The Organization of the European Textile Industry from the Thirteenth to the Eighteenth Century

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Introduction

In a recently published survey of the history of the European textile industries[1] I have distinguished nine principal branches of production: linen, woollens, silk, cotton and cotton mixes, lace-making, passementerie, embroidery, knitting and felt-making. The XIIIth century makes a good starting-point for a study of the European textile industry because of the numerous technical developments that occurred at that time. These included the treadle-less spinning wheel, the horizontal loom, the silk *filatorium*, the draw loom, the water-powered fulling mill, the wool bow and the five-needled knitting machine. The coming of the Industrial Revolution in England and the invention of the basic textile machines marks the end of this phase of development, even though the transition to mechanized factory production had occurred in only certain branches of textile production before the end of the XVIIIth century.

The geographical scope of the study is defined by the ways in which different branches of textile production developed in different parts of Europe. Textile production was concentrated in Western and Southern Europe, but many branches of production took place elsewhere and embroidery was widespread throughout the Balkans for example.

The organization of the production of woollen goods is well

[1] I. Turnau, *Historia europejskiego włókiennictwa odzieżowego od XIII-XVIII wieku* (The History of European clothing industries from the thirteenth till eighteenth century), Wrocław 1987

researched for all the major European countries, and recently the three conferences on this subject organized by the late F. Melis have also been published.[2] There are detailed quantitative studies on the production of woollen cloth in France in the XVIIth and XVIIIth Centuries,[3] while English historians have provided a wealth of information on the transition to factory production.[4] There are also detailed studies on the transition from guild to factory production by Polish[5] and Russian[6] historians.

Although we are well informed on the organization of the production of woollen cloth in Western, Central and Eastern Europe, there is much less information on linen manufactures. Silk, cotton and worsted cloth have received greater attention because these all experienced a faster transition from guild production at early stages in the process of capitalist development.[7] But there is still virtually no information about the organization of production in other branches of the textile industry. I have attempted to redress this neglect by drawing on monographic studies dealing with particular branches of production in more than

[2] *La lana come materia prima. I fenomeni della sua produzione o circolazione nei secoli XIII-XVII,* Firenze 1974; *Produzione, commercio e consumo dei panni di lana (nei secoli XII-XVIII),* Firenze 1976; *Produttività e tecnologie nei secoli XVI-XVIII,* Firenze 1981.

[3] T. J. Markovitch, *Histoire des Industries françaises. Les industries lainières de Colbert à la révolution,* Genève 1976.

[4] For instance: *Textile History and Economic History. Essays in Honour of Miss Julia de Lacy Mann.* Edited by N.B. Harte and K.G. Ponting, Manchester 1973; *Cloth and Clothing in Medieval Europe. Essays in Memory of Professor E.,. Carus Wilson.* Edited by N.B. Harte and K. G. Ponting, London 1983; "Textile History," v. 1-16, 1968-1985.

[5] For instance: M. Bogucka, *Gdańskie rzemiosło tekstylne od XVI do połowy XVII wieku* (Textile handicrafts in Gdańsk in Sixteenth and the first half of Seventeenth centuries), Wrocław 1956; A. Mczak, *Sukiennictwo wielkopolskie XIV-XVII wieku* (The woollen industry of Great Poland in fourteenth-seventeenth centuries), Warszawa 1955; *Zarys historii włókiennictwa na ziemiach polskich do końca XVIII wieku* pod redakcj J. Kamińskiej i I. Turnau *(An outline of the Polish textile history up to the end of eighteenth century* edited by J. Kamińska and I. Turnau), Wrocław 1966.

[6] For instance: G.J. Isaev, *Rol tekstilnoj promyšlennosti v genezise i razvitii kapitalisma v. Rosii 1760-1860,* Leningrad 1970; E.J. Zaozierskaja, *Razvitie legkoj promyšlennosti Moskve v pervój četverti XVIII* v., Moskva 1953.

twenty different European countries in order to present some preliminary ideas on the organization of production.

Economic historians have generally been concerned to assess the overall level of development reached at a certain time in particular areas or particular industries, but much less attention has been devoted to the techniques that were used or to the ways in which innovations and new instruments such as early water-powered or horsedriven machinery was employed. But these innovations often brought important changes to the organization of production and speeded up the transition from guild or domestic production to centralized manufacturing.

