V. MANUFACTURING INDUSTRIES: in LATE-MEDIEVAL EUROPE

A. The Woollen Textile Industries: Lecture no. 8 (week 9)

revised 6 November 2013

INTRODUCTION: European Manufacturing Industries: Textiles

- (1) **The two, twin spearheads of modern industrialization**, and thus of the British Industrial Revolution (ca. 1760 – ca.1830) were
- **Textiles and**
- **Metallurgy**
- (2) **Textiles: the only industry for** this first semester
- - **Chiefly only woollen textiles**
- (3) **But to begin: a list of the major textile industries** in late-medieval & early-modern Europe:
- for both **manufacturing and international trade**

TEXTILES IN EUROPEAN TRADE: 13th to 16th Centuries

TEXTILES	RAW MATERIALS: animal, insects, or vegetable fibres
WOOL-BASED TEXTILES	Wool: from sheep (animal fibre)
■ Woollens (England: the Old Draperies)	Wool: fine, short-stapled
■ Worsteds	Wool: coarse, long-stapled
■ Serges or Stuffs (England: the New Draperies)	Worsted warps (long-stapled wool) &Woollen wefts (short-stapled wool)
LINENS	Flax (fibres): vegetable
FUSTIANS	Flax-based linen warps and cotton-based wefts (vegetable)
COTTON TEXTILES: Asian ■ Calicoes (fine textiles) ■ muslins (coarser textiles)	Cotton fibres (vegetable)
SILKS: Asian and Italian Velvets, satins, damasks	Silkworms (insects), feeding on mulberry leaves

Importance of Textiles: Demand Factors (1)

- (1) **DEMAND FACTORS**:
- a) **International trade**: **by far the most important manufactured commodity in international trade** , world –wide, from 12th to 19th centuries
- - **England**: wool & wool-based textiles produced over 90% of export values up to 1640s
- (b) **Universal (world-wide) demand for textiles**
- - **NECESSITIES**: food, clothing, shelter. Why?
- - **LUXURIES:** for the aristocracy, a necessity?
- - **to assert superior social status**: Sumptuary Laws
- - **personal satisfaction**: in terms of fashion, display

Importance of Textiles: Demand Factors (2)

- (c) **commodities with favourable value:weight (bulk) ratios,**
- **especially luxury quality textiles**: as in shipping diamonds vs coal or timber
- (d) **But related to changes in transport & transaction costs: in later Middle Ages:**
- **warfare and rising transaction costs -** restricted international trade more and more to high-valued luxury textiles – 14th& 15th cent

Importance of Textiles: Supply Factors 1

- (2) **SUPPLY & PRODUCTION FACTORS:**
- (a) **Only a few regions produced textiles that satisfied market demands:** even if home-spun textiles were also universal:
- - but only peasants consumed home-spun goods
- **in Europe,** the chief textile centres were:
- **northern Italy, Catalonia (Spain), NW France, Low Countries (Flanders, Brabant, Holland), England:**
- (b) **Industrial Location: not limited to sources of raw materials**: supplied by international trade

Importance of Textiles: Supply Factors 2

- (c) **Capital Requirements for Production:**
- **large capital investments not required:**
- almost no powered machinery
- - **exceptions noted later, using water-power**:
- fulling (in woollens), and silk-throwing (spinning)
- (d) **rural labour used for much of production processes:** on part time basis, usually

THE WOOL-BASED TEXTILE INDUSTRIES IN ENGLAND

FEATURES:	THE OLD DRAPERIES: WOOLLENS	THE NEW DRAPERIES: WORSTEDS AND STUFFS
Wools for Warps and Wefts	Short-stapled, very fine, curly, scaly, soft wools: very costly. Originally English: Shropshire, Herefordshire, Cotswolds, Lincs.; later, with Spanish merino wools	Long-stapled, straight-fibred, coarse wools: relatively cheap; but in some hybrid or mixed fabrics, short-stapled wools were used for the weft. Some interwoven with goat's hair, silk, etc.
Wool preparation	After initial scouring, wools were oiled or greased (olive oil, butter)	Wools were left dry, ungreased, after scouring; but if short-stapled wools were used for the weft, they were oiled
Yarn preparation	wools were carded, warp and weft (though combed in medieval era)	wools were combed, at least for the warp; if short-stapled wools used for the weft, they were also carded
Spinning	carded wools were spun on the spinning wheel; in medieval era, combed warps were spun on the distaff or 'rock'; Saxony wheel with flyer in use by 16th century	combed wools originally spun with the distaff; but by the 16th century, the Saxony wheel was used for both warp and weft
Weaving	warp and weft yarns were woven on a broadloom with two weavers	yarns were more commonly woven on a single-weaver narrow loom
Fulling	When woven, the broadcloths were intensively fulled [usually at a water-powered fulling mill] to degrease the cloth, to felt and shrink the cloth by about half	Pure worsteds were not fulled (i.e., with dry worsted yarns for warp and weft); but hybrid fabrics with greased carded wefts were partially fulled, if only to degrease the cloth
Finishing	Fulled woollens were stretched on a tentering frame and subjected to preliminary napping; when dried renapped and shorn several times with large shears; and then dyed with costly dyes	No napping or shearing; woven cloths were subjected to simple bleaching and/or dyeing; and then calendared (pressed with steam irons); inexpensive dyes
Names	West Country, Suffolk, Essex broadcloths; later: Spanish medleys with Spanish merino wools	Worsteds, says, bays, serges, stuffs, bombazines, perpetuanas, honscots, ostades, etc. Mixed 'stuffs' with combed worsted warps and carded woollen wefts

warps: the foundation yarns stretched between the warp and cloth-beam rollers on the loom

wefts: the yarn, carried by a wooden shuttle, that is inserted between (above and below) groups of warps to effect the weaving.

Medieval Woollens: Broadcloths 1

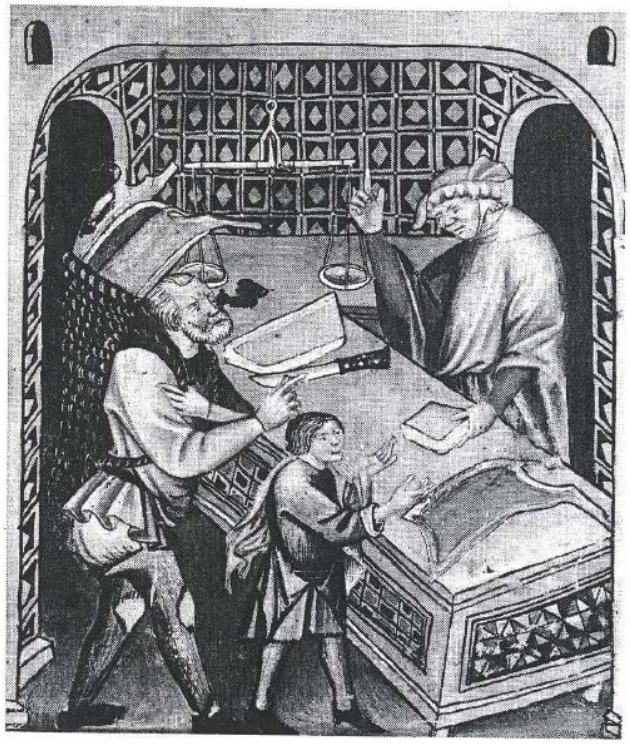
- (1) **Semi-Luxury to full luxury textiles:**
- **ranked with** and just below finer/finest silks
- **cost:** up to several years' pay for master mason
- **scarlets:** the most luxurious – as costly as finest silks: because of **kermes** (insect) dyes
- (2) **Very-heavy weight & durable cloths**
- **- as heavy as a modern woollen overcoat**
- - **reasons: wool composition and fulling processes,** which condensed the woollen by 50% or more

