saxon or Swedish knitting centres. Mention is also made of knitted products, not belonging to the garment category, carpets among them.⁴³

Iconographic sources are of great importance for dating diffusion of knitting with four and five needles in Italy and Germany. Numerous iconographic documents representing hand-knitters in different European countries have enabled us to determine the system of work and method of holding the needles. In addition, technical drawings provide information about the construction of

the first knitting machines and show the production process inside workshops and manufacturing rooms. The simplicity of the technique of hand knitting is such that the iconographic representations are only slightly deformed by the artist's imagination or lack of drawing ability. Technical drawings from the Age of Enlightenment are generally quite precise.

Written material pertaining to the history of knitting gives information relating to the production and consumption of these products. In a book covering all the European countries it was impossible to utilize all this information fully. It was easier to find sources relating to hand-made hosiery production organized in guilds or to materials pertaining to manufactures. The best utilized were archive records from the Polish territories, and fragmentarily those from Russia, Hungary and Czechoslovakia. In other countries it was also possible to gain access to numerous published sources, particularly in the German-speaking region. In this way, mentions of knitters' guilds and manufactures were taken into account in the majority of European countries. Nevertheless, information about some guilds, manufactures or even entire knitting centres could have escaped our attention owing to the material being widely dispersed in not easily accessible regional papers. Even more difficult proved to be the utilization of sources pertaining to the consumption of knitted products. These consist primarily of probate inventories, as well as testaments, accounts, dutiable articles, mentions in memoirs or literature. Usually only the latter have been published. Numerous probate inventories remain in manuscript. To fully utilize the scattered references would exceed the capability of one researcher. An attempt was made to utilize to the fullest the probate inventories from Poland, particularly with reference to the sixteenth and seventeenth centuries. On the basis of the material used, an attempt was made to describe the general character of production, as well as the occurrence of knitted products in different European countries. A detailed history of knitting in particular countries still awaits elaboration.

The present book is the fruit of many years of research into the history of the European textile industry. This study would not have appeared without the help I received from many institutions and people. Here I would like to express my acknowledgements for their help. The Institute of the History of Material Culture of the Polish Academy of Sciences contributed to this work by financing two of my trips, each of three months' duration, one to the USSR in 1964, and the other to France, on a scholarship from the École des Hautes Études des Sciences Humaines in 1973. Thanks to the Pasold Research Fund I spent one month in England and a week in Denmark to advance my investigations. In addition I carried out museum research in Italy, Spain, Austria, Sweden, Norway, Belgium, Holland, the German Democratic Republic, Czechoslovakia, Hungary, Rumania, Bulgaria, Yugoslavia, Greece and Georgia. I wish to express my sincere gratitude to my colleagues, historians of the textile industry and costume in these countries, for enabling me to gain access to museum collections, to iconographic and archive records. I am particularly grateful to all museums for sending me photographs of knitted relics and permitting me to publish them.

Recently the possibility has appeared to publish the book in English version, edited by the Institut für History of Material Culture of the Polish Academy

of Science. A rough translation of the first edition of the present book (History of Knitting in Europe till the Beginning of the Nineteenth Century, Warsaw, 1979) was made for private use in the National Museum of American History, Science, Technology and Culture in Washington, and kindly sent to me by Miss Rita J. Adrosko, the curator of Division of Textiles of this Museum. It revealed the actual demand for the English edition of the monograph. Thus appeared the new version, renewed and updated. I am very thankful to my friends and colleagues, historians of knitting history, who helped me to complete my research and send books and papers published after 1976, the year when I finished the first version of the present handbook. The change of the title shows my interest in Coptic and Arabian knitting, as well as that of the Near East, North Africa, Caucasus, and North America. I also found it impracticable to deal with the question of knitted carpets. Chapter IX, discussing this subject, is a short version of the paper published previously in "Textile History" in 1976 with the late Kenneth George Ponting. I am convinced that my co-author would be satisfied with this solution. Knitted carpets were a peak achievement of the patterned hand knitting guild. I would like to thank to my translator Agnieszka Szonert and Chris Broomfield to his help in correcting the English translation of this book.

The previous, Polish, edition of the book dealt primarily with knitted garments and focused on the territory of Europe. For the present edition, much supplementary research has been done and the area of interest has been considerably widened. I hope that the new, and, this time, English version will be interesting to all those who are interested with textile history. Even if the first language of the book was Polish it will now be more accessible to all specialists.

Warsaw, December 1988.

II Beginnings of Hand Knitting

1 Knitting or Knottless Netting?

Dating the first knitted fabrics presents basic difficulties. Let us discard the undocumented conjectures about the knitted and not sewn robe of Christ mentioned in the Bible, or the reference to Penelope as a knitting woman. The oldest relics of the history of knitting are the socks and other small items of Coptic origin from the first centuries A. D. Nevertheless, D. K. Burnham has established on the basis of technological analysis that the collection of Coptic relics kept in the Royal Ontario Museum in Toronto was produced by the knottless netting technique.¹ Even earlier, M. Hald, while analysing Danish textile fabrics from the Bronze Age up to the early Middle Ages, established that these were produced by the same technique, although previously they were considered to be knitted items. She describes the knottless netting technique "as a kind of sewing based on loops or meshes which can be combined in various way and presents about ten different solutions based on analysis of some kind of relics".² On the basis of the analysis of a few Coptic relics preserved in the Victoria and Albert Museum in London, I am convinced that the theory of D. K. Burnham is correct in this judgment. Nevertheless, all future determinations as to whether a particular sample from the oldest relics has been knitted or produced by knottless netting require individual technological examination. In my investigations only careful registration of these items was possible on the basis of literature or museum research. The oldest knitted items are kept in museums or church treasures under glass which makes microscopic examination impossible. The present chapter provides information on the oldest knitted relics although after further investigation some of them may prove to be products of knottless netting. (II. 2)

According to some definitions of knitting, one need not place so much importance on the distinction between articles produced by knottless netting and those made with two needles. Knitting is understood to produce a texture composed of elastic rows of stitches made out of a thread of indefinite length by the use of two or more needles, or (more recently) a machine. Knottless netting was made with one needle and the left-hand fingers. In many European languages the name of this technique is in fact connected with the term stitch, e.g. in Spanish — *puntos*, in Italian — *maglia*, in German in addition to *Strickerei* and *Wirkerei* — hand and machine knitting, the term *Maschen* is also used. In English, to knit, knitting derives from the very activity,³ similarly as *dzianie*, *dzianka*, *dziantina* (knitting, knitted item, knitwear) in old Polish, *wyazanie*

– Russian, *pletení*, *šitkovany* — Slovak. The term for knitwear is sometimes derived from the most popular product in use, such as French — *bonneterie*, or Czech *punčochářství*. The technique of knottless netting was differentiated and explained only recently. O. Nordland identified 7-9 methods of twisting and knitting the yarn through in the creation of the fabric. J. Emery, in her compendium on textile techniques, distinguishes not only knitting with needles and crocheting, but also a number of techniques derived from the fundamental stitches in each of these techniques.⁴

Articles made by knottless netting fulfilled the same purpose as the hosiery of later days: they provided elastic and close-fitting coverings for hands, feet and head, of particular importance in a cold climate. They also protected the feet clothed in sandals only. The difference between knottless netting and knitting is well characterized by the Finnish country proverb: "the who wears knitted mittens has an unskilled wife".⁵ This differentiation comes from a country where both types of techniques are still in use. Knottless netting was much more time-consuming than knitting and required great nimbleness of the left-hand fingers replacing the instrument. A similar skill was also required in spinning fine yarn on the spindle. The time-consuming technique of knottless netting in the production of gloves, stockings and, less frequently caps, for personal use, is still being used in mountainous regions, particularly in Scandinavia. In Iran, footwear made at home by the knottless netting technique is being used to this day.⁶ However, this technique is linked with home production for personal use. Whenever the question of economic and technological calculation, the market profitability, is involved, certain qualities of knottless netting—such as greater strength, better compactness, smoothness and durability—are no longer appreciated. The mass demand for elastic garment items displaced knottless netting even from home production. The introduction of two needles instead of one long needle was the first improvement in the field of production of articles consisting of elastic stitches formed from a single thread, much longer in knitting than in knottless netting.

Investigations into the origins of knitting should centre on the analysis of all the excavation material from the territory of the Roman Empire. Despite the queries raised by D. K. Burnham on the origin of some Coptic knitted articles, other relics excavated in Egypt deserve further study. The question remains unclear whether the socks formed part of offerings to the dead or were used as foot coverings.⁷ Some of the Roman textile relics were recently investigated by J. P. Wild who describes as knitted fabric a fragment found on the territory of present Holland and dated to the end of the second century A. D.⁸ L. Bellinger considers also as knitted fabric relics from the period prior to the destruction of Dura, therefore, pre-256, kept in the Yale University Art Gallery in USA.⁹ Similar conclusions were also drawn about the knitted fabrics in English, French and Austrian museums.¹⁰ W. Endrei considers as knitted items the fragments of garments found by the Hungarian expedition in Nubia originating from the sixth and seventh centuries A. D. The Coptic linen socks from the sixth-eleventh centuries knitted in stripes with woolen yarn on top from Umělecko-Průmyslové Museum in Prague are knitted, while socks similar in appearance in the Hermitage are a product of knottless netting.¹¹ On the other hand, women's stockings from the second century A. D. found in

Martres-de-Veyre and preserved in Clermont-Ferrand, are sewn from cloth.¹² The leggings preserved in Delémont, are dated to somewhere between the seventh and the twelfth centuries.¹³ The earliest Scandinavian relics have been carefully analysed and judged to be products of knottless netting.¹⁴ It has also been established that the knitting technique was unknown in Peru before the Spanish invasion.¹⁵ Two ivory needles, each about 28 cm long seem to evidence the familiarity with knitting technique in ancient Gaul; one of them appears to have been broken. They were found in the neighbourhood of Nîmes and are dated to the beginning of the second century A. D. They may have been used for making fine silk tissues.¹⁶ This fragmentary data on the relics from the second to the seventh centuries are presented here to show primarily that further technological investigations are necessary to establish whether knitting spread over the territory of the old Roman Empire and later in the Mediterranean world.

2

Knitwear in the Early Middle Ages

The first products defined as knitted were small in size and usually of one colour. Later products, probably of Arab origin, have survived in larger fragments and were generally produced from multicoloured yarn. The earliest of them are knitted socks, Coptic or Arab, kept in the Musées Royaux d'Art et d'Histoire in Brussels, in the section with Coptic and Arabian fabrics. It is impossible to date them accurately. The length of the foot-part is 14 cm. They are made of good quality wool, in stripes of different shades of beige and green. They remind one of the cotton stockings knitted in multicoloured stripes which L. Bellinger dates to the early twelfth century. These were found in Egypt but the authoress places them among the products of Indian Knitting.¹⁷ (Il. 1).

I saw this collection in 1980 as well as another cotton stocking kept in Deutsches Textilmuseum in Krefeld. They were worked with two needles and involved considerable skill in the fashioning of the heel. The biggest pieces from Textile Museum seem to be a part of some garment (no. 73460). Most probably they were of Arabian origin, just as are the above-mentioned socks and two knitted fragments in coloured stripes kept at the Victoria and Albert Museum. The Arabs of the early Middle Ages are supposed to have worn knitted shirts or kalfans.¹⁸ The preserved fragments seem to be parts of knitted garments. The knitted articles from twelfth-thirteenth centuries are of Arabian production also from Las Huelgas near Burgos in Old Castile. Except for a worn-out glove, they consist of patterned knitted cushions, which belong to the oldest and most interesting specimens of Arabian patterned knitting. They have been referred to only in the general catalogue of textile relics of Las Huelgas, without any technological analyses and are accessible only through a glass pane and area badly lit. Despite these unfavourable conditions, they can be stated to be real knitted pieces, and an inscription provides evidence of their Arabian origin. These items should be considered in connection with cushions found in numerous graves of that period. Most of these are sewn from patterned silk

material, often gold-threaded, from coloured wool, embroidered fabrics or in rare cases tapestry of a type of sprang and lace. Therefore the cushions knitted in two needles belonged to less expensive products, one of them has been placed under the head of a child. Thus, among the cushions produced by different textile techniques, knitted cushions from coloured wool were the cheapest ones.

The oldest of the knitted relics from Las Huelgas was found in the grave of Fernando de la Cerdá who died in 1275. It is square, the sides being approximately 36 cm long. The design is worked in three colours, violet, gold and white, in a net arrangement of octagons and squares filled with architectural and rosette motifs. The Arabian inscription means "blessing". Another knitted cushion cover was found in the grave of Fernando, son of Alfonso X, who died in 1283. It is knitted from green, brown, white and black wool. The ornamentation depicts lions, stars, lilies and other flowers, and its size is only about 28 cm square. These two perfectly preserved products of Arabian knitting from the thirteenth century are still waiting to be elaborated. The cushion and gloves from the thirteenth century were found also in Seville. The third relic of Arabian patterned knitting, dating probably from the same period is kept in Kulturen Museum in Lund. It is a piece of fine patterned knitting made of red, white, yellow and black thread. C. J. Lamm bought the piece in Cairo. The white, probably linen, glove from the grave of the Infanta María from Las Huelgas who died c. 1196, produced either with needles or by knotless netting, is not on display owing to its poor state of preservation.¹⁹ (Il. 4ab)

Liturgical gloves belong to the items most frequently met among the knitted products of the early Middle Ages. Bishops, as well as priests, used liturgical gloves from the sixth or at the latest the seventh century. Already in 800, in one of the church inventories, there are 16 pairs of gloves listed. Bishops usually wore knitted gloves while those of priests were sewn from cloth or leather. The gloves were knitted from woollen, silk, less frequently linen yarn. The oldest of the preserved knitted gloves are usually white, while red and violet appear later in accordance with the most important liturgical colours. All these relics are very carefully preserved in church treasures and most of them were already mentioned in the nineteenth century literature pertaining to liturgical clothes.²⁰

The frequency of occurrence of knitted gloves in the liturgical garments of bishops is evidenced, for example, by eleven images of seals dating from 1200-1250. In addition to representations of gloves on sculptures and in illustrated manuscripts, there remain about 30 pairs of knitted gloves still preserved in church treasures. Not all the relics have survived to our times. Church inventories from the Middle Ages listed a large number of gloves. For instance, in 1382 in Cluny there were 22 pairs listed, in St. Paul's Cathedral in London three pairs were counted in 1402, while a preserved glove from Prague was first mentioned already in 1387. The common usage of liturgical gloves is corroborated by papal bulls from the eleventh and twelfth centuries.²¹ The shape of these gloves was subject to regulation: they were close-fitting with five elongated fingers, a long knitted cuff, the upper part of the palm being decorated with a sacred symbol. Preserved relics are kept in church treasures under glass which protects them from deterioration, but make technological analysis impossible. For example, S. Müller-Christensen established recently that the bishops' gloves from the twelfth century from Speyer were produced

by the knotless netting technique.²² Their massive occurrence gives reason to assume that at least some of them must have been knitted in women's convents.

Descriptions of catholic liturgical garments provide much information concerning the oldest knitted relics. The gloves preserved in the treasury of the Saint-Sernin Basilica in Toulouse, the so-called gloves of St. Remigius are datable to the thirteenth century owing to the style of the copper rosette. They are supposed to have formed part of the property of the Joannites order of Jerusalem, therefore might have been modelled on Arabian knitting. These gloves appear to have been produced from raw unbleached silk though M. Dubuisson states them to be of linen and are knitted in simple stocking stitch on rather thick needles. Also from the thirteenth century is a fragment of silk gloves found in the grave on an unknown bishop in the Saint-Denis Abbey in Paris.²³ The third pair of the oldest gloves preserved in France, knitted from red silk, is kept in the St. Bertrand of Comminges Abbey in the Pyrenees and dates from the fifteenth century. Other pairs of gloves listed in early catalogues have not survived to our times.²⁴ Such items are mentioned in Chartres, Troyes, Cambrai, Avignon, in some cases only the decoration of liturgical symbols on the upper part of the gloves has survived.²⁵ The relic from the fourteenth century preserved in the Cluny Museum in Paris is not a knitted piece, while the another pair of gloves made from red silk comes from a later period.²⁶

Another collection of early liturgical gloves is preserved in South Germany. The gloves from the twelfth century originating Speyer are considered to be a product of knotless netting. Two pairs of gloves are preserved in the Cathedral treasury of Brixen. One pair of gloves knitted from bleached linen yarn with rosettes sewn on top, an embroidered cuff and rather wide fingers, is dated to about 1200. The second pair, probably from the fifteenth century, is mentioned by Braun.²⁷ Bock writes about gloves from the abbey in Bamberg, mentioned in the inventory of 1483, but none of the seven pairs seems to have survived.²⁸ Comprehensive catalogues of liturgical garments kept in cathedral treasures mention medallions sewn on the upper part of the gloves as well as relics from the sixteenth-nineteenth centuries.²⁹

Knitted gloves are also found in Italy. Some of the oldest relics are the gloves reproduced by Braun from the twelfth or beginning of the thirteenth century and kept in Saint Trinity church in Florence and in the cathedrals of Narni and Anagni.

M. Hald wrote about gloves in St. Trinity church in Florence, "attributed to the Holy Bernardo degli Uberti which are thought to be made with a needle. The latter are dated to the twelfth-perhaps early thirteenth century, and the method is described as curious kind of stitchwork not identical with knitting". On some Italian sculptures bishops' liturgical gloves can be distinctly seen, for example on the monument of the Pope Innocent IV who died in 1254.³⁰ Four pairs of liturgical gloves have survived in England until the early twentieth century, one is said to have been of St. Thomas of Canterbury from the twelfth century, two are in the St. Paul's Cathedral treasury in London and one is found at New College in Oxford.³¹ One of the most interesting relics is the so-called glove of St. Adalbert of Prague dating from the first half of the fourteenth century, knitted out of gray, possibly natural silk, with three green stripes on the knitted cuff. Another knitted glove from the second half of the fourteenth

century is kept in the Church of St. Vincencius in Stará Boleslav near Prague. It is knitted with fine needles out of natural silk yarn and its cuff is embroidered with coloured silk and gold thread. A legend links this glove with St. Adalbert. (Il. 3)

The latest research of N. Bažantová and D. Stehlíková suggests that the glove kept in the treasury in Prague could be Arabian work from the thirteenth century, while the glove from the church treasury in Stará Boleslav is rather an Italian and not a Bohemian knitting relic dating from the early fourteenth century.³² Iconographic sources show that similarly shaped gloves were used in Silesia.³³

The discovery of a relatively large number of knitted liturgical gloves from the twelfth-fourteenth centuries in different catholic countries of western, southern and central Europe reveals the role of knitting in medieval Europe. These gloves were also worn with secular clothes. The working of five-fingered gloves required good technical skill in the use of silk and in fashioning. During the early Middle Ages a glove served not only to cover the hand, but also as a symbol of: power, dignity, grace and feeling. The giving or sending of gloves could signify the conclusion of a contract; knights receiving a lady's glove were obliged to guard her honor. An enemy was thrown a glove as a challenge to a fight, and the winner's glove given to the losers expressed the guarantee of safety. This custom was known in Poland at the beginning of the twelfth century.³⁴ The use of expensive and richly ornamented gloves had a social meaning. The frequency of references to knitted gloves speaks for the diffusion of the technique of knitting.

Medieval knitted stockings and leggings have survived only in Switzerland, these can be dated to between the seventh and twelfth century. It appears that elsewhere at that time the knitting technique was used mainly for hand or head coverings. Needles were made out of bone or metal (but not wood) which is evinced by the size of stitch in the preserved products.³⁵

In northern Europe knitting developed in the form of products from woollen yarn: the tools used were usually wooden needles. This form of knitwear was found in the northern part of the Polish lands and in Latvia, while Scandinavian relics dating from the Middle Ages have been mainly established to be made by knotless netting technique. Six fragments of woollen knitwear were discovered among textile relics in a twelfth or thirteenth century cemetery at Równina Dolna, Kętrzyn district, in the voivodship of Olsztyn. A Nahlík who studied this collection has suggested that one-coloured or striped items knitted from light and dark woollen yarn were the product of women's household work.³⁶ Their finishing reveals a high degree of skill in working technique but the lack of a proper craftsman's fashioning and dressing is evident.

The largest collection of medieval knitwear has been found on Latvian excavations. It consists of a cap and five pairs of gloves. The woollen cap, beige in colour, with ear-flaps is a prototype of similar English and German products. It dates back to the fourteenth - fifteenth century and A. Zarina has restored the piece with great accuracy. One of the five-fingered gloves from the end of the fifteenth century has been knitted with five needles. The remaining four pairs of woollen gloves come from the most recent discoveries of the Institute of History at the Latvian Academy of Sciences. They were made from undyed

wool, some of them are striped; two of the pairs are five-fingered, the other's having one finger. These are dated to the thirteenth - fifteenth centuries. Only one of the pairs may have been made by knotless netting; the other's show evidence of a technical knowledge of knitting with several needles.³⁷ The fragments of knitted footwear from Beloe Ozero in the vicinity of Wologna and Novogrod, kept in the Moscow Museum of History are, contrary to the assertion of M. Dubuisson,³⁸ products of knotless netting. This technique offered greater compactness, durability and greater rigidity. This is why this technique is still used for shoe production in Iran.

The modest quantity of knitted relics in Baltic countries does not allow any conclusions as to the degree of their diffusion. The knowledge of this technique, both knitting with two needles and crocheting, is indisputable.³⁹ However, it is noticeable that among archaeological relics from the early Middle Ages only fragments of shawls or other flat fabrics have been found. For the production of coverings for the hands, feet or head, the knowledge of fashioning the knitwear by adding or limiting the number of stitches was required. This may have been the greatest obstacle in the first attempts at hosiery; gloves in particular, which require moulding to the shape of the hand, were produced by the older technique of knotless netting.⁴⁰ Headgear in that period is usually made using the sprang technique, which was applied later to the making of belts.⁴¹ Shawls and simple coverings, however, were produced with needles.

III

First Technical Upheaval in European Knitting in the Thirteenth Century and the Appearance of Guilds

The technical upheaval in hand knitting consisted in the introduction of four or five needles, instead of two. The oldest liturgical gloves show the knowledge of this technique, which facilitated the shaping of more complicated products. However, the first indisputable iconographic representations come from as late as the fourteenth century. The Madonna from the atelier of Ambrogio Lorenzino, painted in Sienna in the second quarter of the fourteenth century (Abegg-Stiftung Bern in Riggisberg in Switzerland), is shown knitting a child's robe. Four needles are discernible in the picture as well as the balls of coloured yarn. Still clearer is the picture of the later Madonna of about 1370 finishing a child's robe with five needles (the painting by Master Bertram of Munich comes from the Benedictine convent in Buxtehude). (Il. 7) The third Madonna represented in the engraving of the "Holy Family" by Veit Stoss is from 1480-1485.¹ (Il. 5) It is extremely difficult to classify this Madonna as a woman knitting a child's robe; for she is holding a thread but no needles. R. L. Wyss while discussing the representation of the Madonnas as women busy with various handworks, includes the last picture in that group ascribing the absence of needles to the artist's incompetence at representation.² This does not seem convincing, as Veit Stoss was known to show with great realities of every day life. As the garment represented is not finished the scene is not of the sewing together of its parts. The techniques of knotless netting and crocheting were, as a rule, not used for making larger items of clothing. Hence at least two, if not three, iconographic documents from the fourteenth and fifteenth centuries show that knitting with several needles was a typical women's occupation which was known to artist both in Italy and in southern Germany. The engraving by Veit Stoss was done during his stay in Poland but he might have reproduced one of the female activities known to him from Nürberg. Iconographic documents of the first half of the fourteenth century show evidence of knitting with more than two needles. It can therefore be assumed that this discovery had occurred sometime in the thirteenth century, at about the same time as that of the hand spinning wheel, the wide horizontal loom employed in the textile industry discussed by W. Endrei.³

In the fourteenth and fifteenth centuries the number of preserved knitted relics increases considerably. That is the beginning of knitting is often placed in that period. However the first information concerning the Parisian knitters'

guild dates back to 1268, and later confirmations of guild statutes bear the dates 1366, 1380 and 1467. These knitters did not work in Paris only. Studies by B. Geremek on the labor force market in the Middle Ages mention migrations of journeymen knitters to cities in northern France.⁴ In Doornik (Tournai) in the southern Netherlands a knitters' guild appeared in 1429, and in Barcelona in 1496.⁵ In many other cities knitters may also have been working in joint guilds. Only the beginning of the sixteenth century sees the growth of separate guilds. "Chapelier de gants et de bonnets", mentioned by Etienne Boileau in 1292, did not stand very high in the hierarchy of medieval crafts. Our only knowledge of them is that they worked not only with woollen yarn but also protested against the use of the spinning-wheel to process cotton. In the course of the following two centuries they must have gained in importance, as in 1514 they belong to the six most important guilds of Paris.⁶ The appearance of a knitters' guild in England has not been studied yet. London "cappers", mentioned already in 1310-1311, produced felt caps rather than knitted ones. "Hosiers", existed from at least 1328; they might have been sewing cloth leggings, but knitted gaiters figure in inventories as early as 1320.⁷ According to C. Aberle Henry IV (1367-1413) used knitted woollen stockings, while Henry VIII wore Spanish silk stockings. The former item of information has not been confirmed by studies comparable to our information about the statute of knitters producing carpets, shirts, berets and trousers.⁸ Henry VII, in 1488, issues regulations on the use of knitted caps on feast days, while a reference in *Belles-lettres* from 1461 speaks for the weak diffusion of knitted articles in England.⁹

Not in every countries of western Europe were all branches of production represented in guild organisations during the late Middle Ages. Hand knitting was performed by women for their own use, while nuns probably made liturgical gloves. Guild production was intended to meet the increasing market demand. Knitted gloves and headgear were in use by the fifteenth century, and knitted stockings could have been replacing the use of cloth leggings sewn from thin fabric by the best tailors.

The growing popularity of knitted garments is evidenced both by fourteenth and fifteenth centuries written sources, as well as by the increasing number of archaeological discoveries dating from the fifteenth century. Extracts from French sources of the late Middle Ages quoted in the dictionary of V. Gay and Dupont-Auberville give information about knitted gloves, leggings or stockings and headgears. Here are some examples: "Faiz à l'esguille" from 1387; "Deux paires de mitaines de laines faicles à l'auguille" from 1392 and "deux gants de prélat fais à l'esguille" from 1461. Also from 1387 comes the mention of "3 paires de chausses de fine escartete faictes à l'esguille" produced by Parisian craftsmen, which indicated that the new technique had started to displace leggings made with cloth. Finally, the variety of shapes in knitted headgears is proved by a document dated to 1463: "Pour deux chappeaux noirs fait a l'auguill".¹⁰ Further research into archival sources, particularly inventories of garments and accounts, could considerably increase our knowledge of the use of diverse types of knitted products. Already by this time these articles were relatively cheap and acquired by a large section of the population, except for liturgical gloves which belonged to special attire. This view is presented in the investigation of F. Piponnier into the costumes of the House of Anjou in the

fourteenth and fifteenth centuries. In the archival sources the authoress has not found any mention of the archival sources the authoress has not found any mention of the use of knitwear.¹¹

The number of preserved knitted articles, mainly headgear, increases considerably in excavation materials dating from the fifteenth century. In the museums of London and in the Manchester Gallery of English Costume, there is a large number of knitted woollen caps dating from the late fifteenth and sixteenth centuries. The oldest type of these products are headgear fastened under the chin, for wearing under the Gothic-style helmets. During the period of Italian Renaissance round caps and berets take diverse forms. The products of London workshops imply the mass production of cheap headgear, produced from thick undyed wool. They were probably a commonly used head covering. The paper of K. G. Ponting shows this clearly:

"The knitting of caps in Coventry was a well established industry. The first detailed regulation dates from 1496, and it would hardly have been possible to have reached such a sophisticated arrangement of controls unless the industry had been in being for something in the nature of 50 years. This would have the effect of putting back the coming of an established knitting industry to the middle of the fifteenth century which is considerably earlier than had previously been reckoned the case. In the sixteenth century references to capper increased. In 1520 there are complaints from Chester that their trade had decayed and this is said to have been due to unfair competition from the mercers, who were dealing not only in expensive foreign wares, but were also selling cheap caps made in other towns in England. Later in 1529 the cappers of Bristol found they could not sell their goods because purchasers now stayed away from the city and went and bought at the Fair where they could obtain goods produced by the cappers of London and other foreign cappers of the realm. The result was said to have been a great decline in the prosperity of the native Bristol cappers. To summarize, it is clear that by 1500 knitted caps were a major production and this would mean that they had appeared on the scene at least 50 years before knitted stockings."

After K. G. Ponting gave an interesting hypothesis:

"A number of questions remain to be answered about the technical side of the industry. If Thomas Fuller writing a hundred years later is to be trusted, the fabric was knitted, then stitched into shape and then felted, but some of the existing caps appear to show some shaping during the knitting. In any case, the important part of the sequence was the felting and it is in fact not quite clear whether the cappers guild was closely concerned with the actual knitting. They may have purchased the fabric from domestic workers."

The hypothesis is rather open to discussion. In the late Middle Ages the guilds in Europe used to produce all fabrics in the same workshop. Perhaps it is too early for the beginning of a putting-out system to organize the knitting and fulling in two different places. This could be determined as the beginning of capitalism in the production of knitted caps. In the book about the old hand-knitters of the Dales the authors also provided some information about the caps knitted in the fifteenth century. The first record of knitted goods manufactured for sale in England dates from 1488. Also K. Buckland informed about the early references from 1369, 1465 and 1478 to knitted caps. "The Capper's Company, still active today, was already organized and their rules entered in the Let book in 1496".¹²

Knitted caps with ear-flaps dating from the second half of the fifteenth century have been found in excavations of the Old City of Lübeck. K. Schlabbow, in a detailed description, points out the similarity between this production technique and the oldest types of caps found in English excavations. They were

made of a poor-quality undyed wool.¹³ Such knitted head coverings might have been produced in many countries of northern Europe already by the fifteenth century, although the preserved relics date from the sixteenth century. A woollen beret, much like these English relics, was found in Trondheim in Norway.¹⁴ In the new archaeological excavations in Oslo eleven knitted fragments are probably originating from four different woollen garments. "Two fragments must be parts of different stockings, one is a heavily mended heel, the other probably a part of a leg with a knitted pattern. It is not yet known at what time knitting was introduced into Norway. In Denmark and Iceland, however, knitting has been known from the sixteenth century and in Sweden from the seventeenth century". The socks dating from the Middle Ages published by A. M. Franzen were made by the knottles netting technique. I think it also possible to find some relics of Scandinavian knitting also in the late Middle Ages. Later knitted caps worn in Iceland seem to pertain to this group of headgears.¹⁵ As well as this headgear eleven fragments of knitted stockings and socks dated to the sixteenth century or perhaps even the end of the fifteenth century have been found. They are kept in the Guild Hall in London. They were made using thick wood or bone needles" and utilised carded woollen yarn. Due to a lack of skill in fashioning they did not fit the leg as well as later products made from thinner worsted yarn or silk.

The formation of numerous knitters' guilds in western and central Europe by the beginning of the sixteenth century does not provide evidence for the appearance of a new branch of production but for the increasing demand for knitted garments. The growing number of craftsmen begin organizing their own guild instead of working in joint guilds. Close-fitting stockings became an essential item of Italian and Spanish Renaissance men's attire. Apart from children's frocks, doublets and gloves, knitted berets start coming into fashion. Their fancy shapes required more flexible material than the rigid felt. Thus, already in the fourteenth and fifteenth centuries the production of clothing items knitted on two or five needles had become widespread in Italy, Spain, France, England and in certain German countries. The late medieval period had prepared the ground in western Europe for the technical revolution of the end of the sixteenth and seventeenth century. The early period is therefore particularly interesting and requires further study of the material we have at our disposal, as well as further excavations and a good deal of research into the archival records.

IV Hand-Knitting Production in the Sixteenth-Eighteenth Centuries

I Knitting in Italy and Spain

The increasing demand for knitted products, observable already in the fourteenth and fifteenth centuries, and the parallel improvements in production techniques gave stimulus to the development of hand knitting in the early sixteenth century. The best known is the guild organization of production as it is much better documented than the rural, home or convent production. The dates of statutes indicate usually the registration of several guild workshops. Hand knitting adapted easily to the putting-out system. As a relatively easy technique it did not require expensive tools, but was extremely time-consuming. Hand knitting, as compared to spinning on the spindle, did not disturb other domestic chores to be simultaneously being carried out; it could also constitute one of the activities of itinerants or shepherds. This important feature of knitting was taken into account in the exploitation of the labor force at the beginnings of the capitalist system. Hand knitting was charged to orphans, inmates of for-ces-labour institutions, convicts and soldiers. Owing to the small size of the articles and the use of simple tools even difficult housing conditions did not constitute an obstacle; only the finishing process required a better equipped workshop. On the other hand, the introduction of the knitting machine was in general linked with the formation of centralized manufactures, which rarely tool the kniwear from domestic production for finishing. The complexity of the machine required the employment of qualified craftsmen and technicians. In this chapter we shall deal mainly with different forms of craft knitting production, which in this branch was characterized by the widest assortment and high standard of products, whilst the non-guild production was rather satisfied the mass demand for cheap hands and legs coverings.

According to all studies concerning the history of knitting this art is supposed to have spread from the Arabs primarily to Spain and Italy.¹ These assumptions are quite very similar; however the lack of archival research into the early history of the textile industry limits considerably our knowledge about craft knitting production in these two countries. Preserved relics and references to the import of knitted goods in other countries provide evidence of the production but it is difficult to determine its extent. In Spain, the earliest knitted relics from Burgos,

described in Chapter II, are of Arab production. Textile industry centres, like Cuenca, for instance, are lacking in information about the knitting production: in some cases, however, the existence of this branch is well evidenced as in Andalusian Seville or in Castilian Toledo. H. Lapeyre informs about the wide production assortment of silk stockings in Toledo: the buyers on the French court in 1586 demand stocking in Toledo. The buyers on the French court in 1586 demand stockings in the following colours: "3 paires de vert marin, 3 argentées, 3 rouges, 3 bleu céleste, 3 gris foncé, 3 chatain, 3 couleur de pigeon, 1 jaune, 1 blanche, 1 violette, 12 noires. En 1590, Diego de Campo demande 4 paires fauves, 3 gris cendré, 3 bleu-ciel, 2 jaunes, 2 vertes et 2 cramoisies. Le prix d'une paire s'établissait en 1586-1587 a 66 reaux en noir et 68 en couleur".² The record shows the changes of fashion for coloured stockings, which varied to suit the dress. This trade information concerns expensive silk stockings in a wide range of fashionable colours, and gives us some idea of the export production of Spanish knitting in the sixteenth century, which was probably organized in guilds. The Catalonian knitters' guild existed from 1496, but its activity increases as late as the end of the seventeenth century, the statute being confirmed in 1703. At first the knitters were linked with haberdashers. The importation of machines gave a great production impulse, but only towards 1745.³ Thus only Catalonia possesses documents concerning the group of hand-knitted hosiery producers in existence at the end of the fifteenth century.

Naples, Milan, Genoa and Mantua belong to the group of Italian export centres for knitting. Until now it has only been possible to find mention about the knitted fabrics from these towns, but nothing concerning the guild organization.⁴ Italian knitting history has not been studied thoroughly, and without any doubt it requires further research. There is an interesting iconographic source, which presents an Italian itinerant knitter from the late sixteenth century. He is shown making stockings from two coloured threads. (II. 8) The itinerant Spanish knitter from the eighteenth century was making stockings too, and carried on his back a stockings tree. (II. 9) Not just archive records from other nations, but iconography as well show the spread of knitting in Italy and Spain. The progress in this production needs more study by historians.

2 Knitting in the British Isles

The British Isles, and particularly southern England, distinguished themselves, in the fifteenth century, by the extensive production of hand knitting. The question of guild organization, which were always rather weak in that country, is not of great importance in view of the many and varied relics coming from archaeological excavations. They give evidence of the existence of large knitting establishments in the oldest part of London and in South-East England.⁵ Archival data on these craft workshops would give new light to the beginnings of English knitting. Knitting craftsmen were also working in smaller towns, such as Worcester in the sixteenth century.⁶ The knitting production in the British Isles, which utilized indigenous raw materials, has not been elaborated

until now. It was particularly widespread on the Norman islands of Guernsey and Jersey. W. Cunningham wrote about the Jersey "type of stockings in 1596 in Leicester".⁷

The last studies in Pasold Fund editions discuss some detailed questions of English hand knitting though a detailed history of hand-knitter guilds is still a waiting its author. Already M. Hartley and J. Ingilly present the history of a hand-knitter of the Dales. "After the caps also the stockings were produced. About 1510 there occurred a change in fashion of supreme importance to hand knitting. Men's hose were divided into two and became upper and nether stocks, from which we get our name stocking; and eventually the term hose became synonymous with stocking as it has remained ever since. An early mention of knitted hose was in 1519 when a pair cost 5d. at Nottingham. These were, in all probability, coarse worsted". Later on the authors observed: the invention of the stockings loom in 1589 "was to have little effect on ordinary knitting for very many years". The expansion of the trade in garments hand-knitted by people in their homes still continued. An Act of Parliament of Edward VI, 1552, had mentioned "knite hose, knite petticoats, knite gloves, knite sleeves". In Elizabeth's reign the production of worsted stockings was encouraged by the Queen as a branch of the wool trade, and it became an integral part of the economic life of the nation. Her reign marks the beginning of a state organization for poor relief; and knitting, amongst other crafts, was taught to provide work. A handicraft that aimed to produce quantities of goods had to reach a high degree of efficiency and skill, so that knitting schools were started in towns up and down the country. At Lincoln, one begun in 1591 and continued throughout the next century. The authors show how hand knitting was taught to the poor children together with spinning on a spinning-wheel. Hand knitting had settled in Norwich, Dorset, Hampshire, Leicestershire, Nottinghamshire and Yorkshire.⁸

Writing about the Monmouth caps K. Buckland took a general view of the different confirmations of guild's organizations and charters from the fifteenth and sixteenth centuries. Yet in the late sixteenth century the Monmouth cap was a suitable present for an aristocratic father. Even in 1661 "The best caps were formerly made at Monmouth, where the Cappers' Chapel doth still remain, being better carved and gilded than any other part of the Church. But on the occasion of a great plague happening in this town, the trade was some years since removed hence to Bewdley in Worcestershire".⁹

J. Thirsk wrote about the fantastical folly of fashion which created the English stocking knitting industry in 1500-1800. She shows how "the stockings knitted from wool were beginning to share some of the favour originally bestowed on knitted silk. Documented references in the early decades of the sixteenth century suggest that knitted stockings were then mostly worn by children and country folk". She provided some records dating from 1519, 1530 to 1550. J. Thirsk has stressed how valuable the production of stockings of all types was as by-employment, particularly in rural areas. Making knitted stockings for sale it added considerably to the earnings of whole families. She wrote: "By the beginning of the seventeenth century stockings were made in Wales, Cheshire, Gloucestershire, Cornwall, Devon, Nottinghamshire, Northamptonshire, Yorkshire, Northumberland, Cumberland, Westmorland and Durham.

The local wools of these counties ranged from fine Cotswold to hairy, coarse Welsh and northern yarn. The texture of the stockings must have varied similarly [...] Worsted stockings were finer, though the term 'worsted', evidently covered a wide range of qualities, some being finer than others". An important remark of the authoress concerns the individual style of this product. "Stockings, like other peasant craft goods, were never standardised wares".¹⁰ I have to return to this question in the Chapters VII and VIII. Here the most important question remains how the production was organized. Did guilds of the late Middle Ages produce mainly caps and the big production of hand-knitted stockings was rather organized in putting-out system. This question must be solved by further archive research.

P. Croft wrote about the English stocking export trade. Its success in winning a considerable place in domestic trade has even been compared to that of the better known new draperies. The authoress gives us much important data. Thus the types of stockings exported fell into four major categories. The first was of straightforward knitted woollen stockings, short (to the knee) or long (to the thighs). Most were of medium thickness, but it is possible to find a few shipments of coarse woollen stockings, presumably for heavy duty wear. Coarse woollen stockings were mostly the product of the northern counties. Smoother and more expensive were worsted stockings, knitted from the finer yarn used to produce smooth [...]. They too were available as short or long stockings. Jersey wool stockings, originally made in Channel Islands but later widely copied elsewhere, were finer than worsted [...]. Both woollen and worsted stockings were hand knitted, though as seventeenth century wore on, machine frame knitting slowly began to expand in the regions. The cheapest variety of stockings, however, was not knitted at all, but made of woven kersey fabric.

The fourth group was the leather and silk stockings. The authoress analyzed the port books. For instance, in 1576, 94,5 of the export were cheap kersey stockings, "hand knitting for export was scarcely even in its infancy". In 1618-1619 the lead of worsted stockings had grown. "A total of 246, 268 pairs was exported, followed by 132,574 pairs of woollen stockings and 115,983 pairs of kerseys". About 1668-1669 "the kersey trade was dead". In the export to the North of Europe the port of Hamburg received considerable amounts of woollen stockings, but occasional cargoes were sent to Norway, Stockholm and Gothenburg in Sweden, Copenhagen and Elsinore in Denmark, Gdańsk and Elbląg in Poland. The stockings were also exported to the Netherlands, France, Iberian markets and Italy. The authoress gave a very detailed analysis of this export in different times. It is a very important paper showing the dominance of knitted stockings. The same picture has been confirmed by new archaeological excavations.

T. Rath has shown how long the tradition of hand knitting in Tewkesbury survived. This centre with its advantageous geographical position at the junction of the Severn and Avon had grown a market for industrial products by the sixteenth century. A hosier is mentioned in the borough records as early as 1446.

There is no indication that the seventeenth century hosiers were engaged in anything other than the well established woollen hand knitting industry of the area. The manufacture of hose was associated with the traditional woollen manufacture with a common source of yarn supply and entrepreneurs involved in both industries [...]. The testimony of contemporary authors supports the proposition that in the early eighteenth century the Tewkesbury hosiery industry was largely based on hand knitting and possibly the production of woven stockings.

The author had difficulty assessing the degree of interrelationship and cross-fertilization between the traditional hand-knit woollen hosiery production and the cotton knitting of the Tewkesbury region. But his information about woven kersey stocking is very important.¹¹

The Scottish hand knitting developed later than in England. I.C.M. Barnes wrote:

It is unfortunately impossible to state precisely when the art of hand knitting was first introduced into Scotland. Indeed the whole Scottish wool trade, as well as the introduction and spread of hand knitting in Scotland, are subjects on which much research remains to be done. We can, however, be certain that by the seventeenth century the art of hand knitting was fairly extensively practiced at least on the east coast, in the central lowlands and in the borders of Scotland. By the middle of the eighteenth century the industry was increasing rapidly and Aberdeen had become the most important centre in Scotland for the production of hand-knitted stockings.

The authoress shows the increase of foreign export of worsted stockings from Aberdeen in the years 1743-1795. Much of this production was made by women, as well as by old men and boys. "A woman who is considered as a good knitter, will finish two pairs in a week, if the worsted is spun to her". The norms of hand production were similar in different parts of Europe. The evidence for the production of knitted goods can be found in archaeological excavations in Scotland from the seventeenth and eighteenth centuries. Maybe it is possible to gather information on Scottish hand knitting from the sixteenth century. I have found some information concerning the Scottish merchant Hanuss Schot who sold knitted stockings in the small Polish town of Warta in 1590. Scottish wandering peddlers were rather numerous in Poland in that time. They may have been selling not only English but also some Scottish knitted goods.¹²

3

Knitting in France

The sixteenth century France is ranked amongst the major European knitting centres, both in production based on wool as on silk. In 1514 Parisian knitters belonged to the Six Corps – the most important guilds of this city.¹³ In 1505 the knitters' guild of Troyes in Champagne obtained confirmation of statute. At that time the guild consisted of eight masters and produced woollen caps and stockings. Apprenticeship was of three years. The variety of articles produced was revealed in 1698 on the occasion of the interdiction to non-guild artisans: "ni faire travail les dudit métier, comme bonnet, bas, chaussons, gants, mitaines, calottes, burs et autres marchandises, tant de laine, fil, coton et estame, sur grosses et menues aiguilles". A part of this production was designed for export. Woollen caps under the name of caps from Tunis were exported through Orléans, where a knitters' guild existed from 1575, through Marseilles to Smyrna and Cyprus. The English specialist C. Heywood dedicated a study to the rural hosiery industry of the Lower champagne region beginning only from 1750. But he had seen that "the whole rhythm of the hosiery in - was therefore dictated by the agricultural calendar". Before 1754 "the framework knitting industry

made little headway in the Lower Champagne region".¹⁴ So the hand knitting in Champagne was fairly strong in the early eighteenth century.

The knitters of Compiègne had developed some small production by the fifteenth century, and in 1527 they separated themselves from the clothiers' guild. Their independence lasted only to 1608, when they joined together with the serge-makers and dyers. In Compiègne the name bonnetiers described the producers of not only knitted caps, but also of bonnets from gauze, crepe and lace, later called *barvolets* (or *bagnoleries*). The latter, however, was mostly a side-line production which in larger cities was taken over by milliners. In 1627 there were "18 chaussetiers ou fabricants de bas, un fabricant de bas d'estame [...] et 5 maitres bonnetiers" working in Compiègne. As in other towns, they were required to full their products outside the town and were forbidden to throw the water from hand fulling on to the road. Dyeing was usually in blue. Compiègne was a large centre of hand knitting, which produced cheap articles of common use.¹⁵

Very little is known about the beginnings of hand knitting in Languedoc. Mentions of local products, which appear in the probate inventories come for instance from 1586. At the end of the sixteenth century knitters' guilds become organized in the main towns, such as Toulouse (statute from 1605). The most affluent people wore woollen hosiery imported from England and silk stockings from Lukka or Genoa.¹⁶ In the second half of the sixteenth century many inventory records refer to the use of woollen or silk stockings by the Nîmes inhabitants, while in 1621 there even appears a mention of a special profession of an itinerant mender of silk and woollen stockings. M. Sonenscher discusses the hosiery industry of Nîmes and the Lower Languedoc in eighteenth century. He had only discovered early information about hosiery work on the stocking frame, unfortunately he was not interested in the hand knitting of this region.¹⁷

The knitters' guild in Rennes, the capital of Brittany, was organized pretty early since its statute dates back to 1513; the preserved confirmation however bears the date 1613. The workshops were situated in the outskirts of a town so that the fulling wastes would not contaminate the water. Knitters were required to serve an exceptionally long apprenticeship of five years. It was a small guild which produced articles for local consumption. In 1755 there were 12 master knitters in Rennes.¹⁸

The historians have shown a much greater interest in the beginnings of hand knitting in Dourdan, since that town later became an important centre of machine production. The years 1650-1684 bring the development of the knitting production of silk articles, the beginnings of which reach back to the end of the sixteenth century.¹⁹ This production was organized by Marie Poussepin, the foundress of the Presentation Sisters in Tours. After training a great number of children aged six to twelve, a manufacture was established there in 1684. The unpaid work of a group of orphans constituted the beginnings of manufacture based on forced labour.²⁰

Knitting in Normandy shows an example of the existence of guild production simultaneous to that of machine knitting. The transit route of a large export of woollen stockings from the Islands of Jersey and Guernsey traversed both Normandy and Brittany. For instance, in 1663 there were 20,000 dozens, or 240 thousand pairs of stockings imported, apart from quite considerable

smuggling. Colbert began to raise the customs duty for English machine-knitted products in 1664 and 1667,²¹ but it was only the appearance and development of French machine knitting which diminished the competition of English products. In Rouen, the town where the inventor of the knitting machine William Lee probably died, during the whole seventeenth century there existed a kniwear' guild: marchands bonnetiers. This guild, combated from 1672 by the producers of machine-made hosiery, survived until 1778. Kniwear vendors were allowed to produce articles knitted with needles, their products being somewhat inferior but considerably cheaper than the machine-made ones. They traded not only in their own woollen knit goods and also in articles made by rural and provincial Norman producers of hand-made hosiery. The statute dating from 1731 reveals that they were using wool, silk and cotton coming from the French colonies and linen yarn. They also enjoyed the right to control the quality of the products sold in Rouen. An apprentice had to work 4 years before establishing his own workshop. The technical standard of the guild's products is evidenced in the requirements from a master knitter - a pair of stockings and a sailor's cape made from wool from Carnana in the Anatolian plain of Asia Minor. (Il. 6) Only occasionally a type of examination in the knowledge of raw materials was carried out. A candidate for master was shown 12 knitted items made by different producers and of different quality, from ordinary or floss silk, beaver hair, different qualities of indigenous and imported wool, linen or hemp or cotton yarn, both from France and abroad. Regulations on reduced guild admission fees for the master's family and the management of a workshop by widows are similar for all guilds. The binding guild regulations, however, include the use of such materials as beaver hair, vicugna wool, and specify the standard of finishing. The number of masters in the eighteenth century diminished but in 1747 there were still 50 of them.²²

The example of kniwear vendors in Rouen shows that a strong guild of hand-knitters, which dealt also with finishing provincial products, could survive for more than a hundred years, despite of competition from machine knitting. This testifies to a large and hitherto little-investigated base of hand-knitting production in Normandy. The question is touched upon by P. M. Bondois in a paper dedicated to stocking production in Normandy in the eighteenth century. He informs us about the existence of a knitters' guild in Caen as far back as 1695. In 1705, there were 72 fully fledged master knitters there and 22 members without full status. During the period 1695-1705, there were 97 apprentices trained in this town. However this dynamic centre, was a converging point for knitters who worked on machines. Yet, side by side, the production of hand knitting was growing, particularly in the domain of stockings, not only of better quality made from three-ply yarn, but also from the two-ply one (*a deux fils*), not so strong but much cheaper. This production was widespread in Bayeux and its vicinity, in Falaise, near Alençon, and also in Aunale in Upper Normandy. Production of woollen stockings from raw material imported from the British Isles was also developing on the Atlantic coast in Cherbourg, Vitreil, Saint-Lô and Carentan.²³ However it has not been precisely determined whether it was a hand- or a machine-production centre; the machine was usually too expensive for small rural producers.

Much information referring to the existence of hand knitting in a particular city or region comes to us due to studies which present the distribution of the knitting machine there. Thus we learn that a knitters' guild was established in Dijon in 1698.²⁴ In this respect the data supplied by Savary do not give us any indication of the regionalization of French hand knitting.²⁵ Fragmentary information about artisan production in France shows the hand-knitting production partly organized into guilds, partly dispersed in the form of domestic production in the putting-out system in villages and small towns. Certain guilds protested strongly against the introduction of machines and survived to the beginning of the eighteenth century. Data from guild statutes repeat the general requirements referring to length of apprenticeship, conditions for establishing one's own workshop, fighting with competition from non-guild craftsmen. The data about the technique and assortment of production are analyzed later. Here they allow us solely to determine the size and importance of the knitters' guilds in France in comparison with other European countries.

Alsace constitutes one of the strongest hand-knitting production centres in Europe and only the second half of the seventeenth century sees the fall of this craft. In Strassburg a knitters' guild was organized in 1535, thus not much later than the oldest French guilds. A comprehensive statute of the Hosenstricker and Baretmacher guild from 1574 mentions only fulled, hence woollen, articles: "Paretin, kuetlin, hembdern, handschuben, hosen, socken",²⁶ thus various headgear, caps and berets, shirts or doublets, gloves, trousers or leggings and socks. From 1607 the statutes also mention the woollen scarf and patterned knitted carpet. It appears from this data that the assortment of knitted products had already been established before the diffusion of fashion, i.e., the increased demand for stockings worn with Spanish men's dress in the sixteenth century. The production of stockings would not have exceeded the technical capabilities of Alsace knitters. In 1605 and 1607 in the statutes of the Upper Rhine and Strassburg there appears, as a condition of master craftsmanship, the requirement of a patterned carpet to be produced.²⁷

Guild regulations provide information about the organization of knitting production in Strassburg. For instance, a master could have only one apprentice, and engage a second one three months before the end of the apprenticeship period of the first. Besides he could fill four stools, thus have up to three journeymen. The journeymen could solicit to establish their own workshop six years after completing their term, but during those six years they had to journey for four years and work for at least two or three masters. In the fifteenth century in Strassburg city itself there were about 50 knitting workshops. At the end of the sixteenth and beginning of the seventeenth century space in the guild regulations is increasingly dedicated to the production of various types of men's, women's and children's stockings. Also increasingly created are regulations establishing the relationship between the strong Strassburgian knitters' guild and producers from other Alsace towns or rural competitors as well as domestic production in the putting-out system. This strong centre of knitting was weakened by the Thirty Years' War and ruined by competition from French and Swiss machine-made hosiery at the end of the seventeenth and beginning of the eighteenth century. To the very end it maintained the character of a producer of heavy and solid knitting in wool. In Strassburg there were also

masters producing stockings in cotton, silk and linen thread, but the guild was fighting against these products (for instance the 1655 interdiction).²⁸

The powerful knitting production of the Upper Rhine cities was rather loosely connected with Strassburg during the first half of the seventeenth century and more closely aligned the Swiss frontier towns. This centre of production must have developed in the course of the sixteenth century but the first statutes appear in Sundgau and Brigau only at the end of that century, in 1596. The statute, confirmed one year later, required three years' apprenticeship and three years' journeying. Hand-knitted fulled hosiery was being produced: caps, gloves, leggings and stockings, the making of the latter being allowed also from cotton and linen thread. It was forbidden to cover up imperfections in the finishing by the use of chalk, or to use wool from dead or butchered sheep. Neither was the production of hosiery by hired untrained servants allowed; it was only permitted to make use of the work of one's own children and other family members. The stall from which the products were sold was not to be more than 8 feet long. The aim of these restrictions was to preserve the craft character of individual workshops, as unqualified family members were allowed to work, but not hired workers.²⁹

On the 28th of January 1598, a large number of master knitters gathered in Brise to discuss statutory regulations. These were guild delegates from 25 cities of Alsace, Switzerland and Baden: Basle, Ferrette, Altkirch, Belfort, Gyromagny, Mulhausen, Thann, Soultz, Guebwiller, Colmar, Memmerschwihr, Kayersberg, Alolsheim, Selestadt, Sainte-Marie-aux-Mines, Strassburg, Molsheim, Phalsburg, Offenbourg, Lahr, Freiburg, Brisach, Sautzburg, Neuenburg and Rheinfelden. Representatives of these urban knitting groups protested against the interdiction of using chalk in the finishing and spinning tanners' wool. They also demanded that the current masters shall be released from the obligation of three years' journeying. In order to coordinate these matters, a knitter from Strassburg, Simon Marcutha, was sent to Prague. In 1605 he obtained from Emperor Rudolph II a new knitters' statute, which was in force in all towns of Alsace and in the Swiss frontier during the first half of the seventeenth century. It included the requirement for a master knitter, the same "as in Prague", thus a flower-patterned carpet, a cap, a woollen waistcoat and gloves.³⁰ These items were to be made within 13 weeks. Masters had to sell their products in their own stall. They were allowed to employ the same number of journeymen and only one apprentice.³¹ These regulations in 1599 applied to 133 masters from Alsace and Switzerland, as well as some 50 knitters from Strassburg and 30 from Basle. Large groups of masters based in the two larger towns were dominating there the collective body of some few guild organizations from smaller localities. There was also competition from a rather large group of rural craftsmen who were selling their poorer quality but cheaper products with the backing of the Strassburg guild. This same guild succeeded in obtaining a new statute from the Emperor in 1653. It applied to Lower Alsace and some of the towns of its upper part, a total of 28 localities: Strassburg, Haganaue, Schlettstadt, Oberenheimb, Offenbourg, Gengenbach, Oberkirch, Oppenaue, Baden Lohr, Brischweiler, Lützelstein, Dummeringen, Sarbuckenheim, Wolfskirch, Elsass-Zabern, Wasenheim, Westhoven, Marlenheim, Dachsen, Moltzheim, Mutzig, Otterott, Barr, Mittelberckheim, Andlaue, Dambach, Marlen-

kirch and St. Bläss.³² This list indicates centres in Alsace in the first half of the seventeenth century.

The history of the large Alsace hand-knitting centre shows us how production changed according to movements in fashion. Thus, the execution of the most difficult and time-consuming item for master craftsmanship, i.e., the knitted carpet, could be replaced from 1615 by the execution of fashionable trousers and higher admission fees. In 1624 it was forbidden to practise the craft outside the workshop, the purpose of this was to underline the difference between professional knitters and domestic knitting carried out with other household chores, for instance shepherding. The tendency is also to restrict the output; no more than four workers could be employed in one workshop. On Alsace guild seals or knitted carpets we can see scissors for trimming the products and a teasel, less frequently needles. Increasingly from the second half of the seventeenth century more complaints were being made against competition from Jewish traders, who bought out village products, and itinerant merchants. The most dangerous, however, proved to be the products of French machine knitting. In 1699 the combined guild organizations of Upper and Lower Alsace complain of the financial ruin of hand knitters, the number of workshops having dropped to 600. In this climate machine knitting immediately assumed the form of manufactures.³³

4 Knitting in Switzerland and in the Netherlands

Swiss knitting developed in the seventeenth century. The information that the first stockings knitted with five needles were produced about 1560 is untrue because this technique had been known 200 years earlier.³⁴ Hand knitting developed first on the borderland with Alsace, about 30 workshops functioning in Basle and vicinity. Rules for journeymen from Freiburg date from 1591. Producers of knitted leggings were organizationally connected with clothiers, while a journeyman's pay was fixed at one pfenning per week.³⁵ Already in 1644 knitting was taught along with spinning in the orphanage of this town. In 1672 a statute was conferred on the hand-knitters' guild in Berne, in 1676 in Unteraargau, Aarwangen, Wangen and Bipp. Individual guild masters also used outworkers, placing orders with local villagers. In 1687 in Aargau there were more than 1000 knitters. Knitting developed in the Solothurn canton too, particularly in the small towns of Olten and Niederamt, in the neighbourhood of Schaffhausen, Zurich and Lucerne. Also in the Glarus canton there were woollen caps and stockings were manufactured in the seventeenth century. In the eighteenth century, hand knitting still persisted in the same regions, despite competition from knitting manufactures. Domestic production in the putting-out system assumed particularly large proportions in the Solothurn canton, in the vicinity of Basle, in St. Gallen and Freiburg. W. Bodmer not always distinguishes clearly between hand-knitted and machine-woven hosiery.³⁶ On

the whole, it can be said that hand knitting had existed for a long time and was very popular in this mountainous terrain. However, it involved small-scale production for personal needs and for the local market. Only the introduction of the knitting machine by the Huguenot emigrants from France at the end of the seventeenth century transformed certain regions of Switzerland into knitting centres catering to a larger market.

Hand knitting developed particularly well in southern Netherlands. Owing to the French influence the Tournai region, where a knitters' guild had already existed in 1429, returned to this branch of production. About 1680 there are as many as 2000 masters listed there, who were producing "les bas de la moquette".³⁷ Some of these products were designed for export to Spain.³⁸ We should remember that this part of the Netherlands belonged to France between 1667-1708 and it was then that the knitting machine was introduced there.³⁹ It is possible that the data on the extent of production around 1680 apply not only to handmade but also machine-made knit wear.

Hand knitting also existed in the northern Netherlands. Preserved relics such as knitted hats from the end of the seventeenth century in the Hermitage, the skirt in the Victoria and Albert Museum in London, knitted garments, gloves and stockings in the Museum of Costume in the Hague and the Royal Museum in Amsterdam bring testimony to the high standard of hand knitting.⁴⁰ Only a few studies discuss the development of machine knitting with brief references to hand knitting⁴¹ or describe the different types of knitting sticks, which are solid evidence of the development of hand knitting in villages among shepherds and women occupied with household chores.⁴² The history of hand knitting in the Netherlands is still waiting its author.

5

Knitting in Central Europe

The history of hand knitting in Germanic countries should start from Austria, as it is situated close to Italy, from where knowledge of the production of patterned knitted carpets or of larger garments was to come. It was in this mountainous country with its extensive sheep rearing that knitting based on wool blossomed. In the vicinity of Salzburg and in the Tyrol, as well as in Styria, there was, by the end of the fifteenth and in the sixteenth century, a rather wide diffusion of woollen trousers, leggings, shirts, caps and gloves, and later stockings and socks.⁴³ At the same time, there exists no information about the existence of guild organizations before the beginning of the seventeenth century.

Nevertheless, the high incidence of different types of woollen garments indicates that already in the sixteenth century knitting is not only a domestic craft but that some of this production was carried out by craftsmen, who belonged to joint guilds. The oldest guild statute of the Austrian knitters comes from Vienna and dates back to 1609. The assortment of products is revealed by the requirements for master craftsmanship: a table carpet in six colours, a beret, a pair of silk stockings and a pair of gloves. The statute of the Viennese

knitters from 1614 requires that each candidate for master shall produce "as in the whole Roman Empire", in Prague and in other places: "Eine Decke, vier Ellen lang und breit mit Blumenwerk, ein Barettlein, ein wollenes Hemd, ein paar Handschne", allocating 13 weeks for each masterpiece.⁴⁴

The list of goods required to attain a "masters" varies radically in these two statutes. The later statute gives the traditional assortment of the Alsace and German guilds, while in the earlier one there are mentions of silk stockings and a beret of Renaissance fashion. Guild insignia inform us about a cap, stockings, needles in a ball of wool and open scissors. The reference to Prague in the statute arises from the fact that the Emperor Rudolph, residing in this city before 1600, issued regulations for Bohemian and Moravian knitters. In the sixteenth century Viennese knitters were probably already working because confirmations of statutes usually are suggestive of earlier production of a given branch of the craft. However it was not a very large guild, as by 1675 it comprised 9 masters and 13 journeymen. The rules of 1698 reduce the number of knitting workshops in Vienna to ten. They require that the journeymen, after journeying, should work a year in one of the Viennese workshops. A characteristic feature is the injunction that the more complicated work, particularly the footpart in stockings and repairs to knitwear should not be done by women servants. The work of women as a supplementary force in knitting workshops or of non-guild craftsmen was very common in hand knitting since the production of simple knitwear did not require long professional training. The statute also informs us of the great diffusion of stocking production and its increased variety. In the course of the seventeenth century in the guild called "Paret- und Sockenstricken" stockings became the main production item. There were not only woollen and cotton stockings were being made but also the "Hamburg stocking", single and double ones, with their different technical solutions of the foot-part.⁴⁵

Besides Vienna, hand-knitters' guilds existed in Hallein near Salzburg from about 1620, in Linz from 1655 and in Styria from 1698. Widespread use of woollen knitwear in the Tyrol proves organized production.⁴⁶ A few Austrian knitters' guilds and probably quite a large group of non-guild producers were making head coverings, garments, gloves, socks, and the increasingly popular stockings, mostly from wool, but also from cotton and silk. This knitting production could have satisfied major local needs even before the introduction of knitting manufactures.

The fact that Prague was given the first place in the counts of the Roman Empire in statutes from Alsace and Vienna, was not connected solely with it being the seat of the chancellery of Rudolph II. The Bohemians possessed one of the largest cloth-manufacturing centres in central Europe which affected the rapid spread of other textile techniques as well. As mentioned before, the oldest relics of silk knitting in central Europe are the liturgical gloves from the fourteenth century probably imported from the Middle East and Italy. Local products knitted with five needles are known from at least 1560. In 1570 knitters in Prague left the local clothiers' guild, but confirmation of their own statute dates only from 1612. Soon afterwards another knitters' guild was registered in Kutná Hora. In 1660 there are mentions of stocking-makers in Strakonice. The statute of 1716, repeating the requirements of 1612, gives, as production

requirement for a master knitter, a fulled knitted carpet, a pair of reiter stockings with gussets, two pairs of gloves from black and coloured wool and a beret. From the middle of the eighteenth century red stockings and fezes were being produced in this town for export to the Near East. At the beginning of the nineteenth century there were eighty fez producers.⁴⁷ In the seventeenth century the extent and high standard of Bohemian knitting production poses a serious threat to Austrian and South German products.⁴⁸ There was a connection between Bohemian knitting and production in northern Italy. About 1600 a knitter from Milan, Ferrante Castelle, was staying at the court of the Emperor Rudolph (1576-1612), he settled permanently in Prague and in 1605 became a citizen of the town.⁴⁹ He brought with him from Milan the knowledge of production of patterned knitwear, which was utilized in Prague in the production of woollen carpets. The Prague knitters' guild exists up to at least the end of the eighteenth century. There is still preserved a cup with its guild insignia from 1792. Seen on it are a stocking, a ball of wool with five needles and a brush from fuller's teasel.⁵⁰ (Il. 11)

Hand knitting became prevalent later to Slovakia and Hungary than in Bohemia. The reason was not only the less developed local textile industry, but there was also the less demand for knitted headgear, waistcoats and particularly stockings which were in the sixteenth century a standard item of male dress made according to Italian or Spanish fashion. In Slovakia and Hungary in those days men usually wore the long national dress with high boots which did not require stockings. The latter, however, were worn with female and male dress based on western fashion. The oldest knitters' guild was established in Bratislava, probably by in the first half of the seventeenth century, while its statute was confirmed in 1651. The knitted masterpieces, "as in the whole Roman Empire", were described as: "A long carpet two ells long and large with flowered patterns, as well as a small beret, woollen shirt and a pair of riding socks". These masterpieces had to be made within a thirteen weeks period. The guild name "Paret- und Sockenstricker" indicates that mass production of stockings started somewhat later, and until that time that most important production was that of knitted carpets, headgear, shirts or waistcoats and socks. This statute also specifies the guild subscription fee required to obtain one's own workshop, with a rebate for the members of master's family, and restricts the production capacity of one workshop to the output of three journeymen and one apprentice. If a given item was not accepted by the senior guild members, the journeyman had to make a new one after a year's journeying. Woollen knitwear was always subject to hand fulling. The next statute dating from the 17th of September 1660 indicates the organizational connection of knitters and the haberdashers and the emergence of "Seidenstricker" – producers of silk hosiery. The latter were required to undergo four years' journeying and were even more strictly forbidden to bribe journeymen who were obliged to give two weeks' notice before abandoning the workshop.⁵¹ This gives evidence of the need for a labour force, hence of demand for knitted products.

The Slovak knitters were organized in the seventeenth century into a joint guild in Bratislava. The guild book has been preserved from 1684, but the joint guild's statute remains unknown. Those most numerous belonging to it were the masters from Bratislava and its suburbs, Komarno from 1698, Trnava –

1714, Trenčín – 1723, Šamorín – 1728, Nove Mesto – 1729, Stupava – 1747, Devin – 1751, Dunajská Streda – 1756 and lastly Nitra – 1771. Fulfilled and most probably knitted socks were also produced by felt-workers from Sabino-vo.⁵² Knitters' guilds in Bratislava and in Trnava obtain the confirmation of privileges in the eighteenth century from this it cannot always be determined whether it is a question of hand-knitters or of knitters working on machines. In the imperial privilege dating from 1770 there is a mention of guilds in eastern Slovakia in Soboršice, Holica and Saštin.⁵³

Knitters' guilds were established in Hungary only in the course of the eighteenth century this was caused by the general backwardness in the development of Hungarian textile industry in the seventeenth century as a result of the Turkish conquest.⁵⁴ The oldest knitters' guild in Buda emerged in 1715. (Il. 12) From 1725 dates a very interesting mark of that guild with a pair of stockings, a pair of scissors and a brush made from fuller's thistle. This mark shows the main product of the guild, a pair of scissors served to shear the fulled stockings and other woollen fabricated products; and brush from fuller's thistle was used to comb this article before shearing. The mark reveals the variety in their production of Buda knitters. They made the simplest woollen articles, mainly stockings, which they fulled in small hand-fuling presses. In 1744 the knitters' guild in Sopron confirms its privilege; at least from 1776 there were knitters working in Győr, while from 1781 originates both the statute and knitters' guild shield from Veszprém. Finally in 1782 there are mentions of knitters in the district of Tolna.⁵⁵ The registration of numerous new knitters' guilds in Hungary shows clearly the rapid development of hand knitting in that country, because knitting machines in central Europe were usually connected with manufactured production. In the eighteenth century demand increases for stockings worn alongside western male attire which is beginning to displace Hungarian national dress. The handknitters produced to satisfy the demand of the Hungarian middle class found mainly in towns. The demands of the wealthiest Hungarian people were met by the importing of goods from Austria, Bohemia or Western Europe.