There has been little attempt either to study the ways in which fashion determined the development of the textile industries. But changing fashions for both fabrics and accessories played a major role in the history of certain textiles. This was the incentive for the invention of the knitting machines in 1589 and ribbon looms in 1604, for example. Both the increase in production and the boom in the international textile trade were led by consumer demand. The absence of certain types of machinery in a particular regions was not therefore necessarily a consequence of backwardness, but more simply of the absence of demand for certain commodities. There were very few ribbon looms and lace-making was rare in Central and Eastern Europe, for example, because in these regions national costumes were not finished with lace or ribbon. The small demand of those who in the XVIth and XVIIth centuries wanted to follow more Western fashions was met by imports.

The Nine Branches of Textile Production Classified in Terms of Organization

The organization of textile production followed three models: domestic manufacture that was primarily rural and directed to family or at best local demand; guild production; the putting-out system, which marked the first transition towards more

centralized forms of production in the early stages of capitalist development. By the end of the XVIIIth century the English industry had pioneered a new form of organization with the development of the first textile factories. Each of these models necessarily simplifies more complex economic and social realities, but even so it is possible to detect certain trends in the development of different branches of production which form the basis for the following classification.

1. Embroidery, passementerie and lace-making (except for mechanized ribbon making) were normally either domestic or guild industries.

2. Linen manufacture (except the finishing of unbleached linen) and lace-making using flax were mainly cottage industries, and even when organized on a guild basis remained domestic.

3. Woollen manufactures, knitting and felting were industries that were organized in all three of these ways.

4. Silk-making, cotton and worsteds, as well as machine-made ribbons were branches of textile production that moved the fastest from well-organized guild production to centralized manufactures without an intervening phase of out-putting.

5. Factory production first developed for producing woollen and cotton cloth in England after 1770 and for treating raw materials and for throwing, reeling and spinning silk yarn in Italy, France and England in the XVIIIth century.

There were various types of guild organization in the different branches of textile production, the majority dating from the late Middle Ages. The German-style guild is the best known and was found throughout the Netherlands and the Holy Roman Empire as well as in Central Europe and the Baltic states. These held a complete monopoly over specific forms of production and excluded all non-guild competition. The guilds rigidly organized the training and promotion of craftsmen and exercized strict quality controls over production.[8] But textile production

[7] J. Heers, *Gênes au XV^e siècle. Civilisation méditerranéenne, grand capitalisme*

also expanded greatly in France where the guild system was much looser, existed only incertain trades and was much more flexible concerning the volume of production.[9] In the British Isles, on the other hand, woollen goods were produced mainly in small private workshops, whose number guaranteed large output.[10] In the Balkans, the Turks introduced the *esnaphe* system which was similar to the German guilds.[11] These differences have to be borne in mind when considering the particular form of organization of the principal branches of textile production in different parts of Europe.

1. *Embroidery.* From a technical point of view this was the simplest branch of the clothing industry. With a needle anyone could embroider different types of fabric, be it cloth, hosiery, felt, lace or leather. As a result, the embroidering of various forms of clothing and footwear took place throughout Europe, although in Western and Central Europe guild organization expanded rapidly in the late Middle Ages. The greater part of the sources relate to the XVth century. These show that heavy embroidery, in other words the ornamenting of fashionable gowns and ecclesiastical robes (when this was not done in nunneries), of banners, leather goods and harnesses, was the task of guild artisans, while women working at home embroidered lighter cloths and underwear. Silk fabrics embroidered with silver or gold thread for use in court or ecclesiastical dress were interna-

et capitalisme populaire, Paris 1971; M.P. MAZZAOUI, *The Italian Cotton Industry in the Later Middle Ages 1100-1600*, Cambridge 1981; W. VON STROMER, *Die Grundung der Baumwollindustrie in Mitteleuropa. Wirtschaftspolitik im Spätmittelalter*, Stuttgart 1978.

[8] *Internationales Handwerksgeschichtliches Symposium*, Veszprém 1979; II Internationales Handwerksgeschichliches Symposium, v. I-II, Veszprém 1983.

[9] A. ŠPIESZ, *Das Zunftwesen des Königreichs Ungarn und sein Platz im gesamteuropäischen Zunftwesen, Internationales*, o.c. Veszprém 1979, pp. 293-307.

[10] G.D. RAMSAY, *The English Woollen Industry, 1500-1750*, London 1982, pp. 23-31.