Memling: *Adoration of the Magi*

Memling, *Madonna & Child* (1490)

Speaking in Latin, Pope Benedict XVI shocked cardinals with his resignation Monday during what they had believed was going to be an ordinary meeting. L'OSSERVATORE ROMANO/AP

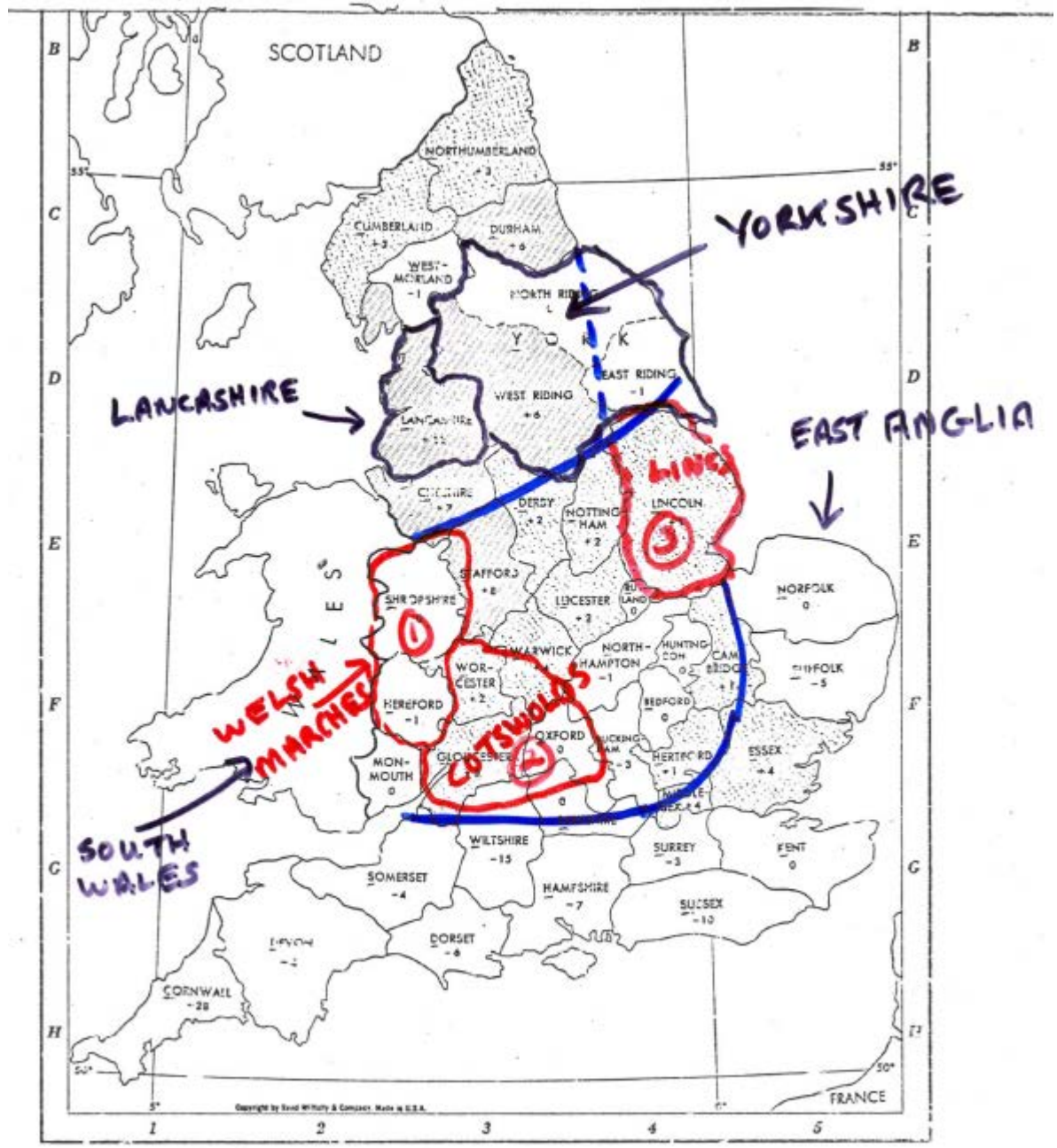
Social Hierarchy of Dress: 1390s



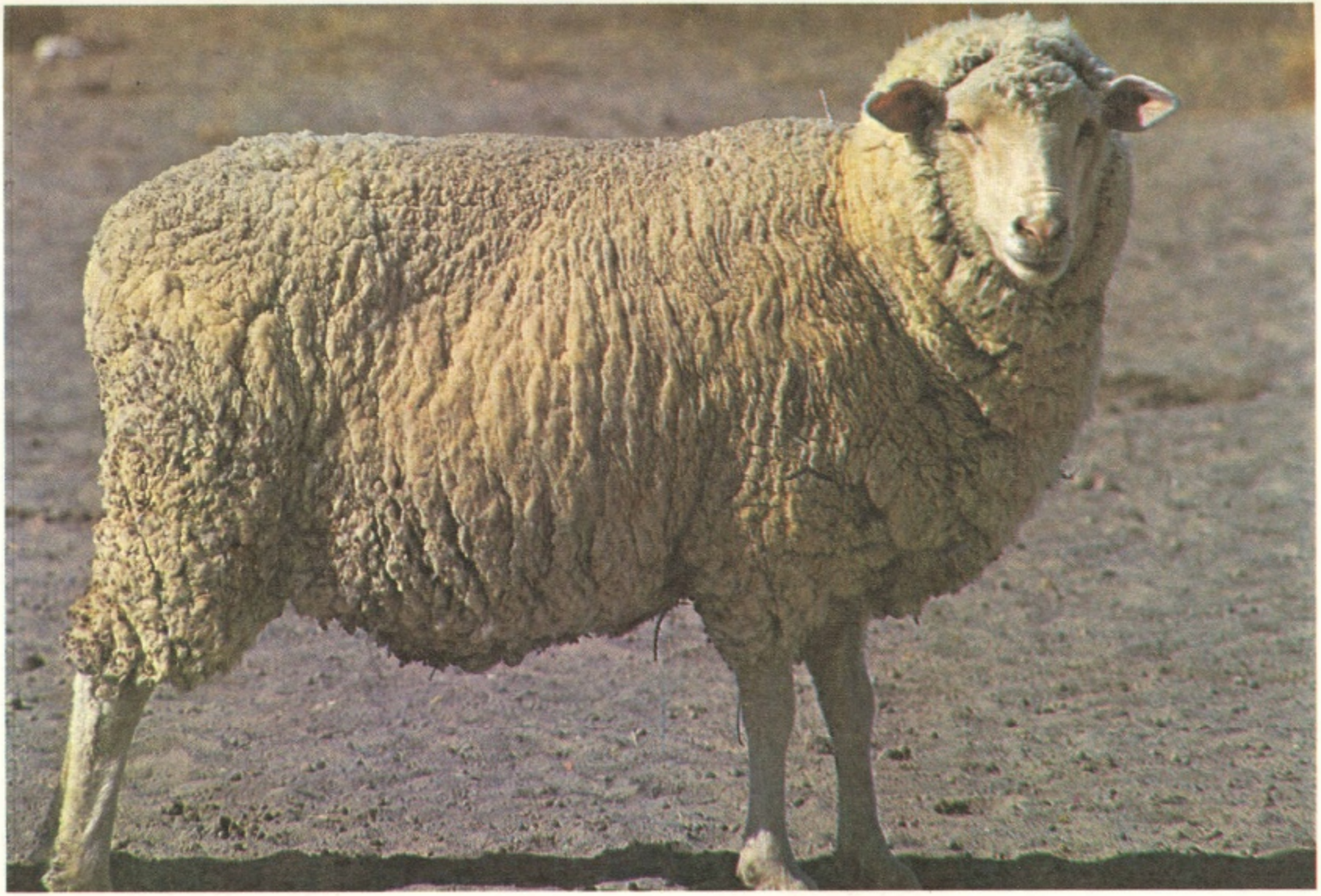
30 Albucasis: *Tacuinum Sanitatis*. Bibliothèque Nationale, Paris, Nal. 1673, f.66, illuminated in Lombardy *c.* 1390–1400. The clothes worn by the merchant and those of the poor man buying from him are quite different. The quality and amount of fabric, the colours and also the number of garments worn suggest a clear-cut hierarchy.