The history of German knitting is still not well known, despite publications of archive records pertaining to the Strassbourg knitters' guilds or Prussian manufactures. Scholars have primarily interested themselves in the introduction of knitting manufactures in some German states, while of the existence of hand-knitting guilds little mentions can be found. Nevertheless, a few hand-knitting workshops were satisfying a proportion of the garment needs of the local market. At this time, before the Thirty Years' War, there were large quantities of knitted stockings being imported from England and Italy to Bavaria, mainly from Mantua, but because of the high price of these products, hosiers' workshops begin to appear.⁵⁶ Cologne carried out considerable trade in textile products imported from England and the Netherlands to the countries of central Europe. Thus, knitting production may have established itself there as well.⁵⁷ In Frankfurt am Main the "Hosenstricker, Teppich und Barettmacher" guild probably existed as early as the end of the sixteenth century, and obtained the confirmation for its privileges in 1640, 1646 and 1649. The original statute from 12 March 1659 still exists and it presents the following requirements for masterpieces: "Erstlich einen Teppich drey ehlen lang und dritthalb ehlen breit

mit Blumenwerk versetzt. Zweitens ein Barelein, drittens ein wollen Hembd, und viertens ein Paar Strumpf mit Spanischen Zwickeln, zum Langsten innerhalb dreyzehn wochen". These requirements give proof of the high standard of hand knitting and the wide assortment of products, and that the latest changes in fashion were taken account. The knitting machine was introduced within this guild only a hundred years later. In Munich and Stuttgart only knitted items from the early sixteenth century have survived, unfortunately there is no information on the existence of guilds there.⁵⁸

In Saxony knitters' guilds were organized exceptionally early. In Dresden "Baretmacher und Strumpfschneider" register their statute in 1563. In Apolda "David der Strickermann" was the founder of this branch of textiles in 1593. A hundred years later a large machine knitting centre develops there. The Dresden statute from 1653 required from a master knitter: Spanish man's beret, a woman's cap, a woollen shirt, a pair of men's long trousers and a pair of gloves. In 1687 there is a characteristic change in the assortment of the most important products; listed are: headgear for men, a pair of men's stockings from beaver hair, a pair of fully-fulled men's stockings, a pair of ladies' fulled stockings from beaver hair and a pair of gloves with fingers. The hosiers from Leipzig were linked with the Dresden guild but in 1674 different masterpieces were required from them: "Baret und ein wollen Hembde. Bey denen Fremden aber ein gebrochener Teppich", which made admission to the guild difficult. The knitters' guild in Zittau was also organized exceptionally early, its first statute being registered in connection with the Prague regulations in 1574.⁵⁹

In Berlin the establishment of the knitters' guild was linked with the development of machine knitting and manufactures. The guild regulations from 1697, however, specify a typical assortment of hand-made knitwear: Spanish beret, woollen shirt, carpet and a pair of men's long fulled and finished stockings; only in 1710 there is the requirement for making trousers and stockings on the knitting machine. In Magdeburg the guild regulations from 1739 already refer to machine knitting. In Lübeck, however, the knitters' guild existed from 1613. There is no data available about the knitters' guild in Hamburg. Nevertheless we learn from the Vienna statute of 1698 and from other mentions that it required production of "Hamburg stockings",⁶⁰ which meant articles of local production and not those imported from England.

Łuzyce lay on the borderland between Lower Silesia and Saxony. Already by the early seventeenth century the knitting technique was known in Zgorzelec (Görlitz); the statute of 1683 required the following masterpieces: "Ein Spanisch Bareth, ein Weiber Bareth, ein wollen Hembde und ein Paar lange Mannes Strumpfe gestrickt, gewalckt und ausgebreit – in 5 Wochen anfertigen".⁶¹ The production of patterned knitted carpets testified to the high standard of Zgorzelec hand knitting.

Lower Silesia is comparable to Bohemia as one of the most important centres of knitting production in central Europe. In the discussed period this region was subject to various changes in national status; nevertheless articles were being produced there both for local needs and for sale to the Polish Republic. A knitting fullery had existed in Wrocław from 1534, which gives evidence of considerable guild production. In 1573 a Spanish man's beret, a lady's cap and a woollen shirt were accepted as masterpieces. The requirements

for masterpieces dating from 1675 show the change in assortment: "Coloured patterned knitted carpet for the table, Spanish or Jewish cap, a pair of English summer stockings with Spanish gussets, also a pair of similar lady's stockings, lady's cap and finally a lined woollen shirt, or rather a waistcoat, cut low in front, with sleeves, finished all round at the bottom with wool". Stricter requirements as to the execution of the garment indicate the trend towards limiting the number of masters; the regulations from 1646 mention only: woollen shirt, lady's cap, various trousers, leggings and stockings (for men, women, children and riders), gloves with five fingers and with one finger, and socks. These specifications show considerable changes in the assortment of guild products according to fashion. Between 1550–1577 there were 26 workshops in the Wrocław guild. In 1617 there are as many as 44 masters, and in 1649 – 66 masters and one widow. We also know the data referring to the expenses on knitting fullery in 1751–1752.⁶² (11. 13)

The beret-, sock- and glove-makers from Legnica make reference in the 1639 statute to an earlier document dating from 1576. Thus it would have been the second knitters' guild in Silesia, the product variety being similar to the Wrocław guild, although not so wide.⁶³ The knitters' guild statute in Nysa dates from 1602 and is the first one among the Silesian statutes to mention about the production of knitted carpets. The masterpieces to be: a carpet for table or bed, a cap, a pair of riding trousers and gloves, a pair of stockings with gussets from Rhenish or strongly twisted wool. In 1672 the Nysa guild had 19 masters and 3 widows managing the workshops. At that time, apart from a carpet, the requirement was to produce a Jewish cap, thick or thin stockings with gussets, winter stockings, fingerless gloves and fashionable riding socks. The knitters' statute from Brzeg dates from 1611 and, in addition to the knitted carpet, lists a beret, riding socks, stockings with gussets and black riding gloves.⁶⁴ Knitters' guilds were also scattered in other towns of Lower Silesia, particularly in the wool-rich mountains region. There is a mention of a hand-knitters' guild in Kowary in 1619, while in Lwówek Śląski hand knitting is still being mentioned in 1791.⁶⁵ The hand-knitters' guild of Głubczyce in Upper Silesia is mentioned in the seventeenth century. The surviving shield represents a cap, stockings, open scissors and other tools. In Raciborz, the silk stockings producers, were in the early eighteenth century organizationally connected with the haberdashers' guild, the guild's seal dates probably from 1685.⁶⁶

Gdańsk is the first place for knitwear production in the former Polish Republic. In 1620 a statute was conferred to the knitters' guild. Rich masters of that guild practised the putting-out system, they sold products made by their poorer colleagues from raw materials which they themselves supplied. Officially the guild existed and trained apprentices and journeymen, while in the organization of production the first signs of the capitalist system had begun to appear. M. Bogucka forwards a well-founded hypothesis, based on the known norms, which requires the existence of the knitting machine in Gdańsk by 1620. A master was not allowed to "demand an apprentice to produce more than 7 pairs of socks or 7 'ladies stocking per day'".⁶⁷ These norms are too high for hand knitting and correspond to the initial output capacity of the knitting machine.

In the seventeenth century knitters of many Polish towns belonged to joint guilds. Around 1660 in Cracow a joint guild comprising the production of woollen fabrics was established, and it encompassed clothiers, felt-makers and kilim – producers. "Hosiers living in the city of Cracow or in the suburbs will belong to their guild".⁶⁸ In the years 1787-1792 only two knitters were working in Cracow. In Posen, knitters were organizationally linked with the bag-makers' guild; they made gloves and stockings, both from leather and from wool.⁶⁹ The hosiers in Lublin appear quite early. One of them is mentioned in notes referring to admissions to the guild between 1605-1626, while in the 1661 survey: "They first of all complained about suburban knitters saying that they create difficulties for them by making and selling products belonging to their guild, and also about the Jews who work in wool but do not want to contribute to the church order".⁷⁰

Punczosnicy (stocking-makers) are also mentioned in the clothiers' statute in Opole Lubelskie in 1662: "so that knitters, not being guild members, would not buy out the wool before them, priority shall be given to the latter". In Zamość, knitters worked in the clothiers' guild from 1646 to at least 1715.⁷¹ "It occurred in the clothiers', hosiers' and hatmakers' guild in Zamość [...] so that clothiers would make cloth and hosiers stockings without interfering with each other". There were a few knitters there, the end of the apprenticeship time and the making of the required masterpieces, enabled a new master to establish his own workshop. The 1671 guild privilege from Strzyżów in Little Poland also gives an indirect proof of the existence of knitters linked with the clothiers' guild since it mentions that "sale is forbidden of Walachian cloth, garments, stockings" except of the fair.⁷² A considerable group of knitters was working in Opatów. In 1687 "a comrade from the knitters' guild" was accused of running away from his master "under cover of night taking with him needles and leaving behind debts, therefore for this offence gentlemen brothers ordain that he be punished by twenty lashes in corpore, and as to the debts that he be jailed". Eventually, instead of lashes he was ordered to pay "2 pounds of wax" and if he made peace with the head guildsman "he would be taken back to the bench". So the guild did not have an excess of journeymen, although it did train apprentices. In 1796 the same hand-knitters' guild complains that "Jewish hosiers do not want to bear, as we do, the municipal and guild obligations – producing botch and hiding other bothers in their midst". Jewish stocking-makers were very numerous in Mazovia already in the seventeenth century.⁷³ Knitters in fairly large numbers banded together in joint guilds on ethnically Polish lands, while the hand-knitting form of production facilitated the use of the putting-out system, which so often occurred in Jewish trade.

On the lands of the former Polish Republic, in Lithuania, White Russia and the Ukraine, there were also many separate knitting guilds registered. In the seventeenth century such a guild existed in Vilno with the following requirements for mastership: "Master hosiers must demonstrate their ability to make patterned stockings and gloves on three needles from pure wool without any defect".⁷⁴ During the same period a knitters' guild in Kowel existed.⁷⁵ Mention of knitters in Stuck dates from 1664. "At a meeting of brotherhood members neither older nor younger brothers should carry on them any sword, cutlass, knife or any other tool which could be used in a fight". In 1728 there

were twenty stocking-makers working in Stuck, thus it was a fairly large centre of production.⁷⁶

The studies on craft knitting production in central Europe is based mainly on information coming from guild statutes, since no data is available on non-guild and home or cottage production. Some pieces of information recur. Thus, guilds always fought against expansion of production, restricting the number of apprentices and journeymen, and came out against competition from the so-called bunglers. Generally speaking, similar data refer to the length of apprenticeship, conditions for obtaining one's own workshop, and concessions for the sons of masters and their families. To limit the size of this work, these recommendations have not on the whole been repeated, because they did not form a characteristic feature of guilds of particular countries. The most important for the subject of our book is the variety of production, its quality and approximate volume. An attempt was made to extract this information from the dispersed and fragmentary statute data. It was impossible, however, to discuss them as a whole in relation to several countries or all of central Europe because of the varied economic situation over such a long chronological period, encompassing three centuries. In some countries guilds were established only at the end of the eighteenth century. This chapter is dedicated to the production of hand-made knitwear before the introduction of the machine.

6 Knitting in Eastern and Northern Europe

The earliest knitting production centres in eastern and northern Europe are characterized by the absence of guild organization, this means that no data is available from written sources, thus we find the difficulty in establishing dates and volume of production. This concerns in particular the Russian knitting. The first mention of a knitting worker dates from 1576-1580 and comes from a Russian Orthodox convent. The reference to knitted woollen stocking appears in the accounts of an Orthodox convent in 1573-1574. Among the earliest pieces of knitting from this period, mention should be made of the discoveries from the excavations on the island of Fadeev in the eastern part of the Siberian Sea. These date from the end of the sixteenth century or the beginning of the seventeenth, and are mostly collected in the Arctic Museum in Leningrad. They prove that the habitat of this island was typically Russian. L. I. Jakunina has studied the remains of garments and footwear but has not commented either on the glove or on the fragments of knitting which were found on the same spot.⁷⁷ The glove was made of coarse, natural coloured wool and had only one finger. It was made using the knotless netting technique, but three fragments of woollen knitting discovered during the same archaeological excavations prove that this technique was also known there too. These few discoveries going back to the seventeenth century show that at this time there was already quite an extensive use of two to five knitting needles, when making minor articles to

protect the hands, feet or head. Nevertheless, it should be realized that before the end of the seventeenth century knitwear rarely features in the Russian national dress as it was generally worn. The long robe worn by men, which was inspired to a certain extent by oriental models, meant that there was no need for stockings. Knitwear played a much more important role in women's clothing, which was modelled to a greater extent on western fashions, particularly as far as gloves were concerned. As early as the seventeenth century knitted silk stockings were worn at the court of the Tsars but they must have been imported. Gloves were also a part of the clothing of Russian Orthodox clergy, and later, little by little, they became an item of military uniform. Amongst the most ancient examples of Russian knitting, one may mention certain liturgical vestments: head-dresses called *klobuki* and gloves preserved at the Palace of Armour in the Kremlin. The head-dresses of the Orthodox clergy offer an extremely interesting example, unique of its kind, of hand knitting produced in the seventeenth century. They were knitted on five needles with a silk thread, that is quite supple and glossy but of inferior quality, perhaps imported from Central Asia or the Near East. I will describe these head-dresses in Chapter VIII. The gloves of raspberry-coloured silk, dating from the first half of the seventeenth century, can be compared with western products of the same or earlier periods. Russian liturgical gloves had five short, wide fingers, and were knitted with five needles in stocking stitch. A rather uneven silk thread was used. The standard of workmanship in these liturgical garments proves that the craftsmen – perhaps nuns working for the clergy, or possibly lay women – were accomplished specialists.

In spite of the inadequacy of the sources and their fragmentary nature, one can deduce that from the seventeenth century onwards, in certain Russian towns, there were a certain number of professional knitters producing hand-made goods. They were probably organized in trade guilds, but some of their numbers may have been either fellow-workers not dependent on corporate organizations, or women. By about 1630-1640 stockings were an indispensable part of the uniform of certain military detachments. In the autumn of 1633, for instance, a very considerable order was placed for long stockings coming reaching the knee. These were for newly organized regiments and fitted out on the West European lines. The small numbers of Moscovite knitters could not cope with such a large order in a such short time, so the authorities turned to the workers in towns in the Vladimir and Galic districts.⁷⁸ This brief reference to the fulfilment of this considerable order is of great significance, for it proves the existence of a hand-knitting industry not very developed it is true, but organized in a good many Russian towns. Further research into the archives might reveal its extent and the manner of its organization.

The work of women probably played a significant part in this extremely laborious industry. One of the characteristic features of the Russian textile industry in the sixteenth and seventeenth centuries is the development of production methods which needed only very slight technical instruction and uncomplicated tools, but which, on the other hand, demanded an enormous amount of labour. The masterpieces of Russian embroidery are a good example. Young serf girls or nuns would laboriously imitate by hand the complicated patterns of imported velvets and brocades. They covered extensive cloth surfaces

with embroidery; and very often, after years of arduous toil, they would lose their sight. An enormous amount of work was needed to adorn fabrics and clothing with little pearls, and the same was true for the hand printing of cloth, with involved first of all the laborious cutting of carved wooden blocks, and then the painstaking application of the design. A *vyboika* is a cloth with a multi-coloured background and monotone pattern, whilst *na-bojki* have a multi-coloured pattern on a monotone background. It was the cheapness of labour which made it possible to produce luxury items, needing a great deal of handwork, according to the changes of fashion or economic conditions.

The hand knitting in some parts of Soviet Union done by Ukrainian, Byelorussian or Caucasian mountain peoples of Daghestan or Georgia only dates from the nineteenth century. It is possible to speak only about peasant's knitting in Chapter X.

The diffusion of hand knitting was in the Baltic countries occurs mainly in Latvia and Estonia. The first relics of the Latvian knitting reach back to the fourteenth century. The discovery in Estonia, in the tomb dating from the second half of the seventeenth century and containing the remains of a poor woman, and of a fragment of mitten and possibly belt, shows how widespread was the technique of this type of knitting. The knitting of the Estonian and Latvian people reveals extremely varied forms as early as the eighteenth century. This applies not only to stockings and gloves, but also socks, headgear, tunics and shirts; decoration of these garments reproduced the traditional motifs of different regions. The most archaic products were made of natural coloured wool; later vegetable dyes began to be used. Estonian knitting, together with that from Latvia, is among the most archaic and varied in the whole of Europe. In the country the stockings made from local wool prevailed, while in the towns imported ones (both silk and woollen) were worn.⁷⁹

The knitting production of Scandinavia is known a little better. It replaced the knotless netting technique in the production of mass consumption articles for export. Central Jutland was the most important centre of production in Denmark. This infertile country, covered with marshes and moors, allowed extensive sheepfarming. From this easily available raw material woollen yarn and also knitwear began to be produced. During the seventeenth century the export of knitted products from central Jutland was continuously increasing. The whole population, both men and women, the elderly and children, was involved in spinning and hand knitting. Only at the beginning of the eighteenth century does the knitting machine start spreading across Jutland. Previously it was hand knitting production from carded wool on 2-5 needles. Different articles, mainly caps, hats, stockings and gloves, were fulled and fashioned on wooden forms known from the sixteenth century.⁸⁰ (II. 14)

Stockings arrived early as a part of Danish dress both the burghers and the male peasant costume was patterned on West European fashion with its knee-length trousers. Because of this, the production of knitwear spread across the whole of Denmark, which is testified to by the numerous fragments of knitwear found in excavations in Copenhagen and preserved in the National Museum. They come from the seventeenth and eighteenth centuries and at least some of them are pieces of hand-knitted production.⁸¹

New research has revealed many knitted garments. "The first time knitting with silk was mentioned in written records in Denmark in 1466 in a will by Karen Thomesiatter of Aalborg, benefiting the convent of Holy Ghost". The new excavations of the coffins of two royal children in Roskilde cathedral gave informations that both children (dying in 1627 and 1628) were dressed in garments of knitted silk, dyed indigo, decorated with designs in gold metal thread, and wore knitted silk stockings. These were probably imported fabrics or fabrics made from imported silk. But woollen garments were found more often. Together with some iconography and knitting sheets it shows the widespread diffusion of this technique across Denmark.⁸² Production could be made by artisans, or by peasant's in putting out system and also by women working for family needs. In the sixteenth century Sweden and Norway imported many knitted goods, particularly patterned waistcoats, silk stockings and all knitted dress.⁸³ Handmade knitwear spread in the sixteenth and beginning of the seventeenth century to the southern part of Halland, Skania, Blekinge and to the isles Gotland and Öland. From this latter, knitted products were exported to Gdańsk in the fifteenth and sixteenth centuries. To the isles of Nadenal and Runo knowledge of hand knitting could have been brought by the St. Brigid nuns. Somewhat later, the knitting technique also developed in north-eastern Sweden, particularly in Västerbotten, Lovikka, Jukasiävi, as well as on the western coats in Selbu, Bohuslän, Göteborg or Laholm. This localization on infertile islands and coasts is characteristic of the whole of Europe. The reference material mentions numerous relics of hand knitting, partly rural, and a rich iconography. Woollen articles were fulled and fashioned on wooden forms.⁸⁴ One is struck by the wide variety of knitted garments found in Swedish museums: stockings, socks, gloves, various types of headgear, doublets or waistcoats. These products were usually made from coloured wool with an ornamentation changing character of the different regions of Sweden.⁸⁵

In recent years growing interest has been shown in the study of the history of knitting both in Norway and in other Scandinavian countries. In Norway some imported seventeenth century shirts knitted from silk and metallic yarn, are still extant. Excavations in Oslo have brought to light eleven knitted fragments from the latter half of the seventeenth century. Of simpler knit, these are probably remnants of four different woollen garments worn by ordinary people. As the bulk of the locally produced material known to us dates from the late eighteenth century, the most plausible explanation is that the fragments from Oslo were of simple imported garments.

Subsequently, however, the possibility has arisen that they are Norwegian in origin. In Rogaland, a district in the south-east of Norway the knitting was practised in the first half of the eighteenth century. A. Kjelberg has looked deeper at sources which would illuminate the development of knitting and of knitted garment in Norway. Her investigations are partly based on custom registers, census reports, estate settlement records, and a manuscript dating from 1760 dealing with crafts and industries in the dual kingdom of Denmark-Norway. Other sources of information include ledgers, travel narratives, charters of foundation, and economic-topographical literature. Archaeological excavations in Bergen have yielded a fragment of a knitted garment found in a layer dated between 1474 and 1525. Thus even at that early date some knitted garments

were being worn in Norway. The oldest written reference to knitwear found by A. Kjelberg was in the accounts of the county of Bergenhus for 1566-1567, which refer to the purchase and use of knitted hosiery from the Faeroes. Knitted stockings were also worn by school children in 1594. The records of a court case from Rogaland reveal that knitting was practised there as early as in the 1630. One of the practical skills required of the inmates in a "Home for Women and Girls" in Trondheim in 1639 was the knitting of woollen stockings and gloves. Knitting was also considered to be a suitable occupation for women who were provided with accommodation in the House for Impoverished Widows in Bergen in the mid-1660. References to exports of peasant stockings from Bergen round a about this time suggests that knitting stockings may have been a source of income for local country folk. Many topographical and economic treatises from the late eighteenth century attest to the fact that the art of knitting was known in many areas. Knitted garments were worn in Norway as early as the closing years of the fifteenth century. But the first undisputable evidence that the art of knitting was known in Norway dates from 1630. The knitting trade in Norway had only been a domestic industry and a supplementary source of income for the peasantry in certain areas. A. Kjelberg wrote: "We have never had knitters' guilds in Norway".⁸⁶

E. E. Guðjónsson described knitting in Iceland. The art of knitting is believed to have been introduced into Iceland by English, German or Dutch merchants. The oldest example of knitted goods, the woollen mitten, is dated to the first half of the sixteenth century, and the latest relics were dated 1650-1750. Knitting took place in the homes working in the natural colours of the wool. After knitting most articles were finished by often rather heavy fulling. As early as 1624, according to the oldest existing list of exports which mentions knit goods, some seventy two pairs of stockings and more than twelve thousand pairs of mittens were exported. In 1743 twelve hundred sweaters, stockings and mittens were also exported. This home made knitting used interesting patterns and special techniques. Lastly we also received some information about knitting history in Faeroes isles.⁸⁷

In Finland knitting also has a long tradition. Between 1438- ca. 1580 some stockings and mittens were made in Nadenal's convent by nuns. By sixteenth century some knitting was made, whereas knottless netting dates back to pre-historic times. The waistcoats were often worn in eighteenth century.⁸⁸

Finally a few conclusions. Guild hand knitting in Europe involved mainly woollen fabrics. Use of cotton, silk, and linen yarn was as widespread as wool. The use of the latter in fabric production usually demanded final dressing, fulling, raising with a tease and shearing. In the assortment of items produced, carpets patterned knit were technically the most complex products of hand knitting generally known. The art of knitting masterworks for full guild status was concentrated in the territory within the German-speaking world, and was common throughout the Holy Roman Empire. The most important centres were Alsace, Silesia, Bohemia, Slovakia and Austria. Knitting craft history in Europe from the sixteenth to the eighteenth centuries shows clearly the development of that branch of guild production as well as the cottage industry. The numerous statutes and rich iconography indicate the large variety of fabrics and the high level of technique in the production of patterned parts of costumes

and carpets. Studies of European knitting show a close relationship between production and consumption. The manufacture of knitted clothing had the advantage of delivering ready-made products. Therefore this branch of the textile industry was particularly linked with actual fashion requirements. The slow development of knitting in Russia, Poland, Slovakia, Hungary, Moldavia and Wallachia was due to the fact that the national male costume did not require stockings. The spread of West European dress certainly increased demand for knitted goods. As the small guilds of knitters were not able to meet this demand, manufactures with the mechanical knitting frames of William Lee were able to expand.

7

Knitting outside Europe

The hand knitting in some Asiatic and north African countries will be mentioned in Chapter X concerning the peasant's knitting. The little information known deals only with the nineteenth and twentieth centuries.

The hand knitting was known in the United States of America. Stockings and other parts of knitted garments were very useful in the rude living conditions of the first settlers of North America, but only rural Pennsylvania clothing has been studied more systematically, by E. J. Gehret. She wrote: "Stockings worn during the eighteenth century and early nineteenth century were created in one of three ways: hand knit, loom made, and fabric sewn [...]. In former times mothers and daughters were always busy at their knitting. They were proud to knit their own wear well [...]. They also made coarser ones stockings for the boys and servants made of thread and woollen yarn. If in large families they could not do it all, they hired a woman to help knit them." The women knitted both linen and woollen stockings. The linen stockings were worn in summer; they were knitted by hand and bleached on the meadow lawn - giving white linen stockings. Quite a number of homespun hand knit stockings of both linen and wool have survived to the present day, and are available in local history museums. The authoress listed the old instructions about knitting the stockings.⁸⁹

The rich American museums have collections of knitted garments from seventeenth and eighteenth centuries. But these were mainly made from fabrics imported from Europe. It is, of course, impossible to find mention of guilds, but hand knitting was widely diffused amongst the settlers from different European nations mainly from England and Germany.

V

Diffusion of the Knitting Machine in England and France from the End of the Sixteenth to the End of the Eighteenth Century

1

Vicissitudes of William Lee's Device

The knitting frame, invented in 1589 by William Lee from Calverton, was the most perfect tool-type machine of the period and its complexity aroused the admiration of contemporaries. In the petition of English knitters, dated 1658, we can see their pride in the excellence of the machine they were using. They declared that the frame was "composed of above 2000 pieces of smith, joiners' and turners' work, after so artificial and exact manner that, by the judgement of all beholders, it far excels in the ingenuity, curiosity and subtlety of the invention and contexture all other frames or instruments of manufacture in use in any known part of the world".¹ The great French encyclopaedia in 1751 brings Perrault's raptures, typical of the Age of Enlightenment.² These praises were not exaggerated. In fact, the 360-needle machine for the production of silk hosiery consisted of 2066 metal parts and constituted the most complicated mechanism introduced into industry in the seventeenth century.

P. Lewis writes lately: "The stocking frame was probably the most sophisticated textile machine in common use in western civilization in the seventeenth and eighteenth centuries. It was said to have been composed of more than 2000 parts and, by 1750, fabrics could be knitted with as many as 38 needles to the inch, though 20 to 24 were more common".³ Contemporaries appreciated it quicker than they had the filature for reeling silk discovered already in the thirteenth century.⁴ It was not the first textile machine to move a row of needles or shuttles by means of a lever; three years before its discovery, Anton Müller, the inventor from Gdańsk of a machine for simultaneous weaving 4-6 ribbons, was killed by drowning in Moltava. A model of the multi-shuttle machine for ribbons was built by van Sonneveldt in Holland in 1604.⁵

The French did not easily accept the leadership of the Englishman Lee in the discovery of the knitting machine because of its fast and almost simultaneous

introduction in both countries. Several authors repeat after J. Savary and the contemporary journals unconfirmed information about a mysterious locksmith from Caen in France who supposedly built a similar machine in the middle of the seventeenth century.⁶ These are secondary discoveries similar to the inventions of the Swede Christopher Polhem.⁷

So the knitting machine was invented by William Lee. There is no documented information about his life and history of the invention except for oral tradition. The inventor, forgotten and unappreciated in his lifetime, became a subject of interest only after the diffusion of the machine, thus decades after his death, he was compared to William Shakespeare. Perhaps archival research in various European countries would bring new data.

K. G. Ponting in his very important paper tried to show how open to discussion was all information about the life of inventors: "So little is known about William Lee, the inventor of the stocking knitting frame, and so much legend has grown up around him in the centuries since his death that it has seemed desirable to set out the few facts which we have that beyond question refer to William Lee the inventor, and to examine them critically so as to see if they alter the balance between fact and fiction in the life of this English genius". The Cambridge university records do not clearly show that one William Leigh having matriculated in May 1579 was the inventor. The ecclesiastical and local records in Nottingham are not very helpful. They do not prove that William Lee was vicar or curate at Calverton. Perhaps it was a William Lee, the father of the inventor, vicar of Calverton, who had three sons, William being the eldest of them, and who died in 1607. He discharged his eldest son who takes this patrimony earlier giving him in testament only "one ring of gold, in the value worth 20 shillings". The first authentic document is the partnership agreement between William Lee and George Brooke from 1600 and the second one was the petition to the Court of Aldermen in the City of London from 1605. After that our inventor was admitted to membership of the Weavers' Guild in the City of London. The next information comes from Rouen with the contract of 1611. The usual presumed date of his death 1610-1611 is incorrect as he was still alive in 1614.⁸

Authors of books on Lee write about his family relations, education and motives for undertaking work on the construction of the machine. This scanty data supplement the technical information on the development of the invention itself. The most difficult problem was the construction of the mechanism for passing the stitches from one needle to another without breaking yarn. Attempts at gaining the support of Queen Elizabeth were unsuccessful because in 1590 the machine was producing only thick woollen stocking. Only in 1599 could the machine, with double the number of needles, blades and general capacity, also knit silk stockings. There exists a contract from 1600 between William Lee and George Brooke pertaining to machine production in England, published by E. W. Pasold⁹ M. and A. Grass found in archives in Rouen a contract from 1611 between W. Lee and de Caux, de Format and Le Tartier providing the establishment of a manufacture in Rouen producing both woollen and silk stockings. Eight knitting machines and six English experts were to work there. W. Lee was to build further 32 machines. This contract proves that the murder of Henry IV in 1610 and the removal of Sully did not end the hopes of the inventor

as to the possibility of the effective use of machines in France.¹⁰ Apart from this contract, however, there is no other data on the fate of the manufacture and the inventor.

We do not know the full extent of English hand-knitting production which makes research into the introduction of the machine difficult. Accelerating the production of thick woollen stockings did not lie in the interest of the mass of hand knitters. Much greater possibilities existed in the domain of the production of silk stockings. This yarn, owing to its sleekness, travelled through the rows of blades and needles more easily. We shall return to the structure of the knitting machine in Chapter VII. But here we must pose the question to what degree could this tool-type machine in its earliest version revolutionize knitting production?

The greatest speed achieved in hand knitting was 100 stitches per minute, while on the machine it was possible to knit 1000-1500 stitches in the same time. The first of W. Lee's machines made only 500-600 stitches per minute.¹¹ These effective technical norms were seldom achieved even after the machine had become fully established in the late seventeenth century. Both in England and in Fournier's manufacture in Lyon machine production norms in 1667 were 10 pairs of woollen stockings per week or 3 pairs of unicoloured ones and 2 pairs of patterned silk ones. At the same time, hand-made items were considered much superior and were more expensive than the early machine products.¹² Work on the machine was restricted to daylight and each correction required laborious treatment. That is why the knitting machine in the initial stage of development encountered great resistance. Still by the early nineteenth century it could produce only flat knitwear which had to be stitched up while as early as fourteenth century the use of five needles made the execution of more complicated types of garments possible.

2 Diffusion of the Knitting Frame in the British Isles

Fragmentary data on the life-history of William Lee tell us that he devoted the period from 1589 to the beginning of the seventeenth century to perfecting his invention and to the construction of a new model which enabled the production of silk stockings. At that time he was loosely connected with the London knitters' guild, while the contract from 1600 evidences an attempt at starting production on a large scale. This attempt failed and Lee left for France. The last information about him comes from Rouen in 1614.¹³ After his death, the inventor's brother James Lee returned with a part of the machinery and apprentices to London, while other experts went to seek their fortune in Venice and Holland.¹⁴ There is little information on the initial period of the establishment of the knitting machine in England, and the time of English revolution did not favour the spread of the new branch of textile production on a larger scale. The stimulus to the introduction of the machine in the mid-seventeenth century was the fear of French competition, since in France the knitting production developed rapidly

with state support. In 1785 there were 45,000 knitting machines in France, i.e., twice as many as in England. Ude cites with reference to 1788 15,000 machines for cotton, 8,000 for linen, 25,000 for wool and 20,000 for silk. Thus there would have been a total of 68,000 machines in operation in France.¹⁵

After 1611 the inventor's brother stayed for a short time in London and then returned to his native county Nottingham. P. Lewis discussed the improvements of the knitting frame in the early seventeenth century. "Robert Thoroton recorded that Aston, a miller and apprentice to William Lee, made an addition to Lee's machine which according to Henson consisted of placing two fixed sinkers between each pair of jack sinkers, whilst Felkin states that one fixed sinker was added at this time. They agreed that this occurred a short while after the death of William Lee and after the return from France of his brother James Lee, who is believed to have entered into partnership with Aston in Nottingham were they commenced building frames with Aston's improvement around 1620".¹⁶ This enabled the production costs of the knit goods to be decreased. The establishment of the "framework knitters" company in London in August 1663 is a decisive date in the development of English machine knitting. At that time, in 1664, according to Henson's calculations, 400-500 machines were working in London itself which with an average of two workers per machine amounted to more than 800 knitters. About 50 machines and 100 workers worked in the area around London in Berkhamstead, Hert, Chesham, Tring, Bucks. About 50 men, therefore up to 25 machines, were in Godalming, Farnham, Surrey, Odham and Hants. In Nottingham and its immediate area there were more than 100 machines and 200 workers, while half that number was employed in Leicester. There were no more than 10 machines at that time in Dublin. Altogether Henson calculates the number of knitters as 1200 working on 650 machines, not taking into account those doing preparatory work and finishing. Three-fifth of the production was based on silk. From thick silk yarn as well as from wool stockings, waistcoats, trousers and breeches were manufactured.¹⁷

During England's post-revolutionary economic development knitting production increased rapidly. S. D. Chapman has best assessed the extent of this production in the county of Nottingham, calculating in increase in the number of machines and their distribution in the years 1660-1700. Data from archival sources show a slightly lower number of machines than the overall number given by Henson. From 30 knitting workshops in the years 1660-1670 to 77 in the years 1691-1700 and in sum 234 new workshops. In 1739 more than 1200 of the total number of 3000 knitting machines in central England are working in Nottinghamshire.¹⁸ The meticulous listings by name of knitting workshops owners together with the map of the locality are capable of showing numbers of employed workers to which archival data has been lost. This is why the overall calculations by Henson can only have an inexact value.

The history of the company of machine knitters indirectly shows the development of English knitting during the period from the middle of the seventeenth to the middle of the eighteenth century. The company defended the interests of its members, although its most combative activity belongs to a later period.¹⁹ At the same time some scholars demonstrate the existence of a putting-out system during that period. Small producers would buy or hire machines from trades people.²⁰ This small tool-type machine was suitable for

workshops of small producers, in the same way as the later spinning Jenny. It is difficult to assess the extent of this production in different regions of England.²¹ Ure deals only with knitting in central England, while elaborations from the field of industrial archeology usually give data from a later period.²²

Technological improvements in machine knitting after 1750 concealed from scholars the slow but steady development of this branch of production in the first half of the eighteenth century. Henson's calculations pertaining to 1723 and 1753 show a considerable numerical jump in the century under discussion. Data for 1721 are given after Wells and in the paragraph below, for comparison, with the data derived from Henson's calculations.²³

Number of machines in southern and central England

London	2500	Leicester	500
Surrey	600	Nottingham	400
Towncester	150	in villages around	
		Leicester, Nottingham	
Odham (?)	Reading	and Derby	
	100		3750
Total	3350	Total	4650

It emerges from these statistics that in southern and central England in 1772 there were about 8000 knitting machines working, thus about 16,000 masters and journeymen, not counting those workers engaged in the processing and spinning of the wool, silk or cotton, and in the finishing of the machine products. Numerical data from 1753 show a considerable translocation in knitting production. In London itself there were only about 1000 machines instead of 2500, while the number in Godalming and Odham had decreased to 350, the number of machines in Nottingham increased from 400 to nearly 1500 because approximately 800 knitters moved there from London. In Leicester the number of machines doubled reaching more than 1000. In Derby a knitting manufacture of silk products was established, operating on about 200 machines. The production of thick woollen knitwear considerably increased both in the counties of Leicester and Warwick, particularly in Bedworth, and in the counties of Nottingham, Derby and Chesterfield. In the latter three counties there were already more than ten thousand machines working, while in 1727 their number was assessed at 3500. The production of cotton knitwear, in particular, increased in the counties of Worcester, Gloucester, Somerset, Northampton and Oxford. A small production centre developed in Kent around Canterbury, in the environs of Exeter, as well as in Tewkesbury.

T. Rath does not think that the information of Henson about the forty frames in Tewkesbury in 1714 is certain. According to his research the first mention of a framework knitter in this centre is only in 1750. "A conspicuous rise in the number of framework knitters being apprenticed is noticeable in Tewkesbury in the 1750 and 1760 s." Unlike the East Midlands industries which spread in villages surrounding the town, the Tewkesbury industry was concentrated in the town. And the conclusion of T. Rath paper are very important for all the hosiery history in England of eighteenth century: "Tewkesbury's growth and development as a centre of the framework industry during the middle and late

decades of the eighteenth century corresponded with the rapid expansion of the East Midlands industry. The Tewkesbury manufacture had its roots in the long established hand knitting of wool and cotton in the area and the growth of framework knitting was based on skills, techniques and business connexions developed over a long period".²⁴ The production on the frames also spread to Ireland. Altogether about 500 machines worked there, of which 200 were in Cork and 100 in Belfast, operated by skilled Huguenot emigrants. Scotland was always an important centre of hand-made hosiery and the machine spread there slowly.

The origin of framework knitting in Scotland was shown by C. Galtvin. The first company was the New Mills Woollen Manufactory at Haddington in East Lothian founded in 1681. A year later three London stocking makers transported two knitting machines. "The frames, whose export was illegal under English law, were stripped down and the carcasses or insides were carried north in the panniers of packhorses rather than being sent by sea which would have courted the official gaze of the customs officers at the ports." "The first venture was not successful and the firm failed. The author suggests that this failure layed in not producing a competitive product either in price or quality. But some frame makers worked in Scotland about 1700 and in 1739 a manufacture with 12 frames worked in Edinburgh. Frame knitting was probably also established in Glasgow about 1743. I. C. M. Barnes also wrote about framework knitting, which definitely made its appearance in Aberdeen in 1750. She writes clearly: "Until the 1790s there had been two main factors tending to encourage hand as opposed to frame knitting: there was firstly the lack of machinery for preparing wool but just as important was the overwhelming cheapness of the women's labour; there was no need for expensive frames and skilled workmen when the women of the countryside could so easily be exploited".²⁵ Nevertheless by the middle of the eighteenth century there were already a small number of machines working in Edinburgh, Hawick, Jedburgh, Perth and Glasgow. Henson calculates the total number of knitting machines on the British Isles in 1753 at about 14,000. Despite the fact that already processed cotton and silk yarn was being purchased, there were several thousand workers engaged in the production of knitwear. The number of machines will only be known after thorough research through the archives. Nevertheless, already now it is possible to observe the decentralization of this production through the whole of central England which testifies to the transition to putting-out production and dispersed manufacture. The improvements of the machine introduced in the second half of the eighteenth century enabled the changes in knitting production from wool to cotton and resulted in its increasing sensitivity to the trends of fashion. We shall return to this topic in Chapter VIII.

The best conclusion of this chapter concerning the use of knitting machines in England was done by S. Chapman:

Lee's stocking frame appears to have achieved technical success by 1589 at the time when hand knitting was still growing and offering attractive employment opportunities to under-employed families in both town and country areas. Shortage of work, particularly through the winter months, was the principal political as well as economic problem in the sixteenth and seventeenth centuries, and successive governments were reluctant to patronize the invention. The first commercial success of the frame was in making silk stockings in London, but the competition of France and then low cost producers at Nottingham restricted its growth, and from the end of the seventeenth century the industry began to migrate into the provinces at an accelerating rate, a movement which the

Framework Knitters' Company proved powerless to prevent. The growth of the provincial industry was not hampered by paucity of technical skills, or in Nottingham, its principal centre, by guild restrictions; but it owed much to the migration of enterprise, capital, and advanced techniques (in the form of stocking frames) from London. Its prosperity was largely founded on feeding the London market with the cheaper, more standardized hosiery that was obviously in growing demand during and after the age of DeJone. Nevertheless the hosiery industry at Nottingham and Leicester and other towns in the locality was built up slowly, merchant hosiers establishing themselves on a modest scale with converted premises and a small inheritance from trading or farming, gradually building up the business with capital generated within the business. In the course of two or three generations the hosiers established their own market in Cheapside, and by frequent journeyings to London acquired an intimate knowledge of metropolitan demand. Supported with capital from all ranks of local society, and lured by cheap labour and machinery, they had ample means to explore new ways of appeasing the metropolitan appetite for cheaper versions of the extravagant fashions of the age. At the end of our period hand knitting was still a significantly larger industry than frame knitting, but political and economic conditions were ripe for innovation, and the success of Jedediah Strutt's "Derby rib" frame (1758) was about usher in a generation of mechanical contrivance that would enormously extend the range of products and markets of the industry.²⁶

So only after about 1750 that the major period of expansion of English mechanical hosiery began.

3 Diffusion of the Knitting Frame in France from the Middle of the Seventeenth Century to the End of the Eighteenth Century

In France, except for the unsuccessful attempt at establishing a knitting manufacture in Rouen in 1610-1611, for half a century only hand knitting was practised. The increased demand for knitted garments, however, resulted in such a enormous imports from England that Colbert's government was faced with the need to place some restrictions according to the principles of mercantile economic policy. Following the tradition of that period, the model of the machine was obtained from England by means of industrial espionage. Supported by the State, machine knitting production flourished in France and by 1785 there were 45,000 machines working in that country. Despite the efforts of the Framework Knitters company, more than 400 knitting machines were illegally taken out of England between the years 1670-1695 mainly to France - to Paris, Orléans, Rennes, Caen, Louvain. The influence of the French Huguenots is evident in Ireland.²⁷

Contrary to the organized investigations into the history of English knitting, in France the data is dispersed amongst a few contributor's papers in regional periodicals. Only the paper of P. M. Bondonis deals in a more comprehensive manner with the introduction of machine production of stockings into France. The commerce treaty with England signed on the third of November 1655

allowed unlimited import of knitted goods. The beginnings of French machine knitting however, are, a classic example of the introduction of a new branch of textiles through a manufacture type of production based on imported technical equipment with supplementary financing from the state and its constant support in the form of monopolistic privileges. This history starts with the dispatch of Jean Hindret or Indret to England. English sources claim that he was a master of the haberdashers' guild in Nîmes. He must have had a knowledge of mechanics and of hand knitting since he succeeded in stealing from England the secret of that most complicated textile machine. Or he managed to bring the machine itself, but he would have had to be able not only to work on it but also to repair it. P. M. Pondois unjustly describes him as only a clever adventurer.²⁸ The large demand for knitted products awoke interest in the invention of the machine. In the mid-seventeenth century appears the previously mentioned locksmith from Caen who is supposed to have presented to Colbert silk stockings produced on his machine, but the Parisian knitters destroyed them for fear of competition. The owner or the mechanic of the Fournier manufacture in Lyon must have had some technical knowledge, even if initially he was working with machines imported from England. The complicated machine used to break down easily and required a good service by experienced mechanics.

The beginnings of French machine production are presented in various ways in different papers. In any case, Jean Hindret remains the first instructor of machine production of silk stockings, managing the manufacture in Madrid Castle in the Bois de Boulogne. From a royal deed registered on 13 May 1659 it emerges that Hindret with his associate Leonard Blaise had the monopoly for the establishment of knitting manufactures in Paris and other French towns. He had to produce by machine different types of waistcoats, breeches, stockings and special *bas à canon*, tight-fitting on the calf, widening under the knee and sometimes turned over the boots. These products could be made of wool, silk and other yarns following the example of foreign articles.²⁹ Colbert's protection against competition was expressed by a customs campaign against products from the British Isles and by the privileged import of raw silk. Particularly enterprises producing *bas d'estame*, that is thick woollen stockings worn by wide masses of consumers, particularly enjoyed the state support of knitting production.

The privileges granted to Hindret's enterprises hindered the free development of machine knitting. Hindret fights against the manufacture established in Lyon by a merchant James (?) Fournier in 1663. He had 15 machines and promised to widen the production to 25 machines. Colbert induced Louis XIV to concede a great loan to this manufacture. He also supported the development of woollen stockings production which spread due to the initiative of a Parisian merchant Jean Camuset, who before 1665, went at the expense of the French government to London, Bristol and the isles of Jersey and Guernsey, i.e., the centres of British export to France. In London a certain Crésé, son of a Parisian merchant, owner of a silk stockings manufacture, gave a careful consideration to the possibility of returning to his country with 800 workers. This re-emigration did not take place and from then onwards Camuset is interested only in woollen knitting. An attempt to establish a manufacture in Auxerre (at present department de l'Yonne) failed, but he managed to establish one in Reims and other Norman towns, as well as in the neighbourhood of Poitiers. Later, knitting is organized in

Berry, Beauce, in the environs of Orléans, in Picardy, then in Bourges, Issoudun, Ainayeu and Montlucon. It appears that Camuset's initiative appertained to the traditional centres of woollen hand-made knitwear. He would employ, on commission, villagers, inmates of orphanages and hospitals. In Bourges in 1667 there was a kind of office which collected the products made by these commission workers in the putting-out system to the amount of 400 pairs of stockings per month.³⁰

First manufactures producing silk stockings in Paris and Lyon fell into decay. The manufacture in Madrid Castle underwent re-organization under the direction of François Estienne; it became the property of a company with a capital of 300,000 livres and during the years 1669-1771 it received fairly large subsidies. In spite of this, in 1672 it was employing only 79 workers. Constant competition from the Paris guild caused the manufacture to be granted a guild statute in 1672, which came as the result of pressure from the workers who could not be promoted to journeymen and masters. The statute in 34 articles defined the technical and organizational matters of the guild. It determined the quality of the raw material and yarn to be used for every type of knitted article as well as the number of stitches, thus its degree of thickness and fineness. It also standardized the dyeing method and the finishing weight of various kinds of stockings. The most important of the statute's decisions appertained to the training and promotion of the manufacture employees. One hundred of the best skilled workers were to obtain the status of guild master within three years, thus up to 1675. Every master was entitled to train 2 apprentices over 12 years. Desertion from the manufacture rendered professional promotion difficult. It campaigned against untrained botchers establishing their own workshops. Finally, widows and families of masters had the same privileges as in other guild corporations. The regularization of products assortment and professional promotion weakened considerably the competition from the knitters' guild. At the same time, however, Paris did not grow in importance as a centre of French knitting and still in the 1720s it was still only domestic hand knitting organized in the putting-out system which assumed great proportions.³¹

However knitting machines spread to many French towns. In 1673, 18 centres of machine production were known. Among the putting-out enterprises and manufactures organized by Camuset, Colbert particularly supported his manufacture in Châteauneuf-sur-Cher. Similar enterprises were also established in Villeneuve-le-Roi, Joigny, Charité, Châtre, Vierzon, Saint-Amand, Janville, Reims, Clermont, Moulins, Issoudun, Auxerre and others. In 1681 Camuset was employing 1340 knitters in the putting-out system with production in six localities. In 1681 the total number of knitters working on machines in the regions of Beauce and Picardy is estimated at 34,106. Knitting production in Languedoc will be discussed separately.³²

Thus during the period 1655-1681, thanks to Colbert's financial and customs support, the production of silk and woollen hosiery developed in different parts of central and northern France both in the form of manufactures and especially of the putting-out system.³³ The history of these centres has not been investigated. In any case French knitting production in this period begins to exceed the local market demands, which is proved by the export of these products

o Spain. In 1686 France exported to Spain and Latin America a total of 1000 dozen stockings from which only a small part could have been of English production passing in transit through the country. Customs duties on French knitwear were established in detail in Spain from the early eighteenth century, which testifies to long-standing and considerable export.³⁴ French hosiery products were initially of poor quality and aimed at a wide market. In the Court of Lorraine during the whole of the seventeenth century imported English and Italian products were being used, and among the stockings of varied colours and types of patterns only a few were of local production.³⁵

After the initial period, machine knitting became concentrated in a few regions of France. The most important of these was Languedoc where surviving archive material pertaining to knitting production has recently been utilized in a separate study. The paper of M. Sonenscher "is an attempt to explain why the manufacture of hosiery in south-eastern France came to be centred upon Nîmes, rather than Avignon, Marseilles or Montpellier, the other major towns of the area, and how the production of first woollen and then silk hose developed over the course of the eighteenth century".³⁶ Before the publication of this work I examined the diffusion of frame knitting into Lower Languedoc giving particular attention to the biggest centre of Nîmes. M. Sonenscher has added much more details from the archive records. Most of the published information appeared in regional publications and museum catalogues. A mention in the topography of the town on Nîmes informs us about the existence of the first knitting machines in this town already in 1656. These were probably a few imported contraptions without significance to later production. Nevertheless, in the last quarter of the seventeenth century machine production is developing there. This town was one of the 18 centres which according to the resolution of 30 March 1700 were entitled to possess establishments equipped with knitting machines. Other towns developing knitting production in that period were: Paris, Dourdan, Rouen, Caen, Nantes, Orléans, Aix, Toulouse, Usès, Romans, Lyon, Metz, Bourges, Poitiers, Orléans, Amiens and Reims.³⁷ This list shows the dispersed nature of the most important knitting centres in the eighteenth century. Some of them developed considerable machine production, while others were only transitory sites of the first manufactures, which moreover were in any case situated outside these towns.

From 1662 a knitting manufacture existed in Avignon, and from 1667 in Orange. Avignon was situated within the terrain of Papal possessions; therefore crafts, free from guild pressure, developed there early, as did, for example, different branches of silk production. A knitting manufacture was established by a partnership of Jean Baptiste Ponce and Antoine Cotelet together with the Hindret brothers. A few months after the establishment of the Company Jean Hindret ceded his rights to his brother Louis. The manufacture develops in collaboration with English knitters; among them are Henry Brent and William Chapman who figure in notary deeds in 1662. In the following years the number of English skilled workmen steadily increases and the names and places from which they came indicate that a group of Irish emigrants from Corcaigh (Cork) had settled in Avignon. Thus, the seventeenth century religious persecutions in western Europe resulted in the migration of skilled knitters from Ireland to

Catholic France and from France to different Protestant countries. Highly qualified experts were able to change their place of residence particularly easily. To this group belonged both producers of knitwear as well as machine constructors and maintenance men. In those times these were usually coppersmiths and watch-makers who had learned to produce knitting machine parts, assemble them and keep them serviceable. For example, François Coutelet is said to have constructed a special workshop for producing individual parts of the knitting machine: "Tenu à faire les moulins, les aiguilles, les ondes, les platines et les petits ressorts ni aucune pièce de cuivre, laiton ou étain".³⁸

This list mentions the most important metal parts of the knitting machine, such as needles, blades, copperheads mounted on little rings and springs. These parts had to be from steel and not from copper, brass or tin. Another master mechanic Jérôme Thiolier entered into a contract with the manufacturer managed by Berkeley and undertook to produce machine parts, primarily blades, while a blacksmith François Soulier was to assemble the whole mechanism. It must be remembered that the knitting machine consisted of more than 2000 parts, most of them minute pieces of the mobile metal mechanism. This explains why the knowledge of machines production was becoming a professional secret of craftsmen from the metal branch, who were being bribed from one manufacture to another. From 1667 we can observe in Avignon the development of a complete training centre not only for knitting apprentices, but also for machine fitters.

The second knitting manufacture in this region was established in Orange in 1667. The privilege for its establishment was obtained by a high Paris official Louis Bouchet. He was to produce "on English machines caps, waistcoats, gaiters, sock" and, in addition to ordinary stockings, also bas à canons which in the fashion of the period formed a sort of flounce above the calf turned down over the top of the boot. Bouchet ordered two knitting machines from the previously mentioned mechanic Coutelet in Avignon. In 1668, Pierre Guichard de Noyans was engaged for a period of two years. He was to produce only 20 pairs of stockings per month.³⁹ This norm tells us something about the work on only these two machines. However, it is worthwhile mentioning this small manufacture because of its connections with the beginnings of large knitting production in Nîmes. Louis Félix, one of the richest Protestant burghers in Orange, gave his daughter in marriage to a sail-cloth merchant Jean Bouzanquet, a citizen of Nîmes. In 1674 the townspeople of Orange and Nages make the sons of Jacques Félix and S. P. Grozot partners in establishing a knitting manufacture in Nîmes. Félix had by then gone through a knitting apprentice ship in Orange, where upon under his direction Thimothée Pastre, a watch-maker from Nîmes, constructs knitting machines, and later even introduces technical improvements. Pastre builds machines not only for his own manufacture, but in 1680 he sells two knitting machines to a master from Barbenante.⁴⁰

Till now the beginnings of machine knitting in Nîmes has not been properly investigated, although in the eighteenth century this town becomes the most powerful centre of production in France with a major concentration of the machines functioning in that country. According to different sources, during the years 1776-1788 the total number of machines functioning in France was

estimated at 20,000 to 68,000, form which more than 4000 were working in Nîmes. Other sources from the same period mention about 4500 machines and 116,850 people engaged in stocking production, these used 2894 quintals of raw textile material to produce 101,966 dozen pairs of stockings. From the machines ascribed to Nîmes over 3400 were working for export. M. Sonenscher gives a very good table showing the number of stocking frames active in Nîmes and the area of its guild from 1705 to 1783. In 1705 there were 887 frames working in Nîmes, while in 1783 already 3000 and in Jurande 5557 frames.⁴¹ Data, which refer to higher production, come from more recent studies making use of additional sources of information, thus they are closer to the truth.

The first manufacture in Nîmes develops rapidly. In 1682 Félix and Grizot have only two qualified workers, while two years later there are 23 and in 1685 - 73. In 1706 in the whole of Nîmes there were 870 machines ensuring the livelihood of 1000 families, in 1711 this number increases to 1110, in 1743 to 3200, while in 1744 there were altogether 5100 machines working in Nîmes and Uzès.⁴² Thanks to the exceptional abundance of material records of knitting in Nîmes, we can obtain on their bases data pertaining to raw material, organization of production, construction of machines and to marketing of the products. Contrary to the data on sericulture in this region⁴³ during the first sixty years of the seventeenth century, in the initial period the production of cheap woollen *bas d'estame* was predominant. In 1743, 9/10 of 4000 knitting machines in Languedoc are working in woollen yarn, producing two-ply stockings at the rate of three pairs per machine a day. According to other data Languedoc in the same year was producing 166,833 dozen woollen stockings as compared to 80,574 dozen articles from silk, twilled silk and cotton. In any case, production of woollen stockings distinctly predominates in the first half of the eighteenth century. The situation had changed in the second half of that century. Already in 1765 a predominance of silk stockings production is noticeable; in 1768 it was to comprise of 2/3 of the whole knitting products, while before 1778 it is recorded that 3500 machines process silk yarn, producing 61,966 dozen stockings, 500 machines process filloselle obtaining 1500 dozen from it and only 500 machines process wool producing 2500 dozen per year. Without further archive research it is difficult to verify the accuracy of this numerical data. Thus its, only by the mid-eighteenth century silk begins to dominate over wool. Dyers raw materials were cultivated in Languedoc, particularly woad, madder, dyer's reseda and kermes, although these pigments were being displaced by indigo and dyewood imported from the other hemisphere. M. Sonenscher clearly states:

Unlike the hosiery industry in Nîmes, the industry in the Cévennes and the Vannage continued to be associated with the production of woollen stockings until well into the eighteenth century. Of the 1868 frames listed outside of Nîmes in 1759, 1543 were working on wool and only 325 on silk. Nearly half of the latter were situated on the town of Ganges, on the southern edge of the Cévennes. The change from wool to silk in the hosiery industry of the countryside occurred as rapidly as the earlier change in Nîmes itself during the 1730s. It marked the second great phase of expansion to the manufacture of silk hose and took place between the mid-1760s and the late 1770s. An enumeration of the number of stocking frames within the region of 1783, lists a total of 2557 frames distributed among eighteenth major centres in the Cévennes and the Vannage. Of this total, there were 2055 frames making silk stockings, 383 working on cotton and only 119

making woollen hose. They complimented the 3000 frames producing silk hose for commercial houses in the city in the last decade before the Revolution.⁴⁴

The most important organizational problem in the initial rise of knitting in Nîmes and other Languedoc towns was the legal status of producers. Proprietors of manufactures were fighting against competition from merchants who were trading not only in ready-made knitwear, but also obtained them through the use of a putting-out system of production. This resembles the situation in Paris. Proprietors of centralized or dispersed manufactures accept guild status both as protection against competition and for the sake of socially recognized trade training. The statute confirmed in Toulouse in 1706 did not reconcile the acute disagreements between the different groups of producers. It required 3 years' apprenticeship under a master who could accept a new apprentice only in the third year of the previous one's term. A journeyman was required to work for two years and then assemble a knitting machine in the presence of senior guild members, after payment of 50 francs admission fee. Facilities were given to the sons of widows and to the husbands of masters' daughters. Women could help in production only in the home of the master. Regulations restricting production to a few workers in a guild workshop encountered such sharp opposition from producers that in 1711 the manner of achieving mastership and the restrictions on the number of workers in a workshop were abrogated.⁴⁵ Restrictions on the volume of production could not be enforced in an industry in which during the eighteenth century thousands of machines were working.

Machine-knitting production did not require long trade training. The only difficulty lay in the assembly of the machine of its parts. According to guild requirements a journeyman establishing his own workshop had to know the structure of the machine. In a manufacture-type division of labour this is not necessary and machine assembly, and even repairs, were taken care of by locksmiths, watchmakers and blacksmiths. The rigid guild division of labour caused sharp disputes between the locksmiths and knitters in Nîmes. According to the mediatory resolutions of 1749, knitters could assemble and repair machines only for use in their own workshops or manufactures. The locksmiths claimed that a knitting journeyman doing assembly work or repairs was entering their sphere of competence. At the same time they were not meeting the local demand for machines because the 8-9 metal-work masters in Nîmes were producing only up to 50 machines per year. However, a special profession of assemblers of knitting machines is only established in this town in 1767. From the times of the watch-maker Thymothée Pastre this large centre of production was introducing structural improvements to the device of the Reverend Lee. Thus, for example, in 1736 a clergyman Mousson from Uzès was rewarded for structural improvements to the machine. In 1788 the Bureau de Commerce paid 400 francs to a certain Fortenow of Nîmes for inventing a machine capable of producing articles having very fine stitches, thus suitable for producing imitation-lace knit goods. Constantly repeated are the injunctions against the export of knitting machines which nevertheless, were being exported even as far as to Russia.⁴⁶

A large part of Languedoc production dispersed across the whole economic region was designed for export. In order to show the extent of this production, a table with details relating to 29 localities in 1760 is given below.⁴⁷

Locality	Machines for wool	Machines for silk
Brissac	11	16
Autais	101	–
Anduze	15	45
Valleraughe	36	–
Bez	80	–
Aumessas	80	–
Le Vigan	161	2
Saint-Genès	67	–
Saint-Jean-de-Gardonnenque	54	–
Lédignan	33	–
Avèze	36	–
Caveirat	–	19
Clarensac	39	11
Nages	18	1
Marguerites	1	11
Congénies	9	–
Marillargues	–	–
Aimargues	18	37
Lasalle	37	–
Ganges	158	22
Saint-Laurent-le-Minier	3	27
Saint-Hippolyte	70	24
Sauve	236	–
Quissac	29	–
Monoblet	14	–
Saint-Jean-de-Serres	16	–
Saint-André-de-Valloignes	3	–
Durfort	26	–
Saint-Côme	64	3
Total	1415	218

It emerges from these statistics that in this provinces, particularly in the Cévennes mountains, machines for processing wool still predominate during this period. In the small villages of Languedoc there were so many knitting machines working. In other parts of France, and particularly in other countries of central or eastern Europe, such a large number would only exist in large manufactures. The total number of knitting machines in Languedoc, despite the differences in data from different sources is higher than in many European countries in the second half of the eighteenth century. This calculation includes just the smaller towns and villages of this region. We would stress the importance of Toulouse and Uzès, and among the smaller towns Roquecourbe, Marseilles, Montpellier or Toulon play an important role not only in the domain of trade in knitted goods, but also of their own production.⁴⁸ On the plateau of the Cévennes with the main towns of Le Vigan and Ganges, machine knitting was already being practised by 1684, passing gradually from local wool to locally produced silk and later cotton. In the uplands, form of the putting-out system of production and later cottage-work proved exceptionally persistent, numerous samples of their fabrics and tools being preserved in the Musée Cévenol du Vigan.⁴⁹

At has already been mentioned, the large Languedoc knitting industry was suited to meet the needs of export to Latin America, Spain, as well as to Italy, Russia and the German markets of Lipsk (Leipzig), Frankfurt am Main and Magdeburg. 90 of the exports however, went to Cadiz and from there mainly to Peru. M. Defournaux has described the production of "bas à la Pérouvienne", that is the stockings adapted to the taste of Peruvian customers. These stockings were made of wool and poorer quality silk, twilled silk and filoselle. These were usually colourful products finished with embroidery near the gussets. In Nîmes itself at the end of the eighteenth century there were about 2000 women engaged in stitching up the stockings and embroidering the gussets, while the topography of this town from 1790 already lists up to 2300 seamstresses and stocking embroiderers. In Nîmes itself the peak of the export period about 200,000 dozen stockings were being produced. At the same time, about 1780, the whole of Spanish America was buying 60-70,000 dozen pairs of stockings per year. Thus one third of Nîmes production was going to America, although for the requirements of these countries stockings were also purchased from England, Italy and Switzerland. Data from different sources show considerable deviations in the assessment of the volume of production. In any cases, knitting was of great importance to the economy of this part of France. The mass and inferior production was better suited to the taste of customers than the English or Genoese one. However, where knitted goods were being produced for the local market, as in Ganges for example, they were of better quality. The production in this town in 1788 was in the hands of 36 manufacturers, having 4000 working knitting machines serviced by 12 locksmiths, in addition, there were 30 workers, 4 dyers and 300 embroiderers of gussets.⁵⁰

The decline of knitting in Languedoc had already begun by the end of the discussed period. It suffered due to import restrictions imposed by the Spanish government. These restrictions were already being imposed already in 1778 as the Spaniards tried to reinforce the Catalan knitting industry. These regulations were less strict after 1783, but even before, they were often evaded by large-scale smuggling. However customs regulations, were tightened again in 1786, as the state of war with England accelerated the decline of Languedoc knitting. Nîmes suffering the most since the coming of export production to Nîmes. During the next 10 years the number of working machines dropped from 4500 to 1912, and the number of workers from 16,830 to 5980. The producers in Nîmes fought for new markets in Italy, Germany, Russia and the Scandinavian countries. at the same time, however, shipments of bas à la Pérouvienne were still smuggled from Nîmes through Barcelona to Peru right up to the early nineteenth century.⁵¹

M. Sonenscher has interpreted this problem in another way:

The relationship between the large commercial houses and those engaged in knitting, dyeing, embroidering, pressing and packing silk hose depended upon form of regulation, surveillance and co-operation which, given the technical composition of manufacture, was necessarily more direct and intimate than that associated with the factory [...]. The last years of the old regime and the early years of the Revolution were to undermine this delicate relationship. Prohibitions upon the importation of hosiery into Spain in 1779 and, more seriously, in 1787, were only partially offset by smuggling and sales in Switzerland, Germany, Russia and elsewhere. In 1787 the cocoon harvest failed and the expected recovery the following year was undermined by the political uncertainty produced by the revolutionary crisis. The conflicts to which these circumstances gave rise over the following decade exposed those engaged in the production of silk, woollen or cotton hose to an

environment which was considerably different from that in which the hosiery industry had previously existed. It was an environment which saw the eclipse of those dynasties – the Maigre, Chabanel, Ribot and Preterre which had dominated the hosiery trade of the eighteenth century, and the formation of a mercantile group whose relationship to those engaged in production was tempered by the experiences of the revolutionary decade. The terms upon which this new relationship operated, the form of co-operation which is implied and the ultimate transition to a completely rural hosiery industry which was a result, were the consequences of the still largely unexplored conflicts and compromise of the revolutionary period.⁵²

It seems that all the history of Languedoc knitting in its peak period of seventeenth and eighteenth centuries is open to discussion. Any comprehensive history of knitting in France would devote a large part to a study of Languedoc, it might even merit a separate monograph.