[11] V. ŠIFTAR, *Zünfte im Murgebiet (Prekmurje)*, Internationales, v. I, 360-382 pp.

tional trade commodities, but the widespread use of embroidery on much less expensive fabrics shows that the female labour involved was cheap.

In the Balkan states, and especially in Greece, the embroiderers were divided into townspeople and those who travelled around to sell their wares. A wide variety of different techniques were used, many deriving from earlier Byzantine traditions, and continued to expand until the end of the XVIIIth century.[12] Because of their skill the Turkish embroiderers were in great demand throughout the Balkans and also in Hungary in the XVIth and XVIIth centuries, although the majority were probably Greeks.[13] Embroidery was sometimes carried on in the form of a large scale putting-out industry, and this was the case in Switzerland and Saxony in the XVIIIth century.

Passementerie covered a wide range of woven and unwoven trimmings. In medieval Paris haberdashers were evocatively termed *enjoliveurs* or 'embellishers'.[14] The types of accessories that were produced varied according to fashion and changed rapidly – often within a single year, in contrast to much slower change in other branches of production. Passementerie was very much a servant of fashion, and its products were tailored to consumer taste and demand to a greater degree than any other branch of textile production. This was explicitly recognized in the nature of guild organization which survived to the end of this period. In the statutes of the Cracow haberdashers it was stated as late as 1788 that "the craft should be carried out according to that fashion ruling at the time."[15]

[12] M. Théocharis, "Le moine brodeur Arsenios et l'atelier des Meteores au XVI[e] siècle," *Bulletin de Liaison du Centre International d'Étude des Textiles Anciens*, nr 45, 1971; the same author, "Sur les ateliers post-bizantins de Constantinople," *Etaireias Byzantinon Spondon*, 1966, 227-242 pp.

[13] V. Gervers, *The Influence of Ottoman Turkish Textiles* and *Costume in Eastern Europe with particular reference to Hungary*, Toronto 1982, pp. 19-23.

[14] R. Heutte, *Le livre de passementerie*, Dourdan 1972, p. 34.

[15] In statute book in Cracov of 1778. (Manuscript in Library of Polish Academy of Science in Cracow nr 1222).

Passementerie was organized entirely on a guild basis. Amongst the oldest of these was the Paris haberdashers' guild that was founded in 1270.[16] Numerous new guilds were founded in the late Middle Ages, and because there were not many master-craftsmen the haberdashers often joined collective guilds. Production was mainly for local and regional markets, although some types of bands, galloons, buttons, shoe-laces, fringes, loops and ribbons did form part of international trade. England imported many forms of passementerie from the Continent, and France and the Southern German states were the main exporters of high quality haberdashery. The first mechanized plaiting machine was invented and the production of fringes was mechanised in the late XVIIIth century.[17]

The invention of the ribbon-making machine in 1604 made it possible to produce from 12 to 40 pieces at the same time, and this soon became a separate branch of production. Owing to fierce resistance from the haberdashers' guilds, ribbon looms spread very slowly in Western and Central Europe and were never used in those countries where national costumes were widely worn. Other forms of passementerie were produced on a guild basis until the end of the XVIIIth century throughout Western Europe and Spain, while there were also many haberdashers' guilds in countries where national costumes were used.

2. *Linen.* Linen was a major branch of textile production in which different stages of production followed quite different paths of development. From the XVth century fibre and flaxen or hemp yarn was transported in large quantities from the Baltic and Russia to western Europe and Britain. Unbleached linen was also carried overland from Bohemia, Silesia and Little Poland to bleaching establishments in Holland, England and Germany. Finishing was always done as a single operation, since

[16] HEUTTE, oc. 12-14 and 26 pp.
[17] N. SPEISER, *The manual of braiding*, Basel 1983, pp. 80-84.

inadequate bleaching or incorrect dyeing reduced the value of the finished product. In the case of woollen or cotton goods this separation of the different phases would have caused a decline in quality. But linen goods were also very cheap and throughout this period virtually every European peasant kept a patch of land to grow flax and meet the family's need for clothing. The developing capitalist manufacturing system finally made ready use of the abundant supply of skilled flax spinners and these workers were drawn into the cities of Western Europe as the demand for fine linen underwear expanded.