Medieval Woollens: Broadcloths 2

- (3) **wools: all luxury woollens woven from finest grades of English wools:** from very short-stapled, fine, **greased** wools
- - **Welsh March wools (Herefordshire, Shropshire), Cotswolds, Lincolnshire**
- - later, also from **Spanish merino wools** (by 16th century)
- - **Fineness**: from **breeding or environment?**


SCOTLAND
NORTHUMBERLAND
CUMBERLAND
DURHAM
WEST-MORLAND
NORTH RIDING
YORKSHIRE
LANCASHIRE
WEST RIDING
EAST RIDING
LINCS
EAST ANGLIA
CHESHIRE
DERBY
NOTTING-HAM
LINCOLN
STAFFORD
SHROPSHIRE
LEICESTER
NORFOLK
WARWICK
NORTH-AMPTON
HUNTING-DON
CAM-BRIDGE
SUFFOLK
WOR-CESTER
WELSH MARCHES
HEREFORD
BEDFORD
OXFORD
COTSWOLDS
GLOUCESTER
MON-MOUTH
HERTFORD
ESSEX
WILTSHIRE
SURREY
KENT
SOMERSET
HAMPSHIRE
SUSSEX
SOUTH WALES
DEVON
DORSET
CORNWALL
FRANCE

19 Ryeland.

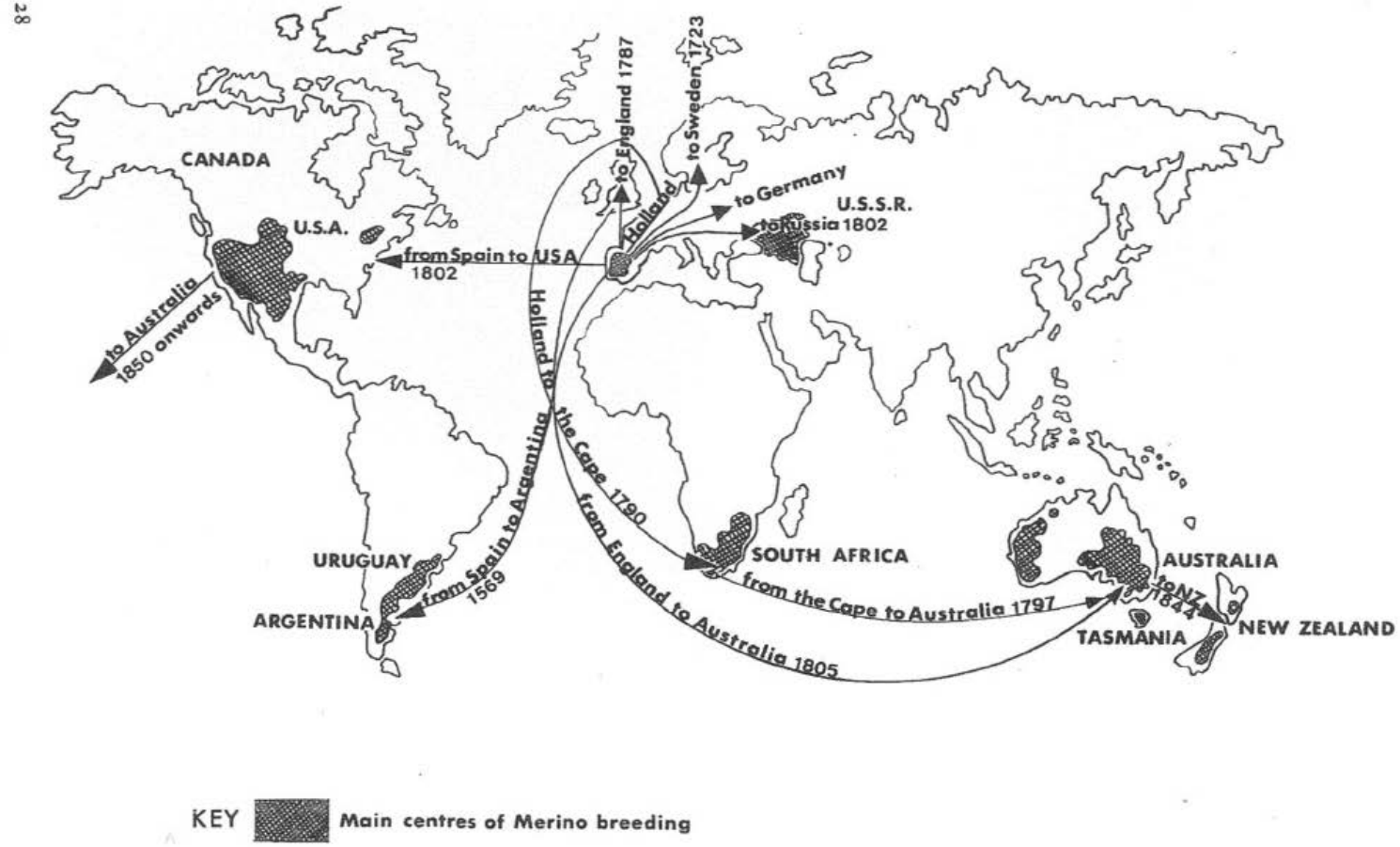


3 Australian Merino Sheep.

4 South African Merino.

5 Fleece of South African Merino showing the fine, dense fibres.

World-wide diffusion of merinos



WORSTEDS: medieval & early-modern

- (1) **Much lighter, coarser,** and thus much cheaper wool-based textiles: *Draperies légères* (Fr)
- (2) F**rom strong, coarse, long-stapled wools**:
- **not greased**: *draperies sèches* (dry draperies)
- **coarse and thus relatively cheap wools**
- (3) **No fulling or other finishing processes required:**
- because wools were not greased nor curly & weak:
- - production concluded with weaving: with visible weaves
- - **finishing**: bleaching, dyeing, pressing