Knitting production in Languedoc was based on various sizes of business, here guild privileges had only a formal character and did not restrict the volume of production. The organization of this production takes a different course in the years 1658-1715 there was a house of forced labour. First hand knitting was used as employment for the inmates, and later, from 1696, knitting machines. Thick linen and woollen stockings were made imitating Italian products from Bergamo. After 1715 the knitting business in Bordeaux became independent of the compulsory workhouse, but in 1734 it was wound up as unprofitable.⁵³ Small knitting production also existed in different localities of Gascony and Provence, production in Marseilles and Toulon having been already mentioned. Finally a knitting manufacture was established in Corsica. All these establishments were of less economic importance than the powerful Languedoc knitting. A small centre of this production existed in le Delphinat, in Grenoble itself and its environs. In 1730 there were 104 workers operating on 53 machines and producing 840 dozen pairs of stockings and caps, while in 1778 this number had increased to more than 2000 workers and 400 working machines.⁵⁴ The fate of the early manufacture of Fournier in Lyon has not yet been investigated. In 1789 in this town there were 6630 workers involved in different spheres of knitting production which testifies to the existence of a rather large production centre. The project of the knitwear producer Chaix and data from 1777 testify to the great financial stratification between the workshops of this industry and the fall of some establishments. R. Vaultier writes about a certain Benois Caillou, a knitter from Lyon, who in 1779 was patenting of the invention of a machine producing open-work knitwear with non-running stitches. J. Poisat relates the history of hosiery in Roanne and its region but only from 1880 to 1973. The book offers some new information about hand-knitting production of the region from the earliest time.⁵⁵

In the eighteenth century Overnia has various knitting establishments. The existence of fairly differentiated production is testified not only by data from written sources but also by quite numerous relics in the museums of Clermont-Ferrand. In this region cotton was spun for the needs of the previously-mentioned manufacture in Bordeaux but also for one in Poitiers. Knitting manufacture existed in the house of forced labour in Tulle. Up to 1706 serge was produced there, but later, up to 1742, also woollen stockings from yarn obtained from the work of hospital inmates was being produced. Knitting

manufactures also developed in Limousin. After 1765 M. Pigney de Montignac was producing, besides fabrics, also caps, stockings and mittens from local lamb wool. The manufacture of M. Teulier and Company was producing, on 17 machines, silk or silk-cotton stockings and silk trousers and waistcoats. Cotton stockings were also produced on 2 knitting machines by a certain Méjean, nicknamed Belle-Olive. Finally in Saint-Junien woollen stockings from local raw material were being produced in a few manufactures.⁵⁶ In Poitou knitting manufactures existed only in Poitiers and Saini-Maixent in the seventeenth century. In the following century these lost their importance.⁵⁷ Mention must be made of the guild craftsmen in Rennes in Brittany. In 1755 there were 12 masters registered. Old traditions of guild knitting are also found in Nantes. In 1656 one of the first manufactures in France was established there and this town has the privilege of developing machine production. The first regulations for Nantes coincide with the Parisian ones and specify the requirements regarding the raw material and technical standard of the first machine-made knit goods. At the same time there was an attempt to reconcile the principles of guild organization in the field of knitters' craft training with the volume of the manufacture production. The manufacture in Nantes existed at least up to 1767 and was producing knit goods of average quality.⁵⁸

Orleans was also mentioned in the first list of towns gaining the privilege of machine production in 1700 and together with its environs, constituted an important knitting centre. A knitters' guild existed in this town from 1575 but craft traditions did not impede machine production. The machine was known since 1680, but the first manufacture was only established in 1693. Production largely intended for export to Canada developed there in the first half of the eighteenth century. Guilds of hand- and machine-knitters joined together only in 1769. In 1726 32 knitwear trades, 228 masters (fagconniers) and 482 machines are listed. In 1736 42 knitwear traders, 356 producers and 819 machines were working in Orleans. The peak comes in 1746 with: 80 traders, 400 producers and about 900 machines. According to other estimates, in the years 1720-1750 there were 1200 machines and about 10,000 workers in Orleans. Rural domestic production organized in the putting-out system was of great importance. In the neighbourhood of Orleans 12,000 workers were annually producing by hand and machine 54,000 dozen stockings, 31,000 pairs of gloves and mittens with one finger and 105,000 pairs of socks. A list of products from 1787 shows a large assortment of knit goods in Orleans and its environs, Beauce, Chartres, Blois and Dourdan. Besides stockings, socks, gloves and mittens the mention is also made of different types of headgear such as elongated night-cap type of sailors' caps, skull-caps and *bonnet-Jacques ou façon de Tunis*, designed for African customers and sailors. The total yearly production was estimated at 304,106 dozen woollen products, 300 dozen silk ones, 100 dozen linen ones and 100 dozen cotton ones. This important centre of production used mainly the local woollen raw material and its products were being sold both within the country and exported to Canada and North Africa. Large numbers of workers were involved in rural domestic production within the putting-out system, for example in the environs of Beauce and in the town itself there were about 12,000 people working in the eighteenth century.⁵⁹

Particularly close attention has been paid to knitting in Dourdan and its early craft traditions. This town was mentioned among the centres privileged in the use of the knitting machine, which was known there from 1685; initially it was used for woollen yarn while silk was used for hand knitting. A contract with the entrepreneur Fiace Mullochon stresses the necessity of training journeymen aged 15 to 22 years and apprentices aged 6 to 12 years. A machine cost at least 300 francs. An apprentice had to work 3 years and produce 4 pairs of stockings per week, which amounted to more than 600 pairs, thus the training covered the cost of the machine without the raw materials and finishing. Only a journeyman brought profit to the entrepreneur. F. Mullochon transferred his establishment to Orleans, but another manufacture with 400 machines was established in Dourdan in 1693. In 1745 there were 8 fullers, 6 dyers and 100 machines listed in Dourdan and it is assumed that the knitting production survived in this town at least till the revolutionary period.⁶⁰

Knitting in Normandy has also been closely researched. Soon, within the first years following the importation of the machine a few towns had developed a considerable production. In the first place we must mention Rouen where in 1694 machine knitters established a guild which existed up to 1778. After three years of journeying, a candidate for master worker had to produce: patterned woollen or silk stockings with gussets and other particular garments specified by masters. The family of a master enjoyed some privileges as regards the execution of the garments as well as a fee discount. Acceptance of guild restrictions on the volume of production and number of workers weighed heavily on the dimensions of knitting in Rouen. In 1755 there were only 65 masters working in small workshops with only a few machines. After the hand- and machine-knitters' guilds joined together, the number of workshops reached 80. Even after the transition to cotton production, no significant increase was noticed there. The knitters' guild in Caen had similar dimensions and character as the Rouen guild; in 1695 it had 97 masters. Woollen knitwear was also being produced in Bayeux, Verneuil, Évreux, Falaise, Montvilliers, Sées (Gouyer), Cherbourg, Vitrel, Saint-Lô, Carentan and Auvigny; rural domestic production organised in the putting-out system was also developed there,⁶¹ unlimited by guild restrictions.

It is difficult to determine the extent of production in Normandy. Data from 1784 for Reims and 17 localities in the neighbourhood of this town mention 514 manufactures producing on 946 machines 12,854 knitted pieces per year. In Soissons, Châlons, Vitry, Saint-Dizier, in Renwez and other localities in Mezières there existed guild production usually limited to 8-13 masters. As to Roubaix and Tourcoing we have data only from the nineteenth century listing 52 and 37 masters respectively. Lille and Armentières are lacking the data referring to the dimensions of production.⁶²

The most important centre of contemporary French knitting production only developed in the last century. Troyes had old craft traditions which became an obstacle in the development of machine knitting production difficult in this town. First machines were set in motion in Arcis in 1733 and in Troyes only in the Trinité hospital around 1746. The manufacturer employing the inmates of the hospital was making use of raw cotton; in 1753 there were 53 machines there, in 1771 over 60. The sudden development of machine knitting in

Champagne only takes place only in the last quarter of the eighteenth century. At that time numerous producers of cheaper woollen, semi-woollen and linen fabrics had switched over to knitting production. In 1787 in Champagne there were about 1500 knitting machines, of which 500 worked in Troyes. During the revolutionary period the production of this centre increased owing to the absence of English competition in Napoleon's time; somewhat later it becomes famous for improvements to the knitting machine. The period of its flourishing, however, surpasses the chronological scope of this book.⁶³ C. Heywood in his papers was interested mainly in the nineteenth century production. "The purpose of this paper is to examine the supply of labour in the rural areas of lower Champagne".⁶⁴ The output of this centre was discussed only on the basis of the nineteenth century statistics. But the mass production of some mills is not the subject of this book.

Knitting manufacture existed in 1748-1792 in Mareville-la-Vénérie in Lorraine near Nancy. Production of this branch existed even earlier in the house of forced labour in Nancy. In Mareville production trials were undertaken on 20 machines. The transfer of Lorraine to France in 1766 contributed to the development of the already well-patronized manufacture. Production, however, did not develop here to any large extent because in 1759 there were only just over 20,000 pairs of stockings registered as the product of the recent years.⁶⁵ Traces of knitting production exist in the environs of de Fournies and in the Vosges.⁶⁶ Little by little the knitting machine penetrates Alsace, the most important hand-knitting centre in that part of Europe. Schmoller believes that the knitting machine was known in Strassburg in 1618, which seems rather unlikely; even if a few machines had been imported there, the strong guild organization would not have allowed their spread. Only in 1735 did Jean Diesberger establish the first stocking manufacture in Colmar, production being based on the work of orphans and inmates of the local hospital.⁶⁷ The decline of hand knitting was gradual, while the growth of machine knitting in Alsace never attained to the dimensions that the hand knitting had achieved.

Thus we have shown above the meandering paths of the development of English and French knitting. While the English elaborations aim at more comprehensive assessments and verify the old quantitative estimates. French knitting has so far been discussed only in catalogues of provincial museums and scattered articles in regional periodicals. To date no elaboration of a more general character has appeared.⁶⁸ In this book an attempt has been made to collect this fragmentary information and to characterize the dimension and importance of the most significant centres, such as Languedoc or Normandy. It was, however, impossible to verify data coming from different sources without archival research and to obtain anything more than scattered mentions about knitting production in several towns or regions. Nevertheless, the development of French machine knitting in the late seventeenth and the eighteenth century, which is shown just with this limited data, amazes us with its impetus. Guild restrictions in the dynamic centres could not lessen the growth of production or limit the division of labour in manufactures and rural domestic production in the putting-out system. The growth of local and foreign demand of knitted products brought about the rise of the larger production centres and the transfer

of production from one centre to others. In the eighteenth century France competes with English knitting and surpasses it, without significant improvements to the machine, in the production of garments designed for wide masses of consumers looking for cheap but attractive articles which follow the whims of fashion.

VI Diffusion of the Knitting Machine and Manufactures in Southern, Central, Northern and Eastern Europe from the End of the Seventeenth to the End of the Eighteenth Century

1 Italian, Spanish and Swiss Knitting

The diffusion of the knitting machine took a different form in France and England than in other European countries. In England, owing to the weak guild system, hand-knitters did not put up organized opposition against the introduction of the machine, and later, from the second half of the seventeenth century, the powerful organization of Framework Knitters defended the interests of this group of producers. machine knitting in France initially enjoyed strong state support; nevertheless this production was concentrated in regions away from hand-knitting centres. The training of apprentices and journeymen required the subsequent formation of guilds, whose norms were greatly surpassed by the dimensions of manufacture production. In other European countries the introduction of knitting machines was usually connected with the formation of centralized manufactures and pointed to a stronger development of diverse textile branches. The knitting machine was a costly and complicated tool, requiring specially trained metal-workers for the assembly and maintenance. Supervision of the whole process of this flat fabric-maker together with the finishing required trained specialists and, consequently, its importation involved the importation of foreign experts. Owing to these costs, machine knitting was generally developed in manufactures subsidized by the state, magnates, entrepreneurs or joint stock companies.

Italy became an important centre of machine knitting, being at the same time a past centre of hand knitting production. This is the third country to which the knitting machine arrived already in 1611. Henson claims that after the death of W. Lee his brother left for England, Jones for Amsterdam and

Henry Mead for Venice. The attempt to organize a knitting manufacture failed and production lasted no longer than to 1611. Recently, the first results of archival research carried out by Adams in Italian archives have revealed that a certain Joiner was engaged in the production of silk stockings. This information, however, refers only to the period 1611-1612.¹ We do not know, whether some small machine production survived a few Italian towns or not. The seventeenth century trade sources from various European countries constantly emphasize the extent of knitwear import, mainly stockings, from Milan, Mantua, Genoa, Naples or Bergamo.² Filatories for silk, diffused through northern Italy in the sixteenth to eighteenth centuries, supplied the yarn required for this production.³ However, we do not know, to what degree it underwent mechanization. First data pertaining to the establishment of knitting manufacture refer to Milan. An Englishman, Hanford, established a workshop there, in 1663 which enjoyed the privilege of a monopoly for 10 years and made use of imported machines and experts. Scarce and dispersed data published by E. Verga reveal that the production there did not develop on a larger scale, while more successful were the manufactures established in 1680s and the eighteenth century. Data from the early nineteenth century inform us of 300 knitters working in Milan, thus we cannot speak about a enormous development, and this production did not grow.⁴ English data tells us about the export of knitting machines to Rome and Messina in the years 1670-1695. After 1721 knitting production spread to Venice, Bologna, Torino and Naples.⁵ Machine-knitting production could satisfy a part of the national demand, but Italy in the seventeenth and eighteenth centuries gradually loses its importance as a knitwear export centre, with French knitwear being imported there. It could, however, export its products, and perhaps even machines, to Dalmatia, which is testified by the varied textile production of Dubrovnik and the numerous relics of machine knitting preserved there.⁶

In Spain the invention of the knitting machine coincided with a period of economic stagnation. In the years 1670-1695 machines were exported from England to Cordova, Seville and Cadiz, and later also to Barcelona. Nevertheless, the development of knitting manufactures did not take place immediately. At this very time the export of French knitted products to Spain increases.⁷ Then the establishment of state-supported manufactures to Spain begins. Guild organization, newly documented from Barcelona, gains fairly large dimensions. Guild organization, newly documented from 1690, did not restrict the dimensions of production. In the statute of 1703 only the production of knitwear made on needles is mentioned, but in 1745 the guild organization encompassed both hand- and machine-knitting producers. Thus during the first half of the seventeenth century the knitting machine was adopted by the guild and in 1753 there were 16 manufacturers who possessed craft-type workshops using 92 machines. The dimensions of their production exceeded the number of workers accepted to ordinary guilds. Little is known about the further development of this knitting guild which existed up to the early nineteenth century. It was, however, an interesting example of combining guild organizations and the production dimensions of small manufactures. A comprehensive work discussing the silk production in Valencia in the eighteenth century assume that these traditional forms of guild production did not withstand the competition

from the better invested and state-supported manufactures; nevertheless they revealed much greater continuity of production.

Studies on textile manufactures established in Spain in the eighteenth century do not take into account the separate knitting establishments which were organizationally connected with cloth and silk manufactures and even with those making cotton fabrics, and used yarn produced there. A considerable knitting production competitive with regard to Languedoc, developed in Barcelona at the end of the eighteenth century. At the end of the eighteenth century Valencia had 1700 knitting machines. Even earlier, in the early eighteenth century, a small manufacture producing knitting machines was established in Madrid. Regulations dating from 1770 for silk knitwear producers specify the weight of stockings, gloves and caps, in order to maintain the standard of production. On the basis of this scattered data and the large number of knitwear products preserved from the eighteenth century,⁹ we can assume that in this period the small knitting manufactures and the already declining guilds could satisfy a part of the national demand.

Switzerland was the first place of residence of the Huguenot emigrants crossing the French frontier in great numbers after the revocation of the edict of Nantes in 1685. A clergyman Tholosen organized their recruitment in other countries, mainly to Germany. Some of them remained in Switzerland. The first knitting manufacture was established in Geneva in 1688. The brothers Louis and Jacques Félix from Nîmes were working there on 8 machines. By 1712 there were already 12 small establishments in this town, while in 1720 a larger manufacture of Autran and Affourti with 15 machines was established. Nevertheless, this production was of importance only to the local market in contrast to the machine production of knitwear initiated by the Huguenots in Berne. Knitting machines also reached other cantons where domestic production organised in the putting-out system was being practised. During the eighteenth century machine-knitting, supplemented by hand-knitting production, started to have export significance. Woollen stockings, gloves and headgear were exported to Italy, Spain, the East and West Indies, Central and South America, as well as to Germany and the countries of northern Europe, and even to France. By 1768 in Berne and surroundings there were more than 500 machines in operation. In other cantons a few hundred knitting workshops have been counted. A fairly large production developed also in the old hand-knitting centre in Basle and surroundings; in 1766, 21 establishments were listed there. In Zurich and its neighbourhood in 1739 there were 120 knitters, small groups of them also concentrating in Freiburg and the surroundings of St. Gallen. Production declines in the late eighteenth century.

In Berne in 1791 there are only 232 machines in operation.¹⁰ W. Bodmer overestimates the extent of Swiss knitting. With such a small number of machines the export could not have been great and it had probably collapsed as a result of competition from French knitting.

Knitting Production in the Netherlands

The neighbourhood of Tournai, thus the region bordering with France, is the most important Belgian knitting centre of southern Netherlands. Already at the end of the fifteenth century this part of the country is famous for hand knitting. The knitting machine was introduced there relatively early, already at the time when this region belonged to France, in the years 1667-1708. Tournai together with Valenciennes figures on the list of towns to which English knitting machines were exported during the period 1670-1695. In England at the beginning of the nineteenth century the southern Netherlands were considered to be an important knitting centre.¹¹ There is data showing that around 1680 there were more than 2000 master-knitters in Tournaisis, who produced mainly stockings, part of this production being exported to Spain.¹² The establishment of machine-knitting production in settlements such as Péruvelz or Leuze brought about their rapid economic development. Already by 1764 in Leuze 85-90 knitting machines were working, producing 50,000 pairs of stockings per year.¹³ Statistical statements from the period of Austrian rule in the second half of the eighteenth century give detailed numerical data pertaining to southern Belgium. In Charleroi there were 4 hosiery manufactures in 1751, in 1764, 6 more were added. In Antwerp in 1738-1764 there was only one silk stockings manufacture functioning with 8-9 workers. In 1764 there are two stockings producers in Merbes-de-Château, one manufacture belonging to a certain Jean Deferrier in Gerpinnes, and establishment of Simon Joseph Boucher in Tournai. The list of manufactures from 1782-1784 supplements these figures. So knitting establishments exist in Antwerp and Brussels; besides these there are manufactures in Diest, Tirlemont and Tournai. In the statistical statements it is emphasized that in the whole Hainaut region knitting manufactures are operating in all towns; hand-made knitwear was also being made. Quevancamps in particular, distinguishes itself among the villages engaged in the production of hand-made knitwear in Tournaisis. This powerful centre of knitting production in Belgium survived right up to the beginning of the nineteenth century, the time when knitting manufactures became the most important textile establishments in Tournai.¹⁴

Exceptionally under investigated is the knitting production in northern Netherlands. After liquidation of the manufacture in Rouen in 1611, Abraham Jones set out with some of the machines and experts to Amsterdam and established a small manufacture there, training Dutch specialists. Soon afterwards, he and his whole family fell victim to the plague.¹⁵ There are no studies on the further fate of machine knitting.¹⁶ There existed in this country a small knitting production for local demand.

Bohemian, Austrian and Hungarian Knitting

Following the chronological order of the introduction of the knitting machine, we shall discuss collectively the group of countries in central Europe which during this period were a single state organism under Hapsburg rule. In the first place we must mention Bohemia which most rapidly became an important centre of machine knitting. Already at the end of the seventeenth and beginning of the eighteenth century the cheapest and most primitive knitting machine had gained popularity being organised in the putting-out system of production. Needles, blades and hold-fast fittings were made of metal, while both the entire casing of the working part and the base, was of wood.¹⁷ No specimen of this cheap wooden machine has survived; however, there are numerous data on the use of these machines, for example in Krusnohoří. They were called *Válcový stávek* and mentions of them appear up to the early eighteenth century. On this primitive type of knitting machine it was possible to quickly make thick woollen articles designed for wide circles of consumers who wore western European dress for which knitted stockings were already an essential item. In central Europe, iron and generally metal goods were expensive, always being listed in detail in probate inventories, while all the household and farm tools consisted of precisely fashioned wooden implements.

The first of the Bohemian manufactures, which also produced stockings apart from other articles, was established during 1684-1688 in Soběchleby. The second one was set up as Jesuit property in Osicek in 1697. The abbot of that monastery, Benedikt Liverich, fetched the Saxon master Johann Paul Rötting from Saxony. At first there were 9 metal knitting machines working there and at the end of the seventeenth century there were 50 specialists. In 1725 the manufacture was employing 91 people comprising 63 spinners, 14 knitters, a dyer and workers engaged in the finishing process. In 1744 the manufacture produced 877 pairs of stockings of which 783 pairs were of the best quality. The establishment had its own dye-works, press and about 15 knitting machines; thus it was not a very large one. Saxon and other experts were establishing knitting workshops in Duchcov, Bilina, Teplice, Krupce, Horní Litvínov and Střelci Světec as well as in Jihlava. In 1713, a group of manufactures grew in the village Družice, established by B. E. von Uechtritz: "The hosiery was located in the largest brick house consisting of 11 rooms [partly occupied by members of the Uechtritz household], 1 counter and 2 shops. There were 12 metal and 13 wooden knitting frames in good condition on which silk and woollen stockings were being produced. There were also two presses there".¹⁸ Wool was also being processed by hosiery manufactures in Slawków from 1701 and in Kržanov from 1704, both of them linked with clothiers' manufactures. The Slawków manufacture was producing woollen stockings, willingly bought in Brno and Vienna. It employed 8 people for sorting wool and repairing machines, 12 carders, 73 spinners for wool and 3 for cotton, 9 journeymen producing stockings on machines, 1 fuller and 1 dyer.¹⁹

Anton Klima cites a few references to the numerous knitting manufactures established in Bohemia during the twenties of the eighteenth century. The manufacture in Liberec arrived in 1723 attached to a similar clothiers' establishment. In the years before 1729-1753 a knitting manufacture existed in Nova Kdynia. There is no precise data on its equipment and the output volume. Altogether in 1761, there were 1853 knitters working in Bohemia. In Bohemian production woollen articles predominated; cotton knitwear constituted just a small part of production. The table below shows the volume of knitting production (without spinners) during 1775-1797 based on data coming from three studies.

Country, Year	Type of knitters	Masters	Journey-men	Apprentices	Helpers	Total	Number of machines
Bohemia	1775 machine	1253	623	288	1600	3764	—
	hand	1438	272	129	578	2397	—
	1780 machine	1396	747	382	2012	4537	—
	hand	1732	354	147	681	2914	—
	1782 machine	1492	822	387	815	3516	—
	hand	1869	350	163	661	3043	—
	1785 machine	—	—	—	—	4393	2850
	hand	—	—	—	—	3117	—
	1788 machine	—	—	—	—	6517	3545
	hand	—	—	—	—	3509	—
Moravia	1797 machine	1925	1379	659	1927	5890	4037
	hand	1625	339	148	1279	3391	—
	1775 machine	27	21	8	13	71	4
	hand	628	101	37	12	778	—
	1789 machine	68	57	14	3	142	139
	hand	506	90	66	42	704	—

The statistical data presented above complement each other, despite some minor differences. H. Freudenberger gave data pertaining to Bohemian and Moravian production on the basis of Austrian archive material. The data up to 1788 are cited after Klima and Salz.²⁰ Only in the eighties do machine-knitters in Bohemia predominate over hand-knitters, earlier their production being small. In 1797 the more than 4 thousand knitting frames in Bohemia make this country a production centre equal to that of the French town Nîmes.

It emerges from A. Klima's book that the number of knitting manufactures did not increase much in the last quarter of the eighteenth century. There is an increase, however, in the number of workers in manufactures processing cotton yarn. Thus, for example, in a manufacture utilizing the labour of children in Bělá near Bezděz, in 1769 cotton stockings were being produced on 6 machines, while in 1771 already on 14. The annual output amounted to 600 dozen, that is 7200 pairs of cotton stockings and caps, mainly night-caps.²¹ The development of Bohemian knitting production was similar to that of other central European countries, that is, less frequently in individual manufactures, more often in larger groups of textile establishments. These groups were generally linked

together by the use of the same type of raw material, such as woollen, cotton, silk and less often linen yarn. An example of such an establishment is the manufacture of Count Belz, set up in 1763 on his estate in Kosmonosy. Cotton stockings and caps from imported yarn were produced there, some of the knitters being employed in the domestic putting-out system.²² Bohemian industry did not enjoy any state support which resulted in a relatively small number of manufactures and in the development of the domestic putting-out production. Both the volume and the quality of the production turned out to be competitive to the neighbouring countries, that is to Austria and southern Germany.²³ Bohemia constitutes an interesting example of a country where knitting machines diffuses early among guild and domestic producers with the simultaneous development of hand knitting. Not only does the quoted statistical data, but also the guild insignia from Prague from 1792 testify to its existence.²⁴ In Moravia, hand knitting predominated up to the late eighteenth century.

Slovakia, following the example of Hungary, adopted male national dress based on eastern models. The demand for knitted stockings was relatively small in this country. Consequently the development of hand knitting, presented in Chapter IV, did not induce machine production, usually organized into manufactures. Still in the course of the eighteenth century, notices about new confirmations of guild privileges recur constantly, as in 1744 in Trnava, in 1770 in Sobotšite, Holica and Saštin in eastern Slovakia.²⁵ At the same time no data is available about knitting manufactures in Slovakia before 1825.²⁶

Bohemia and Slovakia belonged to the group of countries governed by the Austrian Hapsburgs. This status hindered the development of knitting in Bohemia, economically more developed than Austria, as well as in the under-developed Slovakia, and also in Hungary. The protective policy of Maria Theresa was specifically directed at Austria itself. Imperial court support for knitting production was manifested not only by grants but also by restrictions on the import of these products from other Germanic countries, mainly from Prussia and Bohemia. Mention of the first knitting frame working in Vienna refers to a manufacture established there by a Frenchman. At the same time, the need for drafting in machine-knitters' statute was acknowledged in Vienna in 1707. It emphasized the importance of producing silk stockings on metal machines (thus not the wooden, Bohemian, ones), and at the same time it prohibited unorganized citizens from engaging in this production. This new branch of textile production needed the framework of the guild system as much for protection against competition from the fairly strong hand-knitting guild as against free producers. The new statute from 1707 while determining guild powers, restricted the volume of output. The guild was obliged not to exceed the number of 7 masters, and each of them could train only one apprentice over a four-year apprenticeship period. The qualification for master worker was the ability to assemble the machine unaided and to produce men's silk stockings of the highest quality. Hand-knitters could not possess metal machines and were forbidden to produce silk, even semi-silk, stockings, or to sell them. However, they were probably permitted to make coarse woollen stockings on the most primitive, partly wooden, machines. Restrictions on the number of workers and workshops were not enforced owing to the state support and

the great demand for knitwear. In 1742 in Vienna there were already 25 producers of silk stockings, as many as in Berlin in the same period.²⁷

The volume of knitwear production was growing in many parts of Austria in the second half of the eighteenth century. The Viennese association of silk stockings' producers considerably increased the number of its establishments after 1760, 15 producers of woollen stockings belonged to it. In 1766 it was recorded that the annual production in Vienna amounted to 9000 dozen winter stockings, described as Hamburg or Berlin products; therefore they could replace Bohemian products of similar quality. The quantitative ratio of producers of woollen to silk stockings in Vienna was as follows: 1742 – 4:25, 1749 – 17:90, 1790 – 23:129, 1800 – 19:113. Only after 1789 did machine-knitters have official permission to produce stockings from wool or cotton. Till then their production of silk stockings was predominant, since they were easier to execute on a machine. The enlargement of raw material possibilities increased the product variety of Viennese knitting. In 1803, various types of stockings and gloves, night-caps, purses, as well as larger items such as men's waistcoats, bodices and other ladies' garments connected with the fashion of the empire,²⁸ were produced in Vienna.

The development of machine knitting in Vienna was connected with the local market and assumed greater dimensions only in the second half of the eighteenth century owing to the concentration of a large number of small establishments there. Knitting manufactures established themselves in Lower Austria. The first attempt to establish a large machine-knitting manufacture on the Walpersdorf estates belonging to Graf Sinzendorf dates to 1666-1671. It was a typical enterprise based on imported machines, raw material and labour of knitters from Lyon. The quality of the silk stockings did not withstand competition from other European knitting centres; they were unsuitable for export and were too expensive for local consumers. The manufacture came to an end in 1682. After its fall there are no records of machine knitting in Lower Austria in the eighteenth century.²⁹ In Upper Austria in 1636 and later, in 1648, there were attempts to popularize the knitting production in the surroundings of Enns. Also in 1649 the abbot from Kremsmünster organizes to a great extent a domestic knitting production in the putting-out system.³⁰ It is not known, however, whether knitting machines were being used there. Nevertheless, these attempts indicate the fairly large production potential of the region in the field of knitting based on local wool.

The matter of the establishment of a knitting manufacture in Linz is a little obscure. The only documents preserved are from 1697 demonstrating guild opposition towards the establishment of an imperial knitting manufacture in this town. It is not known whether this actually did come into existence and if so, whether it managed to withstand the strong competition from the hand-knitters' guild or not. In 1717 the latter obtained a new confirmation of the statute, which fought against all bunglers, including the confiscation of their products. In 1786 the knitting manufacture of Franz Maurer and Franz Rath was established in Linz, which produced silk stockings patterned upon the products from Halle. In the early nineteenth century there are several knitting manufactures found in this town. After 1782 there was a knitting manufacture in Steyr, which employed 8 masters, 63 journeymen and apprentices

and 340 spinners. In 1803 in Linz a knitting manufacture was established, which produced caps with oriental designs, probably destined mainly for export to the Balkans and the Middle East. During 1785-1789 the number of workers employed in knitting production in Upper Austria increased from 3332 to 4736; in 1790 there were 3484 spinners engaged in the preparation of the yarn for this branch of textiles. Smaller establishments were found in Uttendorf, Kirchdorf, Grieskirchen and Mondsee. A large number of master-knitters employed in these manufactures, came from Bohemia.³¹ Thus knitting in Upper Austria, under the protection of the imperial court, was based on experts from Bohemia and their professional experience, despite the weakness of the local textile industry.

In the years 1763-1818 the largest manufacture in Upper Austria was that established in Ponegg. Abundant archival material elaborated by G. Grüll enables us to present in a more comprehensive way the character of this manufacture and its output capacity. It was set up by Graf Salburg who in 1763 made the attempt to establish a the manufacture of the so-called "Hamburg stockings". Already in 1764 the initial enterprise capital was augmented thanks to the establishment of a company, created by several representatives of the Austrian aristocracy. Support from the imperial court enabled the import rights on knitwear and their retail sale to be restricted. Nevertheless, the manufacture developed slowly; the initial productivity norms - three stockings in two days - reveal the limited skill of the journeymen working on these machines and are close to the productive capacity of hand knitting. The manufacture was located in Ponegg Castle and, in addition to the large number of rooms occupied there, it also had a fulling mill, a large building for five families of skilled workers and 16 houses occupied by other employees.

In 1767, "the yearly output of stockings amounted at most to 6000-8000 dozen. The petition also listed all the people working at Ponegg factory. They totalled 4157, and 2954 of them were spinners, 1101 of them knitters, and 102 were either labourers or clerks in the factory. 1592 of the spinners and 96 of the knitters were recruited from Graf Salburg's own estates in Zellhof, Rutenstein, Arbing, Kreuzen, Greinburg, and Sallaberg; 552 of the spinners belonged to the Thurnheims' Schwerberg estate". The figures from the period between 1782-1812 clearly reveal the decline of the factory. But in some fifteenth years it was one of the largest non-centralized knitting manufacture in Europe. Only the finishing of all the products, including a small production of knitwear, was centralized in the factory buildings. For this reason it is possible understand easily the problems of fulling, dyeing and fashioning the knitwear. The manufacture was producing woollen stockings. The greatest problem was securing a suitable supply of good wool, wool from Banat being considered the best, while worse raw material came from Bulgaria, Macedonia and Wallachia. Treatment of the wool was undertaken in the manufacturing premises, great attention being paid to the proper set of the cards and combs. Several types of dye-stuffs were also needed for dyeing the stockings such as: alum, logwood, cochineal, curcume, brazil wood, gall nut, Hungarian dyer's weed, Dutch ochro wood, indigo, sumack and madder, and also potash and some another dopes. The Ponegg manufacture produced the stockings in different colours and undertones, in very big assortment. Archival data does

not show whether domestic producers were being issued with already treated wool but in any case spinning was done outside the manufacture. The production of stockings required rather strongly twisted yarn. The norms of stocking production on machines must definitely have increased if less than twenty journeymen from the manufacture were producing 6000 dozen different types of stockings, that is 72,000 pairs; the work of about a thousand domestic producers in the putting-out system, however, could have been included here. The most frequently mentioned are 3-4-ply stockings, thus of fairly good thickness. They were fulling in a large fulling mill in hot water with alkaline solvents, then with soap. They were pressed in a large press and only after drying and arranging into pairs were they dyed. The product assortment was not very wide. Listed were smooth men's stockings and 4-6-ply women's ones, patterned men's, women's and children's, less frequently 2-3-ply stockings in different colours. Trade records also mention Hamburg stockings, plain and patterned, English ones, Berlin, Saxon, Paduan and Segovian ones, as well as those produced on the model of Wrocław stockings, Budziszyn stockings, or the products from Erlangen, Naumburg and Apolda. Gaiters and socks were also being produced. Beaver stockings were produced from wool mixed with beaver hair. The long list of descriptions of stockings is of great importance in establishing the attempt at Pönneggen to imitate so many products from different European countries.

"From the earliest times, fashion has been a promoter of economic and technological change. The fashion for stockings spread amongst all classes from the seventeenth century and flourished especially in the eighteenth century, and it was this fashion which created the first impulse for the change from individual production by hand knitters to mass production in factories. The increasing demand could only be satisfied in this way. Fashion led to the establishment of the hosiery company at Pönneggen in order to supply the Austrian Empire with import-substitutes for goods which previously could only be acquired from abroad, especially from northern Germany. It existed for the relatively short period of fifty years (1763-1818), but the existence of fairly good sources has made it possible to examine certain important aspects of this interesting enterprise in a period of state-directed industry and trade.

It also shows that in the second half of the eighteenth century large European knitting centres such as Padua, Segovia, Hamburg, Berlin or the group of towns in Saxony, were producing types of stockings distinguishable to traders and consumers.³²

Knitting production in Styria and Tyrol was of local importance only. In 1769 in Graz itself and its surroundings 40 machines were producing woollen stockings. Greater, however, in this district was the production of hand-knitters who even protested against the construction of a fulling mill for this manufacture. Despite their opposition, a manufacture producing silk stockings was established in Graz itself in the late eighteenth century. In Leibach these products were being manufactured already from 1729. The earliest to come into existence in Graz was a manufacture of cotton stockings and headgear since these did not constitute competition to local hand made production. In the local museum there is a knitting frame preserved from the eighteenth century. (Il. 21) Styria had a powerful domestic production of woollen knitwear organized in the putting-out system and these products played a part in the local dress already from the seventeenth century. Tyrol was always an important centre

of hand knitting, but by 1774 there were already 58 knitting machines. Stockings meant for military dress were mainly being produced on them.³³ Knitting production in Austria gained great impetus during the eighteenth century, while Bohemia, Slovakia, Hungary and Galicia were merely to play the role of raw material base and market for the produced articles.

Textile production in Hungary develops only in the eighteenth century.³⁴ The first mention of the registration of a knitters' guild comes from Buda from 1715. The guild sign of one of the Hungarian corporations is dated about 1725. In 1774 a knitters' guild already existed in Sopron, from 1776 at least these craftsmen had a guild in Győr; from 1781 comes both the statute and the knitters' guild seal in Veszprém. In 1782 knitters were working in the komiat of Tolna. These scattered archival references and the preserved guild insignia reveal the existence of a limited knitting production source about which there is no mention in the literature on the subject.³⁵ Nevertheless, in the eighteenth century there was not a single knitting manufacture in Hungary, although the existence of machine knitting is documented only by two very interesting frames dating from about 1800. One of them is to be found in Fonó-Szövő es Húrköloipari Technikum in Budapest, another one in the textile mill in Hódmezővásárhely. Both resemble the first machine of William Lee from 1589, and not another more complicated version from the eighteenth century. But there are some small differences in the position of wheel transferring propulsion from foot to the working part. They are completely different from the Saxon wooden frames with two slantingly fitted wheels.³⁶ Perhaps further investigation may reveal larger centres of domestic production in the putting-out system and enable us to draw the characteristics of Hungarian knitting. The diffusion of west European men's dress in the eighteenth century created a demand for stockings on the local market.

4 Knitting in Different German Countries

The development of machine knitting in different German countries was not closely linked with former centres of the textile industry. Of direct influence was the colonization of the Huguenot craftsmen who were usually establishing knitting manufactures.³⁷ Some German countries such as Catholic Bavaria did not admit Protestant experts until the end of the eighteenth century, while Prussia most strongly supported this immigration. This is why dates of the establishment of manufacture's encompass a period of more than a hundred years, while Bohemian and Austrian knitting developed more simultaneously. In Bavaria the first manufacture of cotton stockings in Reichenhall was established in 1760 and existed until 1807. Only the washing and dyeing process involved in the knitted products, mainly stockings and night-caps, was centralized. Except for the finishing, the production of the manufacture was based on the work of the inhabitants of the Reichenhall and Traunstein

surroundings. In 1799 it employed: 51 carders, 270 spinners, 730 knitters and 32 seamstresses. Its production did not satisfy domestic needs; stockings occupied an important place among Bavarian imports. It emerges from statistical data that around 1781 in the neighbourhood of Burghausen there were 43 knitters, in the Straubing region – 46, in the Munich region – 70, that is 159 in all, apart from the Inn region, lost to Austria in 1779, with 32 knitters. From the summarized comparison of the number of craftsmen in Upper and Lower Bavaria it appears that there were 107 independent knitting workshops there. E. Schremmer gives general calculations for the number of different branches of craftsmen in relation to the number of inhabitants. These calculations reveal that in the late eighteenth century, there were about 11,900 people engaged in knitting along with spinning and raw material treatment.³⁸ Thus it was small-scale production geared to local needs.

The largest group of knitters from the south France settled relatively early, in 1686, in the duchy of Bayreuth, in central Franconia, mainly in Erlangen. The knitters stood at the forefront of the large group of Huguenot settlers. From the very beginning production assumed rather large dimensions: Louis Rey from Nîmes, for example was working on 300 machines. From 1698 it was organized according to the principles of the margrave Christian Ernst. They indicate that the state favoured manufactures and at the same time sought a guild type of organization facilitating the training of skilled workers but without restricting the volume of production. The privileges of the French settlers caused discontent, among the already-qualified German experts, which in 1705 resulted in further changes in the regulations and in restrictions on production. Thus it was only permitted to admit apprentices aged between 13 and 15, each of them had to be trained for three years and only in the fourth year, that is the last year of apprenticeship, could the next apprentice be taken. Despite numerous protests from producers, no more than three knitting frames were permitted to work in one workshop. This order does not seem to have been very strictly observed if we take into consideration the dimensions of knitting production in Erlangen. Already in 1698 there were 97 knitting machines working there, while in 1712 – 161. In Erlangen, Schwabach and Wilhelmsdorf there were 156,000 pairs of stockings being produced in 1712. In 1775 work was being done on 580 machines, while in 1792 – 350 masters with 180 journeymen and 89 apprentices were producing 420,000 pairs of stockings per year.³⁹

The numerical development of the immigrant and local knitters' colony was as follows: in 1698 in Erlangen 30 independent entrepreneurs, 73 journeymen and 104 family members, relatives of masters and servants were working on 69 machines. 207 knitters were repairing the machines, producing replaceable parts and assembling new ones, as well as finishing the products. In these figures, the spinners of wool, cotton or silk, the combers, carders and other helpers are missing. The large number of family members and servants indicates that the guild regulations limiting the number of persons per workshop were avoided, since it amounts to 7 workers. The number of machines, however, point to a decline of Louis Rey large manufacture. Initially French settlers predominate among knitters. In 1712 50 masters and 40 journeymen and apprentices were mentioned. In 1723, however, there were 272 German knitters

in Erlangen and supposedly a couple or more fullers and dyers. In these figures spinners and carders are not distinguished separately, so the number of qualified journeymen of masters would be at least 50 per cent lower. In the course of 39 years many Germans mastered this new branch of textiles.⁴⁰

Detailed data from 1792 give a more precise idea about the dimensions of knitting in Erlangen. Within a century, cotton became the main raw material. 350 masters together with widows, 180 journeymen and 89 apprentices worked in this town on 565 knitting machines, which meant 619 qualified knitters. Much more numerous was the auxiliary staff consisting of 161 carders, 1500 spinners, 200 seamstresses stitching up the flat-knitted stockings. 268 seamstresses embroidering the gussets and 49 workers engaged in the finishing and packing of the products. In sum, on 565 machines there were 2797 people engaged in the production of stockings and night-caps, which comes to almost workers per machine. It also works out at 3 1/4 pounds, that is more than one and a half kilo of cotton per machine per week. By now it was not 10, as at the beginning of the eighteenth century, but 15 stockings which were being produced weekly per machine. With 50 working weeks per year, production could amount to 35,312 dozen stockings. A carder or comb of cotton was processing material for 4 machines, a seamstress was stitching 4 dozen stockings per week, while an embroiderer of gussets was in that time finishing off 3 pairs. Some of the knitters were producing woollen stockings, gloves and gaiters, as well as night-caps. For dyeing, local madder was used mainly. Thus, taking into account the dimensions of the German knitting industry, Erlangen was an important production centre, comparable to all but the very largest centres of England and France. During the period under Prussian rule and prior to its annexation to Bavaria, Erlangen did not increase its production. In 1805 there were only 1795 people working on 406 machines and in 1810 there were scarcely 1069 workers.⁴¹

Apart from Erlangen, at the end of the seventeenth century as in the eighteenth century the knitting industry was centered in Wilhelmsdorf, Fürth and Langenzenn. Less studied are the amount of production in other localities of the duchy of Ansbach although French knitters were settled there from 1685. In 1701 in Schwabach there were 7 masters, 22 journeymen, 2 fullers with 7 helpers and 1 producer of needles and other machine parts with 3 helpers. In 1734 German masters were predominant, working on more than a hundred machines, while 8 years earlier there had only been 110 French and German masters.⁴² There are no statistical data concerning the further development of knitting production in this town.

In other duchies of southern Germany there was no such powerful knitting production subordinated to guild regulations. There are no statistics available on machine knitting in Württemberg or Frankfurt on the Main. However, in Erfurt and Würzburg, there were workshops in which hand knitting was done, although it is not known whether machines were known there. Hand knitting organized in the putting-out system was practised in the mountainous regions of Westphalia, the Thuringian Forest, the Franconian Forest, Rudavy and it was there that the most primitive of the knitting machines first began to appear. The conditions required from producers under the domestic putting-out system were legally established: "It was no longer permitted for any hosier to work

for a foreign or local trader, all the more so for a Jew or anyone else, but only for masters of a hosiery handicraft, from them to take the wool, cotton or any other material and in return give stockings or caps, else promise payment".⁴³

In Westphalia and Badenia during the eighteenth century small knitting manufactures were being established, but no data is available on the volume of their production. In 1725 there existed a manufacture producing silk stockings and pants, but its further fate is not known.⁴⁴ C. Aberle enumerates a series of other localities in Germany where hand knitting and machine production co-existed, such as Hesse-Darmstadt, Swäbisch-Gmünd, Reutlinger, Balingen in Württemberg with a guild consisting of as many as 80 masters. His work, however, contains so much wrong information, that it is difficult to accept the numerical data. From Stuttgart comes a guild seal from 1750 depicting a knitting machine, which proves the existence of this type of production there.⁴⁵ During the eighteenth century machine knitting was spreading so rapidly to different countries of central and eastern Europe that it was probably being introduced into the less industrialised German Duchies so as to restrict their needs for costly imports. The most recent investigations have revealed a small knitting centre in the Wupper valley in Elberfeld. In 1702, among numerous textile workers, 29 knitters and 8 women producing crocheted lace were working. Already by 1767 in this region, 600 knitters and spinners of floss were employed. In the large textile manufactures co-operative of J. G. Brügelmann in Elberfeld a fairly large number of knitting frames was installed in 1789.⁴⁶ The large knitting production in Hamburg and Lübeck has not been fully investigated. This latter was at the beginning of the sixteenth century an important centre of hand knitting. From the end of the seventeenth century in many countries there are mentions of machine-knitted "Hamburg" stockings, and some Austrian and German manufactures attempted to imitate these models.⁴⁷ However, we do not know, whether this name was not used to describe a certain type of English product imported through Hamburg.

Knitting manufactures in Thuringia, Saxony and Prussia have been relatively better investigated. In Thuringia it was Apolda which was to become the most important centre, hand-made hosiery having existed there from at least 1593. The first knitting machine was imported to the Eschner establishment in 1690. Around 1700 there were 19 machines working there, in 1704 – 52, and in 1714 – already 257. In consequence of this diffusion of machine knitting, a guild was established in 1714, the regulations of which clearly specify that iron and half-iron machines with guild seal must be used. It was strictly forbidden to work on wooden machines. It emerges from these data that wooden machines were being used, just as in Bohemia, for the production of coarse woollen stockings. In 1736 in Apolda there were 481 machines, 59 domestic workers, 230 master knitters, 143 journeymen and 126 apprentices.⁴⁸

A fat monograph presents the history of the Huguenot knitters in Weimar. Initially they were as willingly accepted as in Prussia, but the religious protests of 1699 delayed the development of this settlement. Manufacture rules from 1713 guarantee religious tolerance. The settlement was organized by Jacques Coste and after initial agreements in October 1716, about 20 masters from different textile branches together with journeymen settled in Weimar. Among them there were three master knitters, a locksmith and a producer of needles

for the machines, 2 carders and 2 bleachery workers. In addition to knitwear, the settlers were to produce etamin, woollen and sild cloth, hats and gloves. Such a group of specialists is typical of the textile manufactures established in different countries of central and eastern Europe. Lighter fashionable fabrics and accessories for garments were being produced. Detailed biographies of five of the knitting masters from Weimar reveal that they originated from the Cévennes in Languedoc. They were producing silk stockings and caps, and at the same time they were making new machines, assembling them from metal parts. They were to produce woollen fabrics from better merino wool, usually imported. Already within 15 months of the existence of the colony of Huguenot knitters, Germans as well as Frenchmen and Walloons found work in the combing and carding of the wool in the production of stockings on machines and in the finishing of the knitwear. The decline of the colony has been attributed to the lack of funds for the purchase of imported raw materials, and for the construction of production premises, warehouses and a church. However, there were also difficulties in selling the luxurious fabrics on the local market and even on the markets of Leipzig and Frankfurt.⁴⁹

Data on the Huguenot colony in Weimar indicate that it had a beneficial influence on improving the quality of locally knitted products. In 1724 in Weimar, there were already 171 producers, 11 traders involved in domestic knitwear production and 316 machines, while during the same period in Apolda there were 230 producers, 59 traders involved in domestic knitwear production and 481 knitting machines. Knitting production in these towns was partly based on scattered village production. This production existed in 1686 and at least contributed to the spread of a cheaper and inferior version of the knitting machine made almost entirely of wood. Its construction was based on the Swiss models. The concentration of knitting production in towns and higher requirements as to its quality brought about regulations forbidding the use of wooden machines in villages and led to their confiscation. Special inspectors were to check the knitting machines and destroy the most primitive models. It was also forbidden to export woollen knitwear produced on these machines. Further regulations from 1713 forbade producers both retail and wholesale trade of products, while traders in domestic production were entitled only to wholesale trade, which allowed for the standardization of production. Regulations dating from 1723 ordered quality control of both the machines and the knitted products, confirmed by special markings. Wooden machines, however, did not go out of use because the same interdictions were repeated in 1727 and 1732, ordering their destruction.⁵⁰

These data testify to an extensive production of the least expensive woollen knitwear, finding its market among the widest masses of the populace, which were made on locally produced, almost completely wooden machines. Apparently these products were not suitable for manufacture finishing since their production was so persistently fought against by the state under pressure from municipal authorities. Later, knitters from Apolda and Weimar probably managed to subordinate those rural domestic producers. In 1736, in the neighbourhood of Weimar, there were working a total of: 952 knitting machines, 59 domestic producers, 496 masters, 297 journeymen and 233 apprentices. In Apolda in 1767 there were 607 machines and in 1771 – 740 machines, thus

Weimar and its surroundings had a greater productive capacity. From the beginning of the eighteenth century knitting production also existed in Zeulenroda: the guild was established there in 1738. In 1744 there were already about 800 dozen pairs of stockings being produced there per year.⁵¹

Knitting manufactures in Saxony have been discussed by R. Forberger. He claims that in Saxon domestic production in the putting-out system, the machine was in use by 1650, and that by 1660 it was known in Glaussnitz and its surroundings. At that time the machine was only just beginning to spread in English knitting and had not yet been imported to France. Consequently this most primitive model could have been brought through Switzerland after 1670. Alternatively it might have been a model of a machine exported to Italy at the beginning of the seventeenth century which may be why the wooden knitting machines used in domestic production were known in Saxony so early. Around 1671 knitting gains importance in Chemnitz. (Karl-Marx-Stadt). It had a powerful guild production alongside rural production organized in the putting-out system. Around 1800, there were 88,340 dozen pairs of stockings, caps and gloves and 7500 knitwear items being produced there.⁵² In the eighteenth century only six knitting manufactures were established in Saxony. The oldest of them, in Limbach, had grown before 1745. The Esche family was managing it up to at least 1838. In 1793 this manufacturer was working with 43 machines giving a yearly production of 3600 pairs of silk stockings. Around 1764 a silk stockings business with 7 machines, the property of E. M. Andio, was established in Dresden. In 1765 a similar establishment, managed by E. Heuss, was organized in Leipzig. Before 1785, count Schulenburg established a scattered manufacture of woollen stockings in Burscheidungen; only 6-15 machines were working on the spot, but in addition many domestic producers were employed. A similar manufacture producing woollen stockings was found in 1786 in Naumburg, the property of E. Thierisch, and was working on 60 machines. In 1781 F. G. Haslauer organized a glove manufacture in Dresden which had, apart from seamstresses, female workers engaged in hand knitting, so most probably there were some knitted gloves among the dozens of them produced in 1786. There is no information on the imposition of guild statutes on knitting manufactures, although in Dresden and Leipzig there also existed hand-knitting guilds. We should emphasize the great importance of Saxon domestic production encompassing both hand and machine knitting. In the neighbourhood of Obbergau, for instance, after 1784 there were 58,305 knitting machines in use. Unclear wording may mean, however, that a considerable part of this production only developed after 1800. Domestic production organised in the putting-out system assumed great dimensions also in Budziszyn and its surroundings such as Hoyerswerda, Kemanz, Löbau. Domestic producers were making stockings, caps, gaiters and gloves from wool and were utilizing 6-7 thousand stones (120-140 pounds) of wool yearly. Part of this production went through Bremen for export to North America.⁵³

On the basis of data showing the dimensions of knitting production in different German duchies it appears that it was concentrated mainly in Franconia, Thuringia and Saxony. Two trends of this production are clearly distinguishable. The Huguenots, with state support, were establishing manufactures of products in silk and the highest quality wool, later also in cotton.

Simultaneously, in smaller localities and in villages situated among the foot-hills of the mountains, domestic production was developing based on thick local wool from which, by hand or an almost entirely wooden machines, knitwear was being produced for the local market. In this respect the situation was similar to that in Bohemia. The manufactures were producing garments intended for a much more limited market.

Prussia was the first Germanic country to issue, already in 1685, an edict in Potsdam facilitating the colonization of emigrants from France by means of state allocation. According to mercantile principles, the greatest support was given to specialists contributing to the development of the Prussian silk industry, since they would be able to bring about a reduction of imports. Production of woollen and later cotton knitwear should also have been propagated among the masses, but this did not arouse the interest of the authorities. The expanded Prussian bureaucracy has left an abundance of documents published in part in the volumes of the series of *Acta Borussica*. Data on the subsidies and housing facilities provided to the Berlin Huguenots reveal the difficulties in developing production based on imported raw materials, machines and specialists. Teaching local craftsmen was difficult because of lack of interest among the young, the language barrier and the endeavours of the Huguenots to preserve their monopoly over production. Only the consistent policy of the Prussian state and constantly expanding anti-import customs regulations brought about the emergence of a fairly large centre of production. The injunction of 1734 informs us of confiscation because of export of knitting machines, even the oldest of their models.⁵⁴

Despite so many privileges, the first knitting manufactures only developed in Berlin between 1688 and 1691. The first manufacture of woollen and silk stockings was established by Jean Didelot, while the second one belonged to Jordan and Mialon. Both these establishments had privileges obtained from the General-Commerciencollegium, instituted in 1684. In comparison to many other countries, the absence of legal status with respect to the training of specialists was being felt. Consequently, in 1697 a guild of stockings and cap producers (*Strumpfwerkern* and *Barettmachern*) was established in Berlin based on the privileges of similar guilds from Heidelberg and Switzerland. Customs duties were making the import of knitted stockings and caps difficult.

Other privileged manufactures were the establishment of Henry Delon, existing from 1708, and of Duchesne from 1713. These were small establishments, which were usually working with a few machines and were vulnerable bankruptcy due to difficulties in obtaining both qualified workers and a market for their products. Costs of imported raw materials led to increasing production costs. Already by 1711 in one of these Berlin enterprises, the French had begun co-operating with the Germans. Apart from Berlin, Prussian knitting production was concentrated in Magdeburg and Halle. In 1732 there were altogether 1251 knitting machines working there, of this total in Magdeburg and its vicinity – 940, in Halle – 240. Manufacture was mainly concentrated in large craft workshops. In 1731 there were 295 German knitting masters in Magdeburg working on 587 machines with the help of 165 journeymen and 157 apprentices; 106 French masters working on 250 machines, with 157 journeymen and 45 apprentices and finally 106 masters from the Palatinate with 35 journeymen

and 28 apprentices working on 103 machines. H. Krüger sums up the data pertaining to Magdeburg: 507 masters, 357 journeymen, 230 apprentices with 940 knitting machines. In Halle there were three small manufactures in which on one machine there were 3-4 pairs stockings being produced per week, that is 10,191 pairs per year. Accepting the same productivity norms, the Magdeburg output can be estimated at about 40,000 pairs per year. Thus it was quite a large centre of production in which, unfortunately the lack of an adequate supply of imported silk was being felt. During the same period in Berlin many manufactures fell into decay and in 1739 only the establishment of François Duchesne with 14 machines had survived, while Laurent Bon was producing on two machines.⁵⁵

During 1740-1755 no increase in knitting production is observed in comparison with 1728-1735. In Crefeld, the widow Peter is managing a manufacture with 24 machines. In Berlin in 1746 settles Delacroix (the name was also written: Lacroix and La Croix) from Nîmes, but establishing a larger knitting manufacture he encountered great difficulties. In 1751 he was working on only two machines, while Fasser was working on three and Cornand on one. From 1752 the entrepreneur Pierre Dambonet begins to appear in the records, while Azimont from Erlangen engaged himself in Duchesne's old manufacture. In 1753, silk stockings were being produced in Berlin on 28 machines, in 1754 on 31. This production increases after the arrival of a certain Portal from Amsterdam in 1763; in 1764 the manufacturers Grimbert and Azimont got registered, still later Bauer, Gibert and Moses Levi. The support of the Prussian authorities attracted the Huguenots who had previously settled in Holland or southern Germany. This patronized branch of production also aroused the interest of Jewish capital. In 1765 there were already 100 machines producing silk stockings registered in Berlin.⁵⁶

The knitting production in Magdeburg was developing faster and a wider raw material base was being utilized there, since the petition of 1756 refers not only to silk articles but also to linen and cotton stockings. Its production was intended for a wide market because 25 masters were producing on 40 machines the cheapest three- or even two-ply stockings. Established with state support, Brugner's silk stockings manufacture was working from 1776 on 60 machines. In the same year in Halle a silk stockings manufacture was established with 24 machines. In this period the silk stockings manufactures in Magdeburg and Halle obtained 130 new machines in addition to the 1180 machines of 1732. In Berlin support was given to the workshop of widow Bodof, producing about 400 pairs of silk stockings yearly, and the proprietor of a manufacture, Paul Ferrier, was enabled to move there.⁵⁷ We should remember that all these data pertain only to the most strongly state-supported silk knitting organized in the form of centralized manufactures. A small amount of production of woollen products did not leave statistical documentation.

H. Hoffman has given summarized data on Prussian knitting on the basis of abundant statistical material from 1769. In Berlin itself there were 23 small silk stockings manufactures with 85 machines and as many workers. The number of people employed there was naturally several times higher counting the spinners, machine maintenance men and those working on the finishing process. Many a time manufactures had only two or even one machine, only Du Chesne,

working already from 1718, had 18 of them, while Feting from 1763 put into operation 10 machines. Much more important was one production of woollen stockings which has not been discussed yet. There were 93 enterprises with 351 machines and the same number of journeymen. 10 larger establishments were employing 10 to 33 workers. The comparison of the total number of knitting machines and workers in the whole Prussian state around 1769 provides interesting data, betraying the inaccuracy of previous data from the 1760's. In sum, 67 small manufactures were counted, of which a small number had a couple or a few machine or workers; thus they were of craft-workshop dimensions. Then hand-made hosiery centres with 180 workers are distinguishable. Altogether, in sixty odd localities scattered over the whole territory of Prussia along with East Prussia, there were 1757 knitting machines and 2478 workers. While the first number is probably close to reality, the second number would have to be increased to take into account those working on the treatment of the raw material, spinning, finishing of products and also the construction and maintenance of the machines. It is not worthwhile enumerating here data from tables which show in many localities only a couple of knitters, although these data testify indirectly to the universality of knitting production and the need to work for the local market, which applied in particular to knitting production from wool. We should stress, however, that the whole Brandenburg region, apart from Berlin itself, had only 192 machines with 205 workers. Magdeburg had only 96 machines and 100 workers apart from 520 domestic workers engaged in the putting-out system who made woollen stockings, while the production of Halle was slightly lower.⁵⁸

The heterogeneity of the rich statistical data presented by H. Hoffman means that the above-mentioned figures can be accepted only with great caution. According to different sources, the number of machines oscillated from 512 to 1757, and of workers from 2375 to 2478. Despite these differences it must be acknowledged that it was an important production centre by central European standards. Juxtaposition of data from 1769 could possibly give lower figures with respect to the volume of production on account of the Seven Years' War. The picture of the distribution of different branches of the knitting industry is clear. The state-backed manufactures of silk articles became concentrated in larger towns and were subject to oscillations in the field of raw material supply and the sale of the luxury products. Much more stable was the production of woollen knitwear in smaller towns and of urban enterprises using domestic workers in the putting-out system, who had access to indigenous raw materials and worked for the local market.

Of comparatively more importance is the chronological cross-section of the Prussian knitting industry in H. Krüger's calculations pertaining to 1782. He ignores, however, the small craft workshops, since he is only interested in "factories", that is manufactures of different size. It emerges from these data that in the whole of Prussia there were 128 knitting machines producing stockings from fine silk, 11 from floss, or twilled silk, 172 – woollen stockings, and only 17 – cotton ones. This way the small number of 328 machines is obtained, on which work was carried out by 1635 knitters including those engaged in the finishing process. On the basis of other data, the same author mentions 141 machines producing silk stockings in 1782. From 162, 251 pairs

of stockings were produced, the majority, i.e., 96,848 pairs, were of wool. 29,172 pairs were of cotton. 28,631 of silk and 7600 of twilled silk. It appears from these data that 423 pairs of stockings were being produced per year on one machine, which with 50 working weeks would give 8 pairs per week. These norms would seem to be overestimated, although, taking into account the fairly large domestic production of hand-made knitwear, the total volume of production would not be far from reality.⁵⁹

H. Krüger's comparative data unquestionably gives us an underestimated number of knitting machines. Published sources from 1782 enumerate in Berlin 31 proprietors of manufactures, with 142 machines producing solely silk stockings with just as many masters, journeymen and apprentices. In that same year in Berlin there were 26,062 pairs of silk stockings produced, which is not much less than the number given by H. Krüger with respect to the whole of central Prussia. In 1785 the number of knitting machines engaged in the production of silk stockings increased to 371. The above-mentioned author emphasizes the rapid development of the Berlin textile industry in the last twenty years of the eighteenth century. This development is less pronounced in provincial centres. For example, in Crefeld in 1788, there are only 18 machines working.⁶⁰ The lack of uniformity of the statistical data coming from different sources makes a more accurate evaluation of the dimensions of Prussian knitting at the end of the eighteenth century impossible. Nevertheless, it does not seem to have decreased in relation to that of 1769, put simply the knitters worked mainly in scattered manufactures, small workshops and under various forms of the domestic putting-out system, and these organizational forms have not left much statistical data.

The important role played by the state in the Prussian machine knitting, must be emphasized. Apart from the Russian manufactures of Peter I from the first quarter of the eighteenth century, in no other European country did the mercantile state policy have such a strong effect on the development of textile manufactures, particularly those based on imported raw materials. In addition to tax exemptions, there were subsidies for producers as well as a protective customs policy, which favoured the importation of raw materials while rendered the importation of ready-made products difficult. At the same time, producers were provided with a labour force from compulsory workshops, jails or orphanages and were protected against guild restrictions as regards the volume of production. All these forms of support for manufactures established by the Huguenots (the names of proprietors of manufactures persist, for example, in Berlin throughout the eighteenth century) were used in Prussia on a large scale. During the period of the rise in price of silk, a state warehouse was opened, which bought out this stock from abroad and facilitated its purchase. Similar facilities were provided for cotton and wool. The Prussian customs policy was badly affecting the production of neighbouring states, while facilitating the development of the local textile industry. Import of dyer's materials was also catered for.

The histories of individual manufactures of silk stockings described in detail in the sources, testify to the state protection extended to their owners over decades.⁶¹ The diversity of the organizational forms of the Prussian textile industry has already been underlined. Side by side with the state-protected

manufactures there are craft workshops and the domestic putting-out system which depends upon trade capital. The latter is a reflection of the urban and rural production habits. Prussia in the eighteenth century was a country where hand knitting was practised as much in the drawing-rooms and modest homes of the burghers, as in compulsory workshops, orphanages, hospitals, barracks and village cottages. D. Chodowiecki portrays women engaged in hand knitting. Soldiers knitting stockings on guard duty was a familiar sight in small Prussian towns and on the gradually conquered Polish lands. A Polish diarist from Cracow wrote in 1794-1796: "One could see Prussian soldiers sitting on doorsteps and knitting blue woollen stockings on needles".⁶²

5

Machine Knitting in Scandinavia

In Scandinavian countries hand knitting along with the knotless netting technique satisfied the clothing requirements of the inhabitants. The knitting machine probably appeared early in Sweden, because Jonas Alströmer brought a few models of it in 1723 and opened a manufacture in a complex of textile establishments near Göteborg. One of these machines of the most simple construction datable 1723 has been preserved in the Tekniska Museet in Stockholm. The second knitting manufacture was the establishment of J. Corbiér in 1732. The first attempts to limit importation with the help of the textile manufactures arise in Sweden in 1649. However, the ban on the import of silk products is removed in 1724 and re-imposed in 1739; the largest Swedish silk production dates to the sixties of the eighteenth century. At that very time knitting production based on imported silk as well as on local wool increases. We do not know, however, the dimensions of these first manufactures.⁶³ The knitting machine spread quite quickly. The ingenious Swedish inventor, Christopher Polhem, built two knitting machine models in the years 1730-1745. It was a technical solution based on different principles of construction; it was not introduced into the industry. The volume of production of Swedish knitting can be evaluated on the basis of fragmentary data from the second half of the eighteenth century. For example, in 1765 the centre in Halland supplied the Swedish army with 24,000 pairs of stockings. In the seventies traders from the domestic putting-out system were supplying the admiralty with 10,000 pairs of stockings per year, apart from producing for the internal market.⁶⁴ These data reveal the importance of Swedish knitting which at least partly satisfied the hosiery needs of the army, navy and local market.

The first knitting manufactures in Copenhagen were established by Friderich Boye in 1680 and Johann Simeon Juvalta in 1736. This latter manufacture was working on 15 machines, producing woollen and silk, and later, cotton stockings. During the eighteenth century there also appeared the manufacture of J. M. W. Engelbrecht and of other three entrepreneurs. A similar establishment existed in Hirschholm. Around 1741 machine production also started in an important hand knitting centre in Herning in central Jutland, in connection with royal support for the mechanization of this production. In a description of Denmark

from 1802 there appears a mention that in Hoeringsholm in Jutland there were up to 20,000 pairs of woollen and linen stockings being sold per year.⁶⁵ In a description on Norway from 1802 no knitting manufactures appear in the list of textile manufactures. But recently some mention referring to the use of knitting frames has been found. In Bergen in 1764 there was an artisan who made hosiery using a machine. Later suggestions of use of knitting frames began to be more numerous in Norway between 1785-1797. It seems that a manufacture existed in Amodt in Storelvdal an also some trials took place in Trondheim.⁶⁶ Also lacking are data on the mechanization of knitting in Finland and Iceland before the end of the eighteenth century. Only hand knitting suitable for the needs of the local market has been confirmed without any doubt, while the existence of machine knitting still requires further investigation.

6

Machine knitting on the lands of the former Polish Republic and in Silesia and west Pomerania

The possibility of the development of machine knitting on Polish soil varied according to these areas differing national affiliations. Thus, west Pomerania enjoyed Prussian state support for the establishment of manufactures, while Silesia already had exceptionally powerful guild knitting. On the lands of the former Polish Republic knitting manufactures were being established in complexes of lordly enterprises, and at the end of the eighteenth century similar burghers' establishments also began to arise.

There is reasonable evidence suggesting that the knitting machine appeared in Gdańsk already around 1620. Namely the Gdańsk knitters' statute required the execution of 7 pairs of socks or 7 pairs of ladies' stockings per day, which would have been a very high norm even for the first English knitting machine.⁶⁷ In the absence of data on the development of this production, it would in any event have been a sporadic case of use of a machine imported from England or, perhaps, Holland. The first Warsaw knitting manufacture came into existence in the buildings of a hospital for orphans during 1720-1728. Production of stockings and knitted gloves was organized there anew by the Company of Woollen Manufactures in 1766. Limited production in both manufactures was based on the labour of old people and children. It is possible that knitting machines were introduced only in the later period of these organisations existence. The same Company organized a large knitting establishment in Gołdźdźnów near Warsaw in a complex of textile manufactures. In May 1766 a hosiery master A. C. Hartwig from Toruń settled in Gołdźdźnów bringing with him his own technical equipment valued at 649 zloties. From the royal brick-yard situated in the same locality, the manufacture received 7000 bricks for building a suitable premises. In the summer of 1766 Jakub Fryderyk Weiss arrived there, and in October four more hosiery masters from an important knitting centre in Budziszyn. Weiss tried to bring in still more experts from

Gdańsk, Elbląg, Toruń and Królewiec (Königsberg) along with their own machines, and the dyer Zapski also arrived there. From the very beginning 9 masters working on 5 knitting machines were employed there. The settlers, in part German, were producing stockings from woollen yarn supplied to them from a clothiers' manufacture, and from imported cotton and silk. The 9 people occupied only with knitting and finishing the products were able to develop a fairly large production, if we take into account the Polish conditions. Master Weiss, however, ran away, supposedly because of debts and drunkenness, after presenting the first stockings to the king in September 1767. The master dyer Zapski disappeared as well. In February 1770, master Freitag along with the journeymen was producing on three machines 50 pairs of stockings per week for the Warsaw market. There were plans to import two machines from Saxony at a cost of 30 thalers. The manufacture decayed just as had happened to the other establishments of the Company of Woollen Manufactures, with a loss of 4732 zloties. A few German masters, however, continued working in Gołdźdźnów, and later the premises were taken over by a clothiers' manufacture belonging to Rehan.⁶⁸ There was a considerable demand for knitting production and it could persist if only there were a satisfying supply of yarn.

A hosiery manufacture existed also in the Grodno manufacturing complex, and was producing on imported machines woollen, silk, linen and cotton stockings to the value of 2122 zloties, that is from 200 to 400 pairs. According to the Gołdźdźnów norms this would be the production of three knitting machines over a few months. The value of the raw material, i.e., yarn or wool, amounted to 1358 zloties, of the tools 1092 zloties, while the total value of the establishment was calculated at 4572 zloties.⁶⁹ So in this manufacture on a few machines, stockings, intended for the royal court and for Warsaw, or perhaps also other towns, were being produced.

In the eighties of the eighteenth century hosiery manufactures multiply in Warsaw itself and its surroundings, as a guild is lacking there. In the manufacturing complex of Unrug, a starost of Hamersztyn, in Kobylka, a manufacture of woollen stockings was operating. J. Jezierski set up a manufacture in the village of Sobienie in Garwolin district in 1787: "he would make a profit of more than 200 ducats from his goats, ordering yarn to be spun from their hair and his hosiery to make many beautiful stockings". The goat hair was mixed with lamb wool. A Jewish hosiery manufacture was established in Koźnice in 1791 at the latest. In a clothiers' manufacture in Skieniewice, the director Soubreville introduced hand production of stockings and gloves.⁷⁰ Knitting was next to spinning was the most common branch of textiles in which during the Age of Enlightenment old people, children or prisoners were compulsorily engaged. In the Warsaw Poor House during 1783-1786, a wide assortment of knitted garments was being produced. In 1784 "there were 1500 pairs of woollen stockings, 150 gloves, 21 nightcaps and knitted woollen material for 5 pairs of gowns being produced". However, it was not always a question of hand production because at that time knitting machines were also being found among private craftsmen. Evidence of this is an advertisement from 1788: "There is in Warsaw a certain husband and wife capable of making new stockings, hosiery, gloves, purses on their own frame".⁷¹

Apart from Grodno on the eastern territories of the former Polish Republic a large knitting manufacture, was established belonging to Prot Potocki's complex of enterprises in Machnówka. He had brought in masters from France, Germany and Bohemia, some of the best machine knitting centres on the European continent. In Galicia in 1781, there were only 13 knitters. Data on the production of Chyrow and Dukla only dates from the early nineteenth century. Stockings, however, are already registered as an export item from Galicia, and not as an import from Austria, so perhaps a small domestic production escaped the Austrian statistics.⁷² From Prussian data of 1793 we learn about knitting production in Wielkopolska, that is about the hosiers in Bojanów, Rawicz and Wschowa. In Działoszyn and Zduny there are mentions about knitwear fullers. Data referring to the towns of Wielkopolska, excluding Poznań, inform us about 25 knitters in all. From Grossman's data of 1808 it emerges that in the department of Warsaw there worked 13 hosiers, of Kalisz - 14, of Poznań - 73, of Bydgoszcz - 38, of Płock - 27, of Łomża - 51, thus altogether 216 owners of workshops of various size.⁷³ In sum, it is possible to estimate the whole knitting production on the lands of the former Polish Republic, excluding the Gdańsk Pomerania, at 12-15 thousand pairs of stockings. But even along with the household knitting production, this could not satisfy the garment requirements of the country.