The organization of linen guilds in the towns and in rural areas raises many questions. The Paris linen makers received their guild statute in 1189.[18] Linen guilds were found in all countries where the guild system had been adopted, but the urban guilds normally produced only fine quality linen goods. Since linen-drapers were entitled to trade in linen cloth they were also able to purchase unbleached linen produced in peasant cottages and finish it themselves. But the establishments where bleaching, mangling, dying and printing were carried on required enormous capital expenditure since a large number of rooms were needed as well as meadows and access to abundant water supplies. As a result only wealthy guilds could afford such investments, and in the late Middle Ages this also enabled commercial capital to take over the finishing of linen cloth in many parts of Europe.

Another feature of linen production was the abundance of female labour. The treatment of the raw materials, spinning and even weaving were not normally male tasks as was the case in other guilds, and linen production provided wide employment for women which included not only the womenfolk of the master's or journeyman's families but also "wage-earning wenches." A separate guild for women linen spinners existed in me-

[18] R. de Lespinasse, *Histoire générale de Paris. Les métiers et corporations de la ville de Paris.* v. III, XIV[e]-XVIII[e] siècle. Tissus, étoffes, vêtement, cuirs et peaux, métiers divers, Paris 1897, p. 62.

dieval Cologne between 1370 and 1597 and gave women a journeyman's qualification after four years. Women who had met the guild's requirements could run a workshop even if they did not come from a line-draper's family. The Cologne linen-drapers produced high quality warp yarn that was used in the manufacture of cloth and silken haberdasheries. The finished yarns were rolled onto spools and reels on horse-driven reeling and warping machines, which were similar to the silk-reeling mills (*filatoria*) that had been used in Cologne since 1412.[19] But the womens' guild in Cologne was an exception, and in most linen-making centres women ran workshops or traded independently in linen and yarn only after the death of their husband.

In all those countries where guild organization was strong, linen manufacture was quickly divided into its component parts. In many countries the terms linen-draper and weaver were synonymous, while weavers, bleachers and dyers were all organized quite separately, unlike the case in other manufacturing industries. One reason was that the mechanization of linen production presented greater difficulties than other branches of textile production. As a result the time-consuming task of preparing the raw materials and spinning was left to the peasants from whom first the landowners and then the merchants purchased their yarn. The most typical form of organization was therefore the putting-out system. Yarn and unbleached linen was purchased from peasant producers or supplied as part of villein obligations, and acquired its commercial value from the finishing processes to which it was subject. In the late Middle Ages the major linen manufacturing centres all acquired their raw materials from a wide area, as the linen bleacheries at St Gall in Switzerland and at Haarlem show. In the XVIIth and XVIIIth centuries unbleached linen was carried half way across Europe to be finished, while centralized linen manufacturies first appeared in We-

[19] M. Vensky, "Women's Guilds in Cologne in the Later Middle Ages," *The Journal of European Economic History*, v. 11, nr 3, 1982, pp. 631-650.

stern Europe in the XVIIth century and then spread to Eastern and Central Europe in the XVIIIth century. These specialized in the production of high quality linens in order to reduce the demand for imported goods. Bleacheries and dyeing shops were built around the manufacturies and purchased unbleached linen locally for finishing, thereby expanding the putting-out system and reducing the transport costs of raw materials. But the industry continued to depend on cottage producers.

The organization of lace-making was similar to linen in many ways. The production of white needle or bobbin lace made from the finest linen thread was stimulated by the fashion for embellishing underwear in the late XVth and XVIth centuries. The fashion for lace frills, collars and trimmings grew so rapidly in the XVIth century that the industry was transformed from a womens' handicraft into a major international trade relying on mass production. In those countries where the fashion for lace trimmings caught on and where the finest varieties of flax could be grown, lace-making became a mass industry. Production expanded in Italy, but it was in the Netherlands that mass production and bobbin manufacture first developed. In both countries women and children provided the labour, but production was organized on a putting-out basis. Emroideresses easily took up lace-making, and spinners could produce better quality yarns. The guild masters and merchants took over the organization of networks of out-putters to whom they supplied yarn, patterns and tools and finished of the manufactured goods. Out-putting was concentrated around the major towns in Italy (Venice, Genoa and Milan), but in the Netherlands was much more widespread.