Worsteds: medieval & early-modern 2

- (4) **Worsteds: Very light weight:**
- about 25% - 33% weight of a true luxury woollen broadcloth (per sq metre)
- (5) **Serges :- hybrid textiles,**
- with a **dry worsted warp** and a **greased woollen weft**, only partially fulled
- **warp**: foundation yarn on the loom (see later)
- **weft**: softer fibres inserted between warps

	TEXTILE DIMENSIONS AND WEIGHTS: THE LOW COUNTRIES AND ENGLAND IN THE SIXTEENTH CENTURY			
Drapery: City/Region	**GHENT**	**MECHELEN**	**ARMENTIERES**	**SUFFOLK, ESSEX**
Date of Ordinance	**1456 and 1546**	**1544**	**1510, 1546**	**1552**
A. WOOLLENS				
Name of Textile	**Dickedinnen**	**Gulden Aeren**	**Oultreffin**	**Short Broadcloth**
Additional Names	**Five Seals**	**Five Seals**		**Suffolk, Essex**
Origin of Wools	**England**	**England: Herefords.**	**Spanish Merino (2/3)**	**England**
Wool Types	**March, Cotswolds**	**Lemster Ore**	**English Cotswolds (1/3)**	**short-stapled**
Length on Loom: ells/yds	42.5000	48.0000	42.0000	n.s.
Length on Loom: metres	29.7500	33.0720	29.4000	n.s.
Width on Loom: ells	3.6250	4.0000	3.0000	n.s.
Width on Loom: metres	2.5375	2.7560	2.1000	n.s.
Area in square metres: on loom	75.4906	91.1464	61.7400	n.s.
Weight on Loom: lb.	88.0000	n.s.	88.0000	n.s.
Weight on Loom: kg.	38.1788	n.s.	40.8230	n.s.
Final Length: ells/yds	30.0000	30.0000	30.0000	24.0000
Final Length : metres	21.0000	20.6700	21.0000	22.5552
Final Width: ells/yds	2.3750	2.5000	2.0000	1.7500
Final Width: metres	1.6625	1.7225	1.4000	1.6447
No. of Warps	2066.0000	3120.0000	1800.0000	n.s.
Warps per cm (fulled)	12.4271	18.1132	12.8571	n.s.
Final Area in square metres	34.9125	35.6041	29.4000	37.0954
Final Weight in lb.	51.0000	58.0000	52.0000	64.0000
Final Weight in kg	22.1264	27.2165	24.1228	29.0300
Weight per m2 in grams	**633.7658**	**764.4209**	**820.5034**	**782.5753**

	TEXTILE DIMENSIONS AND WEIGHTS: THE LOW COUNTRIES AND ENGLAND IN THE SIXTEENTH CENTURY				
Drapery: City/Region	**HONDSCHOOTE**	**HONDSCHOOTE**	**BERGUES-**	**ESSEX (Colchester)**	**ESSEX (Colchester)**
Date of Ordinance	**1534**	**1534**	**ST. WINOC 1537**	**1579**	**1579**
B. WORSTEDS & HYBRID STUFFS					
Name of Textile	**Small Single Say**	**Large Double Say**	**Narrow Say**	**Says:**	**Bays:**
Additional Names			**Fine**	**broad**	**Single**
Origin of Wools	**Flanders, Friesland**	**Flanders, Friesland**	**Flanders, Artois**	**English:**	**English:**
Wool Types	**Scotland, Pomerania**	**Scotland, Pomerania**	**long-stapled**	**long-stapled**	**worsted warp;**
					woolen weft
Length on Loom: ells/yds	41.0000	36.0000	n.s.	n.s.	n.s.
Length on Loom: metres	28.7000	25.2000	n.s.	n.s.	n.s.
Width on Loom: ells	n.s.	n.s.	n.s.	n.s.	n.s.
Width on Loom: metres	n.s.	n.s.	n.s.	n.s.	n.s.
Area in square metres: on loom	n.s.	n.s.	n.s.	n.s.	n.s.
Weight on Loom: lb.	n.s.	n.s.	n.s.	n.s.	n.s.
Weight on Loom: kg.	n.s.	n.s.	n.s.	n.s.	n.s.
Final Length: ells/yds	40.0000	35.0000	40.0000	10.0000	35.0000
Final Length : metres	28.0000	24.5000	28.0000	9.3984	31.9530
Final Width: ells/yds	0.9375	1.6250	1.0000	1.0000	1.0000
Final Width: metres	0.6563	1.1375	0.7000	0.9398	0.9398
No. of Warps	1600.0000	2300.0000	1400.0000	n.s.	n.s.
Warps per cm (fulled)	n.s.	20.2198	20.0000	n.s.	n.s.
Final Area in square metres	18.3750	27.8688	19.6000	8.8326	30.0294
Final Weight in lb.	11.0000	16.0000	11.0000	2.7500	22.0000
Final Weight in kg	5.1029	7.4224	5.1029	1.2471	9.9790
Weight per m2 in grams	**277.7088**	**266.3342**	**260.3520**	**141.1931**	**332.3073**

Prices of Woollens Manufactured in Italy, the Low Countries, and England: as sold in Italian and Other Mediterranean Markets, 1380 - 1435: sold by the piece (whole cloth of 21 - 36 metres) with number of days wages that a Florentine master mason required for the purchase of one cloth