In the kingdom of Prussia, considerable knitting production was concentrated in 10 towns. Apart from Gdańsk and Elbląg, these were: Chełmno, Debrzno, Chojnice, Chełmża, Golub-Dobrzyń, Świecie, Teczew and Tuchola. There were all together 57 machines and 240 workers, which testifies to the simultaneous existence of hand knitting. In Gdańsk itself in 1794 there were 7 workshops and 3 workmen with a yearly production of 227 dozen stockings. The total number of stockings being produced in the towns of Gdańsk Pomerania at the early nineteenth century amounts to 11,203 pairs, thus not much less than the estimated production of the rest of the lands of the former Polish Republic. Elbląg becomes the most important of all the centres, a manufacture having been established there under Prussian rule in 1780. Initially only 11 workers and 8 masters worked there, but in 1785 for the same number of masters there are 330 workers, and in 1803 - 302 workers.⁷⁴ Greater machine production of knitwear in Poland dates only from the 1820s-1830s. In 1829 in the Mazovia province, there were altogether only 79 hosiery machines, while Wendisch's manufacture straight away put into operation 60 of them. At the same time, along with a couple of manufactures, a knitters' guild was also established in Łódź in 1828.⁷⁵

In Pomerania in East and West Prussia machine knitting developed with Prussian state support and assumed a manufacturing form. Statistics from 1769 give the dimension of the most important of these establishments. The knitting manufacture established in 1721 in a Huguenot colony in Szczecin was operating in 1724 on 116 machines and employing 842 workers. The later manufacture of Vieslent was established in 1765 and in 1769 it had 9 machines and 52 workers. J. Wiśniewski quotes a total of 18 knitting manufactures in West Pomerania but the larger craft workshops seem to have been included in the statistics as well. In East Prussia a few knitters were registered in Darkiemj, Sępól and Węgorzew, and in Gołdap, where 16 craftsmen were working on

13 machines. Królewiec (Königsberg) had 57 machines and about 230 knitters, who were also doing hand knitting.

Gorzów Wielkopolski, situated on Ziemia Lubuska, had from 1770 Schlee's manufacture (16 machines, 42 workers) and 10 knitters with 4 machines.⁷⁶ Thus the production there revealed similar characteristics to the other parts of Prussia. Manufactures were concentrated in the larger towns, while hand-made hosiery was designed to meet the local market needs.

Knitting production in Silesia, with a considerably old guild tradition, was already in the sixteenth century was developing export production. In the eighteenth century we can observe a disintegration of the guild organization, and an increase in the domestic putting-out system so characteristic of the Silesian textile industry, and some few manufactures. Prussian historians frequently emphasize the importance of the annexation of Silesia after 1740 to its economic development, which is inaccurate, because Lower Silesia was to constitute the raw material base and market for goods produced in Brandenburg, while the protective customs policy was hindering trade with the former Polish Republic. The dimensions of knitting production, particularly in Lower Silesia, can be determined rather precisely. The Wrocław knitters's guild had, in 1732, 28 workshops and in 1741 - 58. Its further quantitative development and degree of mechanization are shown in the table cited from an unpublished study by W. Pyrek.⁷⁷

Year	Number of masters	Number of journeymen	Total	Number of operating machines	Processed wool in stones	Processed wool in stones per 1 knitter
1747	72	25	97	9	2560	26
1750/51	72	46	118	11	4208	35.5
1760/61	81	12	93	8	2552	27.4
1770/71	94	14	108	8	3120	29
1780/81	110	22	132	38	5131	39
1798/99	73	—	73	40	—	—

Changes in the production volume of one of the largest guilds from the central European towns are characteristic of the history of knitting. The machine appears already in 1747, but only the wealthier masters were purchasing it and up to the end of the investigated period it did not increase significantly the dimensions of production, based in part on hand knitting, which was already an anachronism. Consequently, already from 1760 the number of journeymen drops and the dimensions of wool manufacture decrease. As a result of this phenomenon, the guild loses to clothiers a part of its right to the use of the fulling mill and press, which it complains about already in 1763. In 1793 hosiers were forced to yield to other guilds 10 stalls on which they were selling their products, and even up to 1798 they were complaining in letters to the municipality about their difficult economic situation.

W. Pyrek reasonably explains this state of affairs by the shrinkage of the Polish market. Export of knitwear, fairly large in the years 1774-1775 was

gradually decreasing.⁷⁸ A parallel cause of the decline of the Wrocław guild was, however, the fact that knitters were not changing over to the new technique of production. In the second half of the eighteenth century hand knitting could still satisfy the small needs of the local market, but the production of a larger volume could not be based on it.

W. Długoborski compares the volume of Wrocław knitting production during 1772-1779. The table below shows data from particular periods.⁷⁹

Year	Pairs of stockings	Pairs of gloves
1772/73	76,074	2406
1775/76	115,973	480
1779/80	103,248	—
1785/86	86,060	300
1789/90	130,280	—
1794/95	69,315	9054
1799/1800	26,736	17,691

This table reveals large fluctuations in the volume of production of stockings, and even more so, of knitted gloves for which the market was increasing according to the fashion at the end of the eighteenth century. In addition to fluctuations in demand, conditioned by changes in fashion, other influences were the unsteady production base and the technical development of the producing region. The most important market not only for knitted products but also for machines and skilled workers, were the lands of the former Polish Republic, which is emphasized by not only Polish historians.⁸⁰

The afore-mentioned knitting production of Wrocław did not come entirely from guild workshops. There were attempts to increase the output of some Wrocław workshops by use of the domestic putting-out production. A manufacturer Tomasz Wachsmuth, who had disputes with the guild for employing too many journeymen, and in 1763 complained to the town council that he was being prevented from using the fuling mill, was probably a producer on a larger scale, but the great fluctuations in the volume of production testify to the seasonal recruitment of domestic workers.⁸¹ Another "hosier J. Ch. Schmidt in Wrocław was employing only cottage workers – women, and this not just in spinning, but also in stocking production itself. In 1766 there were 325 women form the town, suburbs and surrounding villages employed by him".⁸²

Besides, in 1728 the hosiers' guild itself was seeking statute confirmation for a small manufacture. Another manufacture came into being in 1764 thanks to a grant to three partners, each of them working on two machines. About 1766 there was a manufacture with 115 workers, these including 65 knitters working on an unspecified number of machines. During this period the import of machines and experts from Freiburg, Bohemia and Saxony increased considerably. In sum, during 1763-1786, 99 machine knitters arrived at lower Silesia, a large part of them settling in Wrocław. In 1797 another hosier manufacture was established, employing 59 workers.⁸³

On the basis of data from Generalne tablice statystyczne Śląska 1787 roku (The General Statistical Tables of Silesia from 1787) and from H. Fechner's work it is possible to assess the dimensions of Silesian knitting in the second half of the eighteenth century. Around 1787 in the towns of Lower Silesia there were 648 hand knitters with 109 journeymen and 110 machine knitters with 52 journeymen and 167 machines. Among village craftsmen, 27 hand knitters and only 6 machine knitters were registered. Therefore there is no question of the existence a putting-out production system on a large scale. Among the manufactures there is no mention of the clearly documented Wrocław establishments, but a manufacture in Jelenia Góra with 6 masters and 3 machines producing silk stockings and gloves is listed there. In Upper Silesia, however, there are two manufacture mentioned, one in Rybnik and the other in Pszczyna. In all our research into Silesia, the presence of knitters in many localities and the possibility of a market for their products was emphasized.⁸⁴

H. Fechner gives a great deal of data on the dimensions of knitting in Lower Silesia in the second half of the eighteenth century. He claims that at that time about 100 manufactures came into existence, but he does not distinguish them from craft establishments, while his desire to demonstrate the splendour of the development of Silesia under Prussian rule could have affected his interpretation of the statistical data. Nevertheless, in the absence of other data, we can cite the information about the manufacture of Steigenhöfer working on 6 machines with 36 workers. In 1780 there were 1368 pairs of stockings and 1560 caps produced there. The manufacture in Boguszów existed from 1742 and in 1792 82 masters and 15 journeymen were working there. They were probably engaged mainly in the process of finishing the products of local domestic producers working in the putting-out system whose number was approaching 2000. In 1797 in Kłodzko there were 36 knitters, in Racibórz – 17 and in Głubczyce – 117. In 1798 in the neighbourhood of Głogów there were 57 factories with 76 machines and 463 workers, and also 20 factories with 76 machines and 87 workers, as well as 37 hand-knitting establishments producing stockings, caps and gloves, with 352 workers. A large production centre also existed in Gryfów and Złotoryja.⁸⁵ Statistics from 1787 do not seem to have managed to catch the larger centres of domestic knitting production organised in the putting-out system. These data indicate a fairly large production of woollen knitwear comparable to the Bohemian or Saxon one. The widespread practice of hand knitting, however, made the rapid introduction of the machine here difficult and thus knitting production in Lower Silesia loses export significance in the second half of the eighteenth century.

7 Machine Knitting in Russia, the Ukraine and in the Baltic Countries

I have already written a comprehensive article on knitting in these countries based on scanty subject literature and my own archival and museum inves-

tigations.⁸⁶ Owing to the widespread use of the national dress among men and women in the sixteenth and seventeenth centuries, knitted garments were not in great demand. They were, however, a part of the uniform of some military forces; they were also worn with female dress based on west European fashion, as well as in the liturgical garments of the Orthodox clergy. There were a few hand-knitters working in Russia, but they did not form separate guild organizations. For instance, in the autumn of 1633 a large number of long, above-knee stockings were ordered for the newly organized regiments, outfitted in uniforms of a west European pattern. The small number of Moscow knitters was unable to meet this order quickly enough, so craftsmen from the towns of the Vladimir and Galic districts were approached and soon the stockings were produced.⁸⁷

It was Peter I who introduced knitting manufactures with used the machine. This was closely connected with his orders to relinquish the national dress and introduce west European dress, at least among the boyars (Russian noblemen). Mechanization of knitting production aided by strong state support was introduced simultaneously to Prussia, even earlier than in Poland. Manufactures based their production on imported raw material, machines and experts, with the help of large grants from the state.

From 1702 there had been plans to open a knitwear factory for the wholesale production of stockings, and contact was made with two German overseers. This plan underlined the need to import three or four knitting machines together with other implements and basic materials for the production of a large assortment of stockings, from the finest silk to the coarsest *poil de castor*. But Keler, the overseer, could not agree on financial matters with Brokgauzen, the general organizer of the group of factories. So two years later the Germans were replaced by Frenchmen. On 11 November 1704, four foreign overseers arrived at Moscow under the aegis of the men named Montobrión or Mambrión. Those named in documents are Lewis Russel, in charge of the preparation of fine thread, for making stockings, and Pierre Gerard, a specialist in the construction and maintenance of knitting machines. The two other overseers were probably concerned with the knitting and finishing of stockings and the training of Russian workers. Four knitting machines were imported, with a stock of spare needles and sinkers, other small parts, and a supply of wool, the native wool being considered too coarse.⁸⁸

The industry was first established in the German settlement, and then, from 1706 onwards, in the Posolski Dvor in Moscow, although initially subject to the military authorities, it produced stockings not just for the army but also for general sale. Manufacture of clothing, both wool and silk, began in March 1705. Each foreign overseer was in charge of apprentices, female spinners and an auxiliary workman. Nevertheless, only eight complete pairs of stockings were produced in the first two months, whilst seventy-four pairs were awaiting finishing, or dyeing, sewing, fulling, making up, and ironing. The first four pairs were offered to Peter I, who authorized the purchase of 4000 lb. good quality wool from Astrakhan but at the same time ordered experiments to be made with local wool. But output in the first ten months was extremely low; only 300 pairs of stockings, of which 250 were sold on the open market. The cost of these products was too high for them to be able to compete with those

from abroad. At the time the manufacture employed 15 workers who produced thirteen to fourteen pairs a month. Profits did not cover either the purchase of materials or the workers' pay. In the years that followed, production by the factory did not exceed 360 pairs per annum or about 30 pairs a month. This proves that there must have been periods of great stagnation; in the second half of the eighteenth century, for instance, one of the Polish knitwear manufactures was making up to the 200 pairs a month on three machines.⁸⁹

The output did not make a profit, particularly because of the high cost of importing wool from Spain and Turkey (Russian wool was rarely used). It was there fore decided to let the factory for a ten-year term at 40 roubles per annum to one of the overseers, who, in 1715, promised to give ten people instruction in the trade, so the factory came in the hand of Montobrión, who possessed no capital but counted on a permanent subsidy from the State. During the first two years, Montobrión did not even pay the agreed rent; despite this and a loan of 500 roubles, he had to struggle against the odds, being unable to compete with imported products. But on 14 February 1717 a ban was imposed on importing stockings from abroad, and this brought about a vital change: it then became possible to expand the manufacture of cheaper products. Until the end of the lease in 1721, 7000 pairs of stockings at 31 kopeks (that is, cheaper products made from the local wool) were supplied to the army authorities as military equipment, together with an unspecified quantity of stockings for sale. The rise of production was halted by the death of Montobrión.⁹⁰

Towards 1720-1730 factories in active production began to be sold to private owners, so in the 13 April 1722 stocking manufacture became the property of Rodion Voronin. It was valued at 4445 roubles, 57 kopeks. Voronin also owned a factory which made kersy; for stocking manufacture he probably used a combed wool thread, and sent samples of his products to the Collège de Berg. The output of the manufacture increased considerably. In 1726 in employed 37 workers: 8 foremen manufactured stockings on the knitting machines, the thread was prepared by carders and combers and eighteen spinners; the fuller and dyer dealt with the finishing processes. The factory was run by the local manager, who had been trained by the late Frenchmen. The stockings produced were quite strongly differentiated by quality and price: stockings of full wool cost up to 10 roubles; those made in beaver or a silk mixture cost 20 roubles, and silk stockings were up to 30 roubles a dozen. Apparently silk was imported ready spun, as there is no mention of silk spinners. But the sale of local merchandise was continually impeded by the illegal importation of western European products.⁹¹

The story told here of the first knitwear factory in Moscow is typical of this kind of enterprise in central and eastern Europe in the eighteenth century. Most often they were started near textile factories making cloth and other woollen or silk goods, as this facilitated both the bulk purchase of raw materials and the manufacture of thread. In the first instance, all the work was done on imported machines under the supervision of foreign overseers. Peter I's factories enjoyed special protection by the State; in the equivalent Polish or Hungarian enterprises, the decline of a knitwear factory was sometimes only due to the lack of a specialist capable of repairing the most complicated of all the textile

machines of this period. The equipment of small factories usually only consisted of a few machines. There were also technical difficulties in dyeing and hand fulling woollen stockings in small fulling mills. But the most serious difficulties were economic: a lack of capital to buy the raw materials and pay for foreign specialists and equipment, and difficulty in disposing of the merchandise because of strong competition from products imported from western Europe. In contrast to this, the development of the first knitwear factory in Moscow took place in favourable conditions, and probably in due time its output actually increased. The history of Russia's knitwear factories in the second half of the eighteenth century has not yet been studied, nor has that of other textiles factories.

Nevertheless, even if one relies only on fragmentary information about the history of textile production and trade, one can presume that this production was quite widespread and was not concentrated only in the largest urban centres of the time, such as Moscow or St. Petersburg. E. I. Zaozerskaja considers that the manufacture of stockings between 1720 and 1760 is linked with the production of silk goods, which was developing at that time.⁹² In the trade and custom documents of different Russian fairs, the textile products most often mentioned are those from Moscow. Around 1720, for instance, silk stockings from Moscow were being sold in the market at Nizhnyi-Novogorod. They were also sent to other fairs, even as far away as the Archangel region and Siberia. Mostly these were woollen stockings and gloves "made in Moscow". Around 1737 there is a reference to 10,000 pairs of stockings produced for the use of the army.⁹³ These examples prove the existence of a quite copious output of knitted goods in several factories and craftsmen's shops which were in process of expansion. I. V. Meshalin adds that woollen stockings were also made in Moscow district in 1773.⁹⁴ Other important centres of the knitting industry also existed, such as the town of Kashino in the Volga region. All the Russian markets sold a large quantity of woollen stockings, socks, gloves, and particularly varezhki (winter gloves with one finger, or mittens) made in the first half of the eighteenth century by the knitters of Kashino. For instance, there is a reference to 1260 pairs of stockings, or to several hundred pairs being sold in a single market, which implies an extremely important artisan industry and perhaps even the existence of a factory. In documents relating to different Russian markets, there is more than one reference to fulled wool stockings "from Jaroslav", and also to gloves and mittens. In one case, 2900 pairs of stockings are involved; in others, a few hundred. These documents show that besides Kashino there was a second important centre for knitwear. The products of Jaroslav were quoted beside imports from Germany, which proves that their quality was already well known. According to the custom registers, the third centre of the knitting industry was Great Novogorod. Around 1714 it was producing gloves and coarse sheep's wool stockings, which occur in rather insignificant quantities – 100 pairs at most, in the registers of markets in other Russian towns.⁹⁵ So too with Nizhnyi-Novogorod, where five stockings makers are recorded in 1722.⁹⁶ Knitted gloves and stockings were also made at Kazan, Kaluga, and Tihvin.⁹⁷ Information on hand knitting is derived chiefly from the history of trade; for hand-knitters, even in the eighteenth century, were very rarely counted as foremen of members of craftsmen's guilds; some of them had perhaps learned their trade earlier on, in the first manufactures. This is very

probable since K. A. Pazhinov's monograph, which shows the problem of craftsmen's guilds in the legislation of absolute monarchy in Russia, makes no mention of stockings makers. Neither in his numerous tables, nor in detailed enumeration of collective textile associations (of the Tver governments, for instance) does this author mention a stocking maker or knitter.⁹⁸

However, this want of information on the importance of Russian knitted goods production in the eighteenth century does not prove that it was stagnating; on the contrary, the information we have on the general use of knitted garments permits the conclusion that it was expanding. During the second half of the eighteenth century there was increasing use of knitwear, particularly woollen or cotton stockings, both by men and women. At St. Petersburg in 1804, in the provision for pensioner of a hospital associated with an almshouse, two pairs of woollen and cotton stockings per annum were allowed to each invalid and undoubtedly this was a most economical allowance.⁹⁹ Knitted gloves were less usual because in winter times people generally wore leather gloves or fur mittens. In the customs registers there are several references to other merchandise, possibly knitted, such as different types of woollen belt.¹⁰⁰ Frequent use of knitted stockings and gloves in popular dress as well as knitted bedspreads, is found from the eighteenth century on.¹⁰¹ So that Russian knitting was already widespread in the eighteenth century, both the machine knitting made in the manufactures or by urban craftsmen, and hand knitting used for domestic purposes.

No data are available about the dimensions of knitting in Latvia and Estonia; nevertheless, folk knitting of which there is documentary evidence already in the seventeenth century, at least testifies to the wide diffusion of hand knitting in the next century. Patterned stockings and coloured doublets were prevalent on the islands of Mukhu and Kihknu.¹⁰² On the other hand, in left-bank Ukraine, belonging at the time to Russia, no knitting manufacture was recorded right up to the end of the eighteenth century,¹⁰³ although a small production could have existed in clothiers' manufactures.

8 Knitting in Rumania and in the countries of the Balkan Peninsula

No data are available about the use of the knitting machine in these countries up to the end of the eighteenth century, except for Dalmatia which has already been covered in the discussion on Italian knitting. The national dress worn both in Moldavia, as in Wallachia, in Transylvania, Bulgaria and different countries of Yugoslavia did not require the use of hosiery. They were not manufactured in the Turkish state. In Bulgaria the first textile manufactures came into being only in the thirties of the nineteenth century.¹⁰⁴ The rich and variegated folk knitting of these countries probably developed relatively late, although in the eighteenth century there may have been a limited hand-knitting production in the mountainous regions.

The Hosiery on Knitting Frames outside Europe

Under the influence of English hosiery the first knitting frames began to be used in North America and later in the United States of America in the eighteenth century.¹⁰⁵ The earliest history of American hosiery has not been studied systematically but some evidence is available. Following the imports of stockings and gloves from England in the seventeenth century the first manufactures were organized in the East coast of North America. I. J. Haskell wrote about the stockings in some centres:

From time to time the Colonies subsidised the making of stockings, as when, in 1662 Virginia decreed a premium of ten pounds of tobacco for every dozen worsteds made. In 1775 this state also offered fifty pounds for every 500 pairs made. This must have been for cotton, as a price is given of 1 to 3 shillings a pair. In 1747 a stockings factory was begun in Annapolis, Maryland, but it was not very successful. In 1776 Maryland appropriated three hundred pounds to Covenanter, Frederick County, to start a factory. In 1764 the Society of Arts in New York offered a premium for the largest quantity of three-thread wove stockings made in the State. Again in 1766 is offered the premium for the first thread stocking loom made of iron. In 1775 the Dutch people of New York had stockings in colors – blue, red and green. In the 1747 Governor Law of Connecticut wore what was purported to be the first coat and stockings made of new England silk. The material was made in Mansfield. In 1777 James Wallace asked for a loan of one hundred pounds from the state to manufacture.¹⁰⁶

Also in Pennsylvania in 1748 a stocking weaver from German town named Nicolas Rary moved to Lower Salford Township, Philadelphia County. "A men named Stevens carried on the business of stocking weaving in an old log house which stood near the store in Harleysville. To weave stockings he used a loom or machine which was worked with foot treadles".¹⁰⁷ These few and dispersed mentions are shown as the examples of the use of some knitting frames in America mainly for stockings production. Perhaps additional archive research could tell us more about the history of this hosiery. But it is certain that it was only a limited and dispersed production in the manufactures or artisan shops of that big country. The machine knitting does not seem to have been used in other parts of our world before the nineteenth century.

VII

Techniques of Hand and Machine-Knitting Production

1

Production Premises

Hand knitting does not require special workshops. The oldest iconographic presentations of Madonnas knitting on needles show them in ordinary interiors of houses. During the later period there was a fairly large group of itinerant knitters who were produced caps and stockings, sometimes even from several colours of yarn, keeping their raw material and completed products in handy bags. Hand knitting, just as spinning on the spindle, could be done both on the road and along with other domestic or shepherding chores. In Prussia in the eighteenth century sentries are shown were occupied in this way. Hand knitters' guild regulations strictly prohibited in 1624 the craft from being executed outside the workshop, thus forbidding strolling on the streets with needles.¹ Inside a guild workshop it was easier to supervise both the journeymen and apprentices, as well as women from the master's family or servants. (Il. 15)

Hand knitting guilds had one-room production workshops. Sometimes also other kind of work was done there, such as the treatment of the raw material, spinning and winding of the yarn, as well as the finishing of the produced knitwear, such as fulling making use of thistle brushes, shearing, modelling on forms, drying and pressing. Larger knitters' guilds had a common fulling mill holding a large stove for heating water and possibly with the complete equipment necessary to finish woollen products. This type of establishment could lighten the work of the small masters' craftshops. It was sometimes combined with dye-works for the knitwear; if so there would be several cauldrons and vats there. These production premises were usually situated on the periphery of the town, since it was usually forbidden to pour waste water, used for the fulling of the products, on to the street. The invention of the knitting machine led to an increase in the size of guild workshops and creating special multi-roomed premises for the first manufactures. The knitting machine took up less space than the weaving loom or the large table on which the hand-knitting of carpets several meters in length was done. If, however, in a workshop or manufacturing room, several machines were to be put together, then they would fill it up completely. At the same time, the question of illumination of the workshop should not be forgotten. The knitting of simple items on needles did not require particular precision, while for the work on a machine, particularly for picking up dropped

stitches in silk stockings, good lighting was essential. The example of the knitting settlement in Ruddington near Nottingham in central England reveals that the machines were placed near the windows.² In sum, we can say that knitting production was done in small workshops or multi-roomed manufactures, and only the fulling mills, and in the event the dyeworks, required a separate building.

2

Treatment of the Raw Material and Spinning

We shall deal with this problem only incidentally, because the treatment of wool, cotton, silk and linen has been discussed in many studies, while there exists a wide literature on spinning. We should remember, however, that only some knitting manufactures were using yarn prepared by other textile establishments from the same group. Both in craft workshops and in some forms of the domestic putting-out system, the production of hand- and machine-made knitwear was based on their own yarn. In the two powerful centres of craft and domestic hand-made production, and later of machine knitting, in the Cévennes in southern France and in Hemming in central Jutland, many implements for the treatment of wool, silk, and for spinning have been preserved. In the Cévennes, work was based on local silk and wool, while in Jutland wool specially made for the production of certain types of knitwear was being spun.³ Hand knitting required yarn from carded wool for coarse fulled products, and much more tightly twisted yarn from worsted wool for luxurious articles. Hand-knitting guild statutes bring recommendations as to the use of yarn of proper quality and the production of articles of specified weight and thickness. Nevertheless, in knitting production also coarse wool was also used, easily felted and of the poorest quality – goat hair, floss, inferior quality cotton or linen yarn.

The situation radically changed from the moment when the knitting machine was introduced. Although the first model of Lee's machine was suitable for the production of woollen stockings from coarser wool, the yarn had to be tightly twisted so that it could go through the needles and blades of the machine. In France, the diffusion of a machine for the production of silk stockings is distinctive. It is difficult to say whether the wooden knitting machines used in Bohemia and Saxony in the seventeenth and first half of the eighteenth century were specially adapted to use coarse yarn from carded wool. Such yarn was suitable for woollen stockings and headgear which were strongly felted. Not much has been written on the subject of the adjustment of the thickness and the degree of twisting the yarn to suit machine knitwear production. However, the complaints about the quality of the local wool voiced all the way from Austria to the Moscow manufactures and the constant efforts to obtain high quality imported raw material, occurs not just because of worries about the standard of production, but also from the need to adjust it to the type of machine possessed and the particular yarn required. The specifications regarding the production of 2-5 ply stockings given in Chapter VI testify to the use of thin, and probably

tightly twisted, yarn. Investigation into the quality of yarn, from which the knitted articles preserved in museums were made, indicate a wide range in the quality of the raw material used. Thus, silk used for machine-made products was seldom of high quality, grège also being used. The same holds true for wool: thick stockings and knitted headgear were sometimes made from coarse carded, easily felted woollen yarn. On the other hand, cotton, relatively seldom used in the eighteenth century, was rather a good raw material, the same can be said of linen yarn.

3

Hand-Knitting Technique

We are only interested in the production technique of articles on two to five needles. The knotless netting technique had already been dealt with in Chapter II. Neither shall we concern ourselves with crocheting with its vertical or horizontal arrangement of stitches usually used for articles having a looser and more decorative structure. The knitting technique always adopted a vertical arrangement of stitches. I. Emery describes it as a kind of vertical interlooping.⁴ Many dictionaries and handbooks not only have not captured the difference between knitting and crocheting, but also between flat knitwear, produced on two needles, and the possibilities of fashioning the knitwear by executing it in a circle by means of a larger number of needles.⁵ However, the necessity of using needles of a thickness close to that of the yarn has been emphasized. One of the major preparatory activities was the rewinding of the yarn into easily unwinding balls. Such balls of yarn have been often shown in iconographic material, particularly on guild insignia. They can be seen, for example, on the bowl, of the Prague knitters from 1792, where stuck in a ball of yarn are five needles. In the period under discussion, these needles were usually of metal, although sporadically also bone or wooden implements would be used for knitting coarser fabrics. (Il. 11)

An important problem is the manner of holding the needles and the division of functions, between the two hands in the process of knitting. T. de Dillmont in her excellent encyclopaedia of hand work claims that in Germany the knitter's left hand works more in pushing the yarn, which accelerates the execution of stitches by the right hand.⁶ The authoress managed to make many such observations in Alsace, a former hand-knitting centre. Fairly extensive iconographic material from the whole of Europe from the fourteenth-eighteenth centuries does not allow this observation to be confirmed in the sense of being able to differentiate between German and French knitters, but this perhaps results from inaccurate observation of the artists. What is significant, however, is the economy of movement of professional knitters. They hold the needles close to the article being knitted, the hands slightly inflected, while in unprofessional women knitting, wider hand gestures are observed.

This information could be completed from a book by F. Barrett who writes about the American knitting in the late eighteenth century. She began with the instruction how to make a ribbed band, after narrowing the stockings by making the ankle plain. The most difficult was the knitting of the heel.

Now divide the stitches, of which there should be an odd number, in two parts, putting half the stitches and the extra stitch on one needle. This extra stitch should be the seam stitch, and should come in the middle of the needle. The rest of the stitches are divided equally on two needles, and disregarded for a time. Knit back and forth on the heel needle (the one containing the seam stitch) until you have knit as many rows as there are stitches on the needle. In knitting back, be careful to pull all the stitches except the seam stitch, so as to keep the work 'rightside out', also slip the first stitch of every row instead of knitting in, in order to form an elastic edge. In the last four or five plain rows narrow on each side of the seam to give the heel a slight curve. Now knit to the middle of the needle, turn the two needles back to back or so that the heel is wrongside out, and with an extra bind off, knitting the seam stitch first, and afterward inserting the right-hand needle, always in one stitch of each left-hand needle, treating the two as one stitch.⁷

Such instructions about hand knitting are very seldom in European literature. The same authoress wrote about the technique of making of the gussets in stockings.

An additional implement facilitated the hour-long, work of a hand knitter in many European countries. A stitch of wood, metal or bone with a fork or eyelet, supported one of the needles in a fixed position, thus relieving one of the hands of the knitter. It was either fastened to the belt or held under the arm. There is no Polish name for this implement, since it was not known in central and eastern Europe. In France it was called *L'affiquet*, in Germany – *Strickholz*, in England – Knitting sheaths or Knitting sticks, in Dalmatia – *kanet*, in Valencia – *canito*, in Andalusia – *dagulla*, in Castile – *palillo* or *varilla*, in Denmark – *strikkesteer*. This implement was first described for its decorative qualities, on the basis of material coming from Dutch villages, Lorraine and Alsace.⁸ Only the papers by M. Roussel de Fontanès and N. de Hoyos Sancho, however, showed its use against a wider comparative background. The knitting stick was known in France, on the British Isles, in Portugal, all the regions of Spain, Belgium, Holland, Germany, Italy, Greece and Yugoslavia. (Il. 16ab)

J. Beckmann writes about a Swiss, Dubois, who in 1778 improved hand knitting in Hanover by introducing a stick with a small hook at the end which was attached to the left hand of the knitter. The description is not very clear but it seems that it could have been a kind of knitters' stick. So this tool was also used in Switzerland and some parts of German countries. Recently a Danish specialist Lise Warburg, after my lectures in Copenhagen in 1979, found some of the knitting sheaths in Denmark and Norway. The authoress found 9 knitting sheaths in Bergen: one made of horn and nine of silver and some in gift book from Copenhagen. She has presented very important new information about the Danish technique of hand knitting with a knitting sheath:

The yarn is held in the right hand and pushed with the right index finger around the point of the right hand needle, where the left needle has placed the stitch to be knit, next lifting it over the yarn to form the new stitch. Immediately there after the next stitch to be knit is brought over into the right hand needle. This is all done with very small movements, so that with much practice and the use of knitting sheath it is claimed that a speed of up to 200 stitches per minute can be achieved. The method of knitting which we use in Denmark today is believed to have come from Germany [...]. In Denmark this knitting method was first popularized in the Hammerum district, which from early times was known as a cradle of the knitting industry. Later it spread to other Jutland knitting areas and to the market towns, and by 1798 minister Joachim Junge maintains it was commonplace. This does not, however, agree completely with other sources or with portraits, which throughout the 1800's still show knitting women with the yarn over their right index finger and their hands holding the needles from above and close to the points.⁹

The knitting stick usually had an elongated shape, or sometimes – more rarely – circular. This stick was adorned with carving, and its elongated shape was suitable for portraying human forms or other figurative representations. Such supports were known in Swiss knitting of the eighteenth and nineteenth centuries. An extremely interesting collection of these sticks can be found in the Victoria and Albert Museum in London and in the Castle Museum in York, as well as in the Bergen in Norway and in the museums of Dalmatia. Whilst visiting a museum at York, England in 1973 I also saw some knitting sheaths but it was impossible to make a description of this implement. M. Hartley and J. Ingilby wrote about the knitting sheaths used in some parts of England. They are rather seldom dated, many adorned with initials and carved. Most of them are preserved from the eighteenth century. They have either a hole or a hook. Some motifs carved on knitting sheaths appear to have a symbolic meaning, for instance sacred hand and heart, symbols of faithfulness between two lovers. One of the tools published in this book has incised on it a rising sun, a cook, and other devices, perhaps of a religious significance. M. Hartley and J. Ingilby published forty of very interesting knitting sheaths of different forms such as fishes or snails. It is important to remember that only few carved knitting sticks have had the chance to enter museums collections. I have seen twenty-two knitting sheaths preserved in the Metropolitan Museum in New York and in the Smithsonian Institution Museum of History and Technology in 1980. The most interesting piece was made from bronze, dated from the seventeenth century and catalogued as Italian. It was a figure of a woman with crossed arms and twisted legs. Another, also Italian, was Judith with head of Holophernes made of bone. Some of the small tools are dated from the nineteenth century. Most of them were made of carved wood or silver. Some could have been imported from England, the modest made in America. It would be interesting to have this collection published.¹⁰ This implement appears in many countries which developed knitting. It is connected not only with the work of journeymen in workshops, but more especially with the knitting of itinerant knitters, shepherds or women supervising household chores. It was exactly because of this work that freedom of at least one hand was particularly important. This stick was not shown in the iconography because the artists did not appreciate its significance. Neither was such a tiny labour improvement was not mentioned either in the written guild sources. Only a few European museums have preserved these little sticks mainly for their decorative value. The knitting stick appears in the most important knitting production centres and in coastal regions exposed to foreign technical influences. Except for southern Germany adjoining Alsace and Switzerland, there is no evidence of this tool in central and eastern Europe which may, together with the absence of these decorative sticks in the museums, indicate the limited spread of hand knitting. Recently, one publication shows a special technique of hand knitting, taking the thread from both ends of a ball of wool. "Double threaded knitting seems to have been principally used in the knitting of mittens, but it was also employed in the knitting of stockings and socks, and in the edging of woollen jackets and cardigans. In Norway it would seem that the technique was most widespread in the counties of Hedmark and Oppland, but scattered examples of its use have been found in the counties of Akershus, Buskerud, Hordaland, Sogn og Fjordane, and Møre og Romsdal". This technique is still used but it is difficult to

give the precise date when it began to be used, which is normal with the study of a peasant craft. "How far back the technique goes is somewhat uncertain, but the Nordic Museum in Stockholm has a pair of Norwegian-made mittens dating from 1787. It is thought that they originated in Laerdal in Sogn. A comparison with Sweden reveals both similarities and dissimilarities. Dalarna, Jämtland, Hälsingland are the Swedish areas where the technique of double threaded knitting was most widespread, but it was also to be found in Värmland. Specimens knitted in Värmland are those which most closely resemble those knitted in Norway". This research has not yet been completed. The diffusion of this technique in Scandinavia seems to be very interesting. L. Warburg wrote about this technique in Dalarna in Sweden, also analysing some Danish double threaded waistcoats and gloves. She supposed that the same technique was used in Iceland and probably in the Caucasus.¹¹ This technique as a special solution is worth particular interest and should be discussed more in English book of its own.

The provision in hand knitting with some additional tools is now open to discussion. J. Staňková has presented in her book and papers some Bohemian peasants' solutions: a type of a small frame helping to make belts as well as wooden forms to make gloves or rather mittens with one finger. But it would be rather a special technique for plaiting or braiding. Perhaps the carpets were knitted and a kind of frame fitted with pegs was used to help. Now, it is very difficult to discover, without technical researches, what tools could change our definition of real hand knitting. Scandinavian studies of peasants' knitting in different countries could be very helpful in answering this question.¹² But it is important to remember that all the most complicated hand knitted fabrics could only be made with needles without any additional tools. The small tools such as knitting sheats or even the small frames were important mainly to speed up production and were used in work meant for sale and not for private needs.

Knitting stitches used in old hand knitting had less variety than nowadays, and even less than in patternbooks of the last century. Most commonly used was the simple stitch or stocking stitch, with the right and left side of the knitted article differing from each other. This stitch was used in the most complicated patterned knitwear of the day such as waistcoats, doublets or carpets. Much less frequently encountered are products made in ribbed stitch giving the same surface to both sides of the knitted item.¹³ To determine all the various technical resolutions used in the old hand knitting would require technological analyses of some hundreds of products scattered through more than a hundred museums and church treasures all over Europe. It would then be possible to explain the transition from the simplest to the most complicated resolutions using modern knitting terminology. For the moment, Barbara Sowina has made a technological analysis of three knitted carpets kept in the museums of Wrocław and Görlitz. Carpets were the most complicated of the patterned knit goods being produced by the hand knitting guilds, while their intricate ornamentation was resolved, from a technical point of view, in a similar way to the multicoloured waistcoats or other clothing articles. Carpets were the largest knitted fabrics, of up to 2 metres in width and 3.5 metres in length. Just on those three examples it is possible to ascertain different resolutions to the problem of knitting a pattern consisting of several colours and shades of woollen yarn. Thus, in one type of

carpet, the coloured threads of the design run from the left side (the under-side) over the background stitches and are left loose. Sometimes they did not come up above the design and were broken off, but thanks to strong felting of the fabric the stitches "did not run". This method made use of a simple, or stocking, stitch: the left side differed from the right one by the additionally knitted threads of the design. The second resolution involved catching the coloured threads of the design under the background thread. In this way they were joined by the stitch of the background thread, but were not seen on the right side. Only on the left side can we perceive the method of their execution.¹⁴ Already from the analysis of these three patterned carpets it is possible to establish simple but ingenious techniques. The heavier carpets, intended for table covers or wall hangings, were executed differently to lighter articles of clothing. In these, the threads of the design were many a time broken off or left loose to avoid a thickening of the fabric. J. Staňková shows some patterns of original stockings from Bohemia and E. J. Gehret some from Pennsylvania.

The fashioning of knitted garments was one of the basic skills of a hand knitter, giving proof of his technical and professional preparation. Among the abundant English headgear preserved from the fifteenth and sixteenth centuries it is possible to distinguish articles knitted as one piece and others, usually earlier ones, which had to be stitched together. The production of flat knitwear on two needles required the fashioning of particular parts which were then sown together. Knitting on about five needles was used for making children's garments, headgear, gloves and sometimes also for stockings or sock. By the sixteenth century, European knitting in its leading centres had already established a high degree of skill in the fashioning of its products: the number of stitches was skilfully reduced or increased, taking into account either the measurements of individual clients, or the standard of products intended for marketing to unknown customers. English stockings were produced in a greater number of sizes than the French or Belgian ones, which catered to the simpler demands of the Spanish clientele or of customers from the West Indies or Latin America.¹⁵ Rules for journeymen of knitters' guilds in Austria, Hungary and Moravia from 1747, give 11 sizes and types of stockings produced by the hand knitting technique.¹⁶ French rules usually specify a product thickness of 2-5-ply and a weight of 18-30 dags for caps and stockings. Since it was impossible to carry out an enormous amount of technological analysis on the garments produced, we will not concern ourselves here with the problem of fashioning the most popular garments, as stockings were to become in the sixteenth century. They required simply sewing up and the foot was most easily executed in products of mass consumption. The use of the machine led to a standardization of knitwear and an intricate pattern used to be avoided.

4

Machine-Knitting Technique

Here we shall describe the functioning of the simplest knitting machine without touching upon its improvements in the second half of the eighteenth century. P. Lewis published recently a very important paper about technical

evolution and economic viability of William Lee's stocking frame in 1589-1750 and announced the next article about the evolution of the handframe in the second half of the eighteenth century. She presented a very good description of the English machine of its parts and the changes of the trucks, the sley, the caster-backs, hanging-bit and front stops. I have decided to give my old description published in 1962 and 1979 because it concerns mainly the machines used in the European continent. They were usually less complicated and it is interesting to me that Lee's invention was used mainly in the poor countries of central and eastern Europe. But a general description is necessary.¹⁷ (Il. 17) The oldest flat knitting frame consisted of wooden stationary parts and a mobile metal working part. The wooden part was built on the pattern of the loom. It consisted of double stands, beams serving as support for the working part, and a bench for the worker. Naturally of fundamental importance was only the metal part which could also be placed on a suitably adapted table or any other stand-like construction. The knitting machine executed the majority of stitches with the help of the worker's hand movements, thus it was a typical tool-type of machine. Hooked needles formed a flat horizontal comb with a vertical disposition in the rows. The movement of the treadles would change the position of the blades and the yarn would arrange itself into loops between the needles.

The knitter's first act was to tie the beginning of the yarn thread, from which the item was to be made, on to the first needle and then pass it through the successive needles. The number of needles, i.e., graduation, and their gauge determined the character and width of the produced knitwear. The machine was put into motion by moving the blades by means of treadles, on the same principle as the harness in the loom. The drop of the blades would cause the undulation of the yarn. Leading it under the hooks of the blades would cause a further looping of the already thickening stitches. After the lifting of the blades, formed stitches would arrange themselves under its tapering edges. The worker used to press the formed stitches. Thus, after setting the treadles in motion which, through a wheel, would move the blades, the knitter would press the successive rows of completed knitted fabric which would then wind itself on receiving rollers. Similarities to work done on the hand loom are superficial because the knitting machine was mechanizing many more functions and the knitter's work required much less inventiveness. The lack of attention by the knitter could cause dropping of stitches which had to be immediately caught by a special hook or crochet-type of implement. In order to catch the stitches before they slipped from the needles, the machine had to be stopped, which considerably prolonged the work schedule.

Looking at the framework of a typical knitting machine, particular attention should be paid to the metal frame which contained its basic parts: blades, needles and press for tightening the stitches of the knitted fabric. Mobile pedals through a system of strings and metal clasps move the wheel with drive shaft and drums, and this in turn sets in motion the working parts of the machine. Here we will not give details of the complex system of supports, screws and nuts. Henson in his famous itemization names a total of 2066 parts involved in the functioning of the simple knitting machine.¹⁸ Much clearer, however, is the well-known scheme of the functioning of the simple knitting machine quoted by Felkn. He describes needles as hooks, itemizes the press, weights, shafts, treadles and method of their

suspension. In narrow machines the number of needles amounted to 150-600, and in wide ones up to 1500.¹⁹

The description of the functions of a worker on the knitting machine has so far pertained only to the production of simple, square or rectangular pieces intended for shawl or larger parts of garments. Production of knitted stockings, the basic product of the first machines, required additional functions and calculations. Production of a stocking started from its upper hem, which required the yarn to be passed through the first row of the first needles and subsequent double attachment of the stitches right to the end of the hem. The heel was shaped by a suitable selection of double-stitches. Depending on the type of yarn and thickness of stocking, the length and dimensions of the stitches had to be adjusted on these needles and blades. Sometimes the yarn was hooked every second needle and thrown over to make a loop. It is worthwhile quoting here the stocking sizes standardized for different customers. Large men's stockings had to be, according to French norms of the eighteenth century, 99.06 cm from the hem edge to the foot which was later modelled on a form. Large ladies' stockings were 73.66 cm in length, the smallest men's – 71.62 cm, and the smallest ladies' – 48.26 cm. The average length of the foot was 22-23 cm. Detailed French regulations give precise data in inches as to the length of stockings at which its width should start decreasing in the transition from calf to ankle and further, how to finish off the heel and the whole foot. In these regulations reference is made to the rules issued in 1684 for French machine knitters. Special emphasis is placed on the necessity of using properly treated raw material and strongly twisted yarn, at least three-ply, from uncarded wool, beaver hair, silk, cotton or linen thread. It was not permitted to make stockings, drawers or waistcoats on a machine having 22 sets of 3 needles fixed on one plumb bob, it being too narrow. For the production of silk garments wide machines also had to be used.²⁰ In mass production of stockings in the larger knitting workshops or manufactures, a couple of women were constantly sewing them up prior to the finishing. They were also involved in the embroidery of oblong patterns on the calfs of the more expensive stockings, usually of geometric shape.

The large number of small metal parts, from which the simplest knitting machine was constituted, complicated its functioning and required constant maintenance. As the number of machines increased, the production of its parts and its assembly was also subject to standardization. Full-page illustrations in the *Great French Encyclopaedia* show in detail the forms used for the production of the little springs, blades, devices for drilling holes in the needles, forms used for melting down the lead required for making the blades, files for smoothing them, various drills and screws, and finally the tools for shaping the tops of the mandrels. The necessity of the correct manufacturing of individual parts of the various sizes of stockings and other parts of garments required the use of precise scales.²¹

The above-described model of the simplest knitting machine was still in use at the beginning of the nineteenth century and became labelled in Dziennik Wileński (Vilno Daily) of 1820 as the "common" knitting machine. We should remember, however, that even this simple functional model was undergoing certain improvements. The first of them was introduced by the inventor of the machine himself, William Lee, who devoted at least ten years to its redesign,

which would enable the production of silk stockings. The principle of the functioning of the simple model remained unchanged, the number of needles, however, increased to 20 per inch and they were much thinner. In addition, the raisers, weights and clasps were of metal, while previously they were partly wooden. A further improvement to the machine was introduced by Aston, Lee's former journeyman, after his return from Rouen to Nottingham. He made some changes to the earliest machine which according to Henson consisted of placing two fixed sinkers between each pair of jack sinkers, but Felkin states that only one fixed sinker was added at this time. With the same number of needles it was possible to increase the dimensions and capacity of the machine. We can assume that the wooden knitting frames, so widely used for the production of coarse woollen stockings in Bohemia and Saxony at the end of the seventeenth and first half of the eighteenth century, were linked in their design to Lee's earliest model. Probably only the needles and blades along with the mounting were metal, and the whole construction of treadles, jacks, weights, clasps was of wood. This machine's design was possibly to a greater degree linked with the structure of the narrow horizontal loom. Probably in these machines, there was a relatively small number a fairly thick needles, permitting the passage of coarse woollen yarn. J. Beckmann writes in a book published in 1802 about machines where both the rollers and the whole mechanism setting in motion the needles and blades are made out of wood. However, the later so called Saxon type of wooden knitting machine was probably only constructed in the eighteenth century. The machine from Strakonice in 1780 is one of Lee's models.²² This is, however, only an assumption, because no model of such a wooden machine has survived. Also those preserved with metal working part date from the beginning of the eighteenth century.

5

The Technical Development of the Knitting Machine in the Eighteenth Century

The variations in fashion within the growing demand for knitted clothing had a decisive effect on the evolution of the prototype of the simple knitting machine built by Lee. This machine could only execute the stocking stitch; the fashioning of products was limited, and any more complicated forms of clothing had to be stitched together by hand. These difficulties were taken into account by various redesigners. Some of them aimed at small improvements in the construction of the machine itself and at making it function more efficient. This type of redesign was undertaken primarily in the largest machine knitting centres, in which the machines themselves were also being produced. References are made, for example, to many small improvements introduced by knitting-machine constructors in Languedoc. However, only further archival research into this powerful centre of the eighteenth century French knitting production will enable the type of technical improvements to be determined. Other constructors

attempted to build new models of the machine. First, we must mention on the first place the Swedish inventor, Christopher Polhem, who patented his knitting machine in 1749. This was clearly a new model of the machine because the two earliest specimens of Lee's knitting frame had been imported to Sweden in 1723, while the other arrived in the thirties of the eighteenth century, and both are currently found in the Tekniska Museet in Stockholm and in the Bergslagens Museum in Falun. (Il. 18) So Polhem was familiar with the principles of construction of the machine already in use in Swedish manufactures, and designed a simpler version of it. It consisted of three treadles, while the working part of the machine with the needles was set in motion by a type of lever, not by means of a wheel.²³ Nevertheless, on the basis of the photograph of the model it is difficult to establish the advantages of this construction of the machine. It appears to be simpler than Lee's machine, but it must have had constructional drawbacks, since it was never introduced into Swedish knitting manufactures. (Il. 19)

The original knitting frame, over the several scores of years dating from the moment of its introduction into a manufacturing type of production, was subject to many minor improvements. Consequently various types were created. Four of the hosiery machines in use were mentioned in Dziennik Wileński (Vilno Daily) in 1820. This classification is important because it reveals different types of knitting frames were known of Poland in the early nineteenth century. The types described as "common" were the simplest machines similar to the Lee's frame. In a second type of machine the worker did not have to tighten the stitches with a press manually, but using a crank. The third of the types mentioned, represents the improved resolutions of the eighteenth century. It consists of "a single row of rakes, a piece for tightening the work, two wheels called 'roulatte', which running across the frame in the right and left direction replace the function of springs, rollers, press and other parts used in the forming of the stitches".²⁴ The quotation refers to a simplified machine made by Jandeau from Châlons-sur-Marne. However, it only enabled the production of the thickest stockings only owing to the necessity of a sparse distribution of needles. (Il. 22)

The above-mentioned paper also describes a fourth type of English machine used for the making of striped stockings in which "instead of tin-plate springs and horizontal parts called 'ondes', there are spiral springs made from wire and vertical pieces".²⁵ The most important improvement to Lee's simple machine made in the eighteenth century is not presented very precisely. It was connected with the widespread vogue for various types of stripes in cloth and knitwear as well as ornamentation: ribbed, obtained in weaving by different resolutions to the rep weave of warp or welt. The fashion of stockings and pin-striped trousers and simple patterned ornamentation brought about a considerable influence on English production, as at the same time, the rapid development of French knitting, particularly in Languedoc, constituted effective competition to the production of the British Isles. The large quantitative output of this production had to be offset by a high standard and rapid fulfilment of the new demands of fashion. For this purpose, however, it was necessary to perfect the machine. A definite improvement in the standard of silk products was the constructions in the middle of the eighteenth century of a knitting machine with sets of 38 needles, while the former ones had smaller sets of 22 to 34 needles. This enabled the production of a wider, finer and more compact knitted fabric, used for larger

garments. At the same time, between 1725 and 1742, a different type of knitting machine was introduced to knitting production in Nottingham, in which a special arrangement of needles and blades formed on the fabric surface the impression of grooves in zig-zag form. This invention was attributed to French or Irish knitters.²⁶ However, the improvements to the machine did not make any real difference to the production of knitwear with striped or zig-zag surface.

Jedediah Strutt built a machine for making knitwear with a ribbed surface (rib hosiery frame). He was a brother-in-law of William Woollett, owner of a large knitting establishment in Derby. His complicated knitting frame, apart from horizontally arranged rows of needles, as in Lee's machine, also had vertical ones. These supplementary rows of needles from stripes of a desired width on the fabric. The first patent is from 1758, the second from the following year.²⁷ Strutt making use of the practical experience of Woollett, significantly transformed Lee's model, departing from the uniformly waving arrangement of the needles and blades. The multidirectional arrangement of needles in rows constituted a real technical advance until then the structural improvements had mainly centred on increasing the number and diminishing the gauge of the needles. This invention initiated further improvements to the knitting frame, which were originated in the environment of textile engineers in central England. The constructional principle of the knitting frame also served as a basis for a lace making machine. These machines will be discussed at the end of this work showing the situation of European knitting at the turn of the eighteenth and nineteenth century, prior to the discovery of the rotary machine and the beginning of mass production.

We have already mentioned that the first types of wooden frames were banned in Saxony and Bohemia at the beginning of the eighteenth century. But in Saxony, until the second half of the nineteenth century, work was still being done on the wooden knitting machines. This Saxon machine differed from the Lee's model in the construction of the wooden part transmitting the drive from the treadles to the working part. Instead of the single wheel of the English machine, the Saxon one had two wooden wheels on each side. As well as this, in this machine there was a preponderance of part made from hard wood, but otherwise in its working part it did not differ from the simple knitting frame of William Lee's construction. (II. 21) F. G. Wieck and S. Sieber claim that these machines, thanks to the preponderance of wooden parts, were easier to operate than the English ones, while the products obtained were of similar quality. Only a few of this type of Saxon machines have survived and these come from the nineteenth century as, for example, the frame dating from 1860 in Chemnitz preserved in Schlossberg Museum and also in Leicestershire Museum. (II. 23) This model, so important in the history of the Saxon technique, has not been mentioned by H. Mottek or F. Frölich. Only in the middle of the nineteenth century were these locally produced machines gradually being replaced by steam-driven machines. However, the knitting machines of Saxon construction, were not used in neighbouring Thuringia.²⁸ (II. 20) One such machine, datable to 1811, (thus earlier than the relics preserved in Saxony) is kept in the knitting factory of the Jansen family in Schijndel in Holland.

Martinus Jansen (1802–1879) worked on this machine in Saxony in Karl-Marx-Stadt (Chemnitz) before emigrating to Holland. However, on arrival at his destination, he soon switched over to production using English machines.

There is no room in this book to examine the interesting structural transformations of knitting machines, which took place in the second half of the eighteenth century, connected with the changing demands of fashion in clothing, and particularly the changes in patterned stockings. These structural transformations started within leading English knitting and were gradually introduced to production in other European countries. The question of direct connection between the fashion of patterned knitwear and laces and the structure of specific machines was discussed in my book *Fashion and Technique Textile in Europe between Sixteenth and Eighteenth Centuries*. I was interested in the modification of the early textile machines: those used making ribbons, for knitting and making laces. The changes mentioned above were caused by the variations in taste of west-European fashion. Technological historians have focused their interest mainly on the overestimated increase in output capability. I have discussed different variants of the original English knitting machine, especially the Swedish and the Saxon one. The modifications of the knitting machine were particularly important, for in the eighteenth century they made possible the manufacturing of netted, open-work, striped, double looped and warp knitted garment, as well as those of a ribbed or zig-zag surface.

Technical solutions leading to the transformation of the simple knitting frame in the years 1760–1800 prepared the ground for the invention of the rotary knitting machine. The trend was towards the creation of different types of machines for the production of specific products of variable forms. So it was a question both of replacing the laborious work of hand embroiderers in adorning machine-made stockings, mittens and gloves, and of finding a mechanized resolution to the production of open-work textures. These modifications were so numerous that only the most important can be mentioned here.

Among the patents for inventions during 1675–1800 appears, for instance, the patent from 1682 for: F. Ammonett, C. Hayes and G. D. Guthard "The manufacture of draped milled stockings", from 1765 "Knitting machine for making and knitting of stockings, stocking pieces, and other goods usually manufactured upon stocking frame" build by W. Taylor and F. Jones. Up to 1797 there was about fifteen different patents for knitting machines. Some of them do not have probably any practical value but the number shows the significance of hosiery in textile production. Thus, for example, Josias Crane and J. P. Porter patented in 1769 a slide bearing, which supplement the simple knitting frame. It enabled the production of diverse mittens, gloves, hoods and aprons using different shades of yarn. The needle machine invented by Else and Harvey in 1700 was not into use. John Morris fared better when he patented an improvement, registered in 1784, of a machine which facilitated the production of open-work and mesh knitwear. The numerous small improvements led to a change in the appearance of the knitted surface not only in the sense of loosening its structure or creating colourful ornamentation, but also of evoking a resemblance to the resolutions applied in patterned wearing. Different variants of these machines were used for the production of silk,

woollen, and especially the increasingly more popular cotton knitwear.²⁹ Small changes in the complicated arrangement of needles and blades enabled knitwear with fancifully shaped surfaces to be put into production. However, these products were mean for a narrow circle of consumers and the rapid evolution in production methods and its relatively short duration connected with a changing fashion are the reasons why the construction of these versions of the flat knitting machine is little remembered today. The first patents for a rotary knitting machine also appear at the very end of the eighteenth century (Decroise from 1798).³⁰ This invention revolutionized the production of a part of the knitted garments destined for mass consumption and facilitated their fashioning. The introduction of this machine enabled the transition, in European knitting, from workshop to factory production.

6 Finishing of the Knitwear

The finishing of hand- and machine-made knitwear is discussed here jointly, taking into account the slight differences which appeared in relation to the character of the product, its shape, mode of use, quality, and above all, the raw material from which it was made. Among the finishing treatments the following should be mentioned: washing, the fulling of the woollen products and then, their combing, shearing, the washing as well as cleansing of products made of silk, wool and also of linen yarn, dyeing and modelling of all the products, which gives them the required shape on special forms, lining, finishing of the more expensive ones with embroidery, decorating with ribbons, or other extras under a hot iron or in special presses. Among the final finishing tasks was the selection of the products in pairs or dozens and the packing of them for the whole-sale or retail market. Thine stitching of products made on two needles or on the flat knitting frame belonged to the tasks usually done directly after completion of the appropriate production process of the knitwear. In sporadic cases, however, certain changes were made in the above-mentioned sequence of finishing. For example, sometimes as yet unstitched products would be dyed, and also fulled.

All knitted products made of wool, immediately following completion and sometimes after dyeing, or may be before this step, were rinsed in a special fuller's solution and subjected to fulling of varying of intensity. The felting of the sometimes loosely knitted fabrics in hot water was an essential step to give them greater durability and thickness. Fulling would obliterate the errors of over-hasty knitting, smoothen out the faults in thick coarse yarn and give the products suitable thickness while simultaneously reducing their dimensions. The felted surface of knitwear gave protection against running stitches and then it became possible to lightly shear the loose threads without the risk of weakening the durability of the product. But even strongly felted knitted goods did not have the closed surface of fulled cloth. Even in products of thick wool it is possible to discern the stocking stitch on the surface, while fragments of more closed surface result less from the felting than from their long use. We can cite as an example the strongly

felted and almost stiff Dutch knitted hats of Peter I preserved in Leningrad in the Hermitage. (Il. 29)

The knitter's small fulling mill performed similar tasks to the clothier's fullery. It involved the manual or mechanical kneading of the products in a stamp or ordinary trough with warm water mixed with fuller's clay or soap. Major differences in the structure of this implement arise from the smaller dimensions and volume of the knitted products undergoing finishing. The process of fulling of small quantities of stockings, socks, gloves or caps could quite adequately be done in a large trough placed in the workshop, while the fulling of large carpets had to be done in a clothier's fullery by means of wooden rammers, propelled by the force of water. In this book the discussion centres mainly on knitted garment products. In our case, the size of the fullery depended on the volume and dimensions of production. Small troughs were adequate for workshop products, while the production of large manufactures required fulleries of larger capacity.

An example of a large fullery comes from the Poneggen hosiery manufacture in Austria. The dyed stockings were taken to the fulling mill in the main corn mill "where the fulling mill and the fulling stocks were maintained at the factory's expense. The vats were heated, and the fulling stocks and the hammers were to be thoroughly washed with cold water to prevent sand from getting into the stockings. Ten dozen stockings could be fulled in each stock, and they were to be alternately washed with soap until all dirt was gone and the water was entirely clear". Such a large fullery was also found in Wrocław and in Wschowa³¹ and this investment points to major productions of woollen knitting.

A manual fullery for felting hand-knitted products has been preserved in the Ethnographic Museum in Cracow. Il. 25 It comes from Tyniec, an important centre of production of knitted caps, existing there from at least eighteenth century. It conjures up the troughs mentioned in numerous probate inventories of knitting workshops from the early nineteenth century.³² It is a fairly large trough and on its furrowed bottom, woollen knitwear would be kneaded, while hot water mixed with fuller's clay or later soap was being poured over it. This fullery reminds one of the troughs preserved in Jutland where small woollen products were also kneaded manually in furrowed troughs. I. Staňková presents the small fullery from Bohemia and the process of fulling some stockings in a pail. Il. 26 Some small fullery were also published in Hungary. Such a small sized fulling mill was also used in Tunisia for the finishing of knitted caps.³³

Fulling of hand-knitted products made of coarse wool was referred to in all guild regulations as an indispensable finishing step. For example, the rules for knitters in Rouen, being repeated from the beginning of the seventeenth century, require that: "tous les ouvrages de bonneterie en laine seront foulés à la main dégraisés avec du savon vert foulés à deux eaux vives avec du savon de Marseille ou de Gênes, et tors de façon qu'il n'y reste aucune impureté, et que lesdits ouvrages puissent recouvrir les autres apprêts avec plus de perfection; et si en foulant lesdits ouvrages, il s'y fait quelques cassures, elles seront rentrées et racourtes avec de la laine de pareille qualité ou avec de la soie

plate de la même couleur que cells desdits ouvrages".³⁴ There is no mention here of the use of fuller's clay, although it was probably used for the initial removal of fat from the products. Emphasized, however, is the necessity of using good quality soap and carefully repairing any holes or other defects in the fulled kniwear. It emerges from the text that silk products were also probably lightly rinsed in this fulling solution, since they were required to be inspected and repaired with silk yarn.

Greater production, even if these were just hand-knitted goods caused environmental pollution during the fulling of the products. For this reason, numerous guild regulations in different countries demand that fulleries are located in the outskirts of a town. For example, according to the 1698 regulations from Compiègne, stocking fullers were to rinse and felt their products in places far removed from dwelling-houses, near canals and drains. Similarly with dyers, they were also forbidden under penalty of fine to pour the water from manual fulleries on to the street.³⁵ The Parisian knitters' statute from 1627 orders the painstaking execution, fulling and finishing of two types of men's headgear, called *almuce* and *crémolle*, and of two types of ladies' headwear, which then had to be modelled, ironed and embellished; in addition, it demands the production of fulled woollen stockings.³⁶ The Strassburg knitters' guild regulations require the painstaking fulling of all woollen products and then their stretching and shapping while damp. In all regulations the weight that particular products should have was scrupulously given, as this was the measure of their quality taking into account the amount of raw material used.³⁷ The 1747 hand-knitters' guild regulations of Austria, Moravia and Hungary required from a journeyman simultaneous fulling of an armful of woollen stockings, and daily he had to process four such armfuls in a manual fullery, which meant, a 3-4 hours' job.³⁸ Many hand-books mention manual fulling of woollen kniwear, and such troughs were found in all more important centres of this production, as for example in Silesia in Wrocław from 1534, in Wielkopolska in Wschowa, Działoszyn and Zduny.³⁹

Careful fulling of machine-made products was indicated in the earliest regulations pertaining to the first centres of production. Thus, for example, the 1692 regulations, relating to all French towns which were entitled to use knitting machines, demand: Les ouvrages guise feront sur le métier avec de la laine ne pourront être foulé qu'avec du savon blanc ou vert à bras ou aux pieds. Fait Sa Majesté défences aux fouteurs des diis ouvrages de se servir d'autres instruments que de rateliers de bois ou a dents d'os, et aux foulonniers à fouler draps et d'étoffes de recevoir dans leurs moulins des bas et d'autres ouvrages faits au metier pour les foulé".⁴⁰ It emerges from these regulations that in a manual fullery, hands and feet were used for fulling, while the strict prohibition against doing this work in clothiers' fulleries points to the concern for the quality of the first French machine-made products. Fulling of armfuls of woollen stockings in a clothier's fullery could result in an uneven thickening of the stockings and even in their damage. At the same time, this prohibition testifies to the use of clothiers' fulleries driven by water power for the felting of less expensive knitted products. The order that wooden or bone teeth be used in manual fulleries precluded all metals which could damage and leave rust stains on the knitted products. II. 24

Knitters' fulleries used for the felting of machine-made woollen products were, more frequently than were the contraptions of the hand-knitters' guilds, located on separate premises. They also underwent minor modifications resulting in a general improvement in the efficiency of this production. A detailed description of such a fullery is found in the *Great French Encyclopedia* and shows the technique by which the products of the powerful eighteenth century French knitting industry were fulled. The illustration II. 27 presents a rather large room with a stove for heating water in cauldrons. The fullery itself differs, however, from the preserved troughs of the hand-knitting establishments only by a tap for pouring and releasing the water. It consist of a large wooden trough in which the products were manually fulled, kneading them against the wooden grooves. Rows of blunt teeth facilitate this work. A similar contraption is described by J. Beckmann. This was also a trough with a ribbed bottom. From other descriptions in German hand-books from the end of the eighteenth century we learn that the products placed in the trough were kneaded with a corrugated board while simultaneously soaking in hot soapy water. R. Vaultier has published an illustration of an itinerant knitter from the seventeenth century, who was carrying a small fullery with a corrugated board.⁴¹ II.6 Next, they were laid out on a dense wicker warble to allow some of the water to be drained off. These were, however, only different versions of the manually-propelled arrangement and operated on the same principle as the more primitive hand-knitting fulleries.

Usually immediately after the woollen goods had been fulled, they were subjected to bleaching and dyeing, while other products underwent this treatment after their initial rinsing. The earlier mentioned French regulations from 1692 prohibit the use of "aucune craye ni blanc", i.e. chalk or whitening, for bleaching the knitted goods.⁴² Only at the end of the eighteenth century was there a technical revolution in the bleaching of various types of textiles.⁴³ Therefore, in the period under discussion, the bleaching of woollen, cotton or linen knitted goods did not play a very significant role in the finishing process of these products. The emphasis was put rather on trying to produce them from already bleached, or sometimes also dyed, yarn. French regulations from 1692 require, apart from dyeing in black, the production of silk stockings from previously dyed silk yarn.⁴⁴ The same proceeding was taken in the production of other knitted goods. The process of dyeing required the products to be boiled in dyers' vats, which could cause them to stretch or generally change their dimensions. There were, however, cases of completed products being dyed, particularly, with indigo blue, data on this subject coming, for instance, from Compiègne.⁴⁵

Fulled, and sometimes also dyed, knitted products were dried on wooden frames giving them the required shape and removing the deformations caused by stretching during rinsing or by shrinking during fulling. Wooden forms for drying stockings, gloves, caps or hats are seen in all iconographic representations of interiors of knitting craft workshops or manufactures. Such forms were also carried by itinerant knitters, the Spaniard on his back, the Frenchman attached to a box with ribbed frame probably representing a small fullery. (II. 6 and 9) Among them, the most frequently encountered are the forms for stockings, less often for gloves, cuffs, caps, and hats. R. Vaultier gives a picture of a German

woman occupied with hand knitting, with forms for two types of caps, five-fingered gloves and one-fingered mittens.⁴⁶ Larger knitting workshops with a wide variety of products were supposed to have forms for all the articles in several or more sizes. On these forms thicker knitted goods were simply dried near a hot stove, more expensive products at a certain distance from it. These forms underwent changes with successive changes in fashion, a study of the relics kept in European museums together with a determination of their dating according to changes in fashion for the various types of stockings or headgear, would be an interesting task.

Partly dried woollen knitwear was subjected to roughing with thistle brushes or with combs to raise the hairs which were then sheared with large scissors. Pictures of thistle brushes and large scissors are found on many guild insignia, for instance, from Poland, Bohemia and Hungary, and also on the knitted Alsace carpets.⁴⁷ The work of combing and shearing of knitted woollen stockings is shown on three iconographic representations of knitting workshops: two German ones, from 1698 and the eighteenth century, and a French one from the middle of the eighteenth century. Il. 15 The authors of many studies on the history of knitting in different countries generally did not take note of these activities in the presented iconographic material of workshops or guild insignia. They believed that knitted goods should not be sheared as this would cause the stitches to run, i.e., the products to come apart. However, even a superficial analysis of the numerous preserved relics of knitted products made of coarse wool enables us to affirm that fulling thickened the products to such a degree that there was no question of the stitches running. At the same time, shearing involved only those long hairs sticking out of the smooth surface of the knitwear.