In the XVIIth century, Venetian and Dutch specialists were brought to France. The Emperor Charles V was keenly aware of the importance of this trade and in 1640 made special provision for training lace-makers in the Netherlands. In 1786 it was estimated that there were over 100,000 women making lace in Brussels alone, while there were another 150,000 out-putters in the

Southern Netherlands[20] which indicates that survival of mass production over a long period of time. Lace manufacturies appeared in France in the late XVIIth century, the best known being the workshops of Alençon, Argentan, Sedan and Valencienne which were built around 1665. The studies of these industries show that only a small number of designers and outputting overseers worked in the manufactory and that there were much larger groups of lace-makers working as out-putters in neighbouring towns and villages. The largest French lace-making establishments employed as many as 10,000 workers in the XVIIIth century,[21] but they remained dispersed manufacturies and some were entirely dependent on out-putting. This was even more evident in other areas of France, such as Le Puy, the Vosges, St. Étienne and Normandy, but the goods produced in centralized manufacturies reached higher standards of quality. Lace was also produced on a putting-out basis in England, Ireland, Switzerland and in the Southern German states in the XVIth century, while the manufacture of bobbin lace for export increased rapidly in Saxony and Bohemia: by the end of the XVIth century there were already 10,000 out-putters making lace at Erzebirge on the border between Bohemia and Saxony.[22]

It was in those countries where linen was traditionally produced for export that the production of low and medium quality bobbin lace made from flax yarn began to assume mass proportions, while elsewhere lace-making remained dependent on the demand created by the small social elites. This was the case in Scandinavia, Russia, Slovakia, Hungary and finally Poland where the colourful metallic threaded laces used in national costume were produced locally. By the XVIIIth century bobbin lace-

[20] G. Bever, *La dentelle*, Bruxelles 1945, pp. 17-23.

[21] G. Despierres, *Histoire de Point d'Alençon depuis son origine jusqu'a nos jours*, Paris 1886; P. Guignet, "The Lacemakers of Valenciennes in the Eighteenth Century," *Textile History*, v. 10, 1979, pp. 96-113.

[22] J. Staňková, Primitivni textilni techniky v českých muzeich, (Primitive textile techniques in the Bohemian museums), "Muzejni a Vlastivědná Prace," v. 11, nr 3, 1973, pp. 168-169.

making was a widespread female handicraft throughout much of Europe but catered only for the needs of the producers' household.

3. *Woollens.* The production of woollen fabrics, knitting and felt making was organized on a cottage basis, through guilds, through putting-out and in centralized manufacturies.

Economic historians have devoted much attention to the production of woollen and worsted cloths, but they have not always paid sufficient attention to the growing technical complexities of cloth production which first gave rise to guild organization in the Middle Ages. The principal innovations included: the use of the "wool bow" for breaking up and stirring wool as it was being washed; the greasing of the wool while it was being carded; the use of the treadle-less spinning wheel to produce strong warp yarns; weaving with the use of four heddles and improved finishing processes. By this I do not mean only the water-driven fulling mill which even in England spread very slowly[23] while in the Netherlands foot-fulling was still used even in the XVIth century.[24]

Woollen cloth that was imported from Britain or the Netherlands had to be finished where it was purchased. The cloth was transported by land or sea in tightly rolled bales, and before it could be used it had to be stretched and combed to raise the nap, and sometimes sheared, pressed and dyed as well. This was one reason for the expansion of shearers' guilds from Hungary and Bohemia to Novgorod and throughout Central and Eastern Europe in the Middle Ages. Initially the craftsmen were trained by foreign experts and used imported tools. The finishing processes created the need for strong guild organiza-

[23] A.R. Bridbury, *Medieval English Clothmaking. An Economic Survey*, London 1982, pp. 5-20.

[24] K.G. Ponting, "Sculptures and Paintings of Textile Processes at Leiden," *Textile History*, v. 5, 1974, pp. 128-151.

tions capable of providing skilled workers who were able, under the supervision of the merchant, to increase the commercial value of the commodity.

The transition from guild to capitalist production has been studied in the cases of Italy, the Netherlands and England. The changes that took place in the production of lighter cloths — the "new draperies" — have received less attention. In comparison with the better quality cloths, the requirements of the raw materials, of spinning and weaving were much more simple, and this enabled the production process to be divided up and performed on an putting-out basis. Less control was needed over those working on the primary phases of production, whereas the finishing processes that determined the commercial value of the product were more closely supervised.