Dates of Sales	Places of Sales	Places of Manufacture	Textile Type or Name	Rank Order of Value	Value in Florentine Florins	Value in £ sterling 36d/florin	Value of Florin in lira di soldi piccioli	Mean Daily Wage of Florentine Master Mason in soldi	No. Days' Wages to Buy One Cloth
ca. 1380	Naples	**Italy**							
to. 1400	Sicily	Florence	San Martino	lowest	58.540	8.781	76.500	16.458	272.105
		Florence	San Martino	mean	60.740	9.111	76.500	16.458	282.331
		Florence	San Martino	highest	62.930	9.440	76.500	16.458	292.511
		Milan, Como	dyed woollens	lowest	40.000	6.000	76.500	16.458	185.928
		Milan, Como	dyed woollens	mean	43.360	6.504	76.500	16.458	201.546
		Milan, Como	dyed woollens	highest	45.000	6.750	76.500	16.458	209.169
		Flanders							
		Wervik	dyed woollens	mean	26.000	3.900	76.500	16.458	120.853
ca. 1380	Spain	**Florence**	dyed woollens	mean	64.430	9.665	76.500	17.260	285.567
to 1410		**Flanders**							
		Wervik, Kortrijk	dyed woollens	mean	27.900	4.185	76.500	17.260	123.659
		Comines, Menin	dyed woollens	mean	27.900	4.185	76.500	17.260	123.659
		Bruges	dyed woollens	mean	44.010	6.602	76.500	17.260	195.062
		Brabant							
		Brussels	dyed woollens	mean	44.180	6.627	76.500	17.260	195.815
		Mechelen	dyed woollens	mean	44.180	6.627	76.500	17.260	195.815
		England							
		Essex	straits (dozens)	mean	6.120	0.918	76.500	17.260	27.125

Dates of Sales	Places of Sales	Places of Manufacture	Textile Type or Name	Rank Order of Value	Value in Florentine Florins	Value in £ sterling 36d/florin	Value of Florin in lira di soldi piccioli	Mean Daily Wage of Florentine Master Mason in soldi	No. Days' Wages to Buy One Cloth
1390-1402	**Levant:**	**Italy**		**Place/ Date**					
		Florence	woollens lowest range	D: 1390	35.000	5.250	76.500	16.635	160.956
		Florence	woollens medium range	D: 1390	46.000	6.900	76.500	16.635	211.542
		Florence	woollens highest range	D: 1390	54.000	8.100	76.500	16.635	248.332
		Florence	panni di fontego	D: 1390	27.000	4.050	76.500	16.635	124.166
1395	**Levant:**	**Flanders**							
		Wervik	dyed woollens	D: 1395	19.200	2.880	76.500	16.590	88.535
1395	**Levant:**	**Brabant**							
		Mechelen	dyed woollens	D: 1395	38.500	5.775	76.500	16.590	177.532
1394-98	**Levant:**	**England**				**florin/40d**			
		Norfolk/Ireland?	Saia d'Irlanda	D: 1394	4.500	0.675	76.500	16.590	20.750
		Norfolk/ Ireland?	Saia d'Irlanda	D: 1395	5.300	0.795	76.500	16.590	24.439
		Norfolk/ Ireland?	Saia d'Irlanda	D: 1397	6.000	0.900	76.500	16.590	27.667
		Norfolk/Ireland?	Saia d'Irlanda	D: 1398	3.550	0.533	76.500	16.590	16.370
1405-1410	**Levant:**	**England**							
		Worcestershire	Cotswolds	D: 1405	35.000	5.250	76.500	17.820	150.253
		Worcestershire	Cotswolds	D: 1410	14.700	2.205	76.500	17.820	63.106

Dates of Sales	Places of Sales	Places of Manufacture	Textile Type or Name	Rank Order of Value	Value in Florentine Florins	Value in £ sterling 36d/florin	Value of Florin in lira di soldi piccioli	Mean Daily Wage of Florentine Master Mason in soldi	No. Days' Wages to Buy One Cloth
1414-1416	Levant:	**England**							
		West Country	Panni Bastardi	D: 1414	25.000	4.167	80.000	18.160	110.132
		West Country	Panni Bastardi	D: 1414	28.000	4.667	80.000	18.160	123.348
		West Country	Panni Bastardi	D: 1416	20.000	3.333	80.000	18.160	88.106
		Essex	straits (dozens)	D: 1416	6.000	1.000	80.000	18.160	26.432
1436	Levant:	**Flanders**				**40d/florin**			
		Wervik	dyed woollens	C: 1436	28.300	4.717	83.000	19.520	120.333
		Wervik	dyed woollens	C: 1436	22.000	3.667	83.000	19.520	93.545

Place names by initials:

A: Alexandria
C: Constantinople
D: Damascus

No. of Master Mason's Daily Wages (Florence) to buy 1 cloth, 1390 - 1436

Date of Sale	Place of Manufacture	Type of Cloth	Price of Cloth in Gold Florins	No. Days' Wages to Buy One Cloth
1394-98	Norfolk/Ireland?	Saia d'Irlanda	3.550	16.370
1394-98	Norfolk/Ireland?	Saia d'Irlanda	4.500	20.750
1394-98	Norfolk/Ireland?	Saia d'Irlanda	6.000	27.667
1390-1410	England: Essex	straits (dozens)	6.120	27.125
1390-1402	Florence	San Martino H	54.000	248.332
1390-1402	Florence	San Martino L	35.000	160.956
1390-1410	Flanders: Bruges	dyed woollen	44.010	195.062
1395	Flanders: Wervik	dyed woollen	19.200	88.535
1395	Brabant: Mechelen	dyed woollen	38.500	177.532
1405-10	England: Worcs.	Cotswolds	35.000	150.253
1436	Flanders: Wervik	dyed woollen	28.300	120.333

Prices of Hondschoote Says and Ghent Dickedinnen Woollens, compared with the Purchasing Power an Antwerp Master Mason's Daily Wages in pounds and pence groot Flemish, 1435 - 1544

Year	Hondschoote Single Says: Prices in £ groot Flemish	Hondschoote Double Says: Prices in £ groot Flemish	Ghent Dickedinnen Woollens: Prices in £ groot Flemish	Daily Wage of an Antwerp Master Mason in d. groot Flemish*	No. Days' Wages of a Master Mason to Buy a Single Say	No. Days' Wages of a Master Mason to Buy a Dicke-dinnen	Value of the Brabant Basket of Consumables in d. groot Flemish	Value of Single Say in Baskets of Consum-ables	Value of Ghent Dickedinnen Baskets of Consum-ables
1535			14.150	9.750		348.308	268.733		12.637
1536			14.250	10.250		333.659	297.467		11.497
1537			14.500	10.250		339.512	254.333		13.683
1538	0.967	2.278	14.500	11.000	21.098	316.364	295.533	0.785	11.775
1539	0.945	2.184	15.000	12.000	18.900	300.000	300.400	0.755	11.984
1540	0.835	1.961	11.500	12.000	16.700	230.000	291.133	0.688	9.48
1541	0.879	2.015	12.000	12.000	17.580	240.000	278.000	0.759	10.36
1542	0.838	2.005	14.600	12.000	16.760	292.000	293.600	0.685	11.935
1543	0.783	1.775	14.000	13.000	14.455	258.462	324.200	0.580	10.364
1544	0.908	1.942	14.000	13.500	16.142	248.889	351.067	0.621	9.571

No. of Daily Wages (Antwerp master mason) to buy 12 sq. metres of cloth: 1538-1544

Year	Hondschoote single say	Hondschoote double say	Ghent Dickedinnen
1538	13.788	21.401	108.379
1539	12.343	18.808	103.115
1540	10.906	16.888	79.055
1541	11.481	17.353	82.492
1542	10.945	17.267	100.365
1543	9.440	14.110	88.837
1544	10.542	14.866	85.547