Knitted garments made of silk, linen or cotton yarn were modelled on wooden forms of appropriate size, a scrupulous check being kept of the weight of individual items. Embellishment of the more expensive stockings with embroidered gussets remained in fashion throughout the seventeenth and part of the eighteenth century. Embroidery women usually worked with seamstresses who were stitching together machine-made products. In Nîmes itself, there were over 2000 of them at the end of the eighteenth century,⁴⁸ Detailed French regulations from 1692 inform us about the procedure with products made of a couple of types of yarn, for example of wool and silk. They were knitted on machines with densely set needles and painstakingly finished, marking on each product the master's name and place of production.⁴⁹ All products, irrespective of type of raw material, after modelling on the forms, were ironed. There is no mention of the use of presses, so most probably this was done with an ordinary iron. Thanks to the ironing, the knitted garments acquired a sheen, a compact surface and a soft feel. At the same time, ironing could not weaken the effect of the earlier refining of the surface of the rippled knitwear,⁵⁰ obtained by felting and roughing with thistle brushes. Perhaps in European centres of mass-produced knitwear, presses similar to those of the clothiers were already in use. However, small knitted items, such as garment parts, could be finished off better by using an iron. The last finishing step was matching particular products into pairs and dozens, packing them,

occasionally lining and embellishing them with ribbons or others. This pertains mainly to headgear, but also stockings, gloves, as well as whole garments were finished off with accessories.

7. Productivity Norms in Hand and Machine Knitting

Data on productivity norms are given in part in rules for guild journeymen or manufacture workers, in part, however, they can be calculated from annual, monthly or weekly reports on the actual production volume of a given workshop. The accuracy of these norms are fairly reliable, since wages were calculated on their basis, the latter more realistically take into account all sorts of standstills in production. Detailed norms pertaining to the production of various knitted garments in the hand-knitters' guilds of Austria, Hungary and Moravia from 1747 are given in the rules for journeymen. We should remember that it was a peak period for hand-knitting development in this region, prior to the introduction of the knitting machine. A journeyman had to make within a week: "two shirts with lining (Futterhemd) on thick needles (if the product exceeded the required weight, the master was losing money) or 3 pairs of stockings, or 5 pairs of five-fingered gloves on thick needles, as the ones for making berets, or 8 pairs of socks with one finger or mittens (Faushandschuh)". A journeyman exceeding the weekly norm was entitled to a higher payment per piece. As far as stockings were concerned, the payment was different for men's, women's or boys' ones, thus it depended on variation in their size. For making Spanish gussets in any size of stockings the master paid extra 2 kronen, while with ordinary men's stockings only one krone. Products on thin needles were probably made on individual order, since there were no productivity norms indicating standardization established for them. All finishing work was paid separately, the norms only covering the execution on needles of different garments. A journeyman was not to leave the workshop during the entire day, but he could do small repairs to the knitwear on his own account.⁵¹ Such high hand-knitting norms demanded a strenuously full-week's work from the journeyman. Polish data on hand knitting reveal lower production. Data from the press from 1783 mention that the processing of 96 kg of wool per week can give work to 130 people, "when nightcaps, stockings, gloves, etc. are to be made from it".⁵² So it works out at about 738 grams of wool per week, thus about two pairs of thick stockings much shorter than those worn nowadays. The average output of knitting workshops in Pomeranian towns calculated for the end of the eighteenth century indicates the production of two, at the most three, pairs of thick woollen stockings per week. For this very reason, the production of 7 pieces of stockings or socks per day in Gdańsk in 1620 seems too high to achieve without the use of a machine.⁵³

Machine productivity norms were initially rather modest in comparison with the volume of hand-knitting production. In 1667 in Fournier's manufacture in Lyon a good journeyman, working 12-14 hours per day, was making only 3 pairs of unicoloured silk stockings and 2 pairs of patterned ones per week.⁵⁴ So the first machines did not produce a large jump in work output, if measured against our standards. In Troyes in 1789, the production volume was estimated at about 50 dozen pairs of stockings or caps per year on one knitting machine.⁵⁵ Assuming 50 working weeks per year, which seems excessive, a machine would have been producing about 12 pairs of stockings per week, which indicates a gradual improvement in production. Felkin, as journeyman, was already producing three pairs of fashionable ladies' stockings, working from 6 in the morning to 9 at night in 1808,⁵⁶ which totals 18 pairs per week. In the most important knitting regions of Thuringia and Saxony, the weekly norms at the turn of the eighteenth century are: in Zeulenroda 12 pairs of stockings, in Chemnitz 15 pairs.⁵⁷ In Poland at one of the first knitting manufacture in Gołdźzinów near Warsaw in 1770, on three machines there were already up to 50 pairs being made per week, thus just on one machine more than 16 pairs, which would indicate a fairly productive output.⁵⁸ These norms show a steady and systematic increase in work output on the simple knitting frame, because around 1750 the average productive capacity of a machine in central England was given as 10 pairs of stockings per week.⁵⁹ This fragmentary data collected from different countries show a steady improvement in the organization of work and a more effective use of the machine. The stitching of stockings or other flat knitwear could create a bottleneck in mass knitting production. In Normandy in the eighteenth century a female worker was sewing up to 10-12 pairs of stockings daily.⁶⁰ The technical development of Lee's simple knitting frame and the division of labour which applied in centralized manufactures producing standardized clothing items caused knitting to become in the eighteenth century an important branch of textile production in many economically developed European countries.

VIII. Consumption of Knitted Garments in Europe in the Sixteenth – Eighteenth Centuries

1. Assortment of hand – and machine knitted products

This chapter will discuss types of all knitted garment products with the exception of carpets, as well as some small items used to furnishing interiors, such as cushion-coverings.¹ Among the garments we can list are: headgear, coverings for hands and legs, doublets, waistcoats, trousers, skirts, drawers and shirts, meant also for children's wear. Children's clothes and frocks dating from the Middle Ages were often produced using hand knitting. Belts, shawls and small clothing accessories such as bags of purses, cushions for pins or needles, as well as gussets and the finishing of clothes were also knitted. The most important, commonly used garments were mentioned in the statutes of knitters' guilds. At the same time, on the basis of dates of statues it can be seen that at the beginning of the sixteenth century knitted headgear, so prevalent in the Middle Ages, was still being listed in first place ahead of trousers, leggings and other garments. By at least the beginning of the seventeenth century, stockings become the most important single item of knitting production. In the late Middle Ages they begin to replace the previously popular leg coverings fabricated with cloth sewn together and fitting the leg closely. Indeed, the earliest of the preserved stockings are in fact leggings. In the sixteenth century closefitting knitted stockings become an essential item in male and female dress. Consequently the assortment and variety of raw materials and colour schemes used, widen considerably. Later, stockings are the original sewn product of the simple knitting machine. The demands of fashion as to their patterning, variegation and method of finish lead to small improvements being made to the knitting machine in the eighteenth century.

Headgear

From the early Middle Ages different types of headgear were one of the basic products of hand-knitting guilds. The name for craftsmen registered in Paris in 1268 derives from *bonnet* – the article they produced. In the Middle Ages woollen headgear is encountered in the Mediterranean Basin, on the British Isles and in Lübeck. In warm climate countries they constituted above all a comfortable head covering, worn under a knight's helmet, while in northern Europe a close-fitting warm cap from well-fulled wool was an essential clothing item. Head coverings from the sixteenth-eighteenth centuries present such

a university of form that it is essential to establish their typological classification. Some of these types of headgear were difficult to dressing. Hence their reduced usage during the period of machine production of knitwear on the flat knitting frame.

On the basis of examples preserved in museums, and representations and descriptions of costume, four types of head coverings can be distinguished:

1. Hoods mostly fastened under the chin. They could be worn under another headgear such as helmets or mitres.
2. Berets of different shapes.
3. Hats with brims.
4. Night-caps of elongated form.

The first of the above-mentioned groups of headgear can be considered the oldest ones, since it corresponded in form to the simplest hoods of the Middle Ages and could be worn under other headgear such as helmets or mitres. However, also the fourth type, the knitted night-cap with an elongated top hanging down the back, was also prevalent in the Middle Ages. Unfortunately no relic has survived to confirm this assumption, while the iconographic representations do not leave it clear whether these were knitted caps or were made of a soft woollen fabric. For this reason, in the description of the earliest relics we have separated the first two of the above-mentioned groups – the hood- type of caps and the berets.

The knitted caps found in Lübeck are a typical example of the first group. K. Schlabow dates them at the end of the fifteenth or beginning of the sixteenth century. A careful reconstruction enables the form of these relics to be established despite their rather poor state of preservation. The knitting of the cap started at the neck part; products from Lübeck are 30 cm at the base, with an initial width of 97 stitches knitted on thick needles and from thick wool. After completing 6.5 cm of the item, the knitter began widening the hood to a width of 140 stitches. Next, this hood was finished with a small front part turned over the forehead, while the top of the head was almost flat.² The caps from Lübeck are a perfect example of close-fitting headgear of the first group.

Also belonging to this group are the older relics of the numerous excavated knitted articles from London itself and from southern England. Close-fitting caps made of thick, usually undyed wool, come from archeological discoveries from the beginning of our century and similar material is constantly being found in the most recent excavations. These relics date from the end of the fifteenth and the sixteenth century. The largest group of them, in part preserved in the Victoria and Albert, in part in the London Museum, comes from excavations near Worship Street in London. The exceptionally great number of fragment of caps and unfinished products indicates that it may have been the site of a fairly large knitting workshop. Similar conclusions are also suggested by the smaller group of relics found in excavations in Moorfield in London, predated in the Gallery of English Costume in Manchester. These pieces are very early, since they are dated at about 1500 and are much more carefully made and finished. Similar headgear was being made in numerous localities in southern England. A group of caps and their fragments probably comes from one of larger knitting workshops in Finsburg, and is found in the London Museum, while a part of the relics now in London's Guild Hall was found in

excavations, the materials from which were initially being collected in the Norwich Museum.³ From this rich material we can distinguish caps knitted in one piece, while others, owing to the lack of skill in fashioning the products, were sewn together. The part covering the neck and the ear-flaps were knitted in one piece, the round head being knitted separately. The head part of some of the caps was stiffened by felt insertions, although this was more frequently done in berets. The caps knitted in one piece can be described as products of more skilled craftsmen, while the joining together of different knitted pieces into one article replaced the ability of counting the number of stitches. Nevertheless, the dimensions of the caps must also be taken into account because those with elongated ear-flaps were more often sewn form separate pieces. The caps were then felted in manual fulleries which thickened and stiffened the knitwear surface and facilitated its modelling on wooden forms. In the scores of relics and numerous small fragments still being found in English excavations, even more sub-types can be distinguished.

One of them could be the caps known as the Mommouth caps. This headcovering could be ranked with the night caps. K. Buckland dedicated a large paper to this headgear. She presented numerous mentions about Mommouth caps from different written records from the fifteenth and sixteenth centuries. But she is not sure what they looked like, and how they were made. "There is a brownish knitted cap in Mommuth's Local History collection which is believed to be a genuine specimen and the only survivor. It has been studied by experts who agree that there is nothing opposing a sixteenth century date. It is made with a seamless stocking stitch throughout, with a flat double brim knitted together at the edge, which continues into a loop, the crown is finished off with a small button, and it is knitted in coarse, thick, 2-ply wool, felted, thickened and shorn. It may have been dyed after or during felting. The most noticeable feature is the shape which is achieved with mathematical care and simplicity: all in plain knitting, and in multiples of ten and twenty, it could not be simpler for an illiterate novice to learn. It follows a carefully helmet-shaped head hugging, pattern suggesting that this was important. It is in excellent condition but very small, eight inches deep, twenty-two inches (55 cm) and only fifty-nine stitches in circumference at the junction of crown and brim". The authoress considers the possibility of wearing the cap inside a helmet, she also wrote about the similarity of the cap to a typical sixteenth century "Spanish mutton". Such a cap, catalogued as Mommouth cap, from the fifteenth or sixteenth century made with thick, brown wool, is preserved in Metropolitan Museum in New York. In the book of Cunningtons the Mommuth cap is classified as a type of shallow night-cap, particularly popular between 1570 and 1625 among soldiers, sailors, and also Welshmen.⁴ But I think that this cap should probably be classified in the first group of headgears.

Caps dating from the seventeenth century were also found on archeological excavations in Scotland and in Shetland. Three woollen knitted caps from Scotland were brown and green, heavily felted. Two caps, one with turned-up brim, another without a brim, were dated to the late seventeenth century. The first cap was made of a Cheviot-type fleece, very heavily felted. The second cap was worked in a similar way, in a stocking stitch but less shrunk. The relics show the widespread diffusion of this type of woollen caps in British isles. The

same type of headgear was used in Denmark in the seventeenth century. Five caps are preserved in the National Museet in Copenhagen.⁵ It can be said that, all this evidence testifies to the widespread use of this older form of knitted headgear. These relics have not been studied in the literature dedicated to the subject. They should not only be carefully analyzed, but efforts should be made to retrieve from archive records corresponding to workshops in particular districts of London or other towns of southern England.

In the same group of knitted hoods we can include the four hoods from the Kremlin Armoury. II. 32

The head-dresses of the Orthodox clergy offer an extremely interesting example, unique of its kind, of hand knitting produced in Russia in the seventeenth century. They were knitted on five needles with a silk thread, that is quite supple and glossy but of inferior quality, perhaps imported from Central Asia or the Near East. They were tied under the chin. Two of these headresses have an embroidered representation of the Holy Spirit in the form of a bird with the human face in the middle. Such articles were very carefully made; the wide border of the back of these hoods, carried around the bands which tied beneath the chin, were sewn by hand. They belong to the close-fitting type of headgear, but they differ from the German and English caps by the elongated back covering the neck and by longer fastenings under the chin. These silk caps were a distinct part of liturgical dress, thus not head coverings of common use. Nevertheless, they undoubtedly originate with the hoods which protected the head under metal helmets. The knitting technique reminds one of the early liturgical gloves. The manner in which the wedges are inserted and the execution of the fastenings indicate that they were made by rather unprofessional knitters lacking in skill, but the precision with which the various stitches are executed is worth mentioning. Its possible that these hoods could have been made by nuns.⁶

The absence in France of preserved caps of the first group does not in any way bring evidence that this form was unknown. The repeatedly mentioned Parisian knitters' statute commands in 1608, as well as in 1627: "faire, fouler et appareillez bien et duement un bonnet anciennement appelle aumme ou deux bonnets d'usage d'homme d'appelés anciennement crémioles". The amice (*aumus-se*) in the Middle Ages usually consisted of a cloth cape with hood, while the *crémiole* or *crémignole* was a cap with raised rim worn at the end of the fifteenth and in the sixteenth century,⁷ thus at the beginning of the seventeenth century these were considered old-fashioned.

Berets constitute a considerable part of relics preserved in England and Norway. This head covering gains prominence in Renaissance fashion in the sixteenth century; to this item refers the word *Bareinmacher* used for the South German and Silesian knitters' guilds, in a similar way as French *bonnetiers*, who derived their name from the knitted headgear of the Middle Ages. In written sources from the sixteenth century the name *biretta* occurs interchangeably with *beret*. *Biretta* is a much more ambiguous definition of both male and female headgear, later, seen as rather clerical. In the Parisian knitters' guild statute the *biretta* appears most probably under the name *bonnet carré* and is to be made from good material.⁸ Knitted birettas from the thirteenth-fourteenth centuries were baggy night-caps: they are included in the fourth group of

headgear discussed here. On the other hand, the knitted beret differed from the other headgear as it had a flat, round top and a variously fashioned part clinging to the head. Among the numerous preserved berets found in English excavations, two types can be distinguished. Both have round tops of different size, but the part surrounding the face and back of head was either smooth or made of small overlapping tooth-shaped pieces of a different width. Some of the berets were found in London itself, some in Finsbury and Norwich. They were made in the same workshops as the earlier described hoods. It appears that the indented berets are of later origin. Some of the preserved berets were made in one piece, which required considerable skill in counting the number of stitches. Sometimes the little teeth were sewn on to the rest of the beret. The poor state of preservation of some of the relics and the fact that others are exhibited behind a glass pane renders technological conclusion difficult. As for to the already mentioned group of caps, they require careful technological and archival investigation.

A number of new archeological excavations show more berets worn in England. An excavation in the castle Ditch at Newcastle upon Tyne brought a small fragment of knitting piece and remains of two hats of similar type, dating from the mid-sixteenth century. They resembled the berets. "An interesting feature of these hats is that they have been knitted from the centre, the increase being done in a random fashion, by eye, and at least on of them was worked on only two needles". The other relics from England were made with four or five needles. The other relics from England were made with four or five needles. One beret was also more felted than the other. There caps found in Scotland dated to the seventeenth century were dressed like flat berets. They were catalogued as caps but the form resembles the berets. Another beret was found in an early eighteenth century grave on Arnish Moor, Lewis. It was a cloth of a murder victim. He wore stockings made of cloth and the woollen beret knitted in stocking stitch "worked in round using several needles [...] The fabric is very firm, and inside, heavily felted. The bonnet was apparently made large and then considerably shrunk by milling, presumably to make it waterproof". The present colour is brown-green but in the folds it is dark blue and the analysis has shown that it was dyed with indigo. These new relics show that the knitted caps and berets were worn in England also in the eighteenth century. A beret found in Trondheim in Norway comes from 1575 and altogether reminds one of the English types of beret without the teeth.⁹ This, however, does not point to its English origin: it could also have been made locally. II. 28

The third group of headgear consists of hats with tightly felted brims, bringing to mind similar products made from felt. Only three such hats have survived to our times; they were purchased by Peter I during his visit to Holland at the end of the seventeenth century and are kept in the Leningrad Hermitage. Perhaps some day more of these relics will turn up in one of the Dutch museums. These products indicate a considerable diffusion of hand knitting made from coarse wool in Holland during the seventeenth century and are the peak achievement in the sphere of headgear. The fashion for hats during the seventeenth century displaced other types of headgear, particularly berets. The preserved Dutch hats are an example of an attempt to produce more lasting and somewhat less rigid headgear than felt products. They were made of thick

wool in natural light grey, dark grey and brown colours. The head-part of the hat of varying height, narrowing at the top, was made separately, while the brim in one of the hats was sewn from double knitted fabric, and in the remaining two, the single knitted fabric here is particularly dense. The brim was sewn on to the head-part of the hat, it could also be knitted in one piece with the head-part, but this required complicated counting of the number of stitches. The rigidity of the hat, particularly of its brim, was achieved by considerable compaction of the knitted piece, making it from thick wool on relatively thin needles and then by heavy felting in a fullery. The head of one of the hats was lined with black netting, which also had a stiffening effect, and was finished with a black ribbon. In the remaining ones the decoration and finish may not have survived.

The basic material – natural coloured wool – and the simple technique of these hats, proves that they were articles in common use. A double knitted brim gave the special rigidity to one of these hats. They were probably worn by Dutch artisans and fishermen, and Peter I bought them when he worked as labourer in Amsterdam. These hats, therefore, show that hand-knitted clothes were in everyday use, and that in the Dutch knitting workshops there were hand fullers. The archaeological excavations in Copenhagen gave there more knitted hats kept in National Museum. Their quality deserve a special publication. One of them is made like the Dutch hats with stocking stitch, not very heavily felted, 30 cm high, the brim is narrow and not rigid. The two other were made from a very coarse wool, heavily felted with not very tall head of 19 and 20 cm and a turned-up brim. A felted cap from England dated to the sixteenth century was cut and re-sewn to make two, overlapping brims.¹⁰ II. 30–31

The fourth group of headgear consisted of baggy night-cap types of caps with an elongated and often dangling top. It is only because of the absence of preserved early relics that they are being mentioned last in this list. However, they are part of to the oldest headgear, already prevalent in west European fashion in the early Middle Ages. It was probably for their mass production that the first Parisian knitters' guild was established in the second half of the thirteenth century. This type of cap was particularly suitable for production on two needles, since it did not require special fashioning, stitching of ear-flaps or brim. The night-cap could be made knowing no other principle than that of decreasing the number of stitches. The so called Mommouth cap is sometimes seen as a type of shallow night-cap but I classified them in the first group of headgear.

The oldest of the night-caps preserved in European collections are the relics of Italian origin kept in London museums and dated to the seventeenth century. These technically uncomplicated products soon started to be decorated with colourful stripes or with geometric design. Italian products of purple or pink silk were decorated with an elongated pattern and a pendant at the end of the elongated top. One of the caps has a floral design arranged in longitudinal stripes.¹¹ Two similar night-caps were preserved in American Museums, one from the sixteenth, the other from the seventeenth century, both classified as Italian. They were made with patterned silk knitting, one of them decorated with human figures. These caps were suitable for making with more flexible

raw material, such as silk, and then they would fall in soft folds. Their mass production, however, was based on the use of wool. The only English relic from the sixteenth century, found in the Worship Street excavations in London, made of thick, felted wool, was probably a type of night-cap. But the degree of its deterioration and its execution from several longitudinal stripes indicating ornamentation of the garment, preclude us from linking it with certainty to the type discussed here.¹² A typical night-cap of tsar Peter I, preserved at Petro-doroved Palace Museum (Peterhof), was made of medium quality greyish beige grey wool, hand knitted in stocking stitch; it may have been made locally in Russia.¹³ It was naturally much stiffer than the silk or cotton night-caps. It can be assumed that night-cap type of headgear with different length of top as well as shallower skull-caps were being made in the sixteenth century by Spanish knitters.¹⁴ Part of them were exported to Algiers. This type of cap was taken up by French machine knitwear production in the seventeenth century. Of night-cap or skull-cap shape were the caps exported in great quantities both from Orléans and Troyes, as well as from other machine-knitting centres to Tunis of the Near East. S. Ferchiou has shown the production of such knitted caps *chechias* made in Tunis.¹⁵ These head coverings were particularly suitable for production on Lee's simple knitting frame. They merely required subsequent stitching up, just like stockings.

A large collection of night-cap type of headgear made by hand and machine from thin wool and cotton is found in the Victoria and Albert Museum.¹⁶ Less frequently encountered are the caps made from silk. Nightcaps from the beginning of the nineteenth century, usually of white cotton, were among the indispensable accessories of men's night attire; they were also used by the Dickensian Mr. Pickwick. This type of cap also effectively protected the heads of men working in difficult weather conditions, thus of villagers, fishermen or sailors. Despite the small number of relics dating from before the beginning of the last century, it must be assumed that they were prevalent during the whole period discussed in this book not only as caps for sleeping in, but also as head coverings for the widest masses of male users.

Such shallow caps were worn mainly by peasants, but also by sailors as well as in the towns of numerous European countries such as Scandinavian countries, Estonia, Spain and Portugal, Poland and other countries of central Europe. The caps made mainly of cotton and wool were preserved also in American museums. The biggest collection can be found in the National Museum in Copenhagen, Norsk Folkemuseum in Oslo, Nordiska Museet in Stockholm, in Estonian Museum in Tartu, in Musée de l'Homme in Paris, Ethnographic Museum in Cracow. The caps of Majas of toreadors were kept in Museo de Pueblo Espanol in Madrid and Museo Textil, Collection Rocamora in Barcelona.¹⁷

Knitted Garments

Knitted garments were more widely produced and used among the population than is indicated in current literature on the subject. Attention has been paid primarily to patterned knitted waistcoats which, next to carpets, can truly

be considered the highest artistic achievement of hand knitting. The there iconographic representations described in Chapter III show dresses for small children knitted from bottom to top with multicoloured yarn on five needles. However, only a few such dresses have survived among the sixteenth-eighteenth century museum collections. The most interesting are the dresses of Royal children dead in 1627 and 1628 found in the coffins in Roskilde cathedral. Both children, boy and girl, were dressed in garments of knitted indygo dyed silk with designs in gold metal thread knitted for adults but small. In Museum of Colonial Williamsburg, the trousers for the small boy made also from white cotton with striped patterns are also preserved.

The child's white cotton jacket was catalogued by S. M. Levey and kept in the Victoria and Albert Museum in London. It was "knitted with two-ply cotton, largely in stocking stitch, but with decorative bands of contrasting knit and purl patterning and with imitation of seam stitching. This jacket is finely knitted and is without a seam, except along the shoulders where the stitches were cast off". The garment was said to have belonged to king Charles II as a child. The museum possesses a second, adult's jacket which is similarly executed. At least a dozen jackets are still in existence in some museums. I catalogued one of them in Museum Stibbert in Florence. It was the boy's striped "habit" from the eighteenth century of white cotton yarn, probably machine made with wide cuffs decorated with ribbons. The small dresses hand knitted from the white wool for the baptism of the baby's are also quite numerous.¹⁸ These pieces belong to the typical products of home hand knitting. For this reason, there is no mention of them in guild statutes enumerating the master worker's skills. Entire garments are given in the statutes of numerous knitting guilds starting from the sixteenth century. Thus, among the products from Troyes in Champagne trousers and *burs* are mentioned, i.e. garments from thick woollen knitwear. Many guilds of Alsace and Germany mention shirts and trousers as the most important knitted products. Sometimes, instead of the term shirt, the appears "une canisole de laine". Thus, shirts, trousers, and waistcoats or doublets, usually made of wool, had become prevalent in all Germanic countries, in France as well as in Bohemia and Silesia, in Poland, both in the sixteenth and more especially in the seventeenth century.¹⁹ These garments were worn primarily by men and boys, but also women, and they can be divided into the more fashionable patterned knitted products of silk, and the less expensive, usually unicoloured, of woollen yarn. The silk ones usually served as an outer vest or waistcoat, while the woollen ones were rather worn as warm undergarments.

The patterned knitted silk waistcoats of the sixteenth and seventeenth centuries are believed to come from Italy, Spain, and later from England. Nevertheless, the determination of their true origin requires thorough investigation preceded by archival research and technological analysis of all the numerous relics preserved in museums. On the basis of my own comparative investigation it can only be said that it was a production meant for a quite large market. Patterned waistcoats in relation to similar garments sewn from patterned silk materials just as knitted carpets were to the more expensive figural tapestries. Hand knitting made use of much cheaper implements than patterned weaving and its products from poorer quality silk or coloured wool

were replacing the more expensive woven patterned articles for wide masses of consumers.

The oldest of the preserved relics point to Spain as an important but little investigated centre of knitting production using silk, which utilized the skill of the Arabs. The oldest of the preserved knitted waistcoats comes from the beginning of the sixteenth century and is kept in the Museo de Indumentaria Coleccion Rocamora in Barcelona. It is made of green silk with a gold metal thread. The design depicts eagles within a floral ornamentation similar that seen on woven fabric of the same period. In the present state of preservation the sleeves are missing and it is difficult to state how it was finished around the neck. It could have served as a man's jacket or "casaque", Spanish "casaca". It was made with a stocking stitch with a longitudinal arrangement of the design and decorative finish of the lower part. The design on the underside has a lanced thread, thus its not left loose. In the same museum from the turn of the sixteenth and seventeenth century, there is a fragment of similar patterned knitwear in which, on a yellow-green background, appear white and orange stripes.²⁰ From the same production centre, possibly in Spain, also comes the missing waistcoat from the museum in Lyon. A photography of it reveals that the floral design was less complicated, and in addition to the silk threads silver and gold ones were used; it was two-coloured and at the bottom was finished with unicoloured stripes.²¹ The cataloguer used the word "justaucorps" (jerkin), which signifies a man's attire from the seventeenth century. It appears that this earlier relic served as a man's vest or "pourpoint". II. 33

The remaining garments, described as waistcoats, are dated to the seventeenth century with the exception of the artifacts kept before World War II in the collections of the National Museum in Munich, and connected with the products of the Italian Renaissance.²² Part of these garments dating from the seventeenth century can be linked with the Spanish doublets of the end of the sixteenth century, as this fashion arrived in central and northern European at a much later date. Two silk doublets from the Vienna Museum were probably made in Italy. One of them was made of red silk, the other is coloured green with a gold tinsel thread. The red doublet has a geometric design in the form of horizontal stripes, the green a floral design. The design only appears on the upper part of the garment, above the waist, the rest being made in stripes arranged into checks, whilst on the shoulders and outside the main motif the usual stocking stitch is used.²³ To this group of products belongs the piece of knitted waistcoat from the former Kunstgewerbe Museum in Dresden. Green silk is decorated with a floral design with gold and silver metal threads. This item is also described as Italian product.²⁴ Among the articles of Italian origin are also the doublets kept in the Victoria and Albert Museum and other London museums. F. Boucher has published a description of one of the patterned garments, the best-preserved doublet of green silk with gold thread, done up with gold buttons in the form of small balls. A vertical floral design of large dimensions adorns the whole dress except for the joining with the sleeves. The shoulders of the Spanish vests were stuffed with cotton and in many of the described doublets there was a possibility of such an extension. At the bottom, the garment under discussion was finished with a checked welt. On the museum

card it is described as a Venetian product from the third quarter of the seventeenth century.²⁵

Among the remaining English relics described as imports from Italy appears the vest which Charles I wore at his execution in January 1649. It is an unpretentious doublet knitted in light-blue silk. Its upper part, done up with 12 small buttons, was knitted vertically in the yoke with a diamond-shaped pattern. The remaining part of the jacket together with the long sleeves, was knitted in a complicated geometric design. The rest of the garment described as Italian, or more precisely Venetian, and coming from the seventeenth century, are the doublets from patterned knitwear, finished at the bottom with a checked design from green, brick, purple, silver as well as green and yellow threads. The last of the doublets with a yoke, enlarged with insertions from the waist up, knitted in a geometric design, reminds one of the cut of the later vests. In one doublet only a sleeve from green silk has been preserved.²⁶ Very spectacular but poorly knitted jackets, probably Italian, from the seventeenth century are preserved in Victoria and Albert Museum. These four patterned silk pieces need to be ascribed to particular knitting centres. S. M. Levey presented one of them: "Knitted in green silk and gold thread in stocking stitch. The basketwork border round the hem is in alternate blocks of stocking and purl stitches, the front edges are in garter stitch. Although the floral patterning shows a considerable degree of skill the gold thread is only loosely stranded across the back of the stitches and the garment is not well finished". On the basis of this collection of relics it can be said that they were made of rather poor quality silk, partly even from grege, and along with the gold and silver tinsel threads substituted the more elegant and expensive doublets stitched from patterned fabrics. Their floral or geometric ornamentation was a simplified copy of the Italian patterned silks. II. 36

The best-catalogued relics from Sweden and Norway supplement this collection of knitted vests and waistcoats. Eleven pieces have been preserved in the Norwegian museums, and two in Sweden. G. Hazilius-Berg in her catalogue uses the term "doublet", a garment similar to the vest, while H. Engelstad retains the more commonly used term waistcoat. One Swedish vest was made of silk and gold threads in a large floral design arranged horizontally, while the shoulder parts and finishing around the neck were knitted in a simple stocking stitch. The bottom was finished with a welt, comparable to many other garments of that type. In the museum in Göteborg a similar vest of red silk with gold thread has been preserved. G. Hazilius-Berg believes that these garments were later imitated by the urban and rural Swedish population from the end of the seventeenth and the eighteenth century. Such garments are also shown in women's portraits. Eleven waistcoats are known in Norway at present. They have the cut of a vest along with wide sleeves. M. Hoffman shows some of the waistcoats as "nighshirts" used with detachable sleeves. I have seen some of these waistcoats. The front opening by the neck only reaches the end of the yoke, thus these were garments donned over the head. They were made of silk yarn coloured bright red, green and blue, usually mixed with gold or silver thread. The most important parts of them were made using large floral or geometric designs. The shoulder parts, the finish around the neck and bottom of the garment have a simpler geometric, checked or rhomboid design. H.

Engelstad believes them to have been imported from England. They could have been either male or female dress. A. Kjellberg wrote about these knitted waistcoats and of other knitted fragments of woollen dress dating from the latter half of the seventeenth century which were also found in Oslo. The nineteenth century knitted waistcoats were made mainly with wool and using geometrical patterns described in the handbook of Norwegian knitting history.²⁷

Similar attire described as lady's doublet from the first half of the seventeenth century, produced in Italy, has recently been acquired by the Arts Museum on Boston. An exceptionally interesting collection of knitted garments are kept in the Museum of Costume in the Hague and the Royal Museum in Brussels. In the former there is an extra long man's doublet having a patterned design knitted from blue silk yarn, with long sleeves widened at the bottom by wedges, and also a man's frockcoat from the second half of the eighteenth century, machine knitted in navy blue yarn. The museum in Brussels has preserved two waistcoats, knitted in patterned designs of large flowers from silk yarn with gold thread, as well as a sleeveless waistcoat and children's vests, also patterned, from silk yarn.²⁸ II. 34

In European museums are preserved more than thirty vests and waistcoats are preserved made mainly of using patterned silk, and dated to the sixteenth and seventeenth centuries. M. Ploeg catalogued 127 knitted waistcoats in Denmark from the eighteenth and nineteenth century. They were mainly made of wool and patterned. I have seen ten of them in total and L. Warburg thinks that it is possible to find altogether about 180 such dresses.²⁹ They were worn by burghers and peasants. Thus, these garments were widely worn in southern and western Europe, as well as in southern Germany. It is difficult to believe that these were only Italian and Spanish products imported in such large quantities to other European countries. In Scandinavia the patterned silk doublets are considered to be English products and this assertions requires further investigation. The production of technically perfectly developed English knitting in the seventeenth century, was based on imported silk. For comparison, let us remember the two cotton doublets preserved in the Victoria and Albert Museum, being perfect examples of high quality garment knitting. The first item, a grown man's doublet from white cotton yarn is knitted in a geometric design with a striped arrangement. It has been much more carefully executed than the majority of coloured patterned silk waistcoats from the same period. The second item, a woollen boy's dress, mentioned before and also dating from the seventeenth century, is made in stocking stitch with a geometric decoration finishing the front, bottom and sleeves edges.³⁰

A particularly interesting example of a patterned unicoloured knitted articles is a petticoat made from white wool which the Victoria and Albert Museum has dated to the turn of the seventeenth and eighteenth century and attributed to Dutch knitting. Apart from knitted carpets and the most painstakingly executed waistcoats, it is an example of a most beautiful patterned knitted article on which the most diverse types of animals, birds and plants are represented.

The petticoat is "knitted with two-ply worsted yarn largely in stocking stitch, but with a 'brocated' pattern in purl stitch and with additional patterning in alternating blocks of knit and purl stitches". S. M. Levey discussed the

methods by which the skirts was executed. "It was probably knitted on one of the hand frames, probably on a loop frame; although round knitting could be worked on a peg frame, it was not possible to make knit and purl stitches, as this necessitates knitting across the two rows of pegs. With a loop frame, however, which consists of a series of vertical needles with T-shaped cross pieces, the loops could be made either over the front or over the back of the needles to produce both knit and purl stitches. None the less, this particular piece of knitting seems almost too fine to have been produced by this method, for in looping-frame knitting, the needles have to remain inside the stitches." On the basis of technological analysis of the Wroclaw and Lusatian knitted carpets it can be assumed, however, that this large article could also have been made on two long needles.³¹ This is the only preserved example of a knitted petticoat from the earlier period; only in the nineteenth century do we find the patterned knitted petticoats characteristic of Castilian knitting. Rather numerous, however, are the women's *redécilles*, a type of short manielet knitted in horizontal geometric designs from black or coloured silk, found in the museum in Barcelona.³² Similar bodices and patterned pelerines are still present in women's popular dress in Upper Hessen until the beginning of the nineteenth century.³³

An interesting collection of knitted dress for men from the eighteenth century is kept in the Musée du Costume in Paris. It consists of three "habits" and two waistcoats from the time of Louis XV. The set of "habit" with a waistcoat of green silk is made in simple stocking stitch, ornamented with loops and silver buttons. The garment has a fashionable cut and the waistcoat is sleeveless. Two other "habits", long and black, and a waistcoat of similar style, are done up with loops and buttons of haberdashery workmanship. Both the colour and the fact that all the garments are lined, make their technological analysis difficult.³⁴ Of similar style is the frock – coat or "habit" kept in Costumuseum in the Hague. However, these large items are suggestive of machine execution but at the same time they inform us of the use of knitwear for larger garments in the eighteenth century. From the same period and possibly imported from France, is the knitted attire of the Swedish king Gustav III. It consists of a "habit", waistcoat and trousers made from smooth beige knitwear.³⁵ II. 35 Men's knitted trousers occur fairly often in the eighteenth century dress, but we shall discuss them along with leg coverings. In American museums it was possible to find a number of more modest knitted garments. In the catalogue of the Los Angeles County Museum of Art appears a man's shirt from England ca. 1650-1680: "White knitted cotton with geometric pattern on center front, center back, collar, cuffs, and lower edge; long sleeves". In East Coast museum I catalogued there waistcoats made from patterned silk and three men's breeches. All the relics should be dated to different years of the eighteenth century.³⁶ So the knitted parts of men's dresses began to be more and more numerous in the eighteenth century. Some of them were made on a knitting frame. The relics kept in museums are usually made from silk and patterned, but it is certain that much more diffused were knitted dresses made from wool or cotton. These garments were always cheaper than the garments made from patterned silk clothes. It was possible to make some of them by hand knitting at home. (II. 34)

Hand Coverings

Knitted hand coverings should be divided into gloves with five fingers, seldom occurring; gloves made up of three parts, covering the fingers in groups of two without the thumb; gloves with one finger and mittens in which four fingers were either fully or partly covered with a flap while the thumb was partly uncovered. Among the museum records the largest group of preserved gloves are of course the liturgical ones, mentioned in Chapter II as the oldest hand-knitted relics of the period to the end of the fifteenth century. During this period, knitted products, usually made of silk yarn, were relatively expensive and apart from the clergy were worn only by the most affluent groups of the society. However, the sixteenth century knitted five-fingered gloves are mentioned among the basic products of numerous knitters' guilds; therefore, at least in the countries of southern and western Europe, they were being used by larger numbers of consumers. By the end of the sixteenth century they have spread to in the countries of central Europe, while the woollen gloves with one finger became the most common hand covering in the northern and eastern part of the continent. Among the quite large number of knitted gloves preserved from the sixteenth century, there is a certain additional item of secular ladies' dress, which deserves particular attention. It is a silk glove catalogued by A. Geijer, which belonged to the garment collection of the Sture family: Svante Sture and his sons, Nils and Eric, were sentenced to death by King Eric XIV in 1567. This glove has been knitted in stripes from multicoloured silk with gold thread and bears the inscription "Freuchen Sofia". II. 37 This relic is conspicuous by its secular origin, high technical standard and complete analogy of the method of fashioning the hand and fingers to the much more numerously preserved liturgical gloves. The results of the newest Scandinavian excavation and the publications of the museum relics show how diffused were the knitted woollen gloves in these countries. L. Warburg published two woollen gloves with one finger of mittens from the seventeenth century. A further seven pairs of five-fingered woollen gloves have not been published yet. In Denmark and Iceland also some fishermen's mittens with two fingers were also worn. The oldest woollen glove from Iceland is dated about 1600. Also the pair of gloves found at Gunnister in Shetland from the late seventeenth century grave was made with five fingers. "The pair of gloves are mid-brown in colour. The wool is soft and has a long staple. The knitting is regular, worked on 4 needles, and there is no seam. There are horizontal ribs on the gauntlet", while the back pointing from between the fingers towards the gauntlet". Woollen gloves from the seventeenth century also preserved in Scotland.³⁷ (II. 41)

Liturgical gloves differed from products intended for secular use by their solid colours: black, white, red, violet or green depending on the colours of the church ornaments of a particular feast-day, with the addition of a gold or silver thread and an embroidered monogram on the top of the palm. Apart from this, the technical standard as well as the execution technique of the gloves and its fingers did not differ from the products intended for secular use. The earlier gloves, coming from the sixteenth century, did not have the wide cuff made from embroidered material stitched to it. The cuff of an elongated shape widening out at the base of the palm was sometimes made from patterned

knitwear. Two ecclesiastical gloves catalogued as Spanish and coming from the sixteenth century are kept in the Victoria and Albert Museum. The first one was made "with patterned knitting with red silk and silver-gilt thread in stocking stitch. This glove is beautifully knitted in the round, the second thread having been 'woven' into the back of the stitches so that the inside is neat and well finished. The thumb was knitted separately, also in the round, and a diamond-shaped gusset fits between the thumb and the first finger. The thumb is lined with red, knitted silk". The other glove has only a slight decoration and is less perfectly executed. The liturgical gloves from Lyon are also described as of Spanish origin, made of red silk yarn with a gold thread in a geometric pattern.³⁸ They remind the gloves from the St. Bertrand of Comminges Abbey in the Pyrenees from the fifteenth century. The gloves dated by Braun at the beginning of the sixteenth century, preserved in Halberstadt Cathedral, appear to be a product with embroidered ornamentation.³⁹ The oldest of the Brussels glove collection was belonged to Cardinal Alidosi d'Imola, who died in 1511. The five remaining pairs of gloves come from the sixteenth-eighteenth centuries; they are made of medium quality silk yarn with metal thread. Similar liturgical gloves are also kept in the Centraal Museum der Gemeente in Utrecht; they are conspicuous by their exceptionally wide cuff and poor state of preservation. The gloves from the Rijksmuseum in Amsterdam of white rather thick silk yarn, probably come from the seventeenth century. Of the relics tentatively dated to the sixteenth century belong the gloves of red silk yarn with silver tinsel recently kept in the museum in Boston.⁴⁰ (Il. 38)

The Coleccion Rocamora in Barcelona has the largest and, as far as the determination of datings and origins are concerned, best investigated collection of liturgical and secular gloves from the sixteenth century. Men's gloves knitted from white silk yarn with gold fingers are classified as local products from the sixteenth century, while the ladies' black silk gloves with gold thread and crimson cuff decorated with arabesques are attributed to Italian knitting. From the 12 pairs of liturgical gloves considered to be sixteenth century products, 7 pairs have been discussed in detail in the last catalogue. The gloves of white silk yarn with gold thread and rich ornamentation on the cuff are dated to the beginning of the sixteenth century. The others are chiefly made of red, only one pair of green, silk yarn with ornamentation and the monogram IHS embroidered in gold thread. Three pairs are particularly richly decorated with a floral design and representation of birds have been classified as of Italian production while two pairs with even greater precision – as Sicilian.⁴¹ Their ornamentation is similar to that used on the majority of liturgical gloves kept in the Museo Stibbert in Florence, made of red and violet silk. A more modest geometric pattern, limited primarily to the elongated cuff, can be seen on the liturgical gloves from Dresden made of red-green silk yarn. Similar white gloves, though with much more elongated cuffs and rich geometric ornamentation are kept in the Prague museum.⁴² (Il. 39)

On the basis of the characteristics of twenty odd pairs of gloves from the sixteenth century found in different European museums, we can state the high technical standard of execution of both the liturgical gloves and those designated for secular use. Some of them were made almost entirely from patterned unicoloured or two-coloured, less often multicoloured, knitwear. In others only

the elongated cuff has been decorated with ornamentation, while the monograms on liturgical gloves were usually embroidered in gold or silver thread. In the Catalan catalogue, are gloves with the most rich vegetal, usually floral, even animal, ornamentation are classified as Italian products. Stylized flowers of birds were more difficult to knit on five needles than simple geometric designs, easier for calculating the stitches. Thus the most complicated patterned knit goods, such as waistcoats and gloves, are still attributed in the sixteenth century to Italian knitting. A view which, requires thorough investigation to confirm this hypotheses about the large export production of knit goods from that country.

In the seventeenth and eighteenth centuries, among the knitted five-fingered gloves, liturgical products predominate, preserved in European church treasures and museums. We know, however, that in that very period the use of knitted hand coverings diffused throughout all European countries under the influence of the west European textile industry. Guild statutes differentiated between products with five fingers and those with one and specified the needles they asould be made on. Exceptionally detailed in this respect are the rules from 1747 for journeymen of Austria, Hungary and Moravia.⁴³ As far as the preserved relics are concerned, we shall deal first with large collection – about a hundred items – liturgical gloves preserved in church treasures or vestries and in museums. They were also used by the Orthodox clergy. In the period under discussion these products differ from secular gloves by the greater embellishment expressed particularly on the wide cuffs, which with increasingly greater frequency are sewn on and made from patterned or embroidered fabrics. At the same time, this exterior splendour does not always go hand in hand with precision of execution.

The ten pairs of liturgical gloves from the seventeenth and eighteenth centuries in the Museo Stibbert tell us something about Italian knitting. They are distinctive by their purple and amaranthine colour, the clearly separate cuffs one made from single or double knit or in later relics, usually sewn on to a cuff of rigid fabric. The products were decorated with geometric ornamentation or embroidery, using for both purposes usually gold or silver thread. Also preserved are gloves produced on a larger scale from medium-quality silk yarn and knitted smooth without patterns.⁴⁴ Twelve pairs of liturgical gloves have been studied in the catalogue of the Rocamora collection in Barcelona. Some of them are described as of French production, others as local, Catalanian ones. They are characterized by the rather large number of gold threads, the use of gold fringes on the cuffs, and also by the occurrence of unusual liturgical colours, such as grey or salmon pink.⁴⁵ (Il. 40)

An interesting collection of liturgical gloves is found in the Museum of Fine Arts in Boston. The oldest of them are light-blue, silk and silver-gilt classified as Spanish from the late eighteenth or early seventeenth century. Another two coming from the seventeenth century green and yellow, and red and white silk. One was probably Spanish and the other thought to have formerly belonged to cardinal Richelieu. In the Metropolitan Museum in New York knitted bishop's gloves were classified as Italian coming from the sixteenth century. Six pairs of cardinal's and bishop's liturgical gloves made of coloured silk and classified as Italian, French and one Russian were dated to the eighteenth

century. The French gloves are adorned with a cuff from rich brocade with a large floral design.⁴⁶ Similar cuffs are found in the liturgical gloves from the eighteenth century in the Museo del Pueblo Español in Madrid.⁴⁷ The gloves in the English collections are usually described as Venetian products because local production of the seventeenth century was not geared to satisfy the requirements of the Catholic liturgy. An exceptionally high standard of hand knitting is represented by two pairs of later, because from the eighteenth century, gloves from Lyon made of good silk yarn.⁴⁸ Four pairs of gloves from Vienna are characterized by their original geometric patterns and elongated knitted cuffs, the gloves from Dresden – with colourful ornamentation on a white background, while the gloves from Leipzig have a floral design.⁴⁹

One of the richest collections of knitted liturgical gloves has survived in the museums and church treasures of Slovakia, in Bratislava and Nitra. In Prague there are several pairs of gloves dating from the seventeenth and eighteenth centuries, but the oldest of them with tapering fingers and elongated knitted cuff could have been made even earlier. Their colourful ornamentation is embroidered with gold thread, while an interesting technique is the indented finishing of the knitted cuff which indicates the influence of the late Gothic style. The ornamentation on the cuff of the blue glove has geometric motifs pointing to oriental influence. Bohemian knitting production despite its high technical standard shows a certain backwardness in fashion. For example, the amaranthine gloves dated at 1710 still has the long knitted cuff with floral ornamentation. Relatively few of the preserved gloves have a sewn-on cuff made from patterned fabric. The liturgical gloves from the cathedral treasures in Bratislava and Nitra are made of medium-quality silk, or even grege, in white, red, violet, green and yellow colours. The latest products from the nineteenth century were hand knitted, but from cotton. The cuffs were usually made of silk fabric, thereby avoiding complicated ornamental resolutions. I catalogued 15 pairs of knitted gloves from Nitra and two from Bratislava.⁵⁰ Four pairs of liturgical gloves in Budapest museum testify to importation from Bohemia or to connections between Hungarian and Bohemian hand knitting for liturgical needs. The gloves with elongated knitted cuffs and tapering fingers come from the seventeenth century. They are made of white, violet and red silk, embroidered with gold and silver thread.⁵¹ (II. 42)

Liturgical gloves kept in the Kremlin Armoury are probably local products based on imported patterns. This is indicated by the yellow satin cuffs trimmed with gold thread, metallic lace, smagles, small local pearls and gold wire metal bullion. They have short, wide, roundly finished fingers. The quality of the silk and the rich adornment of the patterned knitwear points to painstaking execution. If the museum dating at the first half of the seventeenth century is correct, then these gloves constitute an early reception of west European fashion as far as the sewn-on cuffs and the shape of fingers are concerned.⁵² In the Polish collection, the oldest liturgical gloves are kept in the National Museum in Wrocław. They date from the seventeenth century, and their shape, absence of sewn-on cuff and type of geometric ornamentation testify to close links with the Bohemian knitted products. The gloves from Poznań, Sandomierz or Cracow made of thicker silk or wool may be dated to the eighteenth and nineteenth centuries.⁵³ The large number of relics have enabled us to establish certain

groups of liturgical gloves, while further analysis of a larger collection of relics would permit more precise determination of their typology.

Secular gloves with five fingers, or one finger or mittens are much more poorly represented in European museum records. The rules for journeymen emphasize that the execution of five-fingered gloves required double the amount of time. According to the 1747 weekly norms in Austria, Moravia and Hungary a journeyman had to produce 5 pairs of five-fingered gloves or 8 pairs of gloves with one finger or mittens per week.⁵⁴ The biggest collection of secular five-fingered gloves, mainly ladies' is preserved in Barcelona. They are decorated with complicated and multicoloured designs, usually floral, braids and haberdashery fringes. Some of them, dating from the seventeenth century, have been described as French products. Similar relics have survived in London museum; an item with interesting ornamentation dating from the seventeenth century and originates in Florence. Knitted women's gloves, perhaps coming from as early as the seventeenth century, are kept in the Czartoryski's Museum in Cracow. They are hand-made of rather inferior quality silk with many faults, decorated with a geometric design and long striped cuffs.⁵⁵ They constitute an interesting example of products designed for a larger circle of users. The hand-knitted gloves and mittens from Russia should be mentioned here as well. The Empress Catherine II's gloves are particularly elegant, but the collection also includes a great quantity of silk gloves in colours matching the dresses of coats. Often they are interlaced with gold or silver thread and usually hand knitted.⁵⁶

Thick woollen gloves with one finger used to protect hand during winter, have not survived in museum, since they were of little artistic value. The oldest of them were made using the knowless netting technique. This technique is used in woollen glove found on Fadiejewski Island, property of a member of a Russian expedition at the beginning of the seventeenth century. Apart from the glove, the same collection has some knitted fragments of natural coloured wool. Together with similar materials from Copenhagen, this relic testifies to the widespread use of woollen one – and two – fingered gloves in the sixteenth – eighteenth centuries in northern Europe.⁵⁷

Of different character are the mittens; they were cheaper and were used in place of five-fingered gloves. They also complemented elegant attire. The name probably comes from "manique" or "manicle" – a type of glove not covering the fingers, used in Roman times by the gladiators. From the fifteenth century, leather mittens were used to protect the hand while performing certain trades. Knitted or sewn cloth mittens, only occur in French fashion from the seventeenth century. Two types of them can be distinguished: in the first type – four fingers are protected on top by a flap, and in the second – usually a knitted mitten and made like a glove, covers only part of the fingers. In the same period as the mittens there also appear in west European fashion mitts, or oversleeves, i.e. a type of knitted cuff protecting a part of the hand.⁵⁸

Interesting and early mittens have survived in Lyon. They are made of red silk with coloured geometric and floral designs similar to oriental ornamental motifs. They have a widening cuff and protect the hand to the middle of each finger. The faults in workmanship indicate use of the hand-knitting technique; they might be an example of Spanish knitting based on Arab designs. Similar

mittens from the seventeenth century can be found in the museum in Madrid, while in Barcelona the majority of the numerous mittens and mitts were sewn from patterned or plain silk fabrics. Another version of mittens is preserved in the museum in Vienna. These long black knitted mittens from the seventeenth century have been finished with a pink flap from patterned silk fabric. Other woollen, cotton and silk mittens preserved in great numbers in the museums, often come from as late as the beginning of the nineteenth century and are machine-made products.⁵⁹ An ordinary mitten, usually with a flap, was easier to make on the simple knitting machine than the five-fingered gloves. In fact, this was one major reason why headgear and gloves were being made by hand for such a longer time.

Leg Coverings

The high demand for knitted stockings induced the invention of the knitting machine and the following technical revolution in this field of the textile industry. Knitting manufactures were sometimes described as stocking manufactures and in many studies the history of knitting is linked with the history of the stocking. This is not entirely true because knitted leg coverings came into use late than had happened with headgear and gloves. In the Middle Ages, pontifical stockings were sewn from cloth, while the leggings preserved are considered to be products of knotless netting. At the same time, the statement oft repeated in works dedicated to the history of knitting, that knitted stockings were unknown before the sixteenth century, is not true because the oldest known English come from the end of the fifteenth century. During the Middle Ages, fitted leggings were sewn from good cloth, and as the ongoing deterioration of these woollen fabric continued, stockings began to be made from knitwear. A pair of long men's stockings required more than ten hours work of a single skilled journeyman. Even slower was the production of shoes using the knotless netting technique, which is still practised in Iran today.⁶⁰ The oldest stockings and socks coming from excavations in southern England and London resemble the "bas d'estame" used in France, made of thick tightly twisted wool. Simultaneously with woollen stockings, in Italy and Spain starts the production of silk stockings, which later spread among the most affluent users in different European courts. For example, from 1560 Queen Elizabeth wore knitted silk stockings, but before then the are known to Henry VIII and Edward VI, as well as to Henry II of France.⁶¹ These first stockings were sometimes made without the foot-part and served only to cover the calves. The execution of the technically most difficult part, that of the foot, was abandoned, this naturally applied to the cheaper products only.

Guild statutes discussed in chapter IV show the variation in the type of hand-made stockings which from the beginning of the seventeenth century become the main item of production. At first, only woollen stockings and socks are distinguished, later silk stockings are added, less frequently linen ones, drawers, leggings and trousers. From the beginning of the seventeenth century, the knitter's statutes of western and central Europe mention Spanish stockings with gussets, full'd stockings with beaver hair, somewhat later Hamburg stockings, men's, women's, children's, stockings, and riding stockings, with

gussets made from Rhenish woollen yarn, more or less tightly twisted, for summer or winter wear. These are only the most important products required from a master knitter. The already quoted rules for journeyman from 1747 mention socks as well as stockings of varying lengths and weights for men, women and children made on thinner needles. Thine labour-consuming production of embroidered gussets and the finishing of all the stockings is emphasized. Roy's dictionary enumerates the types of stockings known in France at the beginning of the seventeenth century, all hand-knitted products. He stresses the frequent changes of fashion with regard to colours and shades of particular silk products, and also gives the prices of several scores of varieties. These were in part stockings imported from England and Milan or Naples. Their high cost explains why, even in 1615, stockings made from Flanders' linen were still being used for boots. Footless stockings were worn to keep the calves warm.⁶² Machine production of stockings in the seventeenth century brings new classifications and rules.

We will begin by discussing the oldest preserved stockings, which are supposed to be products of hand knitting. All definitive determinations require careful technological analysis, particularly where the oldest products are concerned. Because of the high cost of silk yarn, the first English machine-made stockings could be faultless within the entire row, which is considered a characteristic feature of machine-made products, while in hand knitting individual stitches would be dropped. Beyond this, the first machine-made products had not as yet developed the high degree of standardization connected with market production for an unknown consumer. For this very reason, assumptions about the production method practised in the sixteenth century and a considerable part of the seventeenth century must be verified by technologists. The oldest English stockings from the sixteenth century are hand-made, but already the of method production of the children's stockings dating from about 1600 and kept in the castle at Nottingham is uncertain. The woollen stockings were found in the grave from the late seventeenth century at Gunnister, Shetland is described thus: "The woollen yarn is heavy, spun S, two-ply. It is dark brown in colour, a mixture of various shades of brown and some black fibres. In Scotland a pair of child's shoes has also been found. They were made using the knotless netting technique in about 1780. The knitted socks from Iceland are dated about 1600 or the early seventeenth century."⁶³ So woollen stockings and socks were used during the sixteenth and seventeenth centuries in the poorest northern parts of Europe.

The largest stockings collection from the sixteenth and beginning of the seventeenth century is in museum, Barcelona, and consists of silk articles, described as Italian and local products.⁶⁴

In Poland, Czechoslovakia and Hungary, there are five pairs of stockings preserved. They date from between 1600 and the first half of the seventeenth century and have been attributed a Spanish origin. Two of them belonged to the Pomeranian princes of Szczecin. Three stockings from Szczecin are almost certainly the oldest relics of silk knitting from this part of Europe. They were found in the badly destroyed coffins of the Pomeranian princes interred under the castle in Szczecin and recovered in 1946. There are a number of difficulties in dating all the costumes that were found, but the archival researches of Z.

Krzysztof Fajus and my own researches into European knitting history, have made possible a hypothesis about the actual dating of these relics. The pair of dark brown silk stockings is in a very good condition (length 59 cm, length of foot 23 cm); the technique of making the foot and gussets and the calf of the leg is typical of the period and shows good craftsmanship. The stockings are very carefully made using stockings stitch. They were found in the coffin of prince Barnim XII, buried in 1603. Z. Krzyska-Fajus found in the diary of this prince a note dated 1600: "1 thal fur ein Par schwarze seyden gestriche Strumpfen 1 Augusti abgezalet". And it is possible that the stockings referred to here are those bought on the 1st August 1600. Another possibility by the same author is that the stockings were made at the court of the prince. More generally there is some information about the knitters, possibly refugees from the Low Countries, and who worked with other craftsmen. But on the whole it would seem to be more probable that the stockings had been bought in England, Spain, or the Low Countries, since they have been made with good silk, while the craftsmen in the court of the Pomeranian prince appear to have worked mainly with wool.⁶⁵ (Il. 43ab)

The other stocking is longer, about 69 cm, made with best brown silk but considerably destroyed. It possibly comes from the second half of the end of the sixteenth century. The stocking has small holes in the hem for the tapes which tied it above the knee. This fashion was typical of the second half of the sixteenth century and like other costumes of those princes, reveals Spanish influence. It follows, therefore, that this stocking could have been imported from Spain. But a very similar stocking is shown in a picture by Issac Oliver, of Three Brothers Brown, dated 1598, and these would seem to be in general appearance like those commonly worn in England. Similar stockings were also worn by Tycho de Brahe, buried in 1601 in Prague, and Adam Parziewski, buried in Warsaw in 1614, and the Spanish provenance of those two pairs of silk stockings has been confirmed beyond any doubt. Another early stocking found in Sárospatak in Hungary is dated to the first half of the seventeenth century. It is possible that the stockings from Szczecin are the first imports of machine-made knitting from England. William Lee is thought to have completed his machine designed to make of plain silk stockings from the twenty gauge silk frame in the years 1596-1597. But it is very difficult to fix for certain when the first relics of hand or machine production came in, because silk was very expensive when a fault occurred, the machine knitter would unsew the whole row, even if the fault was just one stitch. Nevertheless, it is very interesting to put on record the existence of these early stockings dating from the end of the sixteenth and early seventeenth centuries and of course it would be even better to state with certainty that they had been made on one of William Lee's machines. The stockings coming from Hungary were defined as machine made: the silk stockings from Riga dated to 1656-1661 seem to be so, too. But not those from Tallin classified as stockings of Fabian von Fersen buried in 1577.⁶⁶

G. Ekstrand, in an important paper has presented the early silk stockings kept in Swedish museums. Erik XIV (1533-1577) used to wear these luxurious garments. The largest group the stockings which appear in the inventory of the wardrobe of this king from 1566, were made from silk. About 27 pairs were recorded, both new and old in different colours such as: red, violet, pink, yellow,

brown, black and ash grey. Later king Johann III, arrested by his brother in 1563, possessed in this time 22 pairs of stockings. The authoress analyzed the stockings of the king Johann III as found in the coffin in which he was buried in 1594. They are the earliest samples of stockings in Sweden. "They were made of silk which is now yellow, knitted in a stocking stitch with a well-defined seam at the back in pearl stitch". The oldest pair of male silk stockings kept in the royal wardrobe of the Livrustkammaren in Stockholm is the pair of white silver-embroidered stockings that were used by Gustavus II Adolphus during his coronation in 1617. They were obviously hand knitted. Among the suits left by king Charles X Gustavus four pairs of red and yellow silk stockings were preserved. One pair was imported from France for the coronation of the king in 1654. The last pair of early preserved stockings kept in Sweden was that of Swedish nobleman Nils Nilsson Brahe. They come from 1655 and were made according to Spanish fashion. C. Lindvall-Nordin catalogued the embroidered men's silk stockings of the eighteenth century. The other silk stockings from 1767 are kept in Rosenborg palace in Copenhagen and some are also in Norway.⁶⁷

The later or less precisely dated silk stockings from the seventeenth and eighteenth centuries may have been machine-made products. Their variety of type increases as do the rules regarding their types, weight and finish. The most important requirement for a master machine knitter is "Faire un bas de soie façonée au coins et par derrière". Knitting manufactures in France have left much data on the types of stockings produced. In Orléans during 1689-1691, stockings were being distinguished by the raw material used such as wool and silk, and executed according to two patterns "façon d'Angleterre" and a local one.⁶⁸ At the beginning of the eighteenth century stockings intended for the army were already being listed in several varieties, while the royal statutes of 1743 require that woollen stockings be at least three-ply. Stockings from Spanish wool (so-called "Segovian") from Asia Minor or from vicuña wool had to be done on machines with a specified number and density of needles. Linen stockings were being made from suitable quality yarn. Products made from a mixed yarn (wool within linen or cotton thread) could be two-ply, while stockings from twilled silk – could even be one-ply.⁶⁹ Statutory assent to the production of thin inferior products was characteristic of the qualitatively highly differentiated French knitting. Austrian or Berlin regulations did not permit the making of such products.⁷⁰

Museums generally preserve silk stockings of better quality and often with embroidered gussets. The largest collection has survived in the Catalan museums. Most are masterpieces of hand knitting made of the finest silk with metallic thread and geometric, floral or animal (stylized birds) ornamentation. They are adorned with embroidery, particularly on the gussets, and finished with fringes. Some of these products are supposed to have originated in Italy, particularly from Piza, Majorca as well as Catalonia, and from Bruges in Flanders. The products from the eighteenth century are already lacking such developed ornamentation. In major part they are machine-made with embroidered gussets. It is difficult to determine without technological analysis whether the Spanish stockings in the Victoria and Albert Museum and the Italian ones in the Museo Stibbert or the Rectors' Palace in Dubrovnik are

hand- or machine-made products. On the other hand, it has been established that the children's socks of white wool dating from the seventeenth century items. Some doubts arise with the classification of the carefully catalogued stockings from green silk yarn with gold and silver thread from Brussels, dated to the seventeenth-eighteenth centuries, and others from coffin discoveries, resembling the above-mentioned Polish or Bohemian relics.⁷¹

Three pairs of stockings have also been preserved amongst Peter I's wardrobe. Two pairs are made of red silk, machine knitted in stocking stitch. Their extremely good finish, and the quality of the silk, lead us to consider them imported products. Another pair, tattered and worn out, used to have an embroidered motif on the calf but now cut away to be used on another pair. These patient, careful repairs show the costliness of this type of product. The third pair of stockings apparently comes from a local factory, perhaps in Moscow. It was machine knitted in a mixture of wool and silk, some threads beige and some grey-blue; it deserves further detailed technical analysis. The method of its manufacture shows that machine production was less than perfect; the increasingly frequent use of wool was due to the harshness of the climate. The knitted bands added to beige rep trousers decorated with gold thread embroidery, are of local origin. These bands were made in chain stitch, in somewhat rough, coarse wool; they were made in chain stitch in somewhat rough, coarse wool; they were knitted in order to lengthen trousers which had already been made. The Tsar had perhaps ordered them from one of the women, who lived at court and often spent their time knitting.

Stockings belonging to the Empress Catherine I, wife of Peter I, are preserved at the Palace of Armour in the Kremlin, and are examples of very high quality knitting. They are machine made, in glossy deep beige silk, in stocking stitch. ^{11.44} The calf decoration was embroidered in silver thread on silk cloth. It is possible that silk stockings of this quality were imported; the embroidery representing the Tsar's crown might have been done on the spot. Examination of the majority of knitted articles dating from the period 1725-1800 and found in Russian museums, leads to optimistic conclusions about the technical possibilities of local manufactures. Peter II's stockings, machine knitted in stocking stitch, are made of grey silk and decorated on the calf with gold thread. They date from 1727-1730. They were manufactured using French methods, and could therefore have been made in Voronin's Factory. The stockings belonging to the Empress Catherine II, made of very fine cream-coloured linen with an insertion on the calf, are of more recent manufacture and probably local. It seems unlikely that linen garments would have been imported. I have dealt in detail with clothes belonging to the royal family because they are more closely datable. But in the reserve collections of the museums there is a large number of machine made silk stockings, of medium quality silk, occasionally decorated with embroidery on the calf. At least five pairs of white cotton stockings, probably produced by local factories and intended for courtiers or liveried servants can be mentioned here. Still more probable is the local origin of two pairs of black and white woollen stockings, with a plain, unembroidered piece added in the calf to give more width.⁷² I have given more details about those relics here, as nothing has been published on them up to the present day.

In the second half of the seventeenth century, stocking production reached large dimensions in England and France; while in the eighteenth century coming of the machine had increased output in many other European countries. For this reason, fairly large collections of silk, woollen and cotton stockings from the eighteenth century exist showing changes in the fashioning and shaping of machine-made products. Instead of smooth stockings with embroidered gussets, there appeared the first products to use a combination of different colours to obtain a simple pattern and also open-work design. J. Rapley examines these changes to products themselves, but it is really necessary to link them to the modifications in the construction of the knitting machines. Here the most important variant of leg covering as described by J. Rapley is the stirrup hose without the soles on the feet and with the stirrup running under the instep. Another variant was the boot hose kept in the Victoria and Albert Museum in London catalogued by S. M. Levey, dated to the mid-seventeenth century. "Knitted with two-play white and blue wool largely in stocking stitch. Despite their exaggerated tops, designed to sit within the huge, bucket tops of "Cavalier" boots, these hose were knitted in the round."⁷³

Rich museums collections in southern France, Paris and the stockings' museums in Milan and in Tarrasa, Catalonia, enable us to observe a growing standardization and diffusion of machine production. In England, the appropriate setting of two rows of needles in the machines facilitated the obtainment of open-work, ornamentation or stripes of varying widths. The products preserved from the eighteenth century are usually technically uncomplicated; they were made of different quality of yarn and used to be decorated on the gusset with embroidery. The machine-made stockings from Nîmes of poor quality made with flosselle deserve particular attention. They were probably designed for export to Peru.⁷⁴

Surviving in fairly substantial numbers of museums are the stockings of the French, Dutch, Swedish, Russian and Polish rulers. They used to purchase machine-made products made with the best quality silk yarn, adorned with embroidery on the gussets. They did not wear stockings with tinsel thread. The stockings from the seventeenth and eighteenth centuries and kept in different European museums are very numerous and I not able to enumerate, all of them. Instead, I have tried to highlight those special types of relics in museums, which have often not been catalogued. The special museum of stockings Museo Franceschi in Milan, actually collects stockings of famous people, rulers or artists mainly of the later period. The stockings of the Danish kings from the eighteenth century are kept in the Danske Kongers Kronologiske Sammling Pa Rosenborg in Copenhagen and catalogued by S. Flanagan Christensen. The silk stockings of the last Polish king Stanislaus Augustus Poniatowski dating from the late eighteenth century are kept in the Czartoryski Museum in Cracow. Several pairs of this type of elegant silk products with their embroidered gussets are also found in Museum für Angewandte Kunst in Vienna, in museums of London, Paris, Venice and others. Some collections were also kept in the Museum of City of New York and in the Smithsonian Institution, Museum of History and Technology in Washington.⁷⁵

Among other leg coverings we must include the already mentioned socks. Also thicker woollen stockings, which were usually made by hand and sometimes

worn at night to bed. Also handmade were knitted kneecaps. At the beginning of the sixteenth century knitted trousers were produced for unknown consumers rather than individuals. The name "Hosenstricker" was given to German knitters at this time, before the production of stockings become widespread. A few pairs of these trousers are preserved in museums: Among them are a boys' linen trousers from the first half of the seventeenth century and kept in museum in Zürich.⁷⁶ Long, white, woollen trousers adorned with embroidery and other cloth ones with a "Dutch" foot, i.e. a distinctly separate heel part, are preserved in the Victoria and Albert Museum. The remaining items from London date from the eighteenth century and are made of silk knitwear, one of them being striped. Apart from this five pairs of trousers, another two pairs have survived from the wardrobe of the Swedish king Gustav III. In the trousers of Peter I from the end of the seventeenth century only the leggings are knitted. Trousers of torreadors, preserved in fairly large numbers in the museums of southern France and in Spain, as a rule made from closefitting knitwear, come rather from the nineteenth century.⁷⁷ Five pairs of men's drawers are kept in Italy, in the museums of Venice and Florence. One of them is made of a silk yarn in vertical grey and black stripes, the remaining four pairs are of white cotton. According to the dating of the Museo Stibbert they come from the seventeenth century. However, these appear to be machine-made and are probably of a later date. Some pairs of men's breeches from the eighteenth century and machine-made, are also kept also in New York, Washington and Colonial Williamsburg.⁷⁸ Pantaloon and drawers could easily be made on the first knitting machine adapted to the making of stockings.