Progress towards centralized manufacturing occurred at different speeds in different parts of Europe and recent research on the English woollen cloth industry shows how slow the process of concentration was. In the XVIIth and for most of the XVIIIth century production was still largely dependent on workshops employing little more than a dozen workers and the owner frequently also worked at the loom. The lack of state interference meant that the output varied considerably depending on the supply of domestic and imported wool and on the demand for cloth. But from the XVIth century onwards the wealthier clothiers were gaining increasing importance. Their considerable capital allowed them to organize production by subordinating the cloth producers through the putting-out system and gaining control over the finishing processes. The craftsmen were relegated to producing primary fabrics but were unable to participate in the finishing processes.[25] The putters-out were active in most counties, but the independence of the small producers varied from place to place. The most dependent were the small manufacturers in the county of York who sold fulled but unfini-

[25] RAMSAY, *op. cit.*, pp. 23-50.

shed cloths.[26] But there were few manufacturies that employed a rational division of labour until the mechanization of spinning and certain finishing processes led to the appearance of the first factories.

From the mid-XVIIth century onwards much of France's woollen cloth production came from centralized manufacturies, but guild production survived in many areas and only the best qualities of cloth that previously had been imported were made in the centralized manufacturies. There were also state-subsidised woollen manufactures in the Scandinavian states, in certain German states (Prussia and Saxony in particular) as well as in Russia and Austria. But in many areas of Central Europe which maintained a high output of woollen cloth right through this period — notably Bohemia, Silesia and Great Poland — the guild system remained in force. Here more centralized manufactures were rare and short-lived.

The need to mass produce ready-made garments had important consequences for the organization of production. In the case of the knitting industry the implications were particularly complicated. Until the XVIth century hand-knitting was essentially a cottage industry, although there were also some knitters' guilds from the XIIIth century onwards. But the invention of a knitting machine in 1589 and its subsequent diffusion in much of Europe in the XVIIth and XVIIIth centuries resulted in major changes in organization. In England knitting machines were used for putting-out, but on the Continent they normally brought about the creation of centralized manufactures. But the machines needed careful maintenance which could only be provided by skilled locksmiths, while they were too costly for small craftsmen to purchase. This was why mass production knitting took place throughout most of Europe in relatively small workshops.[27]

[26] D.T. Jenkins and K.G. Ponting, *The British Wool Textile Industry 1770-1914*, London 1982, pp. 1-26.

[27] I. Turnau, *Historia dziewiarstwa europejskiego do pocztku XIX wieku, (The*

Felt-making could also be done at home. Small strips of felt for use in headgear, for lining and filling shoes were fulled over a pot of boiling water standing on a stove. Originally the same techniques were used by the capmakers' and hatters' guilds, but the increase in demand for felt-hats brought improved techniques and manual and mechanical fulling-mills and in tanning processes in the late Middle Ages. But the relative simplicity of the production processes meant that increased demand did not lead to technological development but rather to the employment of more workers who after a period of training were able to work in the fulling-mills, the dye-house and the pattern-shop. The transition from guild workshop to centralized manufactury was also relatively easy for the same reason. Since the different stages of production could not be separated or carried out in the homes of the journeymen the transition to centralized production was easy. Little training was required and centralized felt shops were established in many parts of Europe in the XVIIth and XVIIIth centuries in an attempt to reduce the demand for imported felt hats which previously had come mainly from France. Little training was needed to imitate new hat models, but only the highest grades of beaver fur hats became international trade commodities.

4. *Silk, Cotton and Cotton Mixes.* These products, like machine-made ribbons, quickly broke away from guild-based forms of production in favour of centralized manufacturies. In each trade the pace of change was different, and was not related simply to the period or geographical location. In each case, the raw materials had to be imported mainly from outside Europe and the process of production was relatively complicated. In theory, silk-worms could be raised in even fairly cold climates, but this was rarely sufficient to support local silk cloth making.

History of knitting in Europe up to the beginnings of the Nineteenth Century), Wrocl aw 1979, pp. 60-114.