Brief survey of textile history - 1

- (1) **Early Middle Ages to 12th century**: worsted type fabrics predominated
- (2) **From 12th century: rise of the woollen broadcloth industries:**
- introduction of the **broad horizontal treadle loom & spinning wheel: reduced production costs**
- (3) **From 1290s: warfare and rising transaction costs → made an international trade in cheap worsted and cheap woollens unprofitable**
- **→ increasing shift to production & trade in much higher priced luxury textiles: in woollen (scarlets) and silk fabrics (satins, damasks, velours)**

Brief survey of textile history - 2

- (4) **15th century: Final victory of English woollen cloth trade over the Low Countries:**
- **final straw: Calais Staple and Bullion laws (1429-67): new fiscal levies on wool exports**
- → **led to virtual extinction of luxury woollen draperies** in the major Flemish & Brabantine towns: e.g., Bruges, Ghent, Ypres, Leuven
- **except for smaller-town** *nouvelles draperies* that switched to Spanish **merino** wools

Brief survey of textile history - 3

- (5) **From 1460s – 1520s: revival of the light draperies**
- **restoration of relative peace, European economic and demographic recoveries → led to the revival of the worsted style textile industries**
- **producing light, cheap cloths:** first in the Low Countries (known as ***sayetteries***, led by **Hondschoote**)
- (5) **Low Countries Revolt against Spain, 1568-1609:** Flemish refugees brought these worsted-style manufactures to England: **New Draperies**

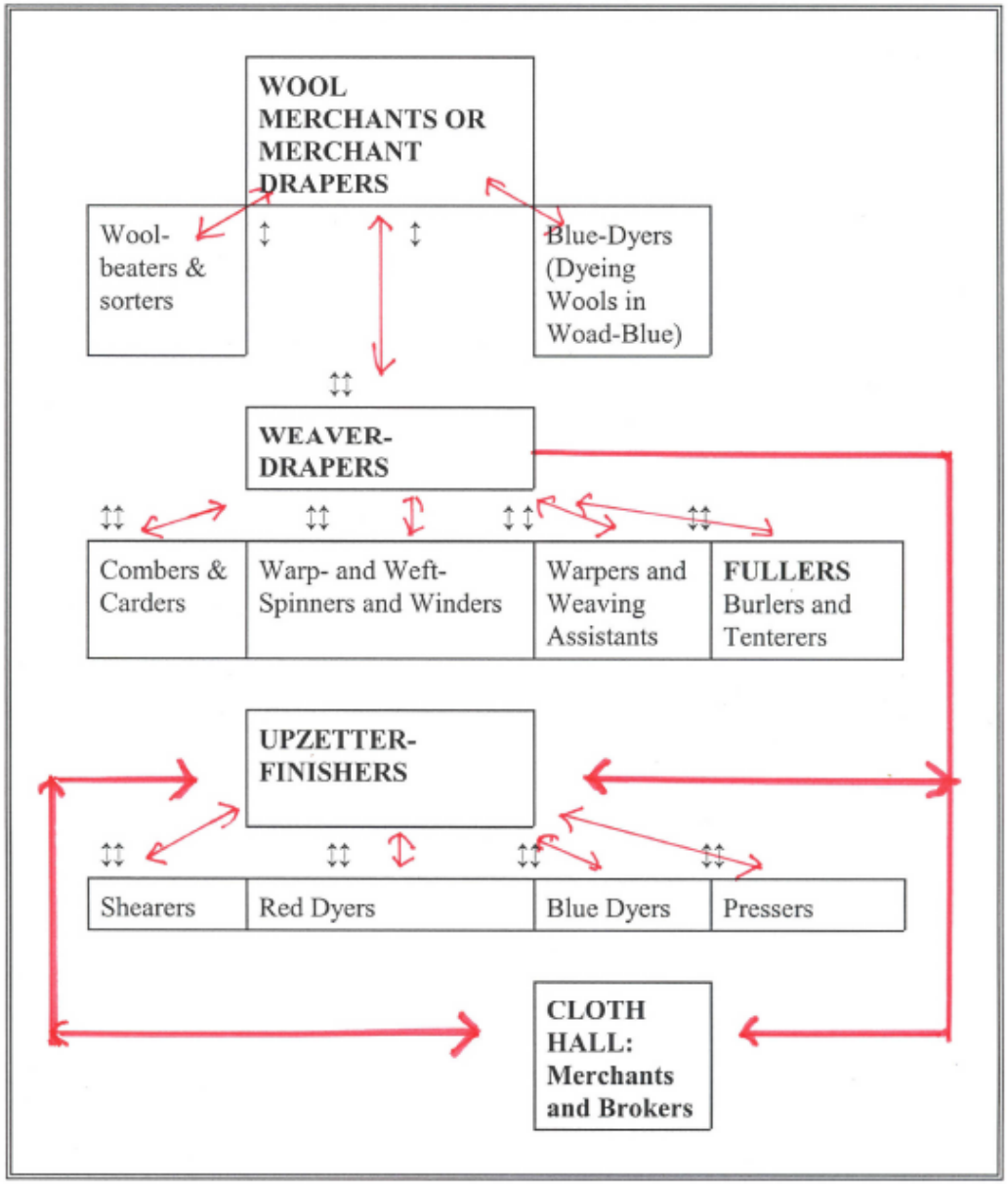
Industrial Organization in Woollens Industries: Putting Out - 1

- (1) **The Putting-Out or Domestic System of Production:** most textbooks ascribe this to rural industries, but it was also found in towns
- (2) **Union of mercantile-financial capitalism (merchants) with artisan handicraft production**
- (3) **Industrial entrepreneurs (weaver-drapers) were subordinate to textile merchants**:
- **who supplied the wool & other raw materials**, the credit, and controlled the cloth sales

Industrial Organization in Woollens Industries: Putting Out - 2

- (4) **Putting-out**: in that the industrial 'draper' or 'clothier' (England) 'put out' the prepared wools to be spun, woven, fulled, and made into woollen cloths: piece-work wages
- (5) **Domestic industry:** almost all the industrial manufacturing processes took place in the homes of the individual textile artisans and workers
- (6) **Cloth finishing processes:** by highly specialized dyers and shearers, undertaken at the behest of the merchants

INDUSTRIAL ORGANIZATION AND 'PUTTING OUT' IN THE LATE-MEDIEVAL FLEMISH CLOTH INDUSTRY



Domestic or Putting Out System of Production: features (1)

- (1) **Payments made to artisans**
- a) **combers, carders, spinners, warpers, weavers (assistants)**: piece-work wages (according to their output)
- b) **fullers and their journeymen**: specified fees, authorized by the town or guild, as combination of daily-wages + piece work: specified payment for 3 days work (for foot-fullers)
- c) **dyers, shearers, finishers**: specified fees per cloth (piece-work), authorized by the town & guilds: usually paid by the merchants

Domestic or Putting Out System of Production: features (2)