Other Products

Dress accessories or other adornments were also made from knitwear. Most frequently appearing are knitted belts and long elastic sashes, used with secular and particularly military attire in England, Russia and Hungary. These sashes were more often than not made by the sprang technique and only at the end of the seventeenth and the eighteenth century do knitted belts appear as well, worn in the Russian army usually by officers of a lower rank. Such belts are preserved in English museums in London and Bath, and Historical Military Museum in Leningrad, while preserved Hungarian sashes are made using the sprang technique.⁷⁹ Less frequently used were knitted garters and braces: although they are encountered among English relics, and in French cottage knitting of the last century.⁸⁰ Among the small knitted products, we can mention aprons, narrow belts or girdles, pockets worn under ladies' dresses and finally ladies' handbags of various shapes, so characteristic of the nineteenth century. Handbags, purses and pillow-covers described as Spanish, coming from the seventeenth century are preserved, for instance, in the Victoria and Albert Museum together with numerous knitted panels belonging to interior furnishing.⁸¹ These small, usually hand-made, products testify to the wide diffusion of knitting, at least in Spain, Italy and British Isles.

2 Use of Knitted Garments in Different European Countries

A survey of museum relics, among which silk products predominate, would perhaps suggest that knitwear was worn only by the richest strata of the population. Museums almost exclusively preserve the embellished articles, or those having artistic value. In order to present the use of knitwear among different groups of consumers we must delve into the written sources, and above all into the probate inventories containing list of garments of deceased or of dowries given to daughters. Such sources, abundant in the period under discussion, have to date seldom been utilized in studies on the history of costumes. In this book, rich archival material on the use of knitwear by the nobility, burghers and peasants has only been utilized in relation to Poland, the results of these investigations having published in a separate paper.⁸² For the majority of European countries, only a little fragmentary data can be quoted here. V. Gay collected the earliest information from French written sources about the use of knitwear. Chapter III lists the information pertaining to the consumption of products during the fourteenth and fifteenth centuries; data from the sixteenth century reveal the use of silk legging (1536) or stockings (1560). Montaiglon claims: "Et ne faut en France chercher en ce fait femme habilée ne qui manie mieux l'esguille, pour tricoter chausses, bonnets, bas d'estame propres et nef, camisolle de soye ou laine".⁸³ His stress on the degree of diffusion of hand knitting in France in the sixteenth century explains why knitted garments were used at that time despite the high cost of craft products. These latter were being replaced by home knitted production intended for personal use and a small market amongst friends and neighbours. A. Puech studied the inventories and testaments inhabitants of Nîmes from the sixteenth and seventeenth centuries. The earliest mention of the use of knitted silk stockings comes from 1577 and reveals their rather high cost. The use of silk and woollen stockings spread among the Nîmes burghers during the seventeenth century,⁸⁴ while the price of the former drops only after the knitting machine has been introduced for their production. Mass wearing of stocking affected the development of production, at the same time as numerous royal statutes for consumer production established the product quality. The frequent repetition of these statutes indicates that mass production did not always adhere to these rules. This caused increased legal and illegal import of knit goods from the British Isles. J. Thirk gives a very important estimation: "By the beginning of the seventeenth century knitted stockings had become standard articles of clothing, and, if we reckon that the average person wore out two pairs a year (and that is surely a modest estimate), somewhere around 10 million pairs of stockings were needed to dress the whole population".⁸⁵

Italian literature on costumes provides very little data on the diffusion of knitted silk garments among a wider mass of users. Knitted stockings are said to have been worn only from the sixteenth century, most attention is devoted to research about their production. English hand-books specify in greater detail

the knitted garments worn in different periods, but these data pertain rather to their production than to their use among different strata of consumers. The wide diffusion of hosiery is testified, to for instance, by a reference to the stockings worn by the English settlers in New England in 1628, in today's United States.⁸⁶ In central and northern Europe the problem of guild or manufactured production of better quality products must be still more carefully distinguished from the widespread use of knitted garments produced at home. This refers to particularly the Scandinavian countries, where cottage knitting satisfied the local requirements in terms of stockings, caps, gloves, as well as of knitted waistcoats and doublets.⁸⁷ Russian trade sources reveal thousands of pairs of stockings and woollen gloves being sold in the eighteenth century at Russian fairs. Not only do they point to the wide diffusion of craft knitting production, but also the mass marketing of these cheap products among a wider strata of consumers. At the same time, home production of woollen stockings and gloves satisfied the needs of the Russian peasantry and a section of burghers. Thus, as well as the Tsar's court where during the seventeenth and eighteenth centuries mainly imported hosiery was used, these products were known among the oldest strata of consumers. In 1804 the inmates of hospitals and poorhouses in Petersburg were provided with two pairs of stockings per year: and without any doubt this was the bare minimum of clothing.⁸⁸

The universal knowledge of knitting and the use of its products is indicated by restrictions on the use of luxury garments. For instance, in Pomorze Szlupskie in 1616, peasants are prohibited from wearing "knitted stockings [that are purchased] and permitted to wear only woollen ones which they themselves can make and dye".⁸⁹ In Berlin in 1698, men's long stockings of craft production were being sold on every market to urban and rural buyers, while mentions about the use of knitted products in the seventeenth century appear in many hand-books on costumes.⁹⁰ Particularly well investigated with the help of archival research, is the use of hosiery in different parts of Austria. Both stockings and headgear, and less frequently other knitted clothing, were worn by the sixteenth century in the neighbourhood of Salzburg, in Tyrolean Styria and in Lower Austria.⁹¹ In Hungary of the sixteenth – eighteenth centuries, as well as Poland and Russia, the national dress was universally worn, which resulted in a reduced demand for men's stockings. Nevertheless, in published probate inventories of the Hungarian Nobility from 1540-1550, there are a few entries that lead us to assume that knitted stockings, leggins trousers, nightcaps and gloves may have been used. However, we cannot always state whether these garments were not produced by other textile techniques.⁹²

Results of detailed archival research in Polish probate inventories of both the nobility and burghers definitively show a mention of knitted stockings in 1580 in one burgher's inventory. This is a deceased man's inventory, so the stockings were probably purchased a quarter of a century earlier. Mentions of garments in inventories of the nobility and burghers become increasingly more frequent from the 1580 s. These were in part products imported from Scotland, England, and Silesia. In the seventeenth century the number of mentions of knitted stockings of different colours made of woollen, linen, cotton and silk yarn for men, women and children increases considerably. Also mentioned are socks, gloves, belts, doublets, shirts, leggings or trousers. In the eighteenth

century also appear references to knitted dressinggowns, waistcoats and small dress accessories. Restrictions on use indicate the wearing of hosiery among a wide strata of the population, maybe these regulations were seldom strictly adhered to. The Gdańsk restrictions from 1642 forbid servants and workers of Gdańsk to wear "stockings costing more than 2 gulden, for men more than 3,10 a pair". The use of hosiery in Poland was a question of it being affordable price. In the *Sejm panienski* from 1684 a publican says: "With what could I buy Venetian slippers, and with them also stockings, even of English make".⁹³ This has changed by the end of the eighteenth century woollen stockings are an essential part of the dress of manufactory workers.

From data pertaining to Poland it emerges that current information on the use of knitted garments requires verification in archival sources. Already by the sixteenth century in many European countries woollen stockings, caps and whole garments were no longer luxury items. In the eighteenth century, knitted stockings are listed among the minimum clothing provisions for hospital inmates and manufactory workers: they are also being worn by the peasantry in many European countries. The mass production of knitted good described in this book had begun to satisfying the needs of a wide masses of consumers. During the three centuries under discussion considerable changes took place both in the types of knitted garments and in their forms. This change was most marked in headgear. In the sixteenth and beginning of the seventeenth century knitted caps and berets were being worn. Later, they are replaced by hats having the same form as the felt ones. A typical head covering was the night-cap. Gloves followed fashion mainly in the shape of the cuff and their ornamentation. Entire garments were being produced by hand and machine according to the demands of the latest fashion. Stockings, depending on the prevailing fashion, were changing colours, type of knitted patterning and finish of the embroidered on the gussets. These particularly rapid changes in ornamentation and method of garment production on various types of machines have been summarised in another work.⁹⁴ Knitted garments were undergoing more rapid changes in fashion than other textile products.

IX. (I. Turnau with K.G. Ponting) Knitted Masterpieces¹

Introduction

Scattered through museums in both west and east Europe there are a number of knitted textiles which have sometimes been referred to as knitted tapestries or knitted carpets. We have preferred not to use this name in the title of this essay, as the technique used in manufacturing has nothing to do with tapestry weaving, being definitely a form of knitting. As these textiles appear to have been used for a number of different purposes – wall hangings, bed coverings and possibly carpets – any name confining their use seemed incorrect. In many cases they appear to have been made by knitting craftsmen as a master-work, both illustrating their skill and entitling them to full membership of their guild, hence the name "Knitted Masterpiece" seemed permissible. But we realize that other knitted garments notably ecclesiastical gloves and patterned waistcoats, were made and required great skill in manufacturing.

The literature on this subject of knitting masterpieces is small, two articles and a few paragraphs in general works about European textiles are all we have. An article by K. Masner on Silesian work gives the most comprehensive information². He gives detailed descriptions of seven knitted masterpieces which, when he wrote, were in Silesia and several others from southern Germany. In some cases we have had to depend on his detailed catalogue descriptions together with photographs as the actual works have disappeared during the last war. Masner was also able to collect some information from archives about the works of a similar kind in Germany. He was familiar with about a half of those described in our catalogue. His conclusions were perhaps a little too narrow and not based on a wide knowledge of the history of European knitting and textile industry in general. But in the majority of cases his conclusions were sound and his article has been basis of our own work. Indeed because several of them have disappeared this essay could not have been written without him. As far as the other standard German treatises on textiles are concerned, H. Göbel was not very much interested in this type of knitted work and R. Jacques reported some of Masner's conclusions, adding to them valuable information about the works at Nuremberg not known to Masner.³

The literature about Alsatian knitting masterpieces is even more limited than that about Silesian. E. Waldner mentioned them in his book about the guild of knitters of the Upper Rhineland, basing his information on the text of the guild statute published by G. Schmolzer.⁴ He added some new documentary information but was not really interested in the tapestries themselves. H. Haug in his work catalogued five knitting masterpieces kept either in private collections or in the museums of Strasbourg and Colmar and added some further documentary

information.⁵ Recent work on the history of European knitting has enabled the present writers to give a slightly wider description of these works, as well as to list the whereabouts of those known at present.

The possibility of using varying colours to produce distinctive patterns is a characteristic feature of hand knitting with two needles. Patterned knitted fabrics first appeared in Arabia and perhaps India, and were not made earlier than the ninth century A.D. Cotton stockings manufactured at the beginning of the twelfth century of either Arabic or Indian origin are technologically the best analysed of all.⁶ Knitted woollen pillow covers found in the Spanish monastery of Las Huelgas, near Burgos, have more developed styles: in addition to the geometric patterns they are also decorated with stylized birds. These works were knitted with two needles using coloured wool in the thirteenth and fourteenth century and are good examples of the artistic and technical achievements of Arabian knitting, which formed the basis of this type of production in south-western Europe in the Middle Ages.⁷

Later examples of patterned knitting are represented by the knitted silk waistcoats dating from the sixteenth and seventeenth centuries. There are quite a number of these to be found in various European museums. In the literature dealing with them it is suggested that they originated in Italy but this assumption is not confirmed by any of the objects preserved in Italian museums or in printed information about them. That oldest of these patterned knitted waistcoats are in fact found in Spain and southern France. There are also eight of them in Norwegian Museums but these in the opinion of local experts are said to be imported from England.⁸ A study of these knitted waistcoats attempting to define their technical and artistic development is badly needed but this is not the place for it and we only make the point here because, before the knitted masterpieces described here, they had been the most technically accomplished products of hand knitting generally known.

The manufacture of knitted works for possible use as wall decorations and as carpets, bed or table coverings, developed in places with long standing traditions of hand knitting. The productions of knitted masterpieces was the most important and most complicated of all the tasks that a future master craftsman had to accomplish. An exemption could be obtained but was costly and in one case the candidate had to knit a pair of trousers instead. Incidentally, these knitted masterpieces were the only non-clothing products of the industry. In their manufacture up twenty different colours of wool were used and the largest ones are about three metres long and two metres wide.

To turn first to the main centres of the productions of these works, the earlier reliable information about their production comes from both Silesian and Alsatian centres. There is, for example, a statement in the statutes of the guild of knitters of Nysa dated as early as the 18 July 1606 which orders: "ein Tisch oder Bettdecke, vier Ehlen lang und wiederhalb Ehlen breit".⁹ A guild of knitters in Strasbourg was established in 1535 but neither in its first statutes from Strasbourg dated 1603, nor in the long list of fabrics manufactured, is there any mention of these knitting masterpieces. They are mentioned for the first time in 1605 in a statute from the Upper Rhineland: "Selon la coutume de Prague et autres lieux, un tapis a fleurs, long et large de quatre aunes".¹⁰ The statutes from Strasbourg of 1607 mentioned among other crafts: "Ein teppich mit

blumenwerk, drithalben elen lang und zwe elen breit".¹¹ The earliest existing reference suggests an earlier centre of production.

We know that in the sixteenth and seventeenth centuries Bohemia was an important centre of textile manufacture including knitting, and from 1560 the Bohemians were manufacturing goods knitted on five needles. In 1570 the knitters of Prague organized themselves separately from the guild of clothiers and in 1612 their statutes were confirmed. At the same time there was another guild in Kutna Hora. The scale and high quality of Bohemian knitting of the seventeenth century threatened Austria and southern German traders and this was overcome by establishing special export and administrative laws. By the end of the sixteenth century Bohemian knitted goods were known not only for clothing but also for non-apparel purpose. This craft then passed to Silesia. Later still it was introduced into Alsace when in 1599 a knitter from Alsace, one Simon Marcutha, was sent to Prague by his regional guild to learn the secret.¹²

It would seem likely that these knitted pictures originated at the court of Rudolph II who, besides being king of Bohemia was also emperor of the Holy Roman Empire. He was more interested in surrounding himself with artists from the four corners of the world, painters, stone cutters and alchemists, than in governing the empire and he filled his Cabinet of Curiosities at Prague (nowadays it would be called a museum) with treasures, works of art, precious stones and curios, such as ostrich eggs, stuffed flying fish and what have you. He was the world's greatest collector towards the end of the sixteenth century, say around 1580, and had the effect of a magnet on craftsmen, conjurers and con-men.

At the same time the art would appear to have been known in Vienna. In the earliest statutes of the guild of knitters in 1609 as the first of the masterworks that had to be produced there, "Einem Tischeppich in sechs Farben" is mentioned. Than in the extended statute of the same guild dated 1614 a masterwork described as: "im Römischen Reich zu Prag und anderen Orten", is needed. The Statutes continues: "Eine Decke, vier Ellen lang und breit mit Blumenwerk".¹³

The main centres for their manufacture must have been one or other of the larger centres of European knitting in the sixteenth century where guild restrictions had survived and still regulated the trade. An examination of the examples remaining in museums and the requirements called for in the statutes make clear the importances of Silesia and Alsace, with some mention of southern Germany. The information given in the statutes gives some indication of productive methods but it must be remembered that statutes from one centre were often copied from another. It is also worth remembering that regulations about getting a master's certificate were, along with the high entry fee, intended as a basic barrier against rapid growth of the guilds. The existing masters were afraid of competition during periods of raw material shortage and perhaps also doubtful of the elasticity of demand, consequently the rule that a large patterned masterwork had to be made before a journeyman obtained his master's certificate, in addition to providing a real test of skill, was useful in regulating the supply of goods to the market. A journeyman had to work on his masterpieces

for several months and before starting had to buy considerable quantity of coloured yarn.

In 1651 Bratislava records: "Eine Decke die zwe elle lang und breit mit Blumenwerken". In these later statutes there is also a statement that productions methods are similar in the whole of the Empire.¹⁴ The statutes of the knitters of Wrocław in 1675 instruct a candidate for membership to make: "Eine nach Maler-Kunst und Art mit Farben formitem Teppich über einen Tisch". The same order is repeated in 1734, which shows that the statutes named already known types of manufacture because the earliest example dates from 1674. There is also a masterpieces from Zgorzelec dated 1728 whereas the guild regulations of 1683 do not mention the product. In southern Germany a knitted work of this type was necessary as a masterwork by the guild of knitters in Frankfurt on the Main from 1659: "Erslich einem Teppich drey ehlen lang und drithalb ehlen breit mit Blumenwerk versetzt". It has been suggested that the tapestry now in Nuremberg dated 1690 could have come from Frankfurt. In then statutes of the Leipzig knitters the production of a knitted masterpieces is specially mentioned as a task of considerable difficulty: "Bey denen Fremden aber ein gebrochener Teppicht"; whereas in the statute from 1629 it is not mentioned at all. In a statute given to the Dresden knitters: "zum Meisterstucken einen mit bunten Blumen durchbrochenen Teppicht", is named. There is no mention about knitted masterpieces in the statutes of knitters in Hamburg or Lübeck, although knitting was a popular craft there, but Berlin knitters in their statutes for 1697 had to make a masterwork: "ein wollen hemdt oder am deren stadt eine Tischdecke von drey ellen lang und zwey und eine halbe elle breit".¹⁵

From these details we can say that the art of manufacturing knitting masterpieces was developed in Prague from the general knowledge already existing about the making of patterned fabric which being produced in Spain in the fourteenth century and which had originated in Arabian countries. From there it passed, now documented by statutes in the early seventeenth century to the Upper Rhineland and Strasbourg, Colmar, Nysa, Wrocław and Vienna, then in the middle of the seventeenth century to many countries of southern Germany such as the important Saxony textile centres of Dresden, Leipzig, and Lusatia also to Frankfurt on the Main and to some extent Berlin. Presumably the art of knitting was known in other German cities and possibly in more statutes remained we would find references to such masterpieces in them. In addition to what can be learned of the background of our subject there are fortunately the existing works in museum and they tell us much about the technical and artistic basis for them. These works come from the seventeenth and eighteenth centuries and divide into two basic groups, those made in Alsace and those made in Silesia. They are quite different in design and probably in the decorative function they served.

After considering the relevant information taken from the statutes of guilds and from the descriptions of the twenty-nine recorded works, it is interesting to consider two elements characterizing the production of different centres; the size of masterpiece and the type of ornament. The size is also important when considering the production technique; it also plays an important role in indicating their purpose. Some of them may have been used as bed or table

covers, some even as wall covers, but there is no doubt that most of them were made as examination pieces for the guild. Therefore the size of the work manufactured as a masterwork may give some information about the purpose of the work made in certain centres, as well as helping to indicate some reason for choosing the subject, the inscription and the manner of decoration. The information given below is taken from the statues of the knitters and is tabulated with the actual size of the existing tapestries. First the length, then the width, both in metres, is given, all in chronological order:

About 1600 presumed data from the statues from Prague:	
1600 statues from Nysa:	2.40 x 2.40 m
1605 statues from Upper Rhineland:	2.40 x 2.10 m
1607 statues from Strasbourg:	2.40 x 2.40 m
	2.1 x 1.20 m
	or 1.80 x 1.20 m
	2.40 x 2.40 m
1609 and 1614 statues from Vienna:	
1611 statues from Brzeg without measurements	2.40 x 2.40 m
1613 statues from Upper Rhineland:	
1618 statues from Strasbourg:	1.80 x 1.50 m
1629 statues from Strasbourg:	1.80 x 1.50 m
1651 statues from Bratislava:	1.20 x 1.20 m
1651 statues from Upper Rhineland:	2.40 x 2.40 m
1635 statues from Strasbourg:	1.80 x 1.50 m
1659 statues from Frankfurt on the Main:	1.80 x 1.50 m
1667 carpet from Nysa:	2.20 x 1.80 m
1674 carpet from Wrocław:	3.10 x 2.15 m
1674 statues from Leipzig without measurements	
1675 statues from Wrocław without measurements	
1675 carpet from Wrocław without measurements	
After 1674 carpet from Wrocław:	
1682 statues from Strasbourg:	1.85 x 1.40 m
1688 carpet from Wrocław:	2.10 x 1.80 m
1690 carpet from Nuremberg:	1.95 x 1.55 m
1697 statues from Berlin:	1.74 x 1.60 m
	1.80 x 1.50 m
1699 carpet of unknown provenance without measurements	
1705 carpet from Alsace:	2.40 x 2.00 m
1713 carpet kept in Berlin:	2.10 x 1.70 m
1717 statues from Alsace:	2.10 x 1.80 m
1723 statues from Dresden without measurements	
1723 carpet from Strasbourg:	2.10 x 1.90 m
1725 carpet of unknown provenance:	2.25 x 2.18 m
1728 carpet from Zgorzelec:	2.00 x 1.35 m
1732 statues from Colmar:	2.10 x 1.80 m
1734 carpet from Wrocław:	1.76 x 1.66 m
1735 carpet probably from Silesia:	1.50 x 1.35 m
1740 carpet from Colmar:	2.40 x 1.64 m
1741 statues from Alsace:	2.10 x 1.80 m
1748 carpet from Upper Alsace:	1.92 x 1.70 m
About 1750 carpet from Wrocław:	1.95 x 1.65 m
1751 carpet of unknown provenance without measurements	
1754 carpet of unknown provenance:	1.43 x 1.43 m
1754 carpet from Colmar:	2.15 x 1.70 m
1756 carpet from Strasbourg:	1.95 x 1.75 m
1759 carpet from Colmar:	2.02 x 1.75 m
1763 carpet from Wrocław:	1.68 x 1.65 m
1767 carpet from Zgorzelec:	1.35 x 1.30 m
1768 carpet of unknown provenance:	1.71 x 1.43 m

1769 carpet from Colmar:	2.02 x 1.76 m
1777 carpet from Colmar:	2.72 x 2.00 m
1777 carpet from Strasbourg:	1.90 x 1.70 m
1781 carpet from Strasbourg:	1.63 x 1.63 m
carpet without dates:	2.20 x 2.20 m

Besides the masterpieces mentioned we have several works without dates, which supplement the already clear picture of more than fifty-one pieces of information about the theory and the practice concerning the measurements of these works.¹⁶

Considering the above list it is clear that in the first statues standard measures for the masterworks were 2.40 x 2.40 m, that is, they were square in shape, but products of half this size, e.g. in the statues from Bratislava, or more oblong shapes were also permissible. It is difficult to state if the first works, whose shapes and measurements are described in the statues from Nysa, Vienna, Alsace and Upper Rhineland, were ever used as bed or table coverings or as wall decorations. The statues state the ornaments should be colourful or show flowers in bloom, but it is not known what the completed work looked like or if there were any figural ornamentation included. After 1667 we have data from the actual works but not all of them were necessarily made as guild masterworks and therefore made so as to correspond exactly with the statues. Many of the largest and most elaborate as far as figural composition is concerned, such as for example at Wrocław with the twenty-one coats of arms of the city council of 1764, were made as special orders. Generally speaking it can be said that Silesian masterpieces were smaller than those from Alsace. The latter are usually two metres long and sometimes even more 2.40 m, which was the statutory measurement. It would seem that their varying measurements indicated that the actual production was often far removed from the statutory regulations. The size was in fact determined, by the kind of composition chosen and the ability of the knitter to make the central part of the tapestry distinctive. It may also have depended on who placed the order and possibly the problem of obtaining the right kind of yarn. Some minor variations could have arisen in the finishing, particularly if the tapestries were fulfilled.

The kind of ornament and the type of inscription have up to now been regarded as the most important factor for indicating the place of origin of the unsigned tapestries. Masner and Haug both had theories of their own on the subject but they did not have complete comparative materials and it is now possible to given different interpretations based on the twenty-nine works traced. After studying the earlier statues and linking the earliest works it is clear that those of the seventeenth century had rich floral ornamentation diversified by coats of arms if made for churches or religious institutions. These are the works preserved in the greatest numbers. Plant ornaments, especially flowers, vases and whole trees dominate in the eighteenth century, particularly in Alsace works. But the similarity with earlier decorations which Haug stresses are not very clear.¹⁷ Another group of masterpieces, Silesian as well as Lusatian and Alsatian, have at the end of the seventeenth and eighteenth century more and more elaborate figural compositions. This is an important development which has bearings on the purpose for which they were used. Although some of with flower decorations perhaps without coats of arms, could have functioned as

humbler table or bedcovers, it seems clear that the large figural compositions were ordered for secular or religious institutions to celebrate political or religious events. In such cases knitted masterpieces were expensive and luxurious articles and usually of a higher artistic value. A patterned knitted fabric at one time common had been changed into an elegant wall decoration in the fashionable Baroque style of the times.

It is interesting to note that all knitted masterpieces of the eighteenth century, whether Silesian or Alsatian, present well-known biblical scenes and not as often in other works of something similar artistic intention, the figures of emperors and other rulers. The most popular motif was the dream of Jacob, the sacrifice of Abraham and various events of the catholic Easter week. Politics changed the coats of arms used, Alsace belonged to France from 1648, Strasbourg from 1681 and Silesia was incorporated into Prussia in 1742. Knitted masterpieces were made for special clients, displaying special iconographic contents.

A comparison of all existing works makes it possible to draw some conclusions about the way which the background and borders, which were of varying width, were decorated. It will be seen that the popular form of stylized plants, flowers, birds and animals are stylistically speaking, backward looking when compared with what was being done in Baroque painting and decoration. But it must be remembered that this was an art of provincial craftsmanship which used old pattern books or copied provincial paintings. It should also be remembered that the comparatively coarse yarn used in some of the Silesian works was difficult to work with. Making complicated patterns and long inscriptions was very laborious.

Finally, to turn to the way in which these knitted masterpieces were made. It is a difficult problem and the views expressed here are very tentative. Masner quotes the opinion of technologists who argues that these works were made with stocking stitch on two needles without any additional tools, as for example the frame. This could be, but it would prove difficult, especially with such large and heavy works of thick yarn even if the two needles were each two metres long. Consequently, we think it possible that three or four needles were used – only of course to hold the stitches since it was flat stitching. This is difficult to prove because the method of keeping the stitches on several needles does not show in the final product. On the other hand, a quite different method could have been used utilizing a kind of frame fitted with pegs. Both methods may have been used.

The time it took to produce a knitted masterpieces is another interesting question. If it was a guild masterwork, it could not take longer than two or three months, but there is a reference to one taking six months or even a year. This referred only to the actual knitting, the yarn would had to be spun but that was not usually reckoned the knitter's job. He was, however, responsible for the finishing which may have included fulling. Some of the Silesian works heavily fulled whereas the Alsatian ones are usually not. During the period of the sixteenth to eighteenth centuries, many knitted fabrics were felted hats almost always, stockings sometimes if they were made of wool. We do not know how these knitted masterpieces were fulled; as far as one can judge, the heavily fulled example now at Wrocław must have quite extensive treatment.

possibly in a small fulling mill, perhaps more likely by being walked on or beaten with a club, while in a wet condition. Knitted masterpieces when not fulled would probably have been scoured, that is, cleaned, although if the yarn had been washed before knitting, this would not have been necessary. In some cases they were raised with a teasel and possibly fulled again. Finally any uneven surface was cut level with scissors; this would have been necessary if the tapestry was fulled and also we think to tidy up the surface even if there had been no fulling. Teasels and scissors are shown on several of the masterpieces and it is strange that there appears to be no representation of knitting needles. To some extent the amount of fulling would account for variations in dimension but it should be stressed that most of those knitted in Alsace were not fulled. With such complicated decorations, we think they must have used some plan serving the same purpose as modern graph paper.

Finally, a few conclusions. Judging by the provenance of the museum relics and archival material, it is clear that the art of knitting masterpieces was concentrated in the territory within the German world and the making of such works was common throughout the whole Imperial Empire. The most important centres were Silesia and Alsace. Some rather sketchy data suggest the possibility of them being made in other principalities of southern Germany and further documentary research could well bring fresh evidences for this view. Bohemia, Austria and Slovakia are other possible centres. It seems safe to assume a fairly wide area for the craft skills spread throughout central Europe after the beginning of the seventeenth century until the end of the eighteenth. Towards the end of the period when making to order as opposed to the making of a masterwork probably became common, the character of the decoration became more linked with the person or institute that ordered the work. A textile which needed several months to make unless serving the purpose of bringing entry to a guild would hardly have been made without a known buyer.

In the previous literature too much stress had probably been laid on the supposed protestant religion of the makers. The tapestries seems to have been ordered for both the catholic and the protestant churches and displayed scenes from both the New Testament and the Old. Some masterpieces were offered to churches, some were ordered by city councillors or city guards, commemorating some historic event and displaying elaborate coats of arms. It is these large figural compositions that have tended to survive and be preserved in museums. Smaller works used for home decoration would have worn out and disappeared.

This article however, has naturally dealt mainly with large works that have been preserved but it is important to realize that they probably represent a much wider number. Woven tapestries and hand-made carpets and rugs were extensively made for similar purposes. In many ways they were better suited for the purpose and tapestry weaving was a more suitable medium than this kind of knitting which may be the reason why the craft died out, or rather, retreated to humbler centres. Amongst other knitted items made with two large needles, one must mention the bed cover, a sort of multi-coloured woollen carpet used as a counterpane. One of these covers is preserved in Suvorov Museum in Leningrad, and a few others are to be found in the museums of less important towns in northern Russia. The way in which these objects were

made has not yet been studied. No confusion can therefore be drawn from certain resemblances that exist between knitted bed covers, decorated with patterns, and the patterns found on seventeenth century and eighteenth century carpets in a well-defined area of Europe, stretching from Alsace through southern Germany and Austria as far as Silesia. But perhaps this is to draw too wide a comparison. In any case, the knitted woolen covers can certainly be attributed to northern Russia; the development of all the woolen products which served to protect people from a vigorous climate justifies this assertion.¹⁸ The tradition discussed here may well have played a part in the development of hand-knitted shawls in the nineteenth century. But as far as artistic achievement was concerned the greatest heights were attained by the guild knitters of Alsace. The reason the great tradition did not continue was probably mainly the clear advantage enjoyed by the tapestry weavers but the decline of the knitters' guilds and perhaps the wide use of the knitting frame may have played a part. Certainly it was a world of craft that could hardly have continued under centralized manufacturing control.

Catalogue

We have divided our catalogue into three sections, first the masterpieces definitely of Silesian origin as listed by Masner in his important article. Secondly the masterpieces listed by Haug in his paper which can definitely be regarded as Alsatian. We have then added masterpieces traced during the course of preparing this paper, and we have there given the generic title of German, as we have found it difficult in some cases to be certain of their provenance.

A. Silesian

No. 1

The earliest known example of this type of textile was made in 1667 by Balthazar Böhme in Nysa. The name of this knitter suggests that he was of Bohemian descent. It measured 2.20 m by 1.80 m and judging by its size and pattern was intended as a table covering; prior to 1939 it was in the Museum de Neisser Kunst- und Altertums-Vereins but disappeared during the war. Fortunately we have a good photograph of it. In the middle of the work there is a pattern consisting of the coat of arms of the principedom and the town of Nysa with six lilies, a date, the initial of the master and the inscription: "S. Johannes hat. mit. sonderem. Fleis. mitgeteilt der. Neis. sex Lillen, weiss. Anno 1667". Griffons bordering the coat of arms and pomegranate flowers in the background reflect the connexion with the Renaissance style. Masner refers to a book with embroidery and lace making patterns from 1604, where similar figures of griffons can be found and have been copied from another lace making pattern book by Aristoteles detto Zoppino published in Venice in 1537. This work was probably made for Nysa town hall and only six colours of wool were used, as in the instructions of the oldest statutes. This carpet is only seven years

older than the following one, but the ornament is distinctly archaic and shows Bohemian influence.

No. 2

This knitted masterpieces hangs in the National Museum at Wrocław and represents the highest achievement of the Silesian school. It measure 3.10 m x 2.15 m and was a table cover ordered by the city authorities for the city hall. This can be verified not only by its size but by its appearance; in the middle of the work we have the city's coat of arms and around it the coat of arms of eight city councillors, eleven aldermen and two town clerks. Altogether there are twenty-one coats of arm and these were placed in the exact order in which their bearers were seated during debate. Masner was able to reconstruct their names as well as that of the guild they represented. The inscription reads: "Jedermann sey unterthan der Obrigkeit die Gewalt über ihm hat. Denn Es ist keine Obrigkeit ohn von Gott. Wo aber Obrigkeit ist die ist von Gott verordnet. Wer sich nu wider die Obrigkeit setzet der widerstreibet Gottes ordnung etc. Röm 13. Anno 1674". This work was made in eighteen different colours of wool placed on a dark background. It was given to the church of St. Elizabeth before 1700, than in 1760 it was repaired by a master knitter named Samuel Gottfried Strauss and remained in the church to 1910 when it was placed in the Schlesischen Museum für Kunstgewerbe und Altertümer. It is certainly an attractive work of art. On technical peculiarity may be mentioned: unlike other knitted masterpieces of this type, there is quite a distinctive ribbed effect and it is difficult to ascertain the reason for this. Probably the tapestry was given some kind of fulling and due the different colours having different shrinking capacities, some ribbing occurred. Whatever the reason, the effect has been to increase the surface interest and, we believe, the pleasure that this work gives. According to a technical analysis made by Barbara Sowina from the National Museum in Wrocław, coloured threads from the pattern on the left side are loosely stranded across the back of the carpet, or cast off, which shows that it was possible to make this carpet with two needles, without additional tools.¹⁹

No. 3

Because of the importance of knitted masterpieces, No. 2, a replica was made in 1675 by master Liebertanz and presented to the church of St. Elizabeth. The work which measured 1.85 m x 1.40 m, was a copy of the central part of the city coulliors carpet omitting the inscription and the border. Masner gives a coloured reproduction of it. In the middle there was a figure of Christ resurrected with two flags bearing Austrian coats of arms and the initial W. The border ornament consisted of plants and leaves. It had ten different colours of wool. This work, which was in the Schlesischen Museum für Kunstgewerbe und Altertümer, was lost during the war.

No. 4

A work of 1688 which measures 1.96 m x 1.55 m, representing Christ in the garden of Gethsemane with a border of vases with flowers. It was from twenty-three colours and shades of wool, and had a very complicated composition of landscape which was difficult to achieve in knitting. There was an

inscription from the New Testament: "Das Blut Jesu Christi des Sohnes Gottes machet uns Rein von aller Sünde: I. Johan 1". Until the outbreak of the war it was hanging in the church of St. Magdalene in Wroclaw but it is now lost and was presumably destroyed.

No. 5

This work has fortunately survived and is in the reserve collection of the National Museum at Wroclaw. It was made in 1734 and is probably the masterwork of Gottfried Benjamin Felbrich. It measures 1.76 m x 1.66 m. Masner hesitated to say whether it was a table or wall covering; examination suggests either is possible with the latter more likely because although rather small in size, it has a definite figural decoration depicting the Holy Trinity surrounded by rather naive angels. Above the dove is the Hebrew word "Jahve" and the inscription: "Gott Vater Sohn Heiliger Geist ein Gott in dreien sey gepreist. Es loben dich der Engel Schaar und wir mit ihnen Immerdar Halleluia". In the border besides flowering ornaments in Baroque style there are symbolical depictions of the four evangelists in the corners. The work was very carefully made with nearly thirty different colours and shades of wool. In several technical ways this work differs from the other Silesian masterpieces (No. 2 in the catalogue) which remains in existence. The finishing processes were notably different, the work being heavily raised with tassels following a considerable amount of fulling. Indeed, judging from the appearance it may have been fullled again after raising. Except in a few places where the nap has worn off there is little sign of the underlying knitted structure. The figural composition although naive is quite complicated and the floral decorated general colour pattern is attractive and in many ways improved by raised surface. The high standard of the finishing is additional evidence of the high standard of work required before obtaining mastership of the craft. The maker of this work came from a well-known local family of knitters and eventually was made a senior member of the guild. The work was originally kept in the church of St. Elizabeth and was then transferred to the local museum and, as stated, has survived which is indeed fortunate as it shows, with the emphasis on the finishing, quite a different technique to other existing Silesian knitted masterpieces. Our catalogue No. 3 and 4 were probably made with the same technique. The coloured threads of the pattern are not stranded across the back of the carpet as in No. 2 but under the threads of the background stitches. It would have been possible to make this carpet with two needles, without any additional tools.

No. 6

A work made about 1750 and hung in St. Magdalene Church. It was a medium sized composition measuring 1.95 m x 1.65 m, representing the Last Supper. Unfortunately it was lost, or more likely destroyed, during the last war. From the photograph it would appear to have been made in the same technique as catalogue No. 5. The main subject is framed like a picture and has a frieze; there is no floral decoration. The twelve human figures look flat, short and heavy and only a few colours were used, but the presentation of an interior is interesting and uncommon in knitted masterpieces. An Easter

inscription reads: "Mich hat hertzlich Verlangt diss Oster Lam mit zu Essen". The name of the craftsman is not known.

No. 7

The last of the Silesian knitted masterpieces was a small composition for hanging on the wall. It was made in 1763 and measured 1.68 m x 1.65 m, and had an inscription: "Fridericus Magnus Rex Borussiae 1763 D. 15Fe" [15 February]. Although the picture of the horse is rather poor, the work was in bright colors and the overall appearance, particularly the landscape with the city, made a good impression. It was probably the masterwork of one of the two knitters who were establishing their own workshop in 1763, either Johann Gotlieb Döring von Beuthen or the eldest son of G.B. Felbrich. The work belonged to the Breslau City guard and then passed to the museum, and like others was lost or destroyed during the war.

B. Alsatian

No. 8

The oldest known Alsatian work was made by H. Cristophe Wagner in 1705 and measured 2.40 m x 2.00 m. In the centre is the Lamb of God, the border is separated from the centre by a verse from a well-known Alsatian Easter hymn: "O lamb Godes unsewling am stamem des creidz geschlacht alzeit gefynten gedwiddig wievol dv wahrest veracht ale sind hast dv gedragen sonst miesten mir verzagen erbarm dich vnser o Jesu gib vns den friten o Jesu Amen". Besides putting his full signature the artist repeated his initials several times in the background. Judging from the various modifications of the double headed Austrian eagle, Haug assumed that the maker came from one of the regions of Upper Rhineland and that he was a protestant. This piece closely resembles No. 10 and when Haug wrote was owned by Madame Rubner of Zurich and she wrote a note about it:²⁰ Madame Rubner later went to the U.S.A. and still had the work in July 1962 at her home in Los Angeles but its present whereabouts has not been traced.

No. 9

The next Alsatian work is dated 1740 and is in Musée des Unterlinden at Colmar. It is excellently hung together with two other similar knitted masterpieces owned by the museum and together they represent by far the best collection we have of these works, all of them having been produced when the craft was at its highest level of achievement. The particular example described here measures 2.40 m x 1.64 m, and has the initials H.M. It is made of good quality wool and of finer yarn than used in the Silesian works having 14 stitches to every 5 cm. Although only ten colours were used they have been combined into an attractive design ornament of peacocks and flowers vases. Until one has seen these works hanging side by side at Colmar, it is difficult to appreciate how attractive this technique could be, but it should be mentioned that this work has been quite extensively repaired and there is little doubt that it is the same masterpiece as described by Haug in his article – No. 2 – but during repair

the date has been changed from 1749 to 1740 and the initials of the knitter from F.E. to H.M.

No. 10

Our next example dates from eighty years later (1748) and was made as the masterwork of a knitter, Jean George Mueller from Upper Alsace. It measures 1.92 m x 1.70 m, and has about ten colours of wool. There are many close resemblances to No. 8 and it was presumably based upon it, the wording of the text is identical but the date is different and there are a considerable number of alterations in the floral details. It is kept in the Musée de l'Oeuvre Notre Dame in Strasbourg.

No. 11

A masterpiece made by Jean-Georges Kraus of Colmar in 1754 and now at the Musée des Unterlinden there; it measures 2.15 m x 1.70 m. The coat of arm of France is the centre motif in this composition and it is supported by two lions. Angels carry a cartouche with an inscription: "Louis, XV. Roy de Fr." Above are the date and below the initials G.K. From the documents Haug found a Jean-Georges Kraus paid a fee to the guild of knitters in 1754 so this must have been one of his masterworks. Although made with somewhat thicker yarn and fewer threads than the earlier Colmar work (18 stitches to 8 cm) it is a very attractive piece. Approximately nine colours are used and the plant decorations are typical of this type of work with the stylized motifs repeated on a smaller scale in the narrow border. In the background of the ornament there are various knitting tools, including apparently a pair of scissors and a teasel. These implements could have been used in finishing these knitted masterpieces when they were pulled as in the case of the Silesian examples; the surface being raised with the teasels and than carefully trimmed with the scissors. However, the Alsatian works do not seem to have been pulled to any extent, and we cannot see how the teasels are likely to have been much used. A pair of scissors for trimming was always helpful.

No. 12

Made by Jean-Frederick Simon of Strasbourg in 1756 measuring 1.95 m x 1.75 m. In 1923 when Haug catalogued in this work belonged to Charles Simon from Au near Zurich but cannot be traced at present. A central motif of the pattern shows the Resurrection of Christ with an inscription: "Christ ist erstanden von seiner marter aller - Alleluia", and then "Surrectio", and the artist's signature: "Das hab ich Iohan Friderich Simon gemacht". Haug thought the ornament on the border showed certain similarities with the pattern on eastern carpets with paradise trees and other trees as well as numerous animals. The eagles are similar to those of the Austrian coat of arms although in the shield is the French coat of arms.

No. 13

A masterpiece made in Colmar in 1759 by a knitter with the initials I.V.; it measures 2.02 m x 1.75 m, and is now in the Musée de l'Oeuvre Notre Dame

in Strasbourg and is made from approximately eleven colours of wool. The decorative motifs closely resemble No. 11 made fifteen years earlier.

No. 14

A masterpiece made in 1777 presumably at Colmar measuring 2.75 m x 2.00 m. The Lamb of God is represented in the middle and there are two fine peacocks and two lions or griffons in the middle of the decoration. Approximately ten colours, mainly pastel are used and this is the third and latest of the three works shown at Colmar. The double-headed eagle of the House of Austria appears at the bottom and the stylized tree-like geometrical pattern is attractive.

No. 15

A masterpiece made by Jean Henri Fischbach in Strasbourg in 1777; it measures 1.90 m x 1.70 m, and was catalogued by Haug and is in the store room of the Musée de l'Oeuvre Notre Dame. In the central part of the ornament there is a rather naive depiction of Jacob's dream with an angel on a ladder and an inscription: "Hilfe. wirt. Gott. ferner. schicken. meinen. Feinden. zum. Verdruss" and the artist's signature: "Das. hab. ich. Ioh. Heinrich. Fischbach gemacht. 1777". Besides the coat of arms with lilies, the masterpiece is decorated with a paradise tree, Adam and Eve, and numerous animals and birds. The narrow outside border is characteristic of this series of masterpieces.

No. 16

A masterpiece made in Strasbourg in 1781 and very similar to the one described above. It belongs to Mr E.W. Pasold, and is approximately 163 cm square. Knitted in multicoloured wools in stocking stitch, the different threads are stranded across the back of the carpet. In the centre is a representation of "Jacob's Dream" and the inscription: "Hilfe wirt Gott ferner schicken meinen Feinden zum Verdruss". Above the dove there is the Hebrew word "Jahve". There is no information about the artist but there are similar depictions of the teasels and a pair of scissors, and the border is also of a similar type but different in detail.

No. 17

This masterpiece also belongs to Mr E.W. Pasold. It measures 2.10 m x 1.90 m, and is dated 1723 (but see note by Mr E.W. Pasold below). It has floral and animal decorations similar to the other Alsatian examples but the central panel representing the crucifixion is rather crude and indeed seems more akin to the Silesian than Alsatian examples, but this may be due to the fact that this work is made of coarser yarn than the other Alsatian pieces. Above the crucifix is the Hebrew word "Jahve" and around the central panel the rather faint inscription: "Des Weibes Samen Wird der Schlangen den Kopf Zu Treten". In the middle of the work there is a coat of arms with three lilies. At the bottom are the words: "Das. hab. ich. Ios. Anto. Bischoff. gemacht. Anno. 1723".

Mr Pasold has prepared the following note: "I remain much intrigued by the mystery of the dates. The test carried out in my firm's laboratory prove

that the date 1723 has definitely been inserted very recently [...]. Obviously the original date altered to 1625, perhaps then some later owner thought the change excessive and re-dated the carpet 1723 which, in my opinion, is also incorrect. I would estimate the true date to be somewhere near 1775".

No. 18

A fragment of unknown provenance with flowers and animals as in other Alsace carpets. It is now in the Musée de l'Oeuvre Notre Dame, Strasbourg.

C. German

No. 19

A masterpiece made in 1690 by a craftsman bearing the initials H.K. It is at the Germanisches Nationalmuseum, Nuremberg, and measures 1.74 m x 1.60 m. The wavy flower ornament, vases, griffons and parrots lead us to link it with Alsace or possibly some other south German centre.

No. 20

This masterpiece was the Oberhausmuseum Passau but was lost during the war. Fortunately there is a small photograph from which our reproduction comes in the book by Wolfgang M.Schmid, Passau published in Leipzig in 1912. The carpet was dated 1699 and had the initial T.K.

No. 21

A masterpiece of 1713 measuring 1.80 m x 1.70 m, which before the war was in the Berliner Schloss Museum but is now lost. It is known where the work was manufactured and no craftsman with the initials P.I.B. or P.I.E. has been found in any guild of knitters examined. On the basis of the ornamental motifs, Masner thought it was probably an Alsatian or south German work. Lions support the coat of arms; peacocks, parrots and numerous flowers and fruit decorate the background and the border. About eleven different colours of wool were used.

No. 22

This unusual knitted masterpiece is in the Schloss Pommerfelden, south of Bamberg. It measures 2.25 m x 2.10 m, and is dated 1725. It is unusual in many ways: unlike all the other works catalogued here, it has unsymmetrical composition with a most odd collection of animals. Perhaps more important, we are told, it was knitted by the nuns for the bishop's birthday and so appears to have no guild connexions. The tone colours are light and the whole appears the most playful of all these works. It was shown at an exhibition at the New Residence at Bamberg, 29 July-16 October 1955 and illustrated on the back of the catalogue.

No. 23

A knitted masterpiece from Zgorzelec made in 1728 and measuring 2.00 m x 1.35 m. The town was a small production centre for these goods. Before the

war it was kept in Museum für Kunst und Kunstgewerbe in Halle and is now in the Staatliche Galerie Moritzburg in that town. It has a very elaborate figural composition topically connected with Easter. In the middle there is the Lamb of God, and underneath the crucified Christ. There are two figures standing by the cross and on the other side Adam und Eve, and the serpent in the paradise tree. Vases with flowers, angels and animals make up the rest of the masterpiece, which has a narrow border on a pale blue background. The inscription reads: "So hat Gott die Welt geliebet das er seinen eingebornen Sohn gab auf des alle sondern das ewige leben haben. Ion.3. CAP.16". The inscription on the border is also important: "Johann Caspar Drewes. Angefangen. den. 10. Marti. verfertigt. den 7. Sept. 1728". This would appear a rather long period of manufacture and may indicate that is not really a guild masterwork, which together with the other required knitted pieces had to be made in about thirteen weeks. About fifteen different colours of wool were used.

No. 24

A masterpiece dated 1735 now in the Germanisches Nationalmuseum, Nuremberg. It measures 1.50 m x 1.45 m, and unlike the other two knitted masterpieces at Nuremberg which resemble Alsatian work, this is from Silesia or shows a strong Silesian influence. The inscription is: "Seyd getropt und nemet der Frucht des Landes d. 46: M 13 Cap. yer. 21. Anno 1735". In the centre we see the men sent out by Moses with grapes carried on a staff, also pomegranates and figs. (see The Fourth Book of Moses, Chapter 13, verse 23). Like the Silesian work at Wrocław this piece has considerable fulling. Unlike others, the centre appears to have been made separately and then sewn in; marl yarn, that is yarn containing several colours, has been attractively used.

No. 25

Is in the Metropolitan Museum of New York and dated 1751. The museum's descriptions is: "grey ground with designs in shades of rose, blue, crimson, green, yellow and black; double headed eagle black, rampant lions, unicorns light brown, peacocks dark blue". A good colour reproduction of this work appeared in the (American) 1975 Knitted Times Year Book, page 50.

No. 26

This work was probably of German origin and was dated 1754. It was square 1.43 m x 1.43 m. Before the war it was in the Schlesischen Museum für Kunstgewerbe und Altertümer at Wrocław but is now lost. The centre of origin is unknown. The general appearance would suggest Silesian work of the type of the first group catalogued but there are problems. In the central part there is a picture of the sacrifice of Abraham with an inscription: "Lege deine Hand nicht an den Knaben I buch mos. 22 Cap. 12 V. Anno 1754". The entire border is decorated with double-headed eagles without crowns, and peacocks, and this last motif would indicate an Alsatian provenance. Perhaps, however, it came from some other protestant centre in Germany.

No. 27.

A smaller and almost square version of No. 23 dated from 1767 measuring 1.37 m x 1.30 m, and was before the war kept in the Kaiser Friedrich Museum in Zgorzelec, having been in the crypt of St. Peter's Church. It is now in the Städtische Kunstsammlungen, Görlitz. Because of the rich biblical iconography, this work is more interesting from an artistic point of view than its archetype. B. Sowina made the technical analysis and she shows that the coloured threads from the pattern on the left side are loosely stranded across the back of carpet, or cast off in the same manner as in the carpet No. 2.²¹

No. 28

A masterpiece of 1768 with the signature of the craftsman bearing the initials S.M. It measures 1.71 m x 1.43 m, and is in the Germanisches Nationalmuseum, Nuremberg. In the centre appears to be a stylized Austrian eagle with two heads and the flower ornament and lions which are linked with Alsace. This work has been considerably repaired and is made in relatively coarse stitching.

No. 29

A masterpiece not dated but now in the Town Hall, Augsburg. It measures 2.20 m x 2.20 m, was acquired by Städtische Kunstsammlungen, Augsburg in 1950 from a dealer. Its earlier provenance is not known.

X. Peasant Knitting

1. Research problems

The basic question what do we mean by the term of peasant knitting in an Europe as well as in the general context. This term is only to describe the hand knitting found in villages or small urban areas performed for private or neighbourhood use, but never for the market, when it took the form of a putting out system. It is not easy to distinguish between peasant and urban hand knitting in their use of technology and in the variety of articles produced. The type of pattern used not only varied within one country, but also within a region, as did the use of colour. Also of great importance is the question of the degree of labour intensity in the case of articles made for private use. It is precisely in peasant knitting that we find many interesting ornamental solutions connected with patterned weaving or embroidery of the region completely independent of any adornment trends of the period. Only those, sometimes archaic, ornament solutions play an important role in peasant knitting. Its influence on urban hand knitting was pronounced even in such developed countries as the British Isles or Scandinavia.

Material records discussed in the present chapter are inevitably fragmentary. In many cases I was unable to carry out my own research, besides which studies concerning this subject very rarely encompass the whole country, most of them being dedicated to particular regions. I was not able to consult every published paper as, many of them, are in local reviews. Some of the problems dealt with here, have been discussed from another point of view in two other papers.¹ However, I did not emphasize, the importance of peasant hand knitting in the field of ornamental decoration; therefore, in the material examined here, I will stress this particular aspect. The basic research only covers European countries; nevertheless, some mention will be made peasant knitting in some Asiatic and North African countries, where monographs on the subject have been available. We should not forget, that in the countries where long and ample attire used to be worn, knitted garments, particularly stockings, did not play a role. At the same time, close-fitting head, leg and hand coverings and warm clothing such as waistcoats or trousers, were connected with a cold climate and worn in Nordic countries, in mountainous regions or on coasts of cold seas. In the countries having a warm climate, their use was much more limited, since ample clothes made of loosely woven fabrics, were more common there.

As far as the chronology of the present chapter is concerned, before the seventeenth century information referring to peasant knitting is very rare. Most references date from the last century. Old artifacts tell us about the common use of knitwear, but nothing is known about its diffusion among peasantry. The oldest knitted peasant costumes preserved in European museums only date from the seventeenth and eighteenth centuries. They have been preserved mainly in

Scandinavia. Peasant knitting had probably spread earlier throughout northern Europe. Wool was the primary raw material, providing warm and well fitted garments to protect the hands, feet and the head, and children's clothes too. However in Scandinavia and Finland knottless netting appeared first and was initially more widespread than knitting. The Finnish popular proverb "He who wore knitted mittens had an unskilled wife"² well express the difference between knottless netting and knitting. Both technique were in use in the villages of northern Europe and provided an elastic and close fitting cover for hands, feet and head, particularly useful in a cold climate.

There is a little information disseminated on the economic and social organization of the production of knitted goods in the villages of various countries. It seems probable that hand knitting, like hand spinning, employed mainly the oldest members of the peasant family and sometimes only women or children. It is extremely difficult to estimate the output, but the most important peasant centres such as the south of France, and especially the mountains in Cévennes, the region near Herring in Jutland in Denmark, and the numerous islands like Iceland, the Shetlands, Guernseys, Jerseys and Arans, produced goods for sale, for export and using the peasant putting out system not just for private family needs.

2. Tools and Patterns in Popular Knitting

Peasant hand knitting in Europe mainly made use of wool, while in northern Africa and Near East of cotton too. Silk was very rarely used by peasants to make knitwear. Flax was also sometimes knitted. As has already been said, hand knitting used two to five needles. It would be very hard to give information about the simplest knitting machines. Almost all of them were made of wood, and by the late seventeenth century being carved in numerous villages of Saxony and Bohemia. In the early eighteenth century, the use of these machines was prohibited in both countries, because of the low on quality of fabrics.³ The machines could only be used in mass production organised in the peasant putting out system as a non-agricultural occupation during winter. In domestic production two or more needles were quite adequate. The needles were of different length and gauge according to the thread, and made of wood, metal or bone. The methods of holding the needles by men or women workers may be an important question in hand knitting. The professional knitters predominately held needles close to the product while amateurs made rather wide movements with their hands, although there were variations in different regions of Europe among the peasantry. But this subject should be studied in ethnographical research.

I have already discussed the question of an auxiliary tools, the knitting sheath or knitting stick, and its spread through European hand knitting. Here we are only interested in the use of this tool in peasant knitting made for sale or for private use. It is not always easy to determine which of these knitting sheaths were solely used in peasant and those just in town knitting. The small tools was

often decorated with carved ornamentation. It is still possible to find numerous examples in Europe ethnographical museums. Numbers of them have not been properly identified, as sometimes the museum curator does not know exactly what such ornamental stick were used for. It was W. P. Smit from skansen in Arnhem, Holland, who first wrote about carved knitting sticks. He found a fine collection of about five hundred of them coming from one of the regions in Holland called Peel, dating from the period 1650-1890. Nearly all the knitting sticks of Peel were richly decorated with geometrical or, more rarely, with vegetal ornament. The end of each stick has been decorated with a small carving of an animal, often a dog, a fox, a hart, a rabbit, a bird, or even a religious symbol such as a heart, chalice or cross.⁴ I suggest that this particular collection of knitting sheaths present tools of popular knitting.

Some other stick in the European peasant production can serve perhaps, to illustrate the diffusion of commercial hand knitting. But it is very difficult to make a clear division between the knitting sheaths used in commercial and domestic peasant production. Both used the same tools and materials. So I think that nearly all informations from chapter VII concerning hand knitting and knitting sheaths was also important for the peasant knitting, particularly if the tools were made of wood. Recently L. Warburg has published a short book about the technique of knitting with the knitting sheath, which is now a forgotten tool. The oldest extant sheaths found in Denmark, date from the last quarter of the sixteenth century. The use of the knitting sheath in knitting, has the yarn in the right hand and one needle kept stationary. Today, the Scandinavians are still knitting with a working thread resting on the left forefinger and both needles moving.⁵ The use of knitting sheaths in Denmark for domestic popular knitting is rather open to discussion, as is the use of this stick in different parts of the British Isles.⁶ But popular knitting in Spain and Portugal or Yugoslavia was never commercial, and the sticks were often used, although under various names in different regions.⁷ Also the important popular knitting for the needs only of this country, mainly of the isles, was made with the knitting sheaths.⁸ So the use of this small tool is important in European popular knitting and they should be analysed by historians of popular art.

The problem of pattern in popular knitting is very important and few researches have been made. It is connected with the type of knitting stitches being used in the villages. Stocking stitch has long been in common use. Garter stitch has been used for all products but mainly in countries with well developed peasant knitting, such as the British Isles, France or Scandinavia. Most of the product of peasant knitting, particularly from the nineteenth century, were richly ornamented. The geometric pattern is the most widespread ornamentation used. The floral and even patterns with figures were used mainly in the popular knitting of Scandinavian and Baltic countries such as Sweden, Norway, Denmark, Finland, Latvia and Estonia.⁹ J. Staňková has made a very important comparison of the plain and patterned stockings worn in the late eighteenth to twentieth centuries found in all the ethnographical regions of Bohemia.¹⁰ II. 45

Another question could be the influence of pattern used in popular knitting on the other hand knitting and even on machine knitting. The most typical examples were the patterns from the British Isles. G. Thompson presents the patterns of the fishermen's sweaters from Guernseys, Jerseys and Arans. G.

Morgan wrote about the same traditional knitting in the British Isles.¹¹ Both used these geometrical patterns in a book for women's private hand knitting. G. Thompson gave the definition: "Almost invariably guernseys are in thick dark blue wool, whilst jerseys are thinner, and of various colours. Jersey became better known owing to the very large number of Jersey men who entered the New Foundland enterprises about 1600, and gave rise to local shipbuilding, and the supply of woolen garments for the mariners. [...] The shape of the guernsey is definitely square – reminiscent of the short smock worn the country or farm workers years ago, and built for hard wear, with quality of good workmanship throughout". The authoress also shows the Aran jerseys' unique and fascinating in design.¹² G. Morgan sought to find the traditional designs in Guernsey, Aran, Fair Isles, Shetland and Faroe Island. She presents Guernsey fingerless gloves and so called Robes of Glory made in Fair Isle "by the older woman for their gransons to wear when they reached adolescence. [...] The pattern representing the water of life is followed by the seed of life, which is nurtured into the flower of life. The anchor of hope is accompanied by the star of Bethlehem to guide the boy on his way, and the crown of glory symbolises the reward for a life well led".¹³ She translated pattern used in hand knitting in order to make jackets, sweaters, waistcoats, scarfs, hats and gloves. The two books are good examples of how to translate the traditional, mainly geometrical, popular patterns for the modern knitting ladies. It is possible to find such practical handbooks in numerous languages.

The final dressing of products knitted by hand, such as fuling, raising with teasels and shearing, was not so widely diffused in domestic knitting as in artisan production. But stockings, caps and gloves should have been modelled by drying on wooden forms, sewn together and sometimes embroidered. Coloured fabrics in European peasant knitting were often dyed in the thread rather than in piece. All woolen fabrics had to be fulled in the small handfulling mills or by being walked on or being beaten with a club while in a wet condition. Handfulling effaced mistakes of hasty knitting and of unequal and rough thread, and dropped stitches. The fulled fabrics did not have a close surface like woolen cloth and the stitching remained visible. I discussed the small handfulling mills from Poland, Bohemia, Jutland and Finland in Chapter VII. II. 46 – 47 Ultimately the fabrics had to be ironed, arranged in pairs and packed, sometimes in baskets, for sale. I have myself seen local markets in villages or small towns in the poorest European countries such as Poland, Spain or Bulgaria, where peasants sit with the basket full of hand-made knitted stockings, socks, caps, gloves or pullovers. This manner of marketing the knitted fabrics of domestic production in local markets is a very old one.

3. Knitted Fabrics in European Popular Costume

I have tried to combine the dispersed information about the knitted parts of peasant costume within groupings of countries reaching similar levels of civilization. There are not many information sources on this subject, but knitted

samples of popular costumes in various countries are a help. I have found three books on this subject of peasant knitting in Sweden, Norway and Estonia. There also some papers about Austrian knitting and a book on the production of knitted caps in Tunisia.¹⁴

Within the the first group we can place countries, in which the vernacular costume has already disappeared by the nineteenth century and had accepted early on the standardizing influence of west European fashion, generally the Germanic countries. In Switzerland, for instance, the costume of different cantons had already disappeared by the early nineteenth century and was only revived after World War I. Swiss peasant costume from the seventeenth and eighteenth centuries often include knitted waistcoats, caps, stockings and gloves.¹⁵

Peasant knitting in Britain has been studied very little. N. Rothstein writes about it: "England is possibly unique in western Europe in having had not regional or "peasant costume" since the early sixteenth century, and this has been true also of the towns in Scotland. The rich of Edinburgh, like those of Bath, Cheltenham or London, wore fashionable dress. The poor in England wore second-hand clothes or rags – but these same rags followed the styles of the fashionable".¹⁶ It is worth remembering that fashionable dress increasingly consisted of more and more knitted articles such as headcovers, stockings and socks, gloves, and also waistcoats and trousers. So a widespread diffusion of knitted portions of dresses is important. Perhaps the mentioned geometric pattern of knitting, which were very traditional in the British Isles, should be better studied, along with the preserved relics of peasant knitting.¹⁷ It could become the subject of a number of ethnographic researches. In general the popular knitting of the British Isles had not appeared in peasant costumes.

The situation is quite different in Scandinavia. Peasant knitting had spread very early there. Scandinavian museums, unique in Europe in this respect, have collected knitted parts of popular costumes from as early as the seventeenth and eighteenth centuries, particularly at Nordiska Museum in Stockholm. But the most important role of Scandinavian museum is played in the process of modelling the contemporary material culture.

Traditional peasant costumes, revealing of the feudal social stratification, were a sign of two things. They distinguished the country folk from the other strata and, at the same time, within village society they accentuated differences of sex, age, civil estate and social status. In the Scandinavian countries, as the people wealth grew and the differences in status slowly reduced, popular costume disappeared in the majority of the villages over the course of the last century, and nowadays, they are only worn by old women in areas far away from communication routes, particularly on the islands. In all the Scandinavian countries, popular costume is being studied very scrupulously on the basis of museum, iconographic and archival records, making use of the historical method. This investigation is being supplemented by the help of oral historians who conduct interviews and inquiries in villages, where the old costumes and their proper use and adornment is still remembered. Four books by A. Noss from Oslo constitute an example of such model ethnographic research. The authoress compares the collection of iconographic records of popular costumes, coming from the years 1760–1874, and the results of her ethnographical research in the

same regions of Norway.¹⁸ B. Lönnquist wrote about dress and fashion within the local community 1870–1920 in Finland. The book analyses the changes of dress in the rural community of Ostrobothnia over a period of fifty years. The relationship between types of costume worn and social stratification can be closely observed within communities where dress is studied. The field work in such studies consists of recording oral tradition, and examining old photographs and preserved costumes.¹⁹

On the basis of these studies, a considerable part of old peasant costume can be reconstructed. The "peasant" dress worn today, serves a different social role. It returned to the villages after having been replaced by incoming urban dress, and continues to varying degrees, sometimes it is also worn by urban youth, originating in particular regions. Carefully reconstructed costumes reveal in individual character of various parts of the country. In Scandinavia, the popular and national culture was never entirely extinguished, and popular dress was to play the role of the national one.²⁰

Knitting garments were of great importance in the popular costume of Scandinavian countries, providing head, hand and leg, as well as covering for the whole body in a cold climate. At the same time, west European influences in the peasant dress brought about the custom of wearing knee-long stockings for men's dress, and the use of knitted waistcoats or doublets being also widespread. Numerous knitted parts of Swedish popular costume, such as patterned stockings and gloves, have been discussed in the books of I. Wintzell and A.M. Nylen.²¹ The peasant costume of Sweden made a major contribution to national costume and to national ornamentation of industrial design. In spite of the simple production technique, popular knitting was able to give by the cut, trimming and design of the garment a regional characteristic.

The biggest collection of knitted waistcoats (altogether about 135 items) in different Danish museum has been catalogued by M. Ploug. A part of this collection is formed by the fabrics from eighteenth and early nineteenth centuries following the examples of knitted waistcoats worn in west European fashion a century earlier.²² E. Andersen wrote about it:

The knitted *natrøje*, which literally means night-jacket, is first mentioned in inventories at the end of the 17th century but it was not in common use till some fifty years later, coming in together with the adoption of the bodice for everyday wear. [...] The oldest Danish peasant vests of this time are open in front and knitted with a looped-effect inside; later, circular knitting without loops became general practice. The traditional diamond patterns and eight-pointed stars that are used in knitting to this day are also found on 17th century knitted garments. The usual term for this garment was: night-jacket, despite the fact that the vest was worn in daytime. In some parts of the country a blue knitted vest was worn with a skirt of the same colour for Christmas and in winter, a green vest and skirt for Easter and in spring, and a red one on Whitsuntide and in summer. This custom seems to be of quite recent origin. When folk costume was longer worn, the knitted vest reverted to its original role as an item of underclothing.

Men's knitted vest and caps were also worn. In Jutland peasants wore knitted stockings as early as the mid-seventeenth century. Men's stockings were usually grey and blue, and women's stockings could be red, yellow, green, blue or black in the eighteenth century. "Stunthoser" i.e. stockings without feet, have been in use right to this very day but have a very ancient origin.²³

Peasant knitting in Norway also retained the old tradition. The patterned peasant waistcoats were influenced by seventeenth century imports of richly

patterned silk waistcoats from England according to H. Engelistad.²⁴ A. Noss wrote about some records of peasant's knitting in Norway and I. Grayford about the technique of glove production.²⁵ A large part of the new book about the history of knitting in Norway, is devoted to peasant and domestic production showing very rich geometric, vegetal and figurative ornament.²⁶

Knitting is believed to have been introduced into Iceland by English or German merchants and the practice spread very quickly. The earliest references date from the sixteenth century and the first mention of the export of knitted goods is in 1624. Knitting was an activity of men as well as of women and children and some of the knitted fabrics were made for domestic use. Peasants in Iceland used to knit: "stockings, socks, insoles, mittens, gloves, wrist warmers, scarfs, waistcoats and caps for both sexes, as well as men's breeches and trousers, sleeveless vests and suspenders and women's shawls, besides undergarments for both sexes: drawers and undershirts for men, undershirts and knickers for women. Other knitted items were purses and pillow cases, even tents, and for ecclesiastical use, knitted belts and a purse are known to have existed".²⁷ The variety of knitted fabrics in Iceland was evidently one of the richest in Europe. It again in the wide diffusion of this technique. In Iceland a strange type of glove with two big fingers (the second finger served as a spare one) were made for fishermen and sailors.²⁸

The use of knitting needles spread to Finland from the West in the seventeenth century and with them came the peaked or round-topped knitted cap, though this cap was not worn in eastern Finland. Knitted mittens with loose wrists resembled leather mittens. The wrists of mittens used for church and bridegroom attire were decorated with multicoloured yarns. Gloves were common in Finnish folk costume in the eighteenth century for church-going and formal wear. The technique of knitting stockings with needles was not known in Finland until the seventeenth century.²⁹ In Österbottens Museum in Finland, in 1984, a conference on knitting as a tradition of Nordic peoples, was held. Five people from among thirteen delivered reports dedicated to Finnish knitting. Bo Lönnquist presented knitted garments known in Finland in the eighteenth century, such as waistcoats, caps, gloves and stockings. Toini-Inkeri Kaukonen dealt with the history of Finnish knitting, paying particular attention to peasant products and their ornamentation. The remaining three papers were also devoted to domestic and peasant hand knitting.³⁰

Latvian and Estonian peasant knitting can also be identified as one of the oldest and the most varied in patterning in Europe. As the earliest relics of Latvian gloves and caps date from the fourteenth to fifteenth centuries,³¹ it seems probable that the knitted fabrics have been largely diffused among Latvian peasantry in the following centuries. M. Slava in the monograph on Latvian popular costume has described extremely richly patterned stockings and gloves with geometric and vegetal ornament. However, most of the surviving examples only date from the nineteenth century.³² The oldest samples of popular knitted costumes found on an archaeological site in Estonia date from the seventeenth century. K. Kõniss has written about the ornamentation of Estonian peasant knitting, distinguishing about fifteen kinds of geometrical design in knitted costumes. The patterning of stockings, gloves, socks, headwear, waistcoats and shirts reproduced the traditional motifs of different Estonia regions. The earliest

fabrics were made of natural coloured wool but later the peasants began to use vegetable dyes with preference given to various shades of blue. The enormous variety of shapes in different garments can be associated with different technical solutions used in hand knitting. Stockings without soles were worn with different forms of knitted gloves and waistcoats both for men and for women. Coloured stockings with the decoration on the calves and the multicoloured waistcoats *julaiki* had arrived in the nineteenth century in the Baltic islands of Moulou and Kichnon (Muchu and Kichnu).³³ The collection in the ethnographical museum in Tartu (Dorpat) of nearly 4000 knitted parts of Estonian costumes is one of the richest in Europe. Il. 50—51. In Lithuania, stocking and glove patterning has also been very ornate.