Because production required cheap labour and sources of power, the more expensive cloths were produced in large cities. Silk cocoons could be imported, but the production of silk thread posed many problems. In Italy the throwing and reeling of silk yarn from cocoons was carried out in mechanized *filatoria* or reeling mills from as early as the XIIIth century. The cheapest forms of raw silk were spun by hand, usually by women who were paid very badly although they belonged to the silk guilds (in medieval Zurich) or else formed guilds of their own (as in Cologne).[28] The employment of women as masters and journeymen was evidence, however, of the difficulty of adapting silk production to the structure of the German guilds. Many different kinds of yarn were needed in the manufacture of higher quality cloths and if there were shortages of supply than the quality of the manufactured cloth declined.

Those who specialized in weaving particular types of silk cloth (for example velvets, taffetas, crepes and brocades) had no difficulty in forming guilds. They used particular types of yarn and the weaving was done on multi-heddled or draw looms. Those employed in finishing, the dyers and the pressers who operated the mangles and calenders, were separately organized.

In the XVth century the silk guilds in Genoa collapsed because through the putting-out system the merchant manufacturers were able to gain control over the guild manufacturers, and to set up their own workshops which were equipped with spinning sheds, draw looms, dyeing vats, mangles and calenders.[29] But the decline of the Italian silk industry was much less rapid than historians used to believe.[30] In the largest centres of production as well as silk yarn large quantities of patterned fabrics were produced in workshops of varying sizes. In Spain, the silk

[28] Wensky, *op. cit.*, pp. 631-650.

[29] Heers, *op. cit.*, pp. 184-192.

[30] S. Ciriacono, "Silk Manufacturing in France and Italy in the XVIIth Century: Two Models Compared," *The Journal of European Economic History*, v. 10, nr 1, 1981, pp. 167-199.

guilds remained strong until the XVIIIth century, especially in Barcelona and Valencia, while yarn was produced in many smaller centres in Andalusia (especially Murcia and Malaga). In the late XVIIth and in the XVIIIth century the first silk manufactures on the French model were built in Castile and Andalusia.[31]

From the XIIIth century silk fabrics had been produced by small guilds in France, Switzerland and the Rhineland, but from the XVIIth century onwards spread virtually throughout the whole of Europe in order to reduce the cost of expensive imports from Italy, Spain and the Near East. This was made possible by importing raw materials and skilled craftsmen, while mulberries were planted and small quantities of silk-worms were also raised locally. In this fashion French production expanded particularly rapidly and had by the XVIIIth century gained a European primacy. Centralized silk manufacturies expanded and separate companies specialized in the production of silk yarns, although when supplies were short yarn and raw silk was imported from Italy. But the frequent recessions that hit major production centres like Lyon were the result of heavy fluctuations in the supply of raw materials and also in the demand for these luxury goods.[32] Foreign competition which deprived France of export markets was also a factor, however. In England in the XVIIIth century, for example, the needs of the home market were already met by domestic production and some English silk cloth was already being exported.[33] Elsewhere nascent silk industries easily collapsed despite state subsidies, tax and customs privileges, owing to the irregularity in the supply of raw materials, the technical pro-

[31] There is a comprehensive bibliography on this subject in the paper: Stan badań nad historia włókiennictwa hiszpańskiego od średniowiecza do końca XVIII. "(Research Problems of the Spanish Textile History from the Middle Ages to the End of Eighteenth Century." *Kwartalnik Historii Kultury Materialnej*, v. 31, nr 4, 1983, pp. 447-458.

[32] P. Cayez, *Métiers Jacquard et hauts fourneaux aux origines de l'industrie lyonnaise*, Lyon 1978, pp. 214-241.

[33] P. Deane and A. Cole, *British Economic Growth 1688-1759. Trends and Structures*, Cambridge 1962, p. 59.

blems of maintaining reeling and spinning mills, the difficulty of finding trained workers locally and the tendency for products to be over-priced in relation to their quality.

The state-supported Prussian silk industry in the XVIIIth century[34] provides a good example of these difficulties. The Prussian silk industry was seen as the favourite child of Prussian mercantilism. But it was a craft that required lengthy training for workers, even in the preliminary phases of silk-worm cultivation. There was rigid control over the work-force, but although the Prussian silk industry reached its highest output in the XVIIIth century it was in the same period that it entered into decline. One reason was that support was switched from the production of silk fabrics to the more fashionable printed calicos.