- (1) **Payments made to artisans:**
- d) **the weaver-draper: the industrial entrepreneur**:
- **earned profits,** as difference between his costs of production (including his wage payments) and the price at which he sold the cloth to the merchants
- e) **merchants and merchant-drapers:** similarly, earned profits: but much higher profits!
- (2) **Some production costs:** pre-finishing manufacturing
- a) **wool-preparation, combining, carding, and spinning**: **about 67% of total value-added labour costs**
- b) **fulling costs (with tentering): 20%:** with foot-fulling; under 5% with mechanical fulling (water-power)

Domestic or Putting Out System of Production: Fulling (1)

- (1) **FULLING: its crucial importance:**
- a) **determined real difference** between true woollens and worsteds
- b) **reason: fine, scaly, short-fibred wools had no strength & cohesion** when woven (on the loom): had to be felted & compressed, with interlocking wool fibres

- 2) **Functions & components of fulling**
- a) **scouring the cloth**: **remove the grease** (butter) & warp sizing
- b) **felting**: **forcing the scaly, curly short-fibres to interlock**, to mesh to become virtually indestructible;
- - **to obliterate the weave** (i.e., make warps & wefts invisible)
- c) **compression**: **shrink, condense, and compress the woollen cloth** by over 50% in its dimensions: thus accounting for its heavy weight (grams per sq metre)

Domestic or Putting Out System of Production: Fulling (2)

- 3) **methodology of foot-fulling:**
- - **woven cloth placed in a long stone-vat** filled with warm water, fullers earth (**kaolinite**: aluminum hydroxide), butter, urine, other chemicals
- - **two strong journeymen**, supervised by the master, trod & stomped on the cloth (about 30 yds by 2 yards) for 3 days (2 separate sessions)
- - **fulled cloth taken from the vat and placed on a tentering frame,** with hooks to stretch the cloth in all directions, to remove wrinkles and make repairs
- 4) **Mechanization**: water-powered mills reduced the task to 1 man and 12 hours ➔ costs reduced to 5%

Domestic or Putting Out System of Production: features (3a)

- (1) **non-capitalist mode of production:**
- **artisans bore most fixed capital costs**
- a) **the textile artisans: combers, carders, spinners, warpers, weavers, fullers, dyers, shearers, cloth-finishers, etc:** owned their own tools of production (usually)
- b) **worked usually in their own homes,** without supervision : hence the 'domestic system' of production
- - even the weaver-draper used his own loom, in his own home

Domestic or Putting Out System of Production: features (3b)

- 2) **Cloth merchants were mercantile-financial capitalists: but divorced from actual physical processes of production**
- - **owned all the raw materials & the final cloth,** which they themselves sold
- - **furnished the working capital needs of production**: delegated to drapers
- - **helped finance the fixed capital requirements** of the artisans

Domestic or Putting Out System of Production: features (3c)

- 3) **Mechanical fulling, with fulling-mills: an exception**
- - often owned by manorial lords, by city government, or merchants
- - **represented the largest fixed capital investment**, with powered machinery and water-mills
- - **Mechanical fulling:** adopted in Italy and England, but not in the Low Countries, not before the 16th century.
- **WHY?** focus on ultra-luxury production
- 4) **In true industrial capitalism, the capitalists own all the tools of production: all tools, machines,** all the industrial inputs, and labour power of hired workers:
- i.e. **workers had no option but to sell their labour power**

Industrial Scale & Productivity - 1

- 1) **Export-oriented luxury woollens industries: characterized by extensive division of labour:**
- - up to 30-35 highly specialized & skilled tasks
- 2) **but still a very-small scale, labour intensive industry,**
- - **highly scattered industry**: divided between town and countryside
- - **rural occupations**: most of the wool preparation, combing, carding, spinning, etc. done by part-time peasant farmers
- - **urban occupations**: weaving, fulling, dyeing, shearing, cloth finishing were urban occupations: in Flanders and much of England, to late 15th century:
- 3) **Little mechanization:**
- except for fulling mills and later some 'gig-mills' (for napping – raising the nap – on finished cloths)

Industrial Scale & Productivity - 2

- 4) **Very low productivity:**
- **from 14th to late 18th century: basically unchanged**
- - **a standard broadcloth (24 yds by 1.75 yds finished)** took over **two weeks** to produce **+ another week** for fulling, dyeing, finishing: no change over four centuries
- - **required the labour of 30-35 persons** (8 carders + combers, 8 spinners, 2 weavers plus many assistants, 3 fullers, 2 dyers, 2 shearers, etc.
- - **an industrial draper produced about 20-25 such broadcloths a year**
- 5) **Raw materials: the wools and dyestuffs in luxury cloth production**: accounted for over 80% of the wholesale price (and thus 20% for labour + enterprise)

Guilds in medieval urban woollen cloth industries (four) - 1

- (1) **Weavers' Guild:**
- - **master weavers** were the industrial entrepreneurs who organized the cloth production
- - **journeymen weavers**: who did the weaving, employed by their masters
- (2) **Fullers' Guild:**
- - **only textile craft guild resembling a modern labour union**: in the Low Countries
- - **both masters and journeymen bargained for their wages**, as specified fees
- - **often went on strike against the weaver-drapers** either to gain or to protect their wages
- - **a combination of time + piece-work wage:** per cloth fulled over 3 days

Guilds in medieval urban woollen cloth industries - 2

- (3) **Dyers Guild:** for **Blue and Red Dyers**; and the
- (4) **Shearers (Finishers) Guild**
- - **BOTH**: **independent professional artisans working for fees** - set by their guilds in co-operation with the town government
- - **worked on commission** for various and many merchants: not for drapers
- (5) **Economic Justification for Guilds: were there any?**
- -**in implementing and enforcing quality controls** for luxury cloth production
- -(6) **Urban textile guilds in Low Countries, England, France:** were all **MALE DOMINATED: no guilds for female spinners, carders, warpers, etc.**

From Urban to Rural Industrial Locations: later-medieval England - 1

- (1) **To escape urban guild and government taxation and urban restrictions:**
- **see lecture notes for other reasons for the decline of the traditional urban cloth industries in eastern England,** from the 1290s to 1340s, **before the rise of the English woollen cloth export trade**: loss of Mediterranean markets, with turning point of 1290s: warfare + rising transaction costs
- - **much of the subsequent export-oriented woollen cloth production in fact took place in towns,** though using much rural labour: to 1470s

From Urban to Rural Industrial Locations: later-medieval England - 2

- (2) **To seek cheaper rural labour:**
- -a) **with decline of serfdom by late 14th century,** much rural labour was both free, mobile, and lower cost
- - b) **rural labourers, with far lower living costs (food & shelter)**, were willing to work for lower wages than urban workers
- -c) **part-time supplementary rural labour** in principle also cheaper

- d) **rural cloth production was fully free of guilds**

- e) **but was rural labour really cheaper? -** when **productivity and the MRP** of labour are factored in:

- especially when that labour was less trained & skilled?