Among the German countries the best known was the folk knitting in Austria and Upper Hesse, and in Upper Hesse this dominated the influence of Denmark. In the nineteenth century women wore a short plain bodice of coloured woollen thread and also a knitted striped waistcoat. Stockings were worn together with short protective socks.³⁴ Austrian popular knitting has been well analysed in a compendium of articles entitled *Maschen* concerning the knitting history, in which H. Harter wrote about the changes of fashion in popular stockings of Lower Austria from the seventeenth century. Peasant stockings were quite different from stockings worn in the town. Colours and patterns of stockings varied according to the sex and ages of peasants and the different regions of Lower Austria. Already in the late fifteenth and early sixteenth centuries peasants near Salzburg wore knitted stockings and trousers. The peasants of the Salzburg region and from Tyrol wore knitted garments, as well. These were jackets, waistcoats, trousers, long coats, women's dresses, gloves, berets, caps and bags, and knitted children's frocks (for instance, for christenings). The variety of patterned knitted parts of Austrian peasant costumes is one of the earliest and richest in all Europe.³⁵

France was a very important centre of hosiery production and in the eighteenth century began to compete strongly with England. But its only since the nineteenth century flat vernacular knitting has survived in that country; there appear such unusual items as braces and garters made in garter stitch used in Brittany and Auvergne. Knitted braces were coloured or patterned with trimming and fringes. In Savoy special socks made only to the half foot, worn with sabots, were produced by hand knitting. Costumes with a large variety of knitted parts were worn by the peasant of the Pyrenees and Cévennes.³⁶

In Italy and Spain knitting was an important branch of textile production by the Middle Ages, but no information is available about the diffusion of peasant hand knitting in those countries in this early period. It is possible to find only brief references to the knitted parts of peasant dress in the nineteenth century and a few samples in ethnographical museums. For instance, the Museo delle Arti e Tradizioni Popolari in Rome has collected numerous caps, made like night caps, stockings, socks and gloves. The knitted parts of costumes were used in southern Italy, in the region of Calabria.³⁷ Also in the ethnographical and textile history museums in Spain, numerous parts of knitted costumes such as patterned bodices, petticoats, trousers, shawls, stockings, socks, caps and gloves have been preserved. A very large diffusion of knitting sheaths in all

region of Catalonia, Spain and Portugal testifies to the use of knitted parts of dress in peasant costumes.³⁸

Hand knitting in Bohemia is documented by J. Staňková. She studied this non-woven technique as part of the history of textiles. As was mentioned before, she analysed the patterning of popular stockings. In the nineteenth century, numerous parts of the peasant dress were knitted by women and by men too. It consisted mainly of stockings and socks, but also knitted laces, muffs, waistcoats, shirts and jackets for both sexes, shawls and full caps.³⁹ Peasant knitting in Slovakia is also very interesting, especially the woollen stockings tubulated on the calf with special wooden sticks and heavily full. Another kind of woollen stockings or socks with a heavily full sole were worn with the moccasins by Slovakian mountaineers.⁴⁰ In the mountainous regions patterned stockings and socks were particularly widespread. Il. 48

A similar variety of knitted parts of popular dress has been diffused through Hungary, as both that country and Slovakia belonged to the Hapsburg Empire till the First World War. Patterned stockings, socks and slippers for men, women and children were heavily full, and sometimes worn with leather soles. E.S. Göney has described the old fulling mill for woollen stockings in Nagbajom. The woollen stockings of the region of Torokó were striped red and white for young girls and blue for women.⁴¹ Caps with leather visors were also a characteristic item of Hungarian peasant knitting.

The first knitter's guilds in Poland developed in the seventeenth century, and knitting spread outside to the country areas rather late. Men's national costume in Poland was worn with boots, thus without any knitted stockings. Only women wore knitted stockings particularly in Silesia and Pomerania. In the western regions the influence of west European fashion was strong enough to appear even in peasant costume, but on the whole, Polish peasantry only began to wear knitted stockings, socks and muffs in the nineteenth century.

Russian peasant knitting took very characteristic shapes, decorations and combinations of colours with very simple technical solution. Knitted fabrics found in ethnographical museums date from the beginnings of the nineteenth century as the earliest, but the traditional form and technique of these garments, the functional character of the warm stockings and the knitted gloves, which were worn in winter for working, demonstrate that they were in use from the eighteenth century if no earlier. Particular interest attaches to the northern regions of Russia, such as the Archangel district and the Komi republic. Knitting from the Archangel region, made by the simple technique with wool that was sometimes undyed and decorated with a geometric motif, shows that gloves and stockings were generally worn in the last century. The thick wool was dyed in several main colours such as white, black, orange, yellow and red, and more rarely blue, violet and green. Some stockings imitated the fashion of the day and are decorated with an open-work insertion on the calf. Knitwear from Comi republic is different ornamented, and it is difficult to decide how old it is. We must emphasize the originality of decoration in Russian knitwear from the Rjazan, Tula or Tambov regions. Peasant knitting from Byelorussia and the Ukraine followed fashion much more closely than did that of the peoples in the north, so it is more difficult to trace the spread of this technique. But

in popular Ukrainian textiles, the knitted parts of dress was just belts and stockings.⁴²

In Moldavia, Wallachia and the Balkans, knitted articles as part of traditional costume only became popular in the late nineteenth century. The Turks were uninterested in that branch of production, although in the high mountains the demand for closefitting garments to protect hands or feet would have created the need for such wear. The Bulgars wore stockings without feet, which of course are much easier to knit, cuffs and gloves with one finger. Popular knitting in Albania also came late and was not particularly common. Only Dalmatia had a longer tradition of peasant knitting but this was probably due to the influence of Italy. I have seen richly patterned woolen stockings and gloves in the museum at Dubrovnik.⁴³

In Greece, knitting was executed using needles or crochet, what is another technique. Among the components of Greek traditional costumes, the vests and stockings are usually knitted, the vest with two and the stockings with four needles. Crochet was used for garments which appeared firstly in the late nineteenth century, such as petticoats and pelerines – a kind of round short cape. At the same time cushion-covers appeared too. The material used in Greek knitting was wool, sometimes cotton. The Greek islands were famous for their hand knitting production of stockings, gloves and caps of silk which was, sold by women from the early nineteenth century onwards. The only survival of this craft is to be found in the cotton lace stockings of Skyros and Skopelos and the knitting of Patmos. "The old fesia worn by the men on the island were also knitted (with four knitting needles), probably imitating the well known earlier type of knitted island caps. These fesia were worked with a loose stockings stitch. They were then left to boil in red dye and beaten to make the yarn fluffy. When dry the texture resembled that of felt".⁴⁴ Some of the patterned knitting items and carved knitting sheaths are kept in the Greek museums. Three knitted caps made of cotton striped white and blue are preserved in Metropolitan Museum of New York.⁴⁵

4. Peasant Knitting outside Europe

Popular knitting outside Europe has hardly started being investigated. It exhibits very interesting technical and ornamental solution, particularly in the mountainous regions. We should start with the Caucasus, where it is pretty difficult to separate precisely the knitting production of European Dagestan from that of Asiatic Georgia and Armenia. All relics preserved in local museums and in the collection of the Museum of USSR Peoples Ethnography in Leningrad, reveal the same characteristic features of patterned woolen knitwear and differ only in their geometrical ornamentation. This knitting developed independently of the influence of Near Eastern textile industry, but some influence of Arabian knitting may have been possible in the Middle Ages. Amongst the hand-knitted examples we might mention are the original design of shoes with upturned toes and very heavily fulled soles, as well as stockings, gloves, caps and bags.⁴⁶ Only the peasant knitting of Georgia has been studied

by Georgian ethnographer C. Karaulashvili. Her doctoral thesis is dedicated to non-woven textile techniques such as knitting, crocheting, sprang and different kinds of braiding. Her classification and attribution of the studied relics to one of those technique, is open to discussion. It is not always clear, which solution was applied in a given case. Her work is also lacking a precise terminology. The authoress mention a fragment of a knitted shoe, dating from the third-fourth century. I have not been given the run of this relic; yet, it seems more probable to have been made by knotless netting technique. The information gleaned from mediaeval miniatures representing head coverings suggests the use of sprang. The rest of the discussed relics comes from the nineteenth and twentieth centuries ethnographical material. The items used to be decorated with geometrical design, vegetal runners having appeared very rarely. Particularly interesting and varied are the knitted shoes worn in the mountainous regions of Georgia. The authoress dedicated a separate paper to those products. The shoes knitted from thick wool were strongly fulled, especially the sole, as such they used to be pretty durable. The toe-caps were sometimes upturned, since the shoes were used for walking the mountainous paths. Other pieces of peasant hand knitting in Georgia were caps, stockings and one- or five-fingered gloves. Apart from wool, knitwear was also made from cotton and silk.⁴⁷

Knitted garments and shoes are also discussed by T. Bezarashvili in her monograph on women's dress in the mountainous part of eastern Georgia in the latter part of the nineteenth and the twentieth centuries. The authoress presents the old forms of knitted garments and their changes according to fashion.⁴⁸

The type of popular dress worn in various parts of Turkey was not favourable to the development of knitted accessories. This question, however, requires further investigations. S. Tansug carried out ethnographical studies on the group of Turkmen living in Anatolia. They used wear "the socks which are knitted from hand-spun, home dyed woolen thread, using five needles. The toes and heels are of black thread, the toes being decorated with five pink roses with green leaves. The legs are white, with blue zigzag stripes".⁴⁹

This information points to the need for close-fitting, thus, best of all, knitted coverings for legs, head and hands in mountainous regions of the Middle East and North Africa. Knitted socks and stockings from the Coptic and Arab times, sometimes made by the knotless netting technique, reveal the necessity of protecting the feet when wearing sandals. In contemporary Islamic world, there is a permanent large demand for little round caps, worn commonly by men as a separate head covering, sometimes under the turban. There appeared a monograph by S. Ferchiou about the mass production of these caps in Tunisia. They are made by women, employed in the putting-out system, using four rectangular and not circular needles. The other production process, like fulling, dyeing and combing or smoothing of the surface, were the man's tasks, performed in great workshops or even manufactures. In the sixteenth to eighteenth centuries, this type of caps was imported in great quantities from France, Italy and Spain. But Tunis, by then, was also an important production centre, to which even now, the best quality items were attributed. The best caps were dyed with kermes (*kermes coccus ilicis*), poorer ones with cochineal, while the most common products used chemical dyes.⁵⁰ It is difficult, of course, to

declare the artisanal production of knitted head coverings to be peasant, but it testifies to the wide diffusion and great demand for those articles, which could also be made in villages, obviously giving product of poorer quality. Knitted gloves and head coverings are made in Maroc, too: hand knitting is performed in the street workshops in Fez, Marrakesh and other smaller towns.⁵¹ II. 49

This short survey of the literature and the most important European museums may give a notion of the technique used in peasant knitting and the variety of knitted items of peasant costume. In the most widespread articles of peasant costume it may be possible to show the early influence of general west European fashion in different countries. This short review of published studies and numerous artifacts preserved in various museums allows us to state that hand knitting persisted in most European countries in the course of the nineteenth and the beginning of the twentieth century, while in some east European and Balkan countries it had only began to spread. For the first time I have tried to gather and publish the fragmentary data about this craft from the Caucasus, the Near East and North Africa, at the same time making an attempt to show the importance of knitted garments in the dress of Islamic peoples.

Thus, hand knitting was still flourishing, by the time that machine production had become widespread. It should be remembered, however, that apart from peasant production for domestic use or a small local market, hand knitting was also an occupation of women not engaged professionally. For them are meant the numerous handbooks and hints, which present various technological and ornamental solution. This private production is beyond the subject of this work. Nevertheless, the links between peasant knitting discussed here and urban private knitting should not be forgotten. This particularly refers to the influence of folk patterning, which owing to varied design and vivid colours, was utilized in many countries in the production of knitted garments, being those of great importance in the fashion of our century.

XI Conclusion

This book presents the development of the production and use of knitted garments from the Middle Ages to the turn of the eighteenth and nineteenth centuries. Until the beginning of the sixteenth century knitting on needles was one of many textiles techniques carefully registered on the basis of archeological relics, without having any real knowledge about the degree of diffusion of these products. The establishment of the first guild in the second half of the thirteenth century and the iconographically documented knowledge of knitting on five needles testify to the triumph of this technique over other methods of making flexible garments, such as crocheting, knoless netting or sprang. Research into written sources preserved in rather great numbers in some European countries may considerably widen our knowledge of the history of hand knitting in the fourteenth-sixteenth centuries. It is exactly in this period that the production and use of knitted garments diffuses. This is indicated both by fragmentary data on the establishment of the first gild organizations, and by extracts from accounts or probate inventories, and finally by whole collections of finds coming from excavations. In this period, patterned knitwear in particular was replacing woven silk products or leggings sewn from the best cloth. This substitute role of hand knitted products still continued in the seventeenth century, in knitted garments: doublets, waistcoats, as well as knitted carpets, performing a similar function as the earlier cushions. Cheaper patterned knitwear was replacing the more expensive products of artistic weaving. At the same time, however, knitted headgear and gloves were an excellent technical resolution, known from the early Middle Ages. In the sixteenth, or perhaps even the fifteenth century, knitted stockings become diffused and the increasing demand for them brought about the invention of the machine. Thus, during the period from the fourteenth to sixteenth century, knitted coverings for the head, hands and legs diffuse to wider circles of consumers, gaining predominance over similar articles produced by other textile techniques.

In Chapters IV-VII an attempt is made to present as comprehensively as possible the diffusion of guild and manufacturing knitting production in different European countries. Unfortunately, there is no information available about the extent of home knitting production for personal use in towns and villages. This production could have satisfied a considerable part of the local demand for stockings, night-caps and gloves, while guild craftsmen, and later manufactures, would have been producing more refined knitwear worn only on special occasions. For this reason, information on European knitting production presented in this book pertains primarily to productions catering to a wider market and especially to export. It is much more difficult to find fragmentary data referring to a couple of craftsmen or a small manufacture, which differed from a guild workshop only by a more advanced division of

labour process and the employment of unqualified workers. Nevertheless, the absence of larger production centres in a given region does not necessarily prove the existence of home hand-knitting production, since the latter was most closely connected with the demand for knitting garments.

At the turn of the eighteenth and nineteenth centuries certain shifts occur in the distribution of the most important export production centres in different parts of Europe. During the eighteenth century, the output volume of the French knitting industry exceeded the English one owing to mass production of cheap and shoddy coloured articles and the very lightest woolen ones intended in part for export to central and southern America, the Pyrenean Peninsula and northern Africa, as well as to central and eastern Europe and the Near East. Languedoc knitting gains the leading position. In Nîmes itself up to 2.5 millions pairs of stockings were being produced yearly with a third of their production being exported to America. The growth of this centre suffered a setback at the end of the century due to Spanish customs restrictions. At the turn of the eighteenth and nineteenth centuries the knitting centre in Champagne has gained in importance, particularly Troyes and its surroundings. In the same period English knitting, held back by the Napoleonic blockade, acquires greater productive possibilities owing to the considerable improvements made to the simple knitting frame and the large number of skilled workers. Some Italian towns are also manufacturing for export, while the Catalan manufactures are beginning at the turn of the century to product for American market. In addition, among the other important centres can be mentioned the Tournai region in southern Netherlands and central Jutland in Denmark. In Germany, not only does the earliest mentioned Hamburg gain in importance, but more especially Thuringia and Saxony. Prussian knitting production also acquired quite considerable dimensions, some of its products being exported to central and eastern Europe. Austrian manufacturers diminished the importance of the earlier developed Bohemian knitting, while Russian and Polish production was able to satisfy a major part of their local demand.

In the three Chapters VIII-X, the assortment of knitted products described shows how the demand of consumers were satisfied in the different, mainly European countries. Knitting articles of dress were more common than knitted carpets, the masterpieces of patterned hand knitting. The peasant's hand knitting fulfilled the dresses needs of the largest part of the population of all these countries and has special importance exhibiting the different design of nations and regions.

Against the background of this data on production centres, the consumption of knitted garments in different European countries has been outlined. At the same time, we should not be misled by the preserved relics, consisting for major part of luxury articles. On the basis of the data concerning the dimensions of production and fragmentary written sources about the utilization of knit goods, it can be said that at the turn of the eighteenth and nineteenth centuries they were widespread among all social strata in those European countries, where French men's fashions had infiltrated. It is precisely here, that data on the export productions centres have to be supplemented by fragmentary information about home hand knitting. Knitted garments bought abroad or produced by local manufacturers and craft workshops catered primarily to the richest buyers,

reaching down eventually to the middle nobility and burghers. However, even in these classes, stockings for every-day use were sometimes made at home. In 1770 the Polish writer, J. Niemcewicz's mother presented him with "6 pairs of fine stockings, made by her own hand".¹ In inventories of Norman peasants in the thirties and fifties of the eighteenth century knitted stockings are not enumerated, although they could be purchased in the local shop. Probably it was not worthwhile nothing in the inventory the most frequently worn domestic products. In Pomorze Słupskie by 1616, peasants were forbidden to wear both knitwear, and obliged to use only that made by themselves. In the eighteenth century in Poland wool was provided for stockings so that servant maids could make them for themselves. In another text we find "the peasant's stockings" of 1600.² Purchased knitwear was no longer a luxury for consumers of average means, but still their production at home was part of the small savings, testifying to the thrift of housewives. The turn of the eighteenth and nineteenth centuries along with the spreading fashion for close-fitting underclothing worn under light and flowing gowns, brought with it an increased demand for different knitted garments. These were not just stockings but also larger items of underclothing or even outer garments. However, this demand could not be satisfied by the existing volume of production and its main predisposition towards leg coverings.

It is difficult to discuss here the fluctuations in the mutual relationship between demand and productive capacities of individual knitting export production centres. Of great significance were political factors, such as the continental blockade or the Napoleonic Wars, as well as fluctuations in demand for European knitwear on the overseas markets. Nevertheless on examining European textile production over its long duration, thus over a period of at least one century, we can notice that productive efficiency, such as the technique and organization of production, was gaining in importance. In many countries, the production of the knitting machine was connected with the application of a manufacture-type of division of labour. This interrelationships, however, was most clearly marked in countries where machine knitting was an element of the state economic policy, as in Prussia, Russia and to a lesser degree in Poland and some Scandinavian centres. Lee's simple knitting frame could function perfectly well in craft workshops. In mass knitwear production centres, knitters' guilds were being established to facilitate the promotion of trade apprentices, journeymen and to organize the work in smaller workshops. However, guild organization in the case was of secondary importance and could not limit the volume of production. It was sometimes being replaced by a large domestic production of unfinished knitted articles which would then undergo the finishing process in the centralized manufactures. This domestic putting-out system of production provided work for whole families, did away with production restrictions affecting apprentices and journeymen, the expensive professionally trained workers, and utilized on a large scale the cheaper labour power of women. Both the organizational and technical aspects of the simple knitting frame made factory production difficult. Because of relatively low output norms, mass production on this machine required a cheap labour force.

The phenomenon of increased consumption needs and difficulties in satisfying those demands, led in the first half of the nineteenth century to a third

technical revolution in the history of European knitting. The invention and introduction into production of the rotary knitting machine was the basic for the transition to factory production, and the contemporary knitting became the most important, next to weaving, branch of textiles. These changes occurred slowly, yet the situation from the turn of the eighteenth and nineteenth centuries, despite production restrictions occasioned by political events, already shows the beginning of the complicated process.

The knitting machine invented by Lee was a flat knitting frame and only the invention of the rotary knitting machine made possible the production of sack-type of hosiery, because the needles in it were arranged radially forming a closed circle. This machine provided much wider possibilities of fashioning knitted garments than the simple knitting frame. This technical innovation was preceded by a series of less radical methods of arranging the needles. The multi-directional arrangement of the rows of needles was already used by Jedediah Strutt in a machine patented in 1758. Felkin wrote about it: "Strutt left every part and movement of Lee's frame unaltered, so that when ribbing apparatus is attached, if not put in separate action, Lee' frame may be worked, as it always has been, and produces perfect plain web; put both into co-operative action, and ribbed work is the result. [...] The apparatus added by Mr Strutt consisted of an iron machine, hung on jointed arms in front of the ordinary frame. In this were placed needles of like form with those at work already, but while the row in Lee's frame is set horizontally, these were placed nearly perpendicularly, and so as to enter between the horizontal ones". A further step in this direction was the construction of a machine for the production of warp knitwear. The first model was built by Crane in 1775, while in 1796 Brown and Pindar patented a warp knitting machine with a vertical arrangement of needles. W. Felkin wrote about this invention too. In Crane warp-frame the thread was given to every needle. "The web was non-elastic, and was cut by scissors, and sewn up into the shape of hose; and being put on and taken off the leg with difficulty, the unsightly seam was liable to break". In 1796 Brown and Pindar arranged a warp hosiery frame, in which "the needles were placed right, and not in the usual, horizontal position".³

This invention considerably widened the possibilities of using knitted fabric for sewing garments, at the same time that it changed the character of knitting which till then had been producing finished articles.

J. Rapley wrote about the development of patterning and shaping in frame knitting. She informed that towards 1750, the standard of English production progressively declined and the development of French trade created a serious rivalry. The change of fashion made ribbed hose very much in demand. Ribbed stockings for men and women remained fashionable for almost the whole century. "It was all part of the mania for stripes, but being perverse, people were not satisfied with simple horizontal stripes but must have vertical ones. Only after the invention of Jedediah Strutt was it possible to produce ribs quickly". The authoress had shown the next changes of fashion such as oyelet holes, fleece-lined goods, the knotted or double loop work, the zig-zag pattern and more elastic goods.⁴ To almost all of these fashion change some new invention were patterned altering the knitting frame. Some of the numerous English inventions from the late eighteenth and very early nineteenth centuries

were introduced a little late into local production, as the demand of fashionable knitted goods fell during the period of the continental blockade.

The rotary knitting machine was invented in France. The first patent was obtained by Decroise in 1798, although French hand-books make mention of the device of Englishman S. Wise in 1769. The next patent is obtained by Jeandeau in 1803. A great improvement was the knitting machine with fixed teeth, patented in 1808 by a certain Leroy, a Parisian watchmaker. Further modifications were introduced by Andrieux who built the first functioning rotary knitting machine in 1815 and improved it in 1821. Among further modifications of the machine, the most important are the technical inventions of Jacquin, a watchmaker from Troyes, in 1833-1836.⁵ In this leading French knitting centre the rotary machine was soonest introduced to factory production, facilitating the fashioning of knitwear. It is not surprising that it was in this very centre of production that the important invention of the knitter Delarothière came into being. In 1829 he built a new model of the warp knitting machine. In 1834 he obtained the first patent for a device enabling an automatic decrease of stitches in the knitted articles. Subsequent knitting machines from the Champagne centre and dating from the nineteenth century are preserved in the museum in Troyes.⁶ This last invention was an enormous step in accelerating the rate of production of knitted garments. The manual setting of the machine so as to decrease or increase the number of stitches needed considerably prolonged mechanical production and in the eighteenth and early nineteenth century only knitwear of a constant width could be produced at a rate considerably exceeding the norms given in Chapter VII.

The increasing demand for various types of knitted garments caused, already in the second half of the eighteenth century and later, at the beginning of the nineteenth century, an enormous number of small modifications. The lead finally to machine production of patterned and open-work knitwear, products with stitches that did not run, sack hosiery (easier to fashion since then), and finally to the automatic increase or decrease of the number of stitches in the rows, in the working part of the machine. Nevertheless, this picture would satisfy only the historian of technology who is mainly interested in the technical possibilities of production. These inventions accelerated the work of knitters in the leading production centres of England and later France. An enormous number of products were made in small establishments run by impoverished urban craftsmen in their tiny rooms, and particularly by domestic producers organized in the putting-out system in the less developed regions of southern France, central England, central Jutland, Thuringia and Saxony, Bohemia and Austria. The simple knitting frame was suitable for work in these craft workshops, domestic producers' rooms, or tiny manufacturing premises. While master knitters in many countries occupied the top position of the guild hierarchy, machine knitters could later only prosper reasonably with a large demand for their products. The output of knitted garments was, to an unusually great extent, subject to economic fluctuations. Due to the political and economic changes of the end of the eighteenth and beginning of the nineteenth century the most socially enlightened English machine knitters start to organize strikes during this period and fighting for their rights. Somewhat later, French and German knitters follow suit.⁷ This book attempts to present the several hundred

years' old history of hand and machine knitting right from the differentiation of the tool machines, though changes in their drive and factory production, explaining the first changes of the knitting frame before the mass production on rotary machine and in the factories of the nineteenth century. This history reveals the close interrelationship between fashion and technical development, which hitherto has not been sufficiently taken into account in the history of the contemporary textile industry.

Footnotes

Abbreviations used:

Bulletin de CIETA – Bulletin de Liaison du Centre International d'Étude des Textiles Anciens
Kv. HKM – Kwartalnik Historii Kultury Materialnej
TH – Textile History

I. Introduction

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² I. Emery, *The Primary Structures of Fabrics. An Illustrated Classification*, Washington 1966, pp. 30-49.

³ O. Nordland, *Primitive Scandinavian Textiles in Knotless Netting*, Oslo 1961 and the review: A. Liestøl, "Ein kommentar", *Norweg. Tidsskrift for folkelivsgenskning*, Oslo 1962, pp. 231-243.

⁴ H.E. Kiewe, *The Sacred History of Knitting*, Oxford 1967; the same, *Origin of the Isle of Aran Knitting Designs*, n.p., n.d.; B. Norwick, "The Origins of Knits: the Ardagh Chalice and Wire Knitting", *Knitting Times*, October 10, 1977, pp. 35-36; the same, "1776 and the Mystery of the Missing Knits", *Knitting Times*, July 5, 1976, pp. 24-25; M. Grass, *History of Hosiery from the Plioi of Ancient Greece to the Nylons of Modern America*, New York 1955, pp. 96-120; *Strickat och Virkat i Nordisk tradition*, Vaasa 1984.

⁵ *Encyclopédie ou dictionnaire raisonné des sciences, des arts et des métiers par une société des gens de lettres*, vol. 2, Paris 1751; J. Beckmann, *Anleitung zur Technologie oder zum Kennniss der Handwerke, Fabricken und Manufacturen*, Göttingen 1777. In Denmark and Norway: A. Sundt, "Strikke Stromper", [in:] *Folke venner. Et Tidsskrift udgivet af Selskabet for Folkeoplysningens Fremme*, Kristiania 1865, pp. 69-80. I. Turnau, *Kultura materialna Oświeceni w rychnach Daniela Chodowieckiego*, Wrocław 1968.

⁶ Henson's *History of the Framework Knitters (1831)*. A. Reprint with a New Introduction by Stanley D. Chapman, Trowbridge 1970.

⁷ Felkin's *History of the Machine-Wrought Hosiery and Lace Manufactures. Centenary edition. Introduced by an Essay on the Life and Work of William Felkin* by Stanley D. Chapman, Newton Abbot 1967.

⁸ J. Norbury, *A Note on Knitting and Knitted Fabrics. A History of Technology*, vol. 3, Oxford 1957, pp. 181-185; A new publication of R. Rutt, *A History of Hand Knitting*, London 1987, enclose important ascertains, but I received it too late to take into consideration.

⁹ A.F. Kendrick, *Catalogue of Textiles from Burying-Grounds in Egypt. II. Period of transition and of Christian Emblems*, London 1921, pp. 88-91, il. XXX-XXXII; C.I. Lam, *Cotton in Medieval Textiles of the Near East*, n.p. 1937, pp. 51-58, il. XIX, S. M. Levey, *Illustrations of the History of Knitting*, Selected from the Collection of the Victoria and Albert Museum, "TH", vol. 1, 1969, pp. 183-205; J.P. Wild, *Textile Manufacture in the Northern Roman Provinces*, Cambridge 1970.

¹⁰ L. Bellinger, *Patterned Stockings: Possible Indian Found in Egypt*, "Textile Museum. Workshop Notes", 1/2, no 10, 1954; D.K. Burnham, "TH", vol. 3, 1972, pp. 116-124.

¹¹ F.A. Wells, *The British Hosiery and Knitwear Industry, its History and Organisation*, Newton Abbot 1972; S.D. Chapman, *The Early Factory Masters. The Transition to the Factory System in the Midlands Textile Industry*, Newton Abbot 1967; the same, *The Genesis of the British Hosiery Industry 1600-1750*, "TH", vol. 3, 1972, pp. 7-50.

¹² M. and A. Grass, *Stocking for a Queen. The Life of the Rev. William Lee, The Elizabethan Inventor*, London 1967.

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- ¹⁴ M. Dubuisson, Musée de la Bonneterie, Troyes 1964; the same, "La bonneterie au Moyen Âge", *The Bulletin of Needle and Bobbin Club*, vol. 50, nos. 1-2, 1967, pp. 34-45; Heywood, "The Rural Hosiery", *op. cit.*
- ¹⁵ *Trois siècles de Bonneterie au Métier en Bas Languedoc. Exposition au Musée de Vieux Nîmes*, Nîmes 1967; O. Teissier du Cros, *Les anciennes techniques Cévenoles. Exposition organisée par la Municipalité du Vigan*, Le Vigan 1961; Sönnenscher, "The Hosiery Industry...", *op. cit.*
- ¹⁶ R. d'Harcourt, *Les textiles anciens du Pérou et leurs techniques*, Paris 1934, p. 91. English edition: *Textiles of Ancient Peru and their Techniques*, Washington 1962.
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Beginnings of Hand Knitting

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- ² M. Hald, *Ancient Danish Textiles from Bogs and Burials. A Comparative Study of Costume and Iron Ages Textiles*, Copenhagen 1980, pp. 285-297.

- ³ G. Udé, *Etude générale de la bonneterie. Le vade-mecum du bonnetier*, Paris n.d., pp. 4-9; M. Brooks Picken, *The Fashion Dictionary. Fabric, Sewing and Dress as Expressed in the Language of Fashion*, New York 1957, p. 194; R. Turner Wilcox, *The Dictionary of Costume*, London 1970, pp. 187-188; G. Willet Cunningham, P. Cunningham, C. Beard, *A Dictionary of English Costume 900-1900*, London 1972, pp. 260-261.
- ⁴ O. Nordland, *Primitive Scandinavian Textiles in Knottless Netting*, Oslo 1961, pp. 21-71; I. Emery, *The Primary Structures of Fabrics. An Illustrated Classification*, Washington 1966, pp. 30-49.
- ⁵ Nordland, *op. cit.*, p. 99.
- ⁶ The relics in the Musée de l'Homme in Paris, Asiatic Department: H. E. Wulff, *The Traditional Crafts of Persia. Their Development, Technology and Influence on Eastern and Western Civilizations*, Massachusetts 1966, pp. 228-230.
- ⁷ This first conjecture is forwarded by M. and A. Grass, *Stocking for a Queen. The life of the Rev. William Lee the Elizabethan Inventor*, London 1967, p. 52. The size of these products indicates rather that they were used by children.
- ⁸ J. P. Wild, *Textile Manufacture in the Northern Roman Provinces*, Cambridge 1970, pp. 59-60, 102-121, 138-139.
- ⁹ R. Pister, L. Bellinger, *The Excavations at Dura-Europos. Final Report, II. The Textiles*, New Haven 1945, p. 54.
- ¹⁰ A. F. Kendrick, *Catalogue of Textiles from Burial-Grounds in Egypt, II. Period of Transition and of Christian Emblems*, London 1921, pp. 88-91; C. J. Lamm, *Cotton in Medieval Textiles of the Near East*, n.p. 1937, pp. 157-158; R. Pister, *Textiles de Halabiyeh (Zemobia) découverts par le service des Antiquités de la Syrie dans la Nécropole de Halabiyeh sur l'Euphrate*, Paris 1951, p. 26; the same, *Textiles de Palmyre*, vols. 1-3, Paris 1934-1946; A. Riegl, *Die ägyptische Textilfunde im K. K. Österreich. Museums Allgemeine Charakteristik und Katalog*, Wien 1889, p. 51.
- ¹¹ Nibbe Abdullah-Nirgi, private collection of Dr. Walter Endrei in Budapest; Hermitage Museum in Leningrad, Eastern Department, after seventh century.
- ¹² P. F. Fournier, "Patron d'une robe de femme et de bas gallo-romains trouvés aux Martres-de-Veyre", *Bulletin Historique et Scientifique de l'Auvergne*, vol. 76, Clermont-Ferrand 1956, pp. 202-203. Stockings and socks were woven from thick woollen yarn in twilled weave, cut and sewn, giving the general shape of the leg.
- ¹³ F. Boucher, *Histoire du costume en Occident de l'antiquité à nos jours*, Paris 1965, p. 159; B. Schmedding, *Mittellateinische Textilien in Kirchen und Klöstern der Schweiz. Katalog*, Bern 1978, pp. 98-99.
- ¹⁴ Hald, *op. cit.*; M. Hald, "Fra bar fod til Strømpe", [in:] *Om Strømpe Valby*, Valby 1953, pp. 7-46; A. Geijer, *Die Textilfunde aus den Gräbern Birka III*, Uppsala 1938, pp. 128-132.
- ¹⁵ R. d'Harcourt, *Les textiles anciens du Pérou et leurs techniques*, Paris 1934, pp. 91-92, 122-123; the same, "Les textiles dans l'ancien Pérou", *Les Cahiers Ciba* no. 86, 1960, p. 27. The knowledge of the knitting technique was probably first brought to Peru by the Spanish settlers and rather numerous products from the contemporary period are preserved there; P. K. Coleman, "Folk Textiles of Latin America", *Textile Museum Journal*, vol. 1, 1964, pp. 12-16.
- ¹⁶ I am referring to unpublished relics discovered in 1906 and kept in the Musée Archéologique in Nîmes.
- ¹⁷ L. Bellinger, "Patterned Stockings: Possibly Indian Found in Egypt", *Textile Museum. Workshop Notes*, nos. 1-2, 1934; Victoria and Albert Museum in London, T. 87/1937, T. 201/1929.
- ¹⁸ A. Mazaheri, *La vie quotidienne des Musulmans au Moyen Âge X-XII^e siècle*, Paris 1951, pp. 67, 71-74, 99, 271.
- ¹⁹ M. Gomez Moreno, *El Pantón Real de Las Huelgas de Burgos*, Madrid 1946, pp. 21-23, 32-37, 85-90; the same, "Presas reales sevillanas (San Fernando, doña Beatriz y Alfonso el Sabio en sus tumbas)", *Archivo Hispánico*, 2 época, nos. 27-32, 1948, pp. 191-204. These relics are probably lost; M. Dubuisson, "La bonneterie au Moyen Âge", *The Bulletin of the Needle and Bobbin Club*, vol. 50, nos. 1-2, 1967, pp. 40-44 mentions these relics giving another dating; Kulturen in Lund, no. KM 37719, 8 × 13 cm. Thanks to the Museum Kulturen for showing me the relic in 1979 and for the photo.
- ²⁰ J. Braun, *Die liturgische Gewandung im Occident und Orient nach Ursprung und Entwicklung. Verwendung und Symbolik*, Freiburg im Breisgau 1907, pp. 366-380; F. Bock, *Geschichte der liturgischen Gewänder des Mittelalters oder Entstehung und Entwicklung der kirchlichen Ornate und Paramente in Rücksicht auf Stoff, Gewebe, Farbe, Zeichnung, Schnitt und rituelle Bedeutung nachgewiesen*, vol. 2, Bonn 1866, pp. 137-147; Ch. Rohault de Fleury, *La Messe, Études archéologiques sur ses monuments*, vol. 8, Paris 1889, pp. 191-196; Ch. de Linas, *Vêtements sacerdotaux et anciens tissus conservés en France*, Paris 1860, pp. 197-226.
- ²¹ Braun, *op. cit.*, pp. 366-380; de Linas, *op. cit.*, pp. 197-236.
- ²² Hald, *op. cit.*, pp. 308-309; S. Müller-Christensen, H. E. Kubaich, G. Stein, "Die Gräber im Königschor. Vorbemerkung zu den Textilien", [in:] *Der Dom zu Speyer*, n.p. 1972, p. 958.
- ²³ Dubuisson, *op. cit.*, p. 39; Braun, *op. cit.*, p. 369; de Linas, *op. cit.*, p. 197; M. T. J. Rowe, "Fragments from the Tomb of One Unknown Bishop in Saint-Denis Paris", *The Bulletin of the Needle and Bobbin Club*, vol. 50, nos. 1-2, 1967, pp. 29-33.
- ²⁴ *Les trésors des églises de France*, Catalogue, Musée des Arts Décoratifs, Paris 1965, pp. 269-272.
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- ²⁶ E. Maillard, "Le point à l'aiguille au XIV^e siècle. Gant de l'abbé Pierre de Coupalay + 1334, Musée de Cluny", *Hyphé*, vol. 1, nos 5/6, 1946, pp. 210-215. I have dated the second glove at the later period than Dubuisson, *op. cit.*, p. 39.
- ²⁷ Braun, *op. cit.*, pp. 370-372; S. Christensen-Müller, *Sacrale Gewänder des Mittelalters*, München 1955, abb. no. 59, catalogue description no. 48; the same, "Vorbemerkung...", *op. cit.*, p. 945.
- ²⁸ Bock, *op. cit.*, p. 144; S. Christensen-Müller, *Das Grab des Papsten Clemens II im Dom zu Bamberg. Mit einer Studie zur Lebensgeschichte des Papstes von A. Freiherr von Reifsteinstein*, München 1960 – does not mention knitted products in the description of textile relics.
- ²⁹ Bock, *op. cit.*; de Linas, *op. cit.*
- ³⁰ Bock, *op. cit.*, pp. 137-147; Braun, *op. cit.*, p. 370, 377; Rohault de Fleury, *op. cit.*, pp. 191-196; L. Hampel, "Stricken und Wirken bis zum Jahre 1700", [in:] *Maschen, Geschichte der Mode der Strick- und Wirkwaren*, Wien (before 1964), p. 11; A. Latour, "Le bas en tricot", *Les Cahiers Ciba*, no. 56, Basle 1954, pp. 1948-1949; M. Hald, *op. cit.*, p. 308; one can also mention the sculpture in the Musée des Augustins in Toulouse representing Jean Tissandier, Bishop of Rioux (d. 1348) wearing gloves with long fingers, cuff and plaquettes on the upper part of the palm.
- ³¹ Braun, *op. cit.*, pp. 37-47; Bock, *op. cit.*, pp. 140-147; de Linas, *op. cit.*, p. 217.
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- ³³ Our Lady of Kłodzko about 1350, Berlin Deutscher Museum, no. 1624.
- ³⁴ Anonymous, so-called Gall, *Kronika polska*, Wrocław 1965, p. 124.
- ³⁵ Braun, *op. cit.*, pp. 401-402; Müller-Christensen, "Vorbemerkung...", *op. cit.*, p. 945; Schmedding, *op. cit.*, pp. 98-99.
- ³⁶ A. Nahlik, "Tekstiny z XII-XIV-wiecznego cmentarza w miejscowości Równina Dolna, pow. Ketrzyn", *Rocznik Olsztyński*, vol. 1, 1958, pp. 171-191.
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- ³⁸ Dubuisson, *op. cit.*, pp. 36-38.
- ³⁹ G. Mikolajczyk, "Początki dziewiaństwa w Polsce", *Z Oriehłani Wieków*, vol. 22, no. 5, 1953, pp. 157-159 – reveals a fairly large number of crocheted needles found in Poland in excavations from the early Middle Ages.
- ⁴⁰ For example the glove from Gdańsk from the thirteenth century: J. Kamińska, A. Nahlik, *Włókniemictwo gdańskie*, Łódź 1958, p. 106.

¹⁴ Hollriegel, A. *csengeri ref. Templari kriptáinak leletei*. II. *Archaeologiai Értesítő*, vol. 49, 1936, pp. 49-66 and the relics from the thirteenth century in the Magyar Nemzeti Múzeum in Budapest; E. Heunemeyer, "Zwei gotische Frauenharnetze", *Waffen und Kostümkunde* no. 1, 1966, pp. 13-21; I. Petraschek-Heim, "Die Goldhauben und Textilien der hochmittelalterlichen Graben von Viliach-Judendorf", *Neues aus Alt Viliach*, vol. 77, 1970, p. 118.

III. First Technical Upheaval in European Knitting in the Thirteenth Century and the Development of Guilds

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² R. L. Wyss, "Die Handarbeiten der Maria. Eine ikonographische Studie unter Berücksichtigung der Textilen Technik", [in:] *Artes Minores*, Bern 1973, pp. 179-180; L. Warburg, "Den strikkende Madonna i syd og nord", *Cras. Tidsskrift for kunst og kultur*, vol. 39, 1984, pp. 79-92 – gave some new iconography of Scandinavian Our Lady as knitter.

³ W. Endrei, *L'évolution des techniques du filage et du tissage du Moyen Âge à la révolution industrielle*, Paris 1958.

⁴ P. Fort, *La bonneterie*, Cames 1951, p. 2; A. Franklin, *La vie privée d'autrefois. Arts et métiers, modes, moeurs, usages des Parisiens du XIV^e au XIII^e siècles*, vol. 4, Paris 1894, p. 34, vol. 6, Paris 1896, pp. 271-295; B. Geremek, *Studium o średnio-wiecznym rynku sily roboczej*, Warszawa 1962, p. 17; the same, *Ludzie marginesu w średnio-wiecznym Paryżu XIV-XV wieku*, Wrocław 1971, p. 257, 558; R. Lespinaasse, *Les métiers et corporations de la ville de Paris. XIII^e-XVIII^e siècles. Tissus, étoffes, vêtement*, Paris 1897; R. Lespinaasse, F. Bonnardot, *Histoire générale de Paris. Les métiers et corporations de la ville de Paris XIII^e siècle. Le livre de métiers d'Etienne Boileau*, Paris 1879.

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⁹ *Felkin's History of the Machine-Wrought Hosiery and Lace Manufactures. Centenary Edition*, Newton Abbot 1967, p. 16.

¹⁰ V. Gay, *Glossaire archéologique du Moyen Âge et de la Renaissance*, vol. 1, Paris 1887, pp. 758-761, vol. 2, Paris 1889, p. 424.

¹¹ F. Piponnier, *Costume et la vie sociale. La cour d'Anjou XIV^e-XV^e siècle*, Paris 1968.

¹² K. G. Ponting, "Knitted Caps", *Bulletin de CIEITA*, no. 49, 1979/1, pp. 78-81; M. Hartley, J. Ingilby, *The Old Hand-Knitters of the Dales. With an Introduction to the Early History of Knitting*, Clapham 1951, pp. 4-13; K. Buckland, "The Mommouth Cap", *Costume*, no. 13, 1979, pp. 23-37.

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V. Diffusion of the Knitting Machine in England and France from the End of the Sixteenth to the End of the Eighteenth Century

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⁶⁷ E. Waldner, "L'ancienne confrérie bonnetiers du Haut-Rhin", *Bulletin du Musée Historique de Mulhouse*, Mulhouse 1894, pp. 5-55; G. Schmolliet, *Die Strassburger Tucher- und Weberzunft. Urkunden und Darstellung. Nebst Register und Glossar. Ein Beitrag zur Geschichte der deutscher Weberei und des deutschen Gewerbetrichs von XIII-XVII Jahrhundert*, Strassburg 1879, p. 548.

⁶⁸ Some of general elaborations provide dispersed and fragmentary data about knitters and different regions or localities. For example Ballot, *op. cit.*; G. Martin, *La grande industrie en France sous le règne de Louis XV*, Paris 1900; F. Levasscur, *Histoire de classes ouvrières et de l'industrie de France avant 1789*, vol. 1, Paris 1900.

VI. Diffusion of the Knitting Machine and Manufactures in Southern, Central, Northern and Eastern Europe from the End of the Seventeenth to the End of the Eighteenth Century

¹ Henson's *History of the Framework Knitters. A Reprint with a New Introduction by S. D. Chapman*, Newton Abbot 1970, pp. 51-57. I am grateful to the Pasold Research Fund for information on the results of M. Adams' investigations.

² For example H. R. O. Y., *La vie, la mode et le costume au XVII^e siècle*, Époque Louis XIII, *Étude sur la cour de Lorraine établie d'après les mémoires des fournisseurs et artisans*, Paris 1924, pp. 270-272; V. Gay, *Glossaire archéologique du Moyen Âge de la Renaissance*, vol. 1, Paris 1887, pp. 123-124; E. H. Guillard, *Un grand atelier de charité sous Louis XIV. L'hôpital général de la manufacture à Bordeaux (1658-1715)*, Paris 1916, pp. 85-151.

³ C. P. Oni, "Archéologie de la fabrique. La diffusion des moulins à soie 'alla bolognese' dans les États vénitiens du XVI^e au XVIII^e siècle", *Annales. Économies, Sociétés, Civilisations*, vol. 27, no. 6, 1972, pp. 1475-1496.

⁴ E. Veriga, *Storia della Vita Milanese*, Milano 1909, p. 165; the same, *Le corporazioni delle industrie tessili in Milano. Loro rapporti e conflitti nei secoli XVI-XVIII*, Milano 1903, the same, *Le leggi sumptuarie e la decadenza dell'industria in Milano 1565-1750*, Milano 1900, p. 47.

⁵ Felkin's *History of the Machine-Wrought Hosiery and Lace Manufactures. Introduced by an Essay on the Life and Work of William Felkin* by S. D. Chapman, Newton Abbot 1967, p. 71; R. Levy-Pisetzky, *Storia del Costume in Italia*, vol. 4, Milano 1967, p. 95; M. Vaussard, *La vie quotidienne en Italie au XVIII^e siècle*, Paris 1959, pp. 200-218.

⁶ M. Mirkovic, *Ekonomika historija Jugoslavije*, Zagreb 1958, pp. 86-87; F. W. Carter, "The Woolen Industry of Ragusa (Dubrovnik) 1450-1550: Problems of Balkan Textile Centre", *TH*, vol. 2, 1971, pp. 3-27. Also the numerous relics of machine knitting in the Palace of Rectors in Dubrovnik.

⁷ Henson's, *op. cit.*, pp. 87, 429; Felkin's *op. cit.*, pp. 71-82; A. Girard, *Le commerce français à Seville et Cadix au temps des Habsbourg. Contribution à l'étude du commerce étranger en Espagne*

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- ¹² J. Everaert, *De internationale en koloniale handel der vlamse firma's te Cadix 1670-1700 (Le commerce international et colonial des firmes flamandes à Cadix 1670-1700)*, Brugge 1973, p. 890; E. Levassieur, *Histoire des classes ouvrières et de l'industrie en France avant 1789*, vol. 1, Paris 1900, p. 314; J. Vidalenc, "L'industrie dans le Département Normands à la fin du Premier Empire", *Annales de Normandie*, vol. 7, nos. 3-4, 1957, p. 298.
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- ⁸⁵ *Historia Śląska*, vol. 2, p. 1; Wrocław 1966, pp. 163-164, 171; Fechner, *op. cit.*, p. 143.
- ⁸⁶ I. Turrau, "Un aspect de l'artisanat russe. La bonetterie aux XVII^e et XVIII^e siècles", *Cahiers du Monde Russe et Soviétique*, vol. 9, no. 2, 1968, pp. 209-226; "Aspects of the Russian Artisan. The Knitter of the Seventeenth to the Eighteenth Century", *TH*, vol. 4, 1973, pp. 8-25.
- ⁸⁷ E. I. Zaocerskaya, *Razvitiye legkoj promyshlennosti v Moskve v pervoi chetverti XVIII v.*, Moskva 1953, p. 30.
- ⁸⁸ *Ibid.*, *op. cit.*, pp. 156-157, 174-177, 211-213; Centralny Gosudarstvennyy Archiv in Moscow, Dela o zerkalnykh zavodach 1706-1707, Berg, Kollegium, no. 91.

VII. Techniques of Hand- and Machine-Knitting Production

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- ⁹⁰ As in the note 88.
- ⁹¹ *Ibid.*
- ⁹² E. I. Zaozerskaya, *Rabochaya sila i klassovaya bor'ba na tekstil'nykh manufakturah Rossi v 20-60 gg. XVIII v.*, Moskva 1960, pp. 51, 152-155, 286.
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- ⁹⁴ I. V. Meshalin, *Tekstil'naya promyshlennost' kretyan moskovskoy gubernii v XVIII i pervoi polovine XIX veka*, Moskva 1950, p. 26.
- ⁹⁵ Kafengauz, op. cit., pp. 47-50, 60, 102-103, 109, 135-142, 152-154, 175, 211-212, 277.
- ⁹⁶ *Ibid.*, p. 57; N. B. Giličkova, *Naemnyy trud v gorodakh Povolzhya v pervoi chetverti XVIII veka*, Moskva 1965, p. 157.
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- ⁹⁸ K. A. Pazhitov, *Problema remeslennykh cehov v zakonodatel'stve russkogo absolutizma*, Moskva 1952, pp. 195-208; R. Klokman, *Ocherki socialno-ekonomicheskoi istorii gorodov severo-zapada Rossii v seredine XVIII veka*, Moskva 1960.
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- ⁴² Pied, *op. cit.*, p. 39.

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⁴⁸ M. DeTournaux, "Les bas à la pérouvienne et les manufactures de Languedoc au XVIII^e siècle", *Annales du Midi*, vol. 78, 1966, p. 274; J. Rapley, "Handframe Knitting, the Development of Patterning and Shaping", *TH*, vol. 6, 1975, pp. 18-51 – shows the changing fashions with regard to the embroidery on the gussets and the execution of different patterns on the stockings and other knitted products in the seventeenth and eighteenth century.

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⁵² *Pamiętnik Polityczny i Historyczny*, 1783, p. 257.

⁵³ Turnau, *Zmiany...*, *op. cit.*, pp. 282-284.

⁵⁴ M. Dubuisson, "La bonneterie" [in:] *Histoire générale des techniques*, II, *Les premières étapes du machinisme*, Paris 1965, pp. 248-249.

⁵⁵ J. Ricomard, *La bonneterie à Troyes et dans le département de l'Aube. Origines, évolution, caractères actuels*, Troyes 1934, p. 36.

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⁶⁰ G. Martin, *La grande industrie en France sous le Règne de Louis XV*, Paris 1900; Dutil, *op. cit.*, p. 240.

VIII. Consumption of Knitted Garments in Europe in the Sixteenth-Eighteenth Centuries

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² K. Schlabow, *Spätmittelalterliche Textilfunde aus der Lübecker Altstadtgrabung*, Lübeck 1952, pp. 135, 144 and illustr.

³ I. Turnau, "Knitted Caps and Hats in Europe from the Sixteenth to the Nineteenth Century", *Bulletin de CIET4*, nos. 61-62, 1985/I-II, pp. 87-89; the relics, for instance: Victoria and Albert Museum nos. 936-1902, 1364-1570-1901, 1571-1572-1901; London Museum, no. A 6335, A 6338, A 25567, A 25595-99, A 26566, A 26567, A 26572, A 26606, A 26608, A 26574, A 6333, A 6339, A 6341; Manchester Gallery of English Costume nos. 1952, 338, 339, 342, 343; Guild Hall nos. 5001, 5009, 22398.

⁴ K. Buckland, "The Mommouth Cap", *Costume*, no. 13, 1979, pp. 23-37; Metropolitan Museum in New York, nos. 9158 488; C. Willet Cunningham, P. Cunningham, C. Beard, *A Dictionary of English Costume*, London 1972, pp. 16, 138.

⁵ A. S. Henshall, "Early Textiles Found in Scotland", pt. 1, "Locally Made", *Proceedings of the Society of Antiquaries of Scotland*, vol. 86, 1951-1952, pp. 1-29; A. S. Henshall, S. Maxwell, "Clothing and other Articles from a Late 17th-Century Grave at Gunnister, Scotland", *ibidem*, pp. 30-42; National Muset in Copenhagen, nos. 12a55, 12a56.

⁶ *Gusudarstvennaja Oruzheniynaya Palata*, nos. 12229, 13222, 13228; I. Turnau, "Un aspect de l'artisanat russe. La bonneterie aux XVII^e et XVIII^e siècles", *Cahiers du Monde Russe et Soviétique*, vol. 9, no. 2, 1968, pp. 209-226; the same, "Aspects of the Russian Artisan: The Knitter of the Seventeenth to the Eighteenth Century", *TH*, vol. 4, 1973, pp. 7-25.

- ⁷ A. Franklin, *La vie privée d'autrefois. Comment on devenait patron*, Paris 1889, p. 194.
- ⁸ M. Leloir, *Dictionnaire du costume et des accessoires des armes et des étoffes des origines à nos jours*, Paris 1951, pp. 20, 114; F. Boucher, *Histoire du costume en Occident de l'antiquité à nos jours*, Paris 1965, pp. 425-431.
- ⁹ Franklin, *op. cit.*, p. 194.
- ¹⁰ Henshall, *Early textiles...*, *op. cit.*, p. 21-24; P. Walton, "The textiles. An Excavation in the Castle Ditch Newcastle upon Tyne", *Archaeologia Aeliana*, vol. 9, 1981, p. 200; H. Bennett, "A Murder Victim Discovered: Clothing and other Finds from the Early 18th-Century Grave on Armish Moor, Lewis", *Proceedings of the Society of Antiquaries of Scotland*, vol. 106, 1974-1975, pp. 176-177; Metropolitan Museum in New York preserved the betel of wool from sixteenth century no. 29158:485.
- ¹¹ Ermitage Museum in Leningrad, nos. 8509, 8510, 8498; Turnau, "Aspects...", *op. cit.*, S. M. Levey, "Illustrations of the History of Knitting Selected from the Collection of Victoria and Albert Museum", *JH*, vol. 1, 1969, p. 188; L. Warburg, "Strick i de Københavnske jordfund", [in:] *Tekstila teknikker i Nordisk tradition*, Uppsala 1987, pp. 79-94.
- ¹² London Museum no. 228-1893; Victoria and Albert Museum, T. 176-1958, 346-1898; Metropolitan Museum in New York 1977-385, 26:231:8; Smithsonian Institution, Museum of History and Technology in Washington T. 17905.
- ¹³ London Museum no. A 7611.
- ¹⁴ Petrodvorec Museum (Peterhof) near Leningrad, no. 4456.
- ¹⁵ B. Benassar, *Valladolid au siècle d'or. Une ville de Castille et sa campagne au XVI^e siècle*, Paris 1967, p. 344.
- ¹⁶ J. Hayem, "Les inspecteurs des manufactures", *Mémoires et documents pour servir à l'histoire du commerce et de l'industrie en France*, II serie, Paris 1912, pp. 259-270; J. Ricomard, *La bonneterie à Troyes et dans le département de l'Aube. Origines, évolution, caractères actuels*, Troyes 1934, pp. 9-10; S. Ferchou, *Techniques et sociétés. Exemple de la fabrication des chéchias en Tunisie*, Paris 1971.
- ¹⁷ For example: Circ. 718/8-10, 1912; T. 214-1960.
- ¹⁸ Smithsonian Institution, Museum of History and Technology in Washington, T. 17185; T. 17814, T. 17881; Kunsthindustrimuseum in Copenhagen, B. 11/1933; K. Konin, *Slintkeesmed*, Tallin 1972; K. Klement, "Traditionell stickning i Estland", [in:] *Tekstila teknikker*, *op. cit.*, pp. 19-28.
- ¹⁹ E. Østergaard *The Coffins of Two Royal Children in Roskilde Cathedral*, the review of K. Finch, *National museets Arbeidsmark*, 1982; Levey, *op. cit.*, p. 191; Museo Stibbert, no. 16596; The boy's trousers are kept in Colonial Williamsburg in USA, no. G. 1971/1565. The baby's dress in Smithsonian Institution, Museum of History and Technology in Washington for example no. T. 11633.
- ²⁰ They are listed in the statutes quoted in Chapter IV.
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- ²² Musée Historique des Tissus in Lyon, for example no. 23446.
- ²³ K. Masner, "Gestricke Teppiche des 17. und 18. Jahrhunderts", *Schlesien Vorzeit*, vol. 8, 1924, p. 143.
- ²⁴ Österreichische Museum für Angewandte Kunst, T. 2205, T. 2206.
- ²⁵ Kunstgewerbe Museum in Dresden, no. 20363.
- ²⁶ Boucher, *op. cit.*, p. 276.
- ²⁷ Levey, *op. cit.*, pp. 187-188; Victoria and Albert Museum nos. 346-1898, 106-1899, 469-1884, 473-1893; Jacket of Charles I in London Museum.
- ²⁸ A. M. Nylén, Hemsjö, *Den svenska hemsjöder från till 1800-talets slut*, Lund 1968, pp. 95-100, 315-340; I. Winzell, *Hallandsstickning Falduren. Nordiska museet och skansen*, Årbo 1957, pp. 93-106; G. Hazelius-Berg, *Modedägar från 1600-1900*, Stockholm 1953, il. 13; the same, "Stuckade tröjor från 1600 och 1700-talet", *Nordiska Museum och Årbock Falduren*, 1935, pp. 87-100; H. Engesträd, "En bonnet og åtebordryde og flosse næ-troyer", *Vestlandske Kunsthindustrimuseums Årbock*, 1954-1957, pp. 37-53; A. Kjellberg, I. Gråvold, G. Aarsland Rosander, A. L. Svendsen, *Strikning i Norge*, Oslo 1987, pp. 14-16, 32-52; M. Hoffmann, *Of knitted "Nightshirts" and Detachable Sleeves in Norway in the Seventeenth Century*, *Opera textilia variorum temporis*, to honour Agnes Geijer on her ninetieth birthday 26th October 1988, I. Estham and M. Nockert eds., Stockholm 1988, pp. 131-144.

- ²⁹ L. Salmon, "A Second Lehman Collection", *Antiques*, August 1976, pp. 314-321; Kostuummuseum in the Hague, no. K. 40-1965; Musées Royaux d'Art et d'Histoire in Brussels, costumes and laces department, nos. 1043, 1336, 1548, 2196.
- ³⁰ M. Ploeg, *Strikkede natrøyer*, Roskilde 1979; the same, *Strikkede natrøyer. Mark og Monte*, 1978, pp. 46-56.
- ³¹ Levey, *op. cit.*, pp. 187-188; Victoria and Albert Museum, nos. T. 61/1939, T. 39/1932; H. Dible, "Nachklänge der spanischen Tracht", *Waffen und Kostümkunde*, vol. 16, no. 1, 1974, p. 2 describes the oldest Spanish vests similar to knitted doubles.
- ³² Levey, *op. cit.*, p. 192; no. inv. 177-1926.
- ³³ Museo Provincial Textil, Tarrasa 1972; Museo de Indumentaria. Coleccion Rocamora, Barcelona 1970, pp. 97-102.
- ³⁴ M. Hain, "Bäuerliche Strickkunst in Schlitzerland (Oberthessen)", *Zeitschrift für Volkskunde*, vol. 48, 1939, pp. 289-296.
- ³⁵ Musée du Costume in Paris, nos. 92, 1132, 1180, 1771.
- ³⁶ S. Svärdsström, "Ärmetis Dätråkt och Gustav III:s Daluniform", *Livrustkammaren*, vol. 5, nos. 8-9, 1951, pp. 136-166; G. Ekstrand, "Dräktplägen", *Livrustkammaren*, *ibidem*, pp. 167-186.
- ³⁷ A. Geijer, *Textile Treasures of Uppsala Cathedral from Eight Centuries*, Stockholm 1964, pp. 67-70, il. 74-75; L. Warburg, "Omkring den anden lundavante", *Kulturs Årbock*, 1986, pp. 22-36; National museet in Copenhagen. From Reformert kirke, nos. D 9822, D 9823, D 9825, 1249, 12451; E. E. Gudjonsson, *Notes on Knitting in Iceland*, Reykjavik 1986; Kjellberg, Gråvold Rosander, Svendsen, *op. cit.*, p. 24; Henshall, Maxwell, *op. cit.*, pp. 85-86.
- ³⁸ Levey, *op. cit.*, pp. 185-187; Victoria and Albert Museum, nos. 876-1897, 437, A. 1892; Musée Historique des Tissus in Lyon.
- ³⁹ J. Braun, *Die liturgische Gewandung in Occident und Orient. Nach Ursprung und Entwicklung. Verwendung und Symbolik*, Freiburg im Breisgau 1907, p. 373; F. Bock, *Geschichte der liturgischen Gewänder des Mittelalters*, vol. 2, Bonn 1866, p. 147. Extensive literature on the earliest liturgical gloves of the Middle Ages is given in Chapter II.
- ⁴⁰ I. Ereta, Catalogue d'étoffes anciennes et modernes, Bruxelles 1907, p. 169; Musées Royaux d'Art et d'Histoire, nos. 759, 926, 228, 1399, 2166; Rijksmuseum in Amsterdam no. N. M. 3079; Salmon, *op. cit.*, pp. 314-321.
- ⁴¹ [In:] *La seda en la indumentaria siglos XVI-XIX*, Barcelona 1957, pp. 22, 29, 58 - 12 pairs are listed; also Museo de Indumentaria..., *op. cit.*, p. 220-222.
- ⁴² J. Nickl, *Historische Prunkkleidung. Schriften der Staatlichen Kunstsammlungen*, no. 32, Dresden n.d.; Historische Museum in Dresden, no. 1987; Museum Hlavniho Mesta in Prague, no. 242; I. Turnau, "Zabytki dziewiarskie w muzeum Pragi", *Kv. HKM*, no. 4, 1965:13, pp. 793-794.
- ⁴³ Archives of Bratislava City prepared for publication by Dr A. Špez. Many thanks to the editor for giving me the copy of the statue.
- ⁴⁴ Museo Stibbert in Florence, nos. 14263-265, 16296, 16297. Many thanks to the director Prof. Dr Giulio Cirri for the photograph.
- ⁴⁵ Museo de Indumentaria..., *op. cit.*, pp. 220-222.
- ⁴⁶ C. C. Mayer-Thurnan, *Raiment for the Lord's service. A Thousand Years of Western Vestments. The Art Institute of Chicago*, Chicago 1975, pp. 211-213, no. cat. 97-99; Metropolitan Museum in New York, no. 26:231.12; Brooklyn Museum in New York, nos. 17:511.3, 32:1718.13, 14:511, 17:511 A, and 17:511 from Russia.
- ⁴⁷ Museo del Pueblo Español in Madrid, nos. 762, 9041, 9042, 9044, 9045, 765.
- ⁴⁸ Musée Historique des Tissus in Lyon, no. 36 and without number.
- ⁴⁹ Museum für Angewandte Kunst in Vienna, nos. 4298 T., 4299 T., 3118 T., 8149 T., 1030 T., 7173 T., 3108 T.; I am grateful to the Direction of Museum for the photograph; Leipzig Museum des Kunsthandwerks, no. V 2193. I am grateful to Dr A. Hanisch for the photograph; Staatliche Kunstsammlungen in Dresden, no. 9249 ab.
- ⁵⁰ Museum Hlavniho Mesta Prahy, nos. P 141 and 242; Umelecko Průmyslové Museum in Prague, nos. VK 586-590, VK 160, 42299, 11485, 7769, 52259, 55580.

- ⁵¹ Iparművészeti Múzeum in Budapest, nos. 13108, 59.862, 1.12.880; Magyar Nemzeti Múzeum in Budapest, no. 29/1918, 64.
- ⁵² Gosudarstvennaya Oruzheinnaya Palata in Moscow, nos. 3692, 4035.
- ⁵³ National Museum in Wrocław, no. S.III. 329; Archidiecejalny Muzeum in Poznań, nos. 2314, 2315; Diacejalny Muzeum in Sandomierz.
- ⁵⁴ See Note 43.
- ⁵⁵ *La seda...*, *op. cit.*, pp. 29, 46, 58-59; *Museo de Indumentaria...*, *op. cit.*, pp. 189-191; Victoria and Albert Museum, circ. 716/719/1912; London Museum, nos. A 12419-420, 12541; Museo Stibbert in Florence, no. 16299; National Museum in Cracow, Department Czartoryskich, no. 530.
- ⁵⁶ Istoricheskiei Musei in Moscow, for instance no. 54679/35; Turnau, Aspects..., *op. cit.*, pp. 171-178.
- ⁵⁷ L. I. Jakunina, "Fragmenty odezdy i obuvi", [in:] *Istoricheskiei pamyatnik ruskogo Arkhtekhnogo moreplavaniia XVI i VII veka*, Leningrad 1951, pp. 179-186; Museum Artiki in Leningrad, nos. 3865, 3792; National Museum in Copenhagen, relics in Textile Department; L. Warburg, "Strik i de Københavnske jordfund", *Tekstila tekhnika, op. cit.*, pp. 79-94.
- ⁵⁸ Leloir, *op. cit.*, pp. 233, 246.
- ⁵⁹ Musée Historique des Tissus in Lyon, no. 208; *Museo de Indumentaria...*, *op. cit.*, pp. 187-191; Museo del Pueblo Español in Madrid, nos. 670, 755, 812; Museum für Angewandte Kunst in Vienna, no. 2259 T; Museo Stibbert in Florence, nos. 11605, 11615; Victoria and Albert Museum in London, nos. T 396, A 1920.
- ⁶⁰ The bibliography about the beginning of knitting has been quoted in Chapter II, C. Aberle, "Geschichte der Strickerei und Wirkerei", [in:] *Geschichte der Textilindustrie*, Leipzig 1932, pp. 385-441; A. Latour, "Le bas", *Les Cahiers CIBA*, no. 56, 1954; H. E. Wulff, *The Traditional Crafts of Persia. Their Development, Technology and Influence on Eastern and Western Civilisations*, Massachusetts 1966, pp. 228-230; Relics in the Department d'Asie in the Musée de l'Homme in Paris.
- ⁶¹ C. de Linaas, *Anciens vêtements sacerdotaux et anciens tissus conservés en France*, Paris 1860, pp. 162-168; E. Jenkins, *Elizabeth the Great*, New York 1959, pp. 160, 215, 258-259.
- ⁶² See: Footnote 43; H. R. Oy, *La vie, la mode et le costume au XVIII^e siècle*, *Époque Louis XIII. Étude sur la cour de Lorraine établie d'après les mémoires des fournisseurs et artisans*, Paris 1924, pp. 270-272; C. de Linaas, *op. cit.*, p. 162.
- ⁶³ Henshall, *op. cit.*, pp. 26-27; Henshall, Maxwell, *op. cit.*, pp. 37-38; Gudjonsson, *op. cit.*, pp. 2-4.
- ⁶⁴ *Exposition de bas appartenant à la collection Racomora présentée à la ville de Barcelona des siècles XVI au XIX*, Barcelone 1965, pp. 1-4; *La seda...*, *op. cit.*, pp. 46-47, 84; *Museo de Indumentaria...*, *op. cit.*, pp. 79-81.
- ⁶⁵ I. Turnau, "Stockings from the Coffins of the Pomeranian Princes Preserved in the National Museum in Szczecin", *TH*, vol. 8, 1977, pp. 167-169; Z. Krzymska-Falius, *Renesansowe stroje książęcy szczecińskich*, Szczecin n.d.; the same, "Ze studiów nad dziejami kleptomów i ubiorów książąt szczecińskich", [in:] *O przemiośle artystycznym w Polsce*, Warszawa 1976, pp. 57-85; *Baltische Studien. Herausgegeben von der Gesellschaft für Pommersche Geschichte und Altertumskunde*, Stettin 1878, p. 391; W. Pekačka-Zechmeister, "Ubiory książąt Pomorza Zachodniego z XVI i XVII wieku w zbiorach Muzeum Narodowego w Szczecinie", *Materiały Zachodniopomorskie*, vol. 26, 1980, pp. 423-443.
- ⁶⁶ F. Boucher, *Historie du costume en Occident de l'antiquité à nos jours*, Paris 1965, p. 237, il. 496; Státní Museum Historii Prahy: I. Turnau, "Zabytki dziewiarskie w muzeach Prahy", *op. cit.*, p. 793; I wrote about the stockings of Adam Parmieński [in:] *Zmiany w polskiej produkcji włókienniczej XVII wieku*, Wrocław 1962, pp. 280, 345; The stockings found in archeological excavations in Sárospatak are kept in Magyar Nemzeti Múzeum, Textile Department in Budapest; the silk stockings in Museum of the City of Riga and also woolen socks from the eighteenth century, no. 41149; the silk stockings of Fabian von Fersen, buried in 1577, are kept in History Museum in Tallin, no. A. M. 5000/3.
- ⁶⁷ G. Ekstrand, "Some Early Silk Stockings in Sweden", *TH*, vol. 13, no. 2, 1982, pp. 165-182; C. Lindvall-Nordin, "Hertskapsstrumpor", *Kulturens Årbok*, 1977, pp. 99-122; S. Flamaud Christensen, *Kongedagterne fra 17. og 18. aarhundrede*, København 1940, pp. 173-174, 227-279; The stockings in City Museum of Roskilde; A. Kjellberg, "Il par bunding-shoset sorte", *Bidrag til strikkings historie i Norge*, [in:] *Byggo Bygd. Festskrift til Maria Hoffman. Norsk Folkemuseum. Årbok 1983-1984*, vol. 30, p. 148.