The production of mixed cotton cloths was far more widespread than silk in medieval Europe. Since the XIIth century Italy had produced large quantities of fustians and other mixed cotton fabrics. These were originally made by guilds, but merchant capital quickly gained control over the processes of spinning, weaving and finishing,[35] mainly because the process of production was much more loosely articulated than in the case of woollens. The raw materials could be transported almost anywhere by land or sea, cotton was easy to spin while only narrow looms using the simplest forms of weaving were needed to make cloth so that commercial value depended almost entirely on the nature of the finishing process used. In the early period the Italian guilds played an important part in providing training and in stabilizing production. Even when in the XVIth century capitalist organization of cotton production increased this did not lead to the creation of centralized manufacturies but only affected the organization of labour.[36]

[34] O. Hintze, *Die preusische Seidènindustrie im 18. Jahrhundert und ihre Begründung durch Friedrich den Grossen*, Berlin 1892, pp. 135-311.

[35] Mazzaoui, *op. cit.*, pp. 59-86.

[36] The same pp. 105-126.

In the major fustian producing centres of southern Germany guild organizations survived until the late Middle Ages.[37] But Jacob Fugger invested some of his capital in the creation of a new centre at Weissenhorn, and soon others imitated this experiment in putting-out that began to compete with the guilds in the area around Ulm.[38] In Silesia and Little Poland fustian had been produced by small guild organizations since the XVth century. The output of fustians at Kosice expanded between 1411 and 1430 as imports of raw materials increased, new skilled workers and machines were attracted and centralized workshops were established. Part-cotton fabrics were widely exported in the late Middle Ages to the Hanseatic towns (Stralsund, Stettin, Danzig, Riga and Tallin) as well as to London and Edinburgh, and began to assume capitalistic forms of organization.[39] The production of mixed-cotton cloth was often associated with guild-based linen production, and if there was a shortage in the supply of raw cotton the workers could make linen cloth instead.

The rapid expansion of the production of printed calico throughout Europe in the XVIIth and XVIIIth centuries saw the establishment of numerous centralized workshops for finishing, bleaching, dyeing, mangling, calendering and printing. The ease with which the different phases of production could be separated influenced the way in which production was organized. The cultivation of cotton was increasingly concentrated in North America. Imported bales of American cotton were spun either in Britain or in Western Europe. In order to speed up the otherwise time-consuming business of spinning short-fibre cotton, numerous spinning machines were invented in England. But these supplies were augmented by the cotton yarns and unfinished calicos that were imported in large quantities from India. During the XVIIth and XVIIIth centuries the import of unfinished Indian

[37] W. von Stromer, *op. cit.*, pp. 5-63.

[38] H. Kellenbenz, *The Fustian Industry of the Ulm Region in the Fifteenth and Early Sixteenth Centuries, Cloth and Clothing*, oc. pp. 259-276.

[39] W. von Stromer, *op. cit.*, pp. 78-154.

calicos rapidly overtook the import of printed calicos, and the technical progress that came with the development of colour-resistant dye printing using copper rollers encouraged more centralized production. Except in Scandinavia and the Balkans, silk and linen cloths were pushed aside by printed calicos produced in centralized manufacturies which sometimes relied on putting-out for supplies of cotton yarn or plain calico.

In Italy factory production began with the development of the large scale water-powered silk *filatoria*. The machines did not require large numbers of workers and silk reeling was a highly mechanized process. Nonetheless economic historians still debate whether these were really factories,[40] and there can be no doubt that the factory system proper first occurred in more economically advanced regions like the West Riding of Yorkshire in the years after 1770.[41] The employment of spinning machines and the mechanization of different primary and finishing processes in wool and cotton textile production made it possible to use largely unskilled workers and to increase productivity. The mechanization of weaving was not to follow until the XIXth century and was very much slower.

In terms of the factors which influenced the development of different forms of organization in different branches of the European textile industry, in relation both to technical factors and changing demand, the principal feature of the European textile industry in the period from the XIIIth to the XVIIIth century was the coexistence in a single region of several different forms of organization. The organization of production not only reflected the broad distinctions between town and village, but also the more complex distinctions between the home, the guild workshop and the manufactury or proto-factory. Social realities are always too complex and varied to fit into neat classifications.

[40] C. Poni, "All'origine del sistema di fabbrica; tecnologia e organizzazione produttiva dei mulini da seta nell'Italia settentrionale (Sec. XVIII-XVIII)," *Rivista Storica Italiana*, v. 88, nr 3, 1976, pp. 444-497.

[41] Jenkins and Ponting, *op. cit.*, pp. 29-56.