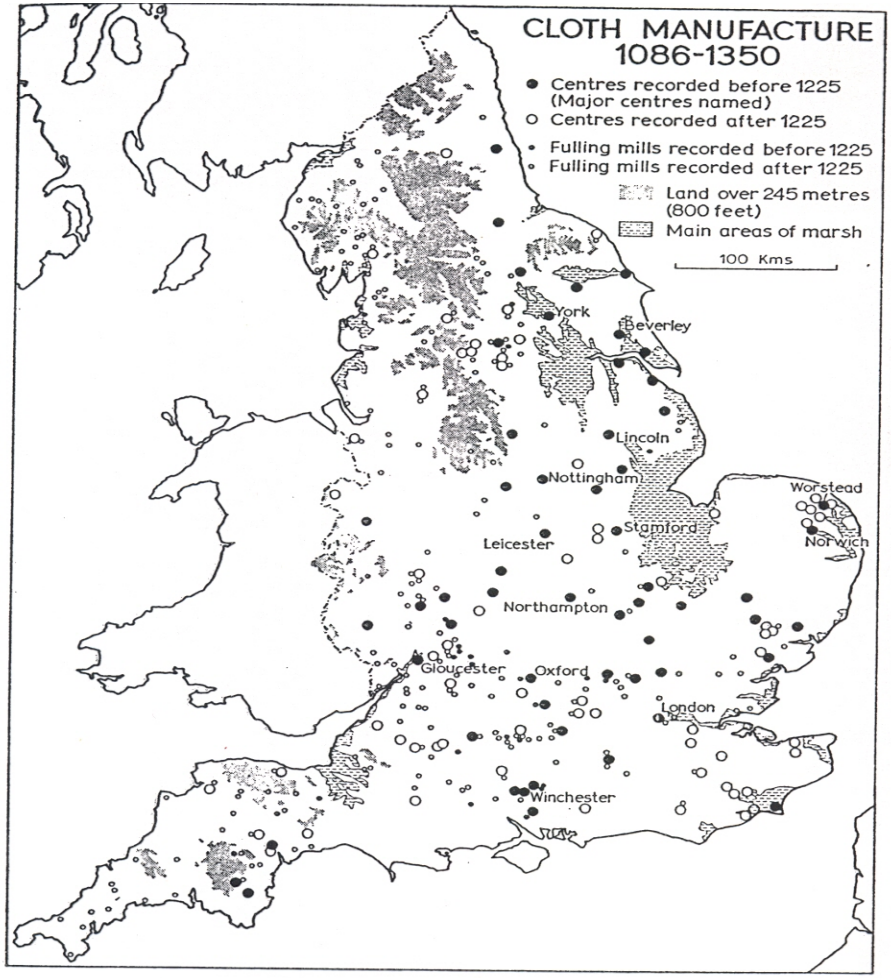


Fig. 28 Cloth manufacture, 1086–1350
Based on miscellaneous sources.

From Urban to Rural Industrial Locations: later-medieval England -3

- (3) **To seek access to cheaper water-power: fulling-mills**
- (a) **rural water sites cheaper because of much lower opportunity costs:** fewer competing needs for water, compared to urban locations
- (b) **rural industrial areas were in sparsely settled, hilly areas:** faster flowing water
- - **urban sites with slower rivers**: used **overshot** wheels,
- - **hilly rural areas, with swift streams**, used much lower cost **undershot** wheels (but less powerful)
- (c) **many manorial lords chose to convert water-powered grain mills into fulling-mills:** absorbing capital costs
- (d) **More important from 1460s** - when industry more rural

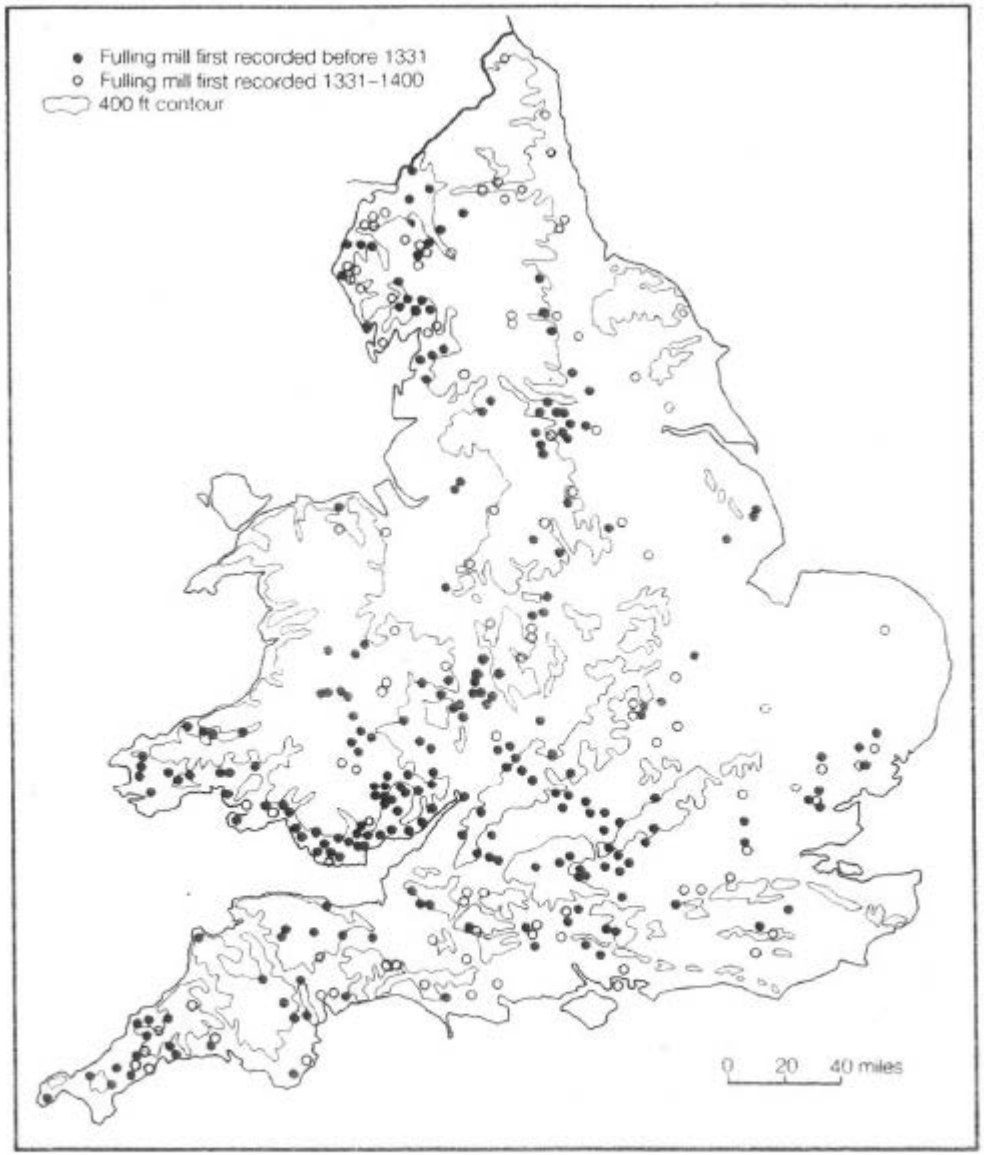