- ⁶⁸ Franklin, *op. cit.*, p. 198; R. P. G. Théry, *Les origines du machinisme en France au XVIII^e siècle d'après les documents originaux*, Oran 1945, pp. 29-35.
- ⁶⁹ Extrait des lettres patentes du Roi données à Versailles le 16 juillet 1743, règlement, pp. 2-13, Bibliothèque Nationale in Paris, département des Estampes, In 45-46, Les matériaux Richelieu vol. 1.
- ⁷⁰ G. Grüll, "The Poneger Hosiery Enterprise, 1764-1818", translated and edited by N. B. and E. Harle, *TH*, vol. 5, 1974, pp. 60-78; H. Krüger, *Zur Geschichte der Manufakturen und der Manufakturarbeit in Preussen. Die mittleren Provinzen in der zweiten Hälfte des 18. Jahrhunderts*, Berlin 1958, pp. 533-559, tabl. E. and F.
- ⁷¹ Victoria and Albert Museum in London, nos. T.6.1943, T. 77, A.1957, T. 95/1963; London Museum, A.12544-45, A.12418; Museo Stibbert, nos. 14090-91, 16676; Rectors' Palace in Dubrovnik, 8 parts of stockings unnumbered; Errera, *op. cit.*, p. 170, no. 219; E. Heinemeyer, "Die Gewänder des Grafen Anton Günther von Oldenburg", *Waffen und Kostümkunde*, vol. 2, 1967, pp. 95-96.
- ⁷² Turnau, "Aspects...", *op. cit.*, pp. 15-18; Herminge, Leningrad nos. 8441, 8490, 8498, 8510, 8565; Peterhof Museum near Leningrad, Montplaisir, no. 4465; Gosudarstvennaya Oruzheinnaya Palata, nos. 146, 159, 160, 327-9, 326, 347; Museum Pavlovsk near Leningrad, no. 257; Istoricheskiei Muzei Moscow, no. 42567/344, 54679/35; Summer Palace in Leningrad, no. 47.
- ⁷³ Levey, *op. cit.*, pp. 189-191; J. Rapley, "Handframe Knitting: The Development of Patterning and Shaping", *TH*, vol. 6, 1975, pp. 18-51; J. Thirsk, "The Fantastical Folly of Fashion – The English Stocking Knitting Industry", [in:] *Textile History and Economic History. Essays in Honour of Miss Julia de Lucy Mann*, Manchester 1973, pp. 50-73.
- ⁷⁴ Musée du Vieux Nîmes, nos. 923, 185, 123, 964.4.1, 973.3.2.1.2.2.; M. DeFourneaux, "Les bas à la peuvienne et les manufactures du Languedoc au XVIII^e siècle", *Annales du Midi*, vol. 78, 1966, pp. 271-282.
- ⁷⁵ *Museo Franceschi. Mostra retrospettiva della moda delle calze*, Milano n.d.; S. Flamaud Christensen, *Kongedagterne på Rosenborg*, København 1940, vol. 2, pp. 173-174, 227, 264-279; National Museum in Cracow, Czartoryski's Department, no. XIII.1. 15/12184; Museum für Angewandte Kunst in Vienna, nos. T.2200-2204, 2222, 2224-25, 2261, 7085, 8549; London Museum, A.15099-101, A.12418, A.12544-45; Musée Du Ranquet in Bèstiers in France; Musée du Costume in Paris; Museo Civico Correr in Venice nos. XXIV, 228, 403, 496-4, Smithsonian Institution, Museum of History and Technology, no. T. 17906; Museum of City of New York, no. 54, 100, Z. B.; *Art Fashion and Fantasy in the Eighteenth Century...*, *op. cit.*, p. 201.
- ⁷⁶ J. Schneider, *Textilien. Katalog der Sammlung des Schweizerischen Landesmuseums Zürich. Angewählte Stücke*, Zürich 1975, p. 67; Victoria and Albert Museum in London, nos. I 6-1943, 371, cc/1908, 473-1897; Museo Stibbert in Florence, nos. 5583, 5913; Folk products in the National Museum in Copenhagen, Norsk Folkemuseet in Oslo and Nordiska Museum in Stockholm; Narodni Museum in Prague, nos. C. and 61.751.
- ⁷⁷ Victoria and Albert Museum in London, no. 63 A-1910; Levey, *op. cit.*, pp. 189-191, 196; also nos. 140-1900, 945-1902, T. 68-1935, 355 B-1903; the knitted trousers of Peter I in Hermitage in Leningrad, no. 8441; the dress of Gustav III mentioned in Note 36; *Museo de Indumentaria...*, *op. cit.*, pp. 51-52 wrote about the knitted trousers of the Mayas from the eighteenth century.
- ⁷⁸ Museo Civico Correr in Venice, no. XXIV 283 acq. 408; Museo Stibbert in Florence, no. 16624-16625.
- ⁷⁹ I wrote about these sashes in the paper: "Aspects...", *op. cit.*, pp. 19-21.
- ⁸⁰ Victoria and Albert Museum in London, no. 196 A-1964; Manchester Gallery of English Costume MIC, 1958 21/3; Musée des Arts et Traditions Populaires in Paris and Musée in Clermont-Ferrand; Smithsonian Institution, Museum of History and Technology, knitted garters from the early nineteenth century e.g., T.15060, 15666.
- ⁸¹ Levey, *op. cit.*, pp. 201-203; Victoria and Albert Museum in London, nos. 138-1900, 1384-1900, 1386-1900, 1487-1900, T. 1154-1913, 4664-1858, 34-1876, 137-1900, T. 13-1951. Altogether up to a hundred relics, but some of them from the nineteenth century; Pannau: Z. 199-1960, 584-1899, T. 127-1921; *La seda...*, *op. cit.*, pp. 46, 59, 84, il. 75, 92; the knitted pockets in the Museo del Pueblo Español in Madrid.
- ⁸² L. Turnau, "Użytkowanie dzianin odzieżowych w Polsce w XVI-XVIII w.", *Kw. HKM*, 1977-25, no. 2, pp. 243-255.
- ⁸³ V. Gay, *Glossaire archéologique du Moyen Âge et de la Renaissance*, vols. 1-2, Paris 1887-1928, vol. 1, pp. 758-761, vol. 2, p. 424 – the quotation.

⁸⁴ A. Puech, *La vie de nos ancêtres d'après leurs livres de raison ou les Nîmois dans la seconde moitié du XVII^e siècle d'après des documents inédits*, Nîmes 1888, pp. 373-374.

⁸⁵ P. Boissonnade, *Le mouvement commercial entre la France et les îles Britanniques du XVI^e siècle*, Paris 1920; J. Thirsk, *Economic Policy and Projects: The Development of a Consumer Society in Early Modern England*, Oxford 1978, p. 5; I. Turnau, "Cechy i manufaktury dziewiarskie na ziemiach polskich w XVII i XVIII wieku jako wynik oddziaływania mody na produkcję", [in:] *Buddania nad historią gospodarczo-społeczną w Polsce (Problemy i metody)*, Warszawa 1978, pp. 147-153.

⁸⁶ R. Levy-Pisetzky, *Storia del Costume in Italia*, Milano 1964, vol. 4, p. 95; M. Vocino, *Storia del Costume. Veni secoli de via Italiana*, Roma 1952, p. 118; M. Contini, *La moda nei secoli*, Milano 1965, p. 156; C. Willert, P. Cunningham, *Handbook of English Costume in the Sixteenth Century*, London n.d.; the same, *Handbook of English Costume in the Seventeenth Century*, London after 1953; the same, *The History of Underclothes*, London 1951; A. M. Earle, *Customs and Fashions in Old New England*, London 1893, pp. 313-329; I. H. Haskell, *Hosiery thru the Years*, Lynn 1956, pp. 41-43; E. J. Gehret, *Rural Pennsylvania Clothing*, York 1976, pp. 222-243.

⁸⁷ See: Note 27.

⁸⁸ Turnau, "Aspects...", *op. cit.*, pp. 7-25; I. Zabellin, *Domashnii byt russkikh cariv v XVI i XVII st.*, Moskva 1901, pp. 533-538, 598, 608, 671, 704; the same, *Domashnii byt russkikh carei v XVI i XVII st.*, Moskva 1915, p. 470; Archives in Leningrad, no. f 759/8-XLIV.

⁸⁹ M. Szczaniecki, K. Ślaski, *Dzieje Pomorza Słupskiego i innych terenów województwa koszalińskiego w wypisach*, Poznań 1961, pp. 82-83.

⁹⁰ A. Grenser, *Zunft-Wappen und Handwerker-Insigien. Eine Heraldik der Künste und Gewerbe*, Frankfurt am Main 1889, p. 100; M. Boehn, *Die Mode. Menschen und Mode in Sechszenten Jahrhundert*, München 1923; I. Turnau, "Consumption of Clothes in Europe between the XVth and the XVIIIth Centuries (Research Problems)", *The Journal of European Economic History*, vol. 5, no. 2, 1976, pp. 451-468.

⁹¹ Moschen, *Geschichte der Mode der Strick- und Wirkwaren*, Wien (after 1964), pp. 142, 158, 164, 188-189.

⁹² M. Belénysy, *Kultúrörteneti szemlények a nádásdiak 1540-1550-es számadásából*, vol. 1-2, Budapest 1959.

⁹³ M. Bogucka, *Życie codzienne w Gdańsku. Wiek XVI-XVII*, Warszawa 1967, p. 136; K. Bałucki, *Polska satyna mieszczańska. Nowiny sówitzkie*, Kraków 1950, p. 106.

⁹⁴ I. Turnau, *Moda i technika włókiennicza w Europie od XVI-XVIII wieku*, Wrocław 1984; the same, *Historia europejskiego włókiennictwa odziedziczonego od XIII-XVIII wieku*, Wrocław 1987.

IX. Knitted Masterpieces

¹ This chapter was published as a paper in *Textile History*, vol. 7, 1976, pp. 7-59. It is not possible to publish the knitting history without the information about knitted carpets. So I publish now all the paper, nearly unchanged, with only some abridgements. I hope that my friend, the late Ken Ponting, would be happy of this reprint. It was only impossible to publish the illustrations.

² K. Masner, "Gestricke Teppiche des 17. und 18. Jahrhunderts", *Schlesiens Vorzeit*, vol. 8, 1924, pp. 121-146.

³ H. Göbel, *Wandteppiche*, III, *Die germanische und slawische Länder*, vol. 1-2 Berlin, 1933-1934; R. Jaques, *Deutsche Textilkunst*, Berlin 1942, pp. 258-260.

⁴ E. Waldner, "L'ancienne confrérie des bonnetiers du Haut-Rhin", *Bulletin du Musée Historique de Mulhouse*, Mulhouse 1894, pp. 5-52; G. Schmollet, *Die Strassburger Tucher- und Weberzunft Urkunden und Darstellung. Nebst Register und Glossar. Ein Beitrag zur Geschichte der deutschen Weberei und des deutschen Gewerbetreibers von XIII-XVII. Jahrhundert*, Strassburg 1879.

⁵ H. Haug, "Sur quelques tapisseries alsaciennes du XVIII^e siècle", *Compte Rendu des Musées de la ville de Strasbourg*, Strasbourg 1923, pp. 1-12.

⁶ L. Bellinger, "Patterned Stockings: Possibly Indian Found in Egypt", *Textile Museum. Workshop Notes*, 1954, no. 10.

⁷ M. Gomez Moreno, *El Panteon Real de las Huelgas de Burgos*, Madrid 1946, pp. 21-23, 32-33, 36-37, 85-90; J. L. y Montevende, *Monasterio de Las Huelgas y Palacio de la Isla, de Burgos y Monasterio de Santa Clara de Tordesillas (Valladolid. Guia Turistica. Comentarios y Notas*

Monasterio de Las Huelgas), Madrid n.d., pp. 24-25; M. Dubuisson, "La bonneterie au Moyen-Âge", *The Bulletin of the Needle and Bobbin Club*, vol. 50, no. 1-2, 1967, pp. 40-43.

⁸ S. M. Levey, "Illustrations of the History of Knitting Selected from the Collection of the Victoria and Albert Museum", *TH*, vol. 1, 1969, pp. 187-188; the oldest knitted waistcoats are kept in Museo de Indumentaria Colección Rocamora and Musée Historique des Tissus in Lyon. Bibliography about knitted dresses in the notes of Chapter VIII.

⁹ Masner *op. cit.*, p. 123.

¹⁰ Schmollet, *op. cit.*, pp. 222, 234; Waldner, *op. cit.*, p. 14.

¹¹ Schmollet, *op. cit.*, p. 238.

¹² G. Schanz, *Zur Geschichte der Colonisation und Industrie in Franken*, Erlangen 1884, pp. 75-80, 119, 194; H. Jäger-Sunstenau, "350 Jahre Innung der Stricker in Wien", [in:] *Maschen. Geschichte der Mode der Strick- und Wirkwaren*, Wien (before 1964), p. 139; Waldner, *op. cit.*, pp. 11-15; Masner, *op. cit.*, pp. 143-145.

¹³ Jäger-Sunstenau, *op. cit.*, pp. 132-134.

¹⁴ Archives from Bratislava, Ce 41, Ce 387, inv. č. 2398, pp. 265-272; A. Špiess, *Remeslo na Slovensku v období existencie cechov*, Bratislava 1972, p. 290; the same, *Statuty bratislavských cechov. Dokumenty*, Bratislava 1978, p. 43.

¹⁵ Masner, *op. cit.*, pp. 124-143; Jaques, *op. cit.*, pp. 259-260.

¹⁶ Haug gives the compendium of part of statues from Alsace.

¹⁷ Haug, *op. cit.*, pp. 3-12.

¹⁸ I. Turnau, "Aspects of the Russian Artisan: The Knitter of the Seventeenth to the Eighteenth Century", *TH*, vol. 4, 1973, p. 18.

¹⁹ I. Turnau, "Śląskie dywany dziane XVII-XVIII wieku na tle europejskim", *Roczniki Szukli Śląskiej*, vol. 12, 1979, pp. 53-65; B. Sowina, "Wyniki analiz technologicznych dywanów dzianych", *ibidem*, pp. 66-67.

²⁰ *Burlington Magazine*, vol. 47, p. 298.

²¹ Sowina, *op. cit.*, pp. 66-67.

X. Peasant Knitting

¹ I. Turnau, "Ludowe dziaństwo europejskie XVII-XIX wieku", *Lud*, vol. 62, 1978, pp. 85-108; Hungarian translation, "Az európai népi kötés-szövése a XVII-XIX. században", [in:] *Folklóristica*, no. 4-5, 1980, pp. 285-314; the same, "The History of Peasant Knitting in Europe. A Framework for Research", *TH*, vol. 17, no. 2, 1986, pp. 167-180.

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XI. Conclusion

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List of Illustrations

- 1 Patterned cotton stockings, Arabian or Indian, found in Egypt from the early twelfth century, L. Bellinget, "Patterned Stockings: Possibly Indian Found in Egypt", *Textile Museum. Workshop Notes*, vol. 1/2, 1954, no. 10.
- 2 Diagram illustrating the knotless netting technique, D. K. Burnham, "Coptic Knitting: An Ancient Technique", *TH*, vol. 3, 1972, p. 123.
- 3 So-called glove of St. Adalbert from the thirteenth century, preserved in the Castle of Prague, N. Bažantová, D. Stehlíková, "Pontifikální rukavice sv. Vojtěcha", *Památky a Přiroda*, no. 7, 1987, p. 402.
- 4a,b Patterned woollen knitted cushion covers found in the coffins of: a – Fernando de la Cerda, d. 1275; b – Fernando, son of Alfonso X of Castile, d. 1283, both buried in Las Huelgas near Burgos in Spain, M. G. Moreno, *El Panteón Real de Las Huelgas de Burgos*, Madrid 1946, pp. 22, 23.
- 5 Our Lady engraved by Vit Stoss, 1480-1485, Archiwum Instytutu Sztuki PAN (Archives of PAN Art Institute), no. inv. 12041.
- 6 French knitter, R. Vaultier, "Historique du bas" "Parlons Bas", no. 38, 1935 p. 11.
- 7 Our Lady of Buxtehude by Master Bertram of Munich, ca. 1370, *TH*, vol. 3, 1972.
- 8 Itinerant Italian knitter from the sixteenth century, Victoria and Albert Museum in London, M. Dubuisson, "La bonneterie", [in:] *Histoire générale des techniques*, vol. 2, *Les premières étapes du machinisme*, Paris 1965, p. 235.
- 9 Itinerant Spanish knitter from the eighteenth century, Lagniez, *Série des proverbes*, n.p., n.d.
- 10 Knitter from Tunisia, S. Ferchion, *Techniques et sociétés. Exemple de la Fabrication des chéchias en Tunisie*, Paris 1971, p. 26, il. IX/
- 11 Bowl of the Brague knitters from 1792, C. Halová-Jahodová, *Vergessene Handwerkskunst*, Praha 1955, p. 139.
- 12 Mark of the Buda knitters from 1725, Iparművészeti Múzeum in Budapest, no. inv. 522907-1
- 13 Coffin shield of the knitters guild from Wrocław, 1655, K. Masner, "Gestricke Teppiche", *Schlesiens Vorzeit*, vol. 8, 1924, p. 127/
- 14 Itinerant Danish knitter from Jutland, H. P. Hansen, *Trikotage-Museet i Herning*, Herning 1960, the cover.
- 15 German knitter guild workshop from the eighteenth century, Troyes.
- 16a, b a – English knitting sheaths of various materials, M. Hartley, J. Ingilby, *The Old Hand-Knitters of the Dales. With an Introduction to the Early History of Knitting*, Clapham 1951, p. 100; b – Knitting sheaths from Greece, I. Papantonio, *Peloponnesian Folklore Foundation*, Nafpion 1981, p. 38.
- 17 English knitting frame from around 1660, draw. J. Hindret, Bibliothèque Nationale in Paris, Cabinet des Estampes, 1h32, M. Dubuisson, "Une découverte capitale concernant le premier métier de bonneterie", *La Vie en Champagne*, vol. 21, 1973, no. 228, p. 7.
- 18 The oldest preserved knitting frame, imported from England to a Swedish manufacture around 1723, Tekniska Museet in Stockholm, B. Hallerdt, "Strumpvärstolar av Christopher Polhem", *Saertryk ur Tekniska Museets Årsbok "Daedalus"*, 1951, p. 57.
- 19 Knitting frame built by Christopher Polhem around 1745, with three treadles (the left one is missing), B. Hallerdt, *op. cit.*, p. 57
- 20 Hall with two knitting machines from the eighteenth century in the Zeulenroda Museum in Thuringia, *Die Geschichte der Strumpfwirkeri in Zeulenroda*, Zeulenroda n.d., p. 15.
- 21 Knitting machine of Saxon construction used by the knitter Anton Tieschiderer in Rietz in 1773, Troler Volkskunst Museum in Innsbruck, no. 1-294.
- 22 Knitting machine of English type from the eighteenth century with the inscription "Fait par Jerome Boisset à Hangest", Smithsonian Institution. The National Museum of History and Technology in Washington, no. T. 13944.
- 23 Knitting machine of Saxon construction originating from 1860, but modelled on a design from the eighteenth century, Schlossberg Museum in Chemnitz.
- 24 Tools used for finishing French knitwear in the eighteenth century: 5 – brushes from fuller's wheel; 4-7 – tools for carding and beating the wool; 9 – scissors for shearing the knitted goods; 10-13 – wooden forms for drying and modelling the knitted fabrics, *Encyclopédie ou dictionnaire, Planches*, Paris 1762.
- 25 Hand fullery for felting knitted caps and gloves from Tyniec near Cracow, Ethnographical Museum in Cracow, no. 32109.
- 26 Bohemian fullery for fulling the woollen stockings from 1884, Museum Kašperské Hory, J. Staňková, "Les techniques textiles dans la culture populaire tchécoslovaque", *Bulletin de CLET4*, no. 36, 1972/II, p. 36.
- 27 French knitting fulling mill from the eighteenth century, *Encyclopédie.... op. cit.*,
- 28 Norwegian woollen beret from the sixteenth century, Det Kongelige Norske Videnskabers Selskab Museet in Trondheim.
- 29 Woollen hat of the tsar Peter I, purchased in Holland at the end of the seventeenth century, the Hermitage in Leningrad, Dep. of Textiles, no. 8510a.
- 30 Danish woollen knitted hat from the seventeenth century, National Museum in Copenhagen, no. inv. K. V.
- 31 Danish woollen knitted hat from the seventeenth century, National Museum in Copenhagen, no. inv. D 9776.
- 32 Headwear of bonnet type, silk hood worn by the Russian Orthodox clergy in the seventeenth century, Palace of Armour in the Kremlin, no. 12179.
- 33 Patterned waistcoat of silk yarn from the sixteenth century, possibly of Spanish production, Musée Historique des Tissus in Lyon, no. 25446.
- 34 Patterned dress of silk yarn from the seventeenth century, Kostuummuseum of Hague in Holland
- 35 Garment with sash from begin silk of the Swedish king Gustav III from the second half of the eighteenth century, Livrustkammaren in Stockholm, no. 3497 b.B.17.284.
- 36 Patterned waistcoat of silk yarn from the seventeenth century, possibly of English production, Kunstinstitut Museet in Oslo.
- 37 Lady's glove of gold thread and multicoloured silk yarn with the inscription "Freuchen Sofia" belonging to the Swede Eric Sture, d. 1567, A. Geijer, *Textile Treasures of Uppsala Cathedral from Eight Centuries*, Uppsala 1964, il. 75.

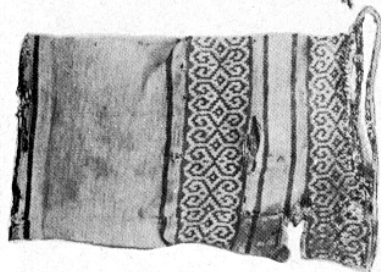
- 38 Silk liturgical glove from the sixteenth century. Musée Historique des Tissus in Lyon.
- 39 Silk liturgical glove from the sixteenth century. Staatliche Kunstsammlungen in Dresden. no. 768
- 40 Collection of Italian silk liturgical gloves from the sixteenth and seventeenth centuries, Museo Stibbert in Florence. nos. 14263, 14265, 16197.
- 41 Danish woollen gloves from the seventeenth century. National Museum in Copenhagen. no. 12a36.
- 42 Silk liturgical gloves from the seventeenth century. Museum Hlaviho Města Prahy in Prague. no. P 242.
- 43a b Silk stockings of the Pomeranian princes: a) stocking from the end of the sixteenth century; b – stocking of Barmm XII. d. 1603, probably purchased in 1600. National Museum in Szczecin. no. Rz. 2221.
- 44 Silk stockings with embroidered gussets from the early eighteenth century of the Catherine I. from Kremlin Museum. no 146.
- 45 Tool for knitting sashes from Ruský Potok in Bohemia, 1957, Staňková, *op. cit.*, p. 36.
- 46 Fulling of kniwear in a hand fullery in Tynec near Cracow/
- 47 Fulling of kniwear in a pail in Horna Súča in Bohemia, 1952, Staňková, *op. cit.*, p. 36.
- 48 Slovak woollen stockings tubular on the calf with special wooden sticks and heavily fulled. Fotoarchív, ULUV, Bratislava. neg. 6690.
- 49 Kniters from Morocco. *La laine. Aquarelles de R. Roy*, Paris 1946.
- 50 Estonian popular knitted caps from the twentieth century, K. Kõniste, *Silmkoesemed*, Tallin 1972. il. XXIII.
- 51 Estonian knitted waistcoat from the isle Muhu. Kõniste, *op. cit.*, il. XXIV.

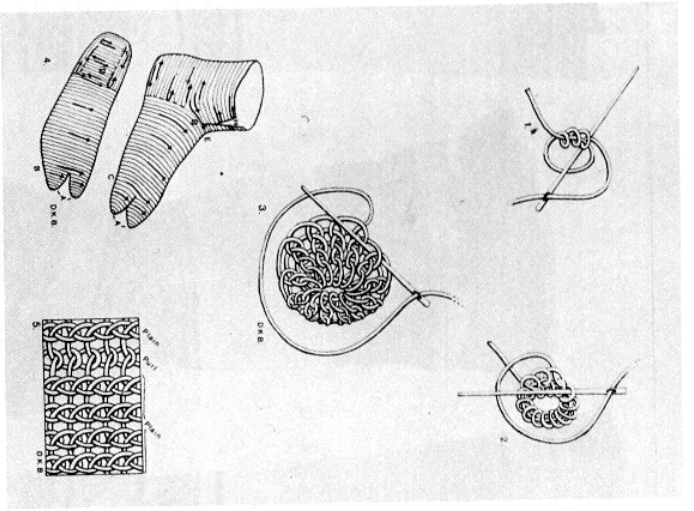
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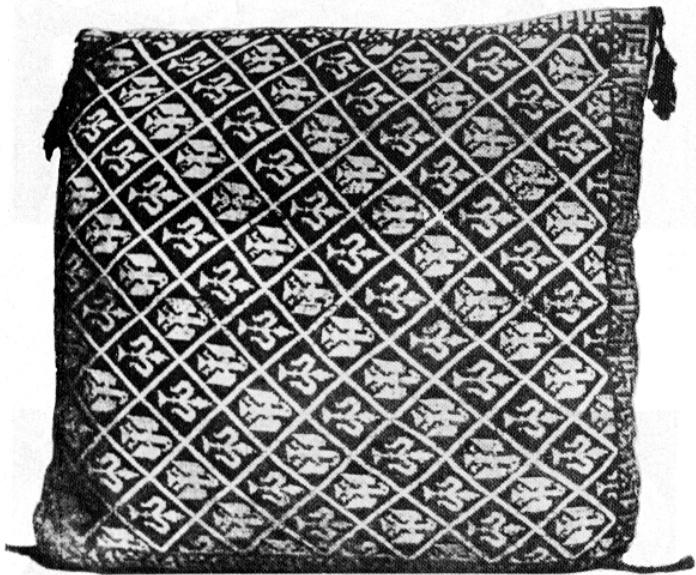
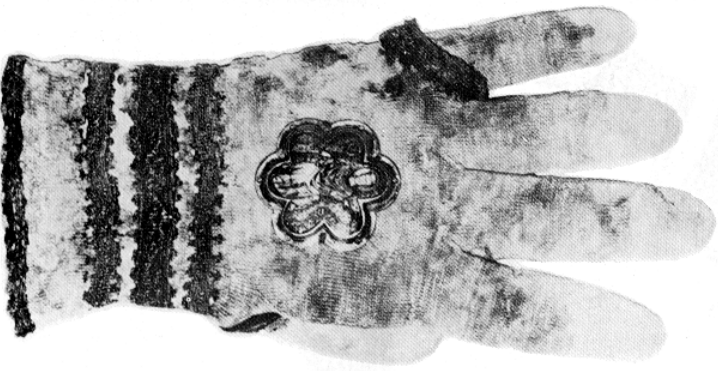
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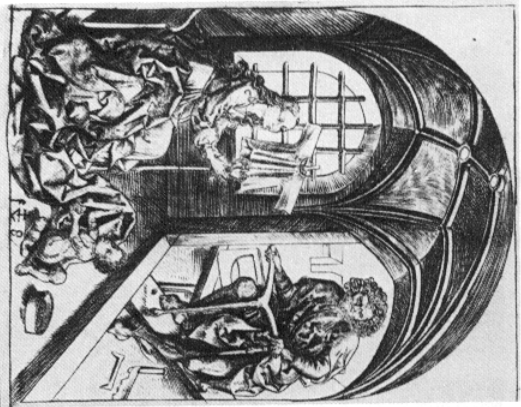




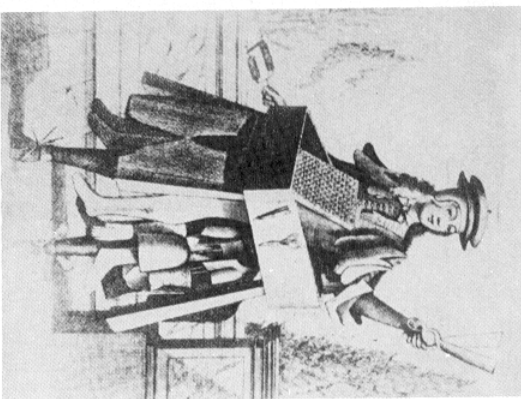
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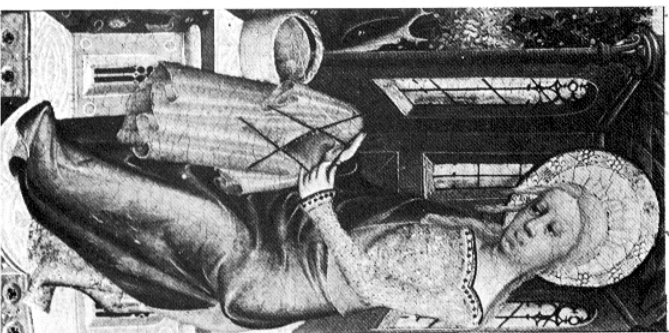
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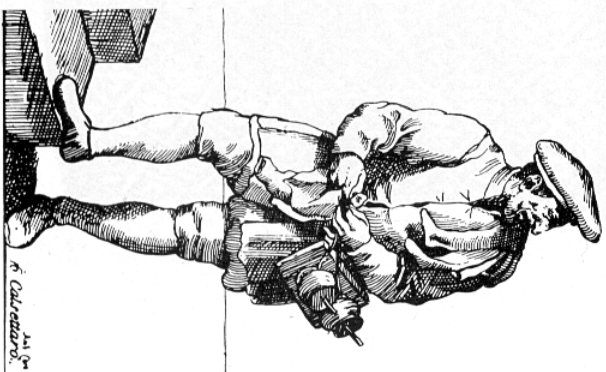
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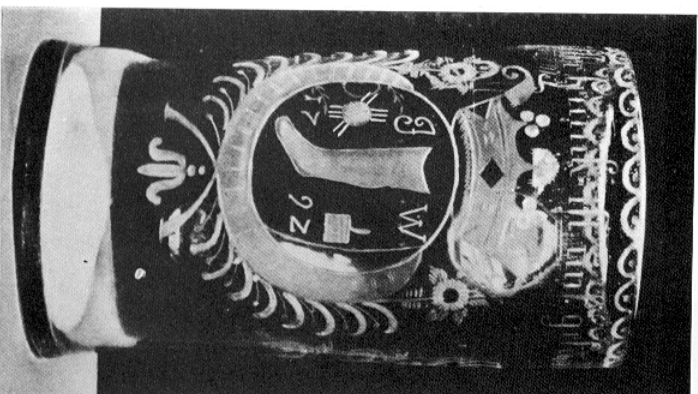
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8



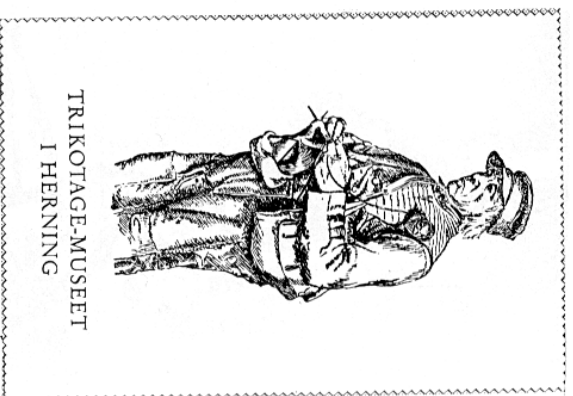
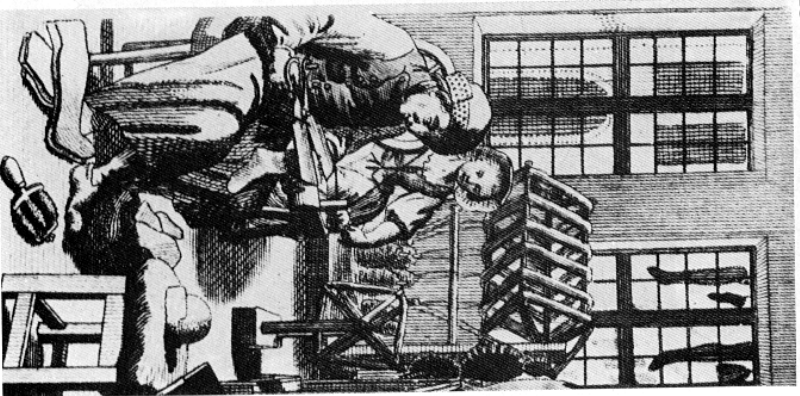
11



12

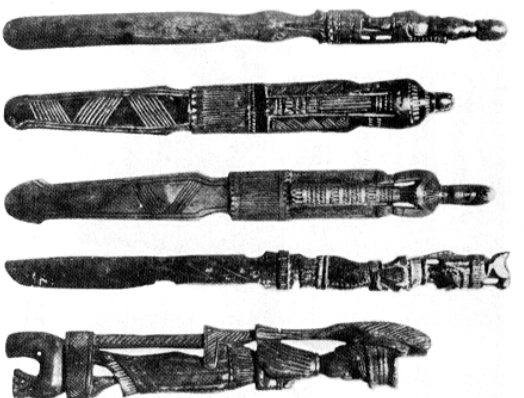
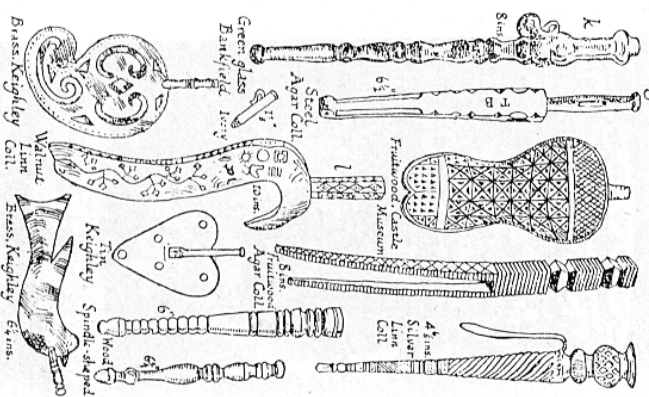


13
15

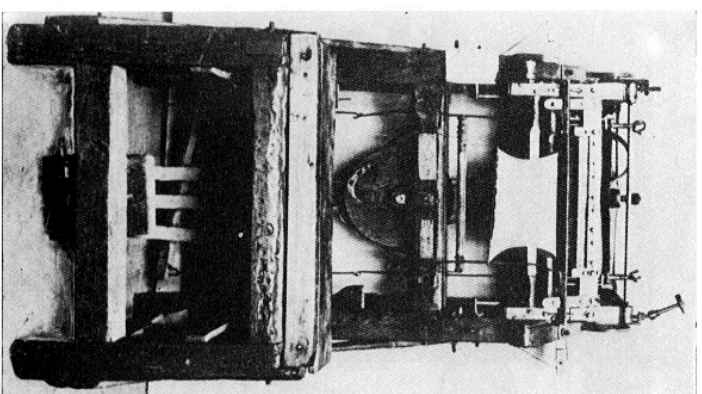


14
16a

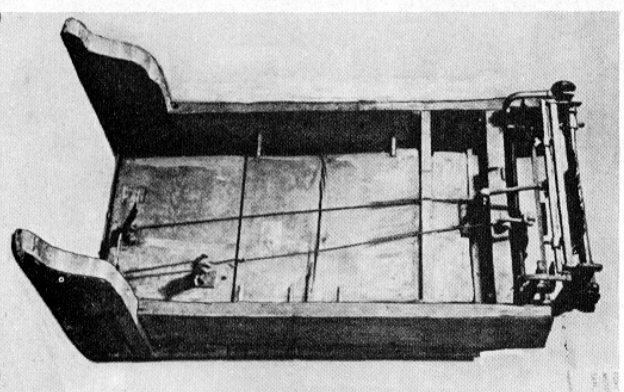
Knitting Sheaths of Various Materials



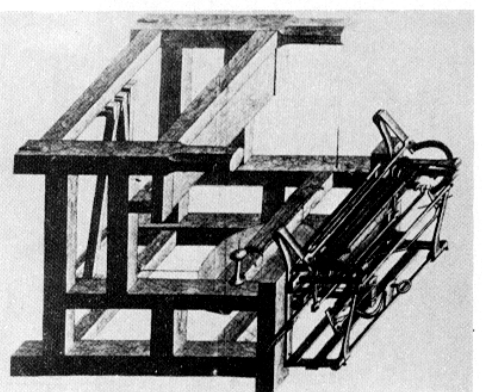
16b



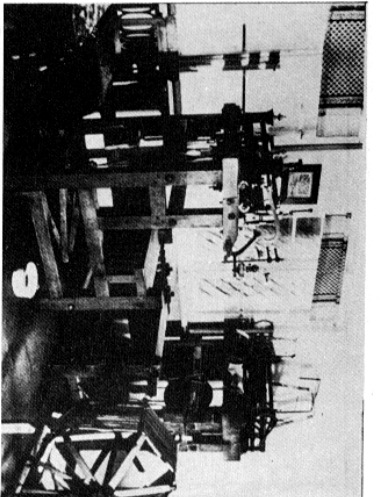
18



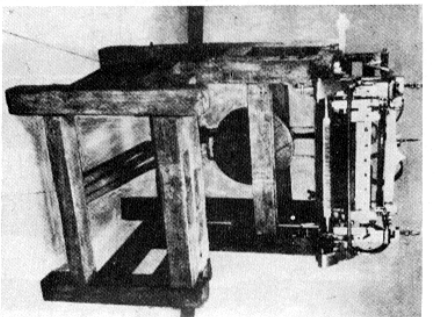
19



17

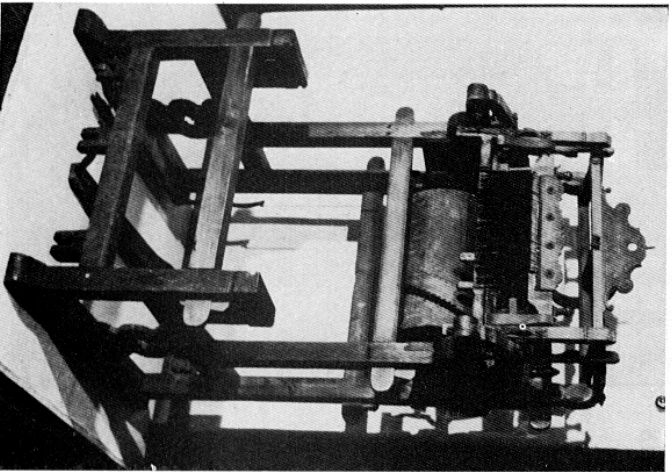


20

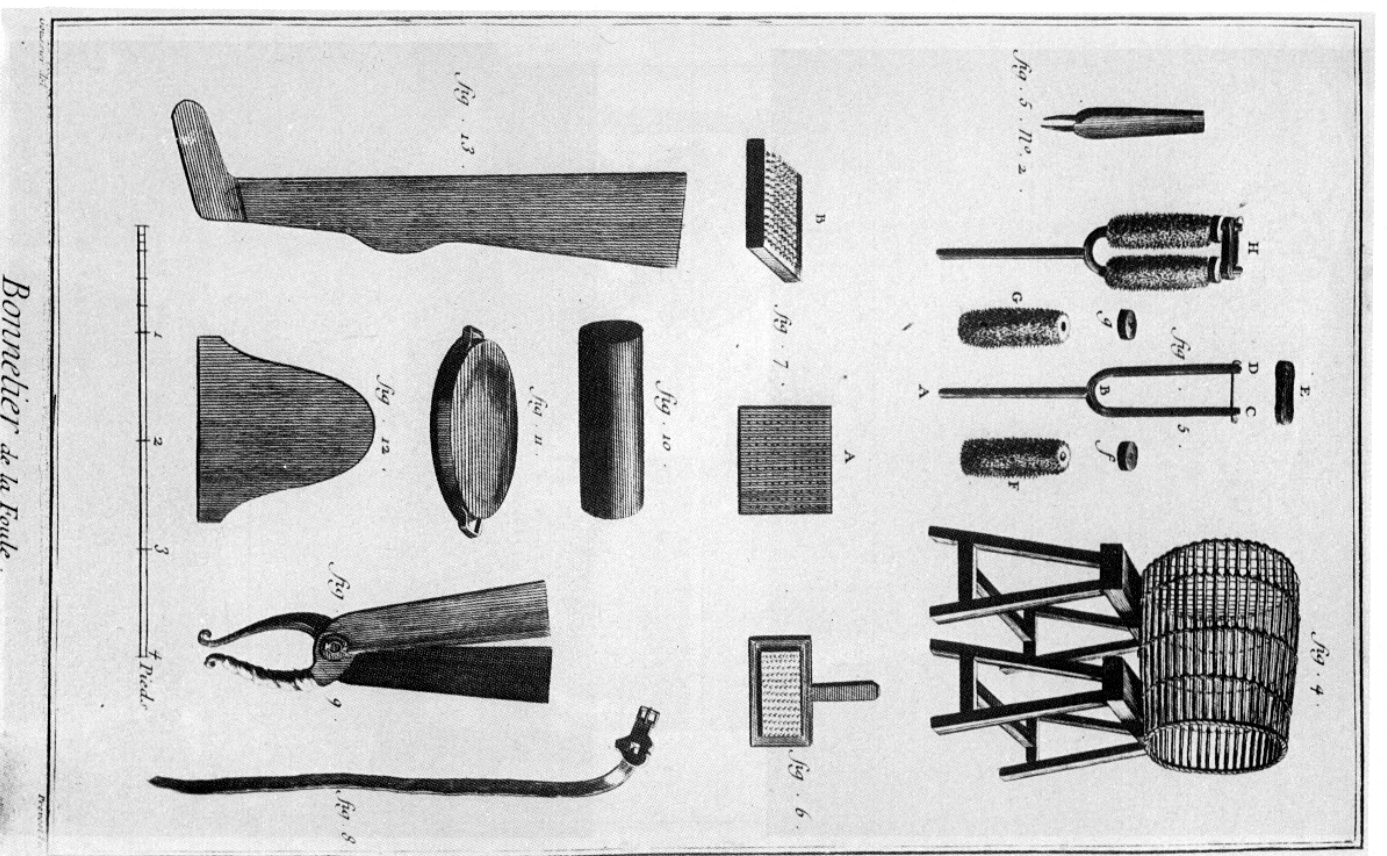
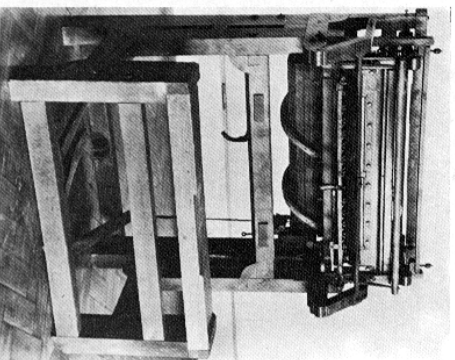


22

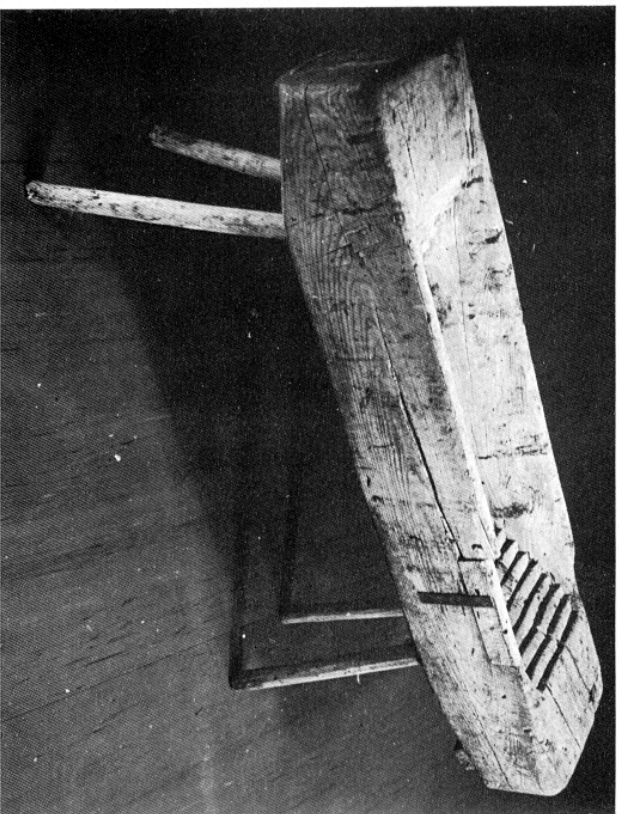
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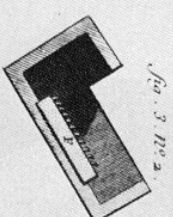
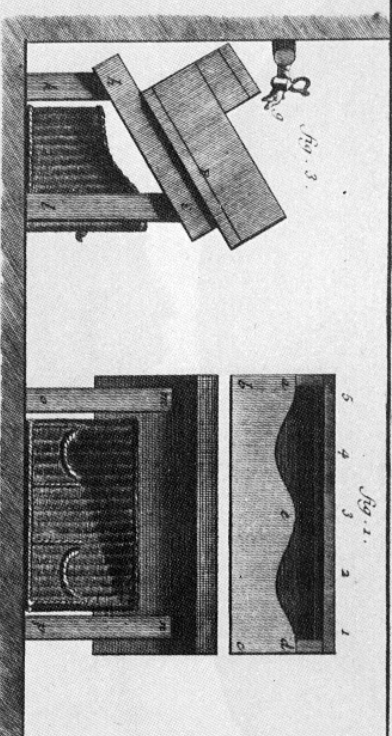
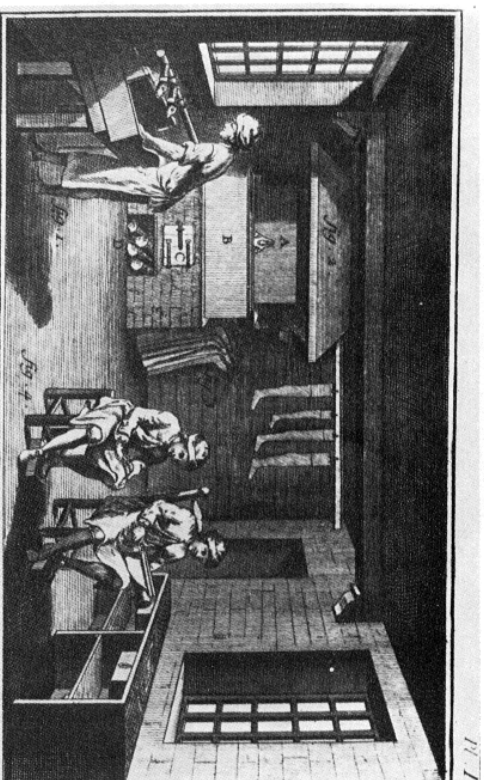
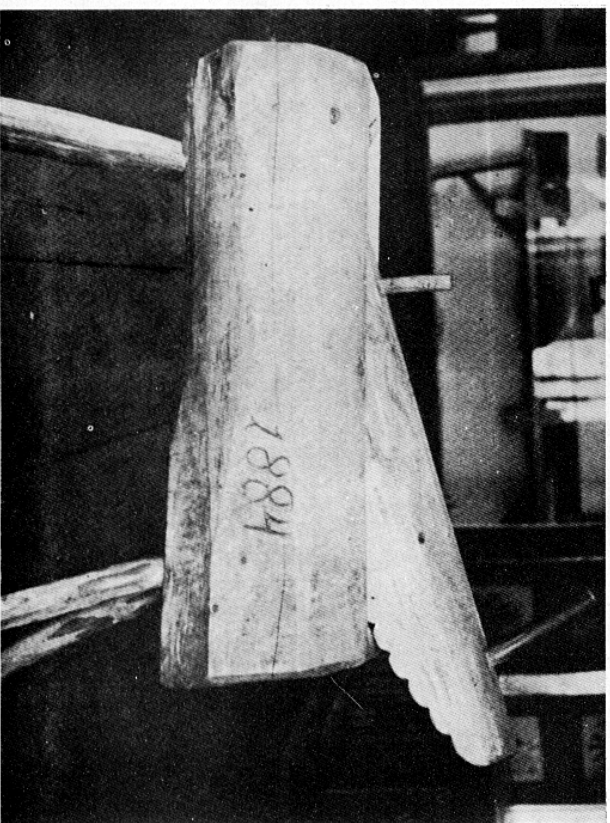


Bonneter de la Foulle



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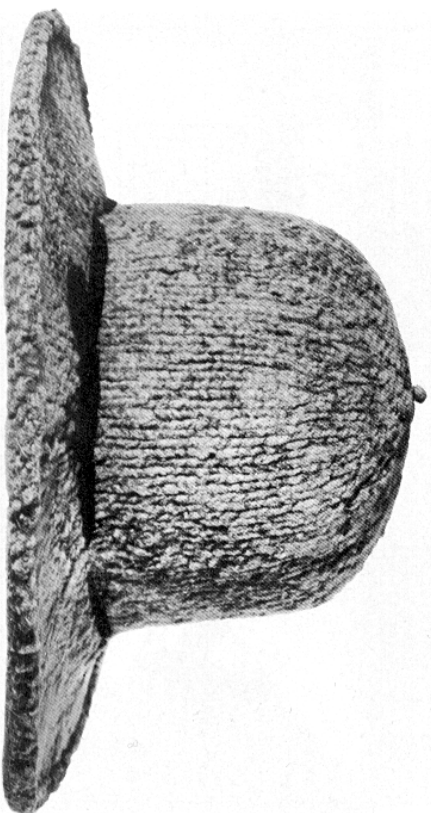
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Bonneterie de la route



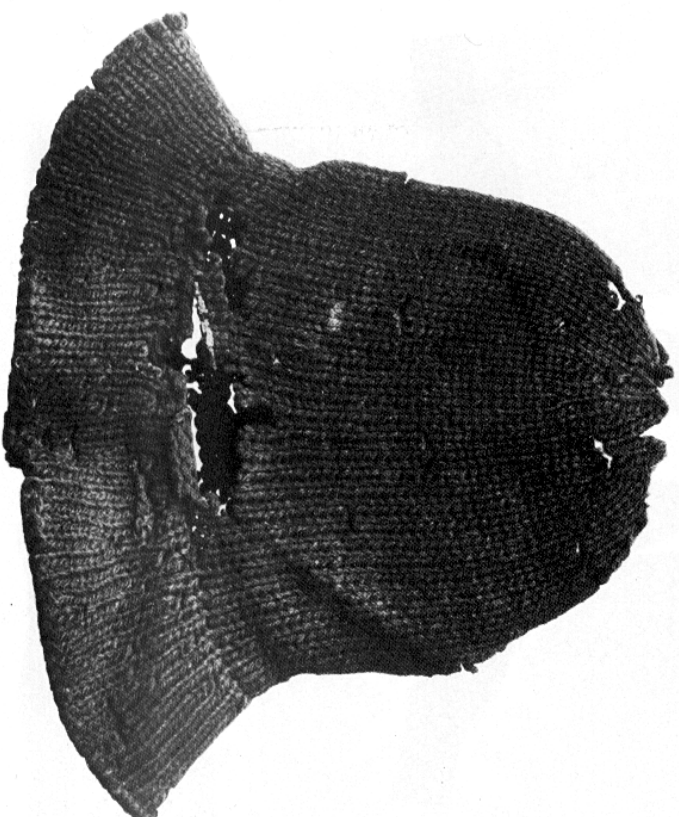
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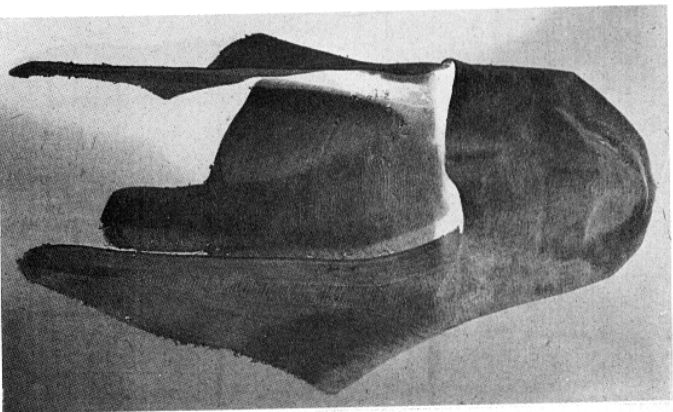
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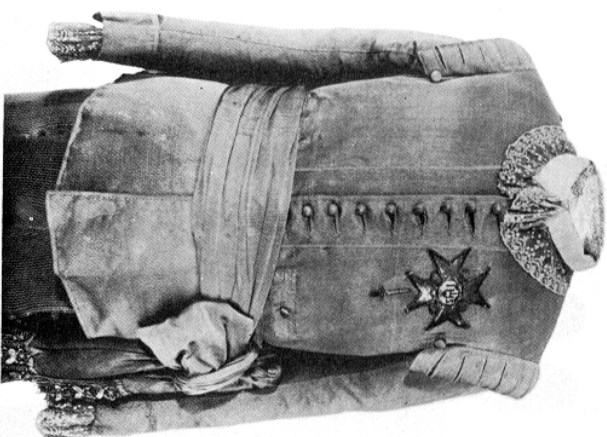




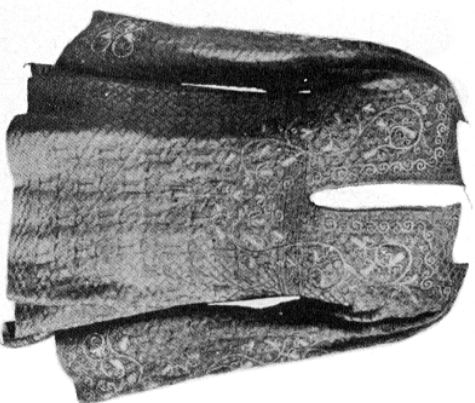
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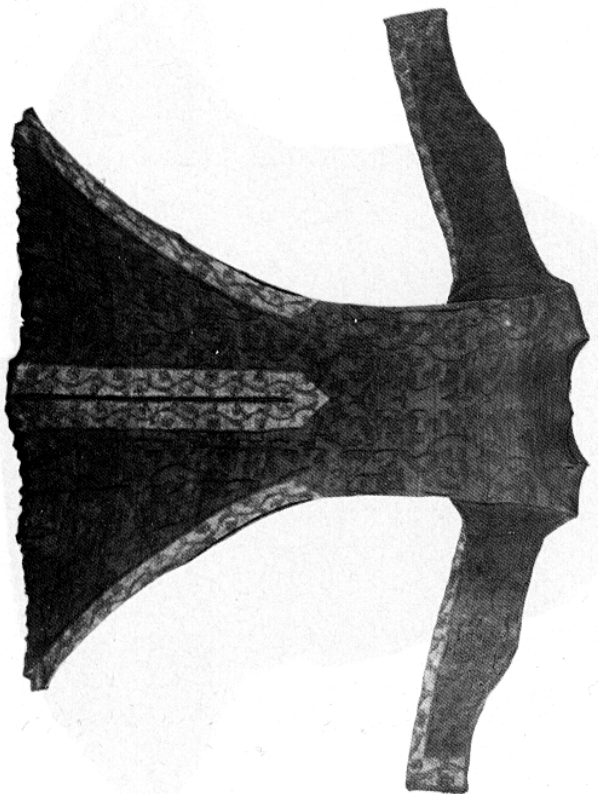
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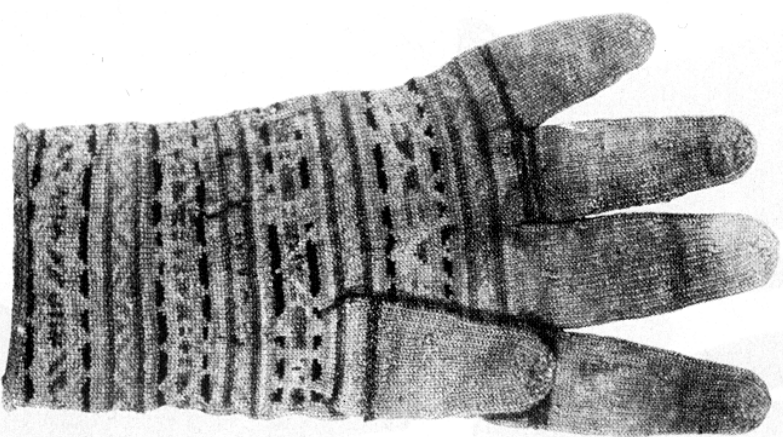
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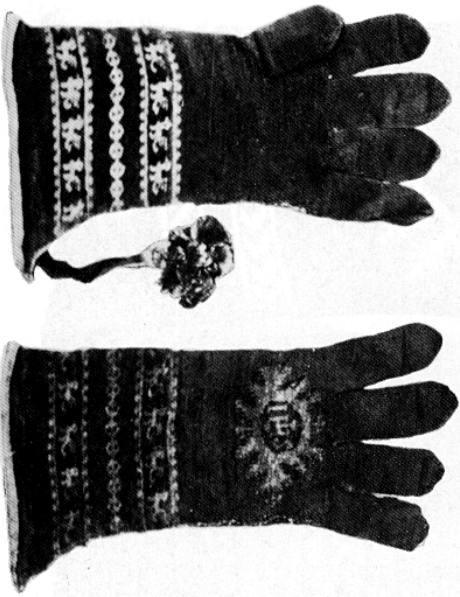
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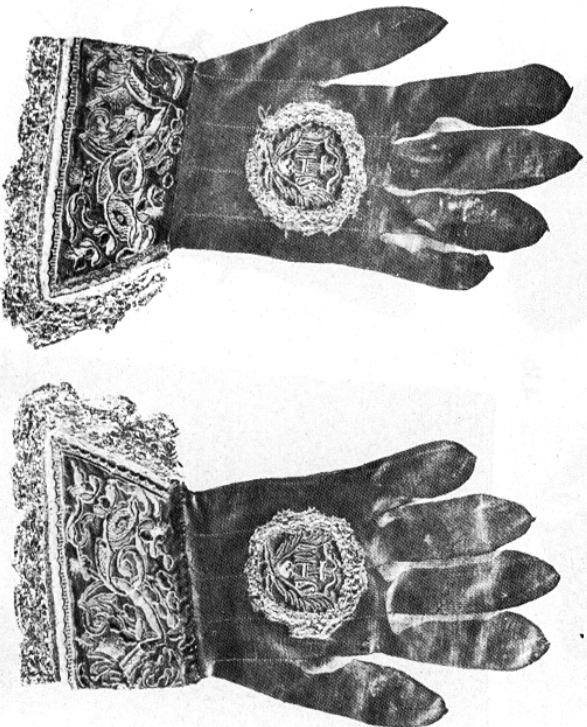
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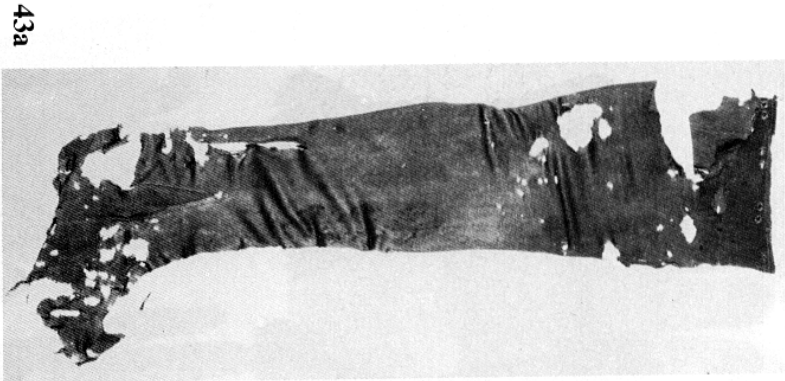
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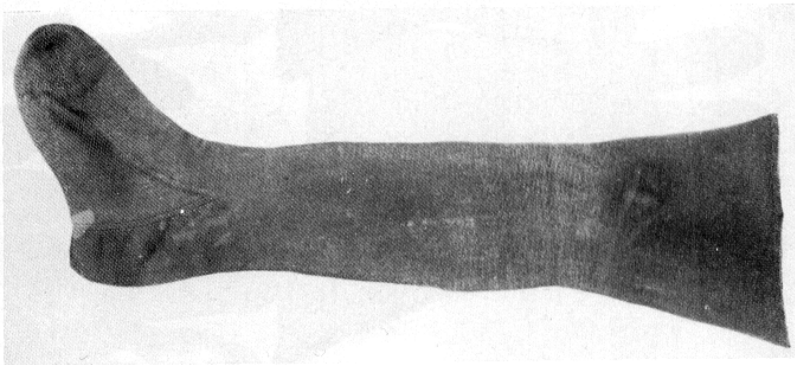
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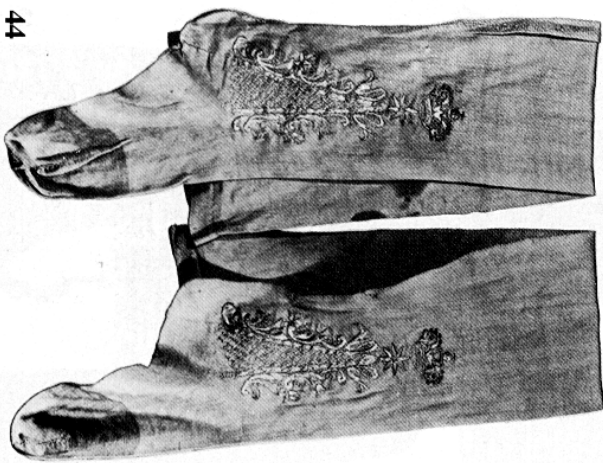
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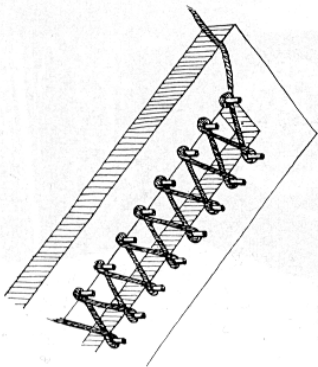
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43b



44



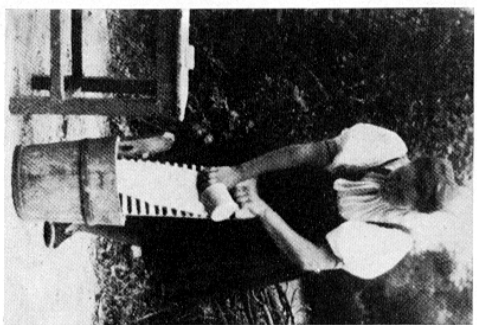
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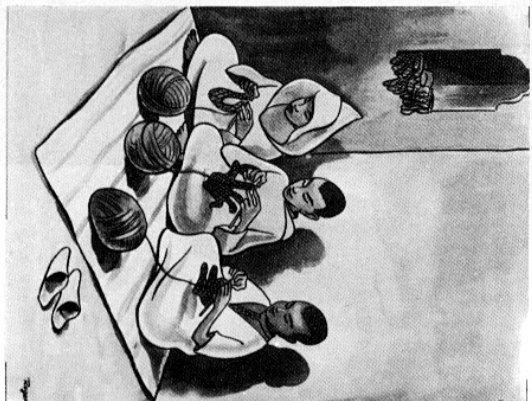
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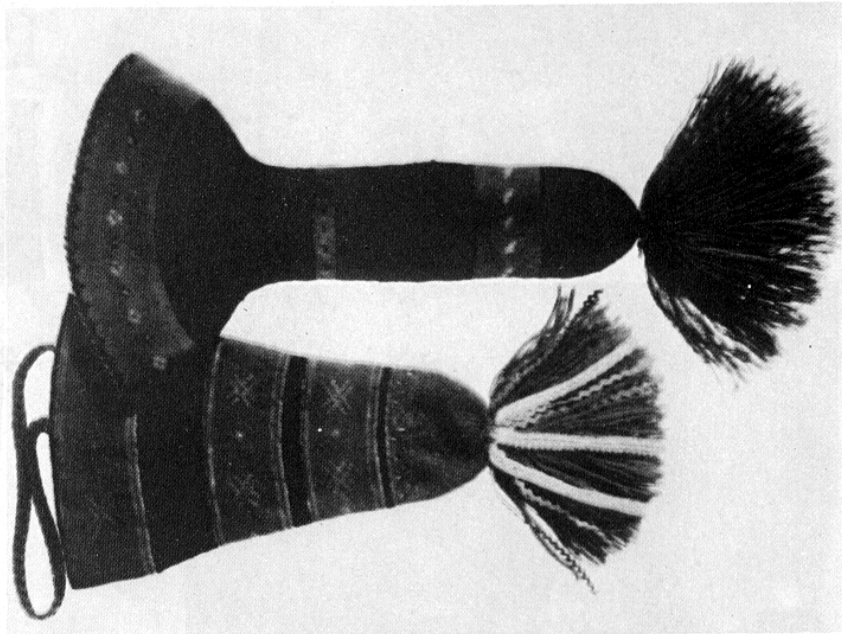
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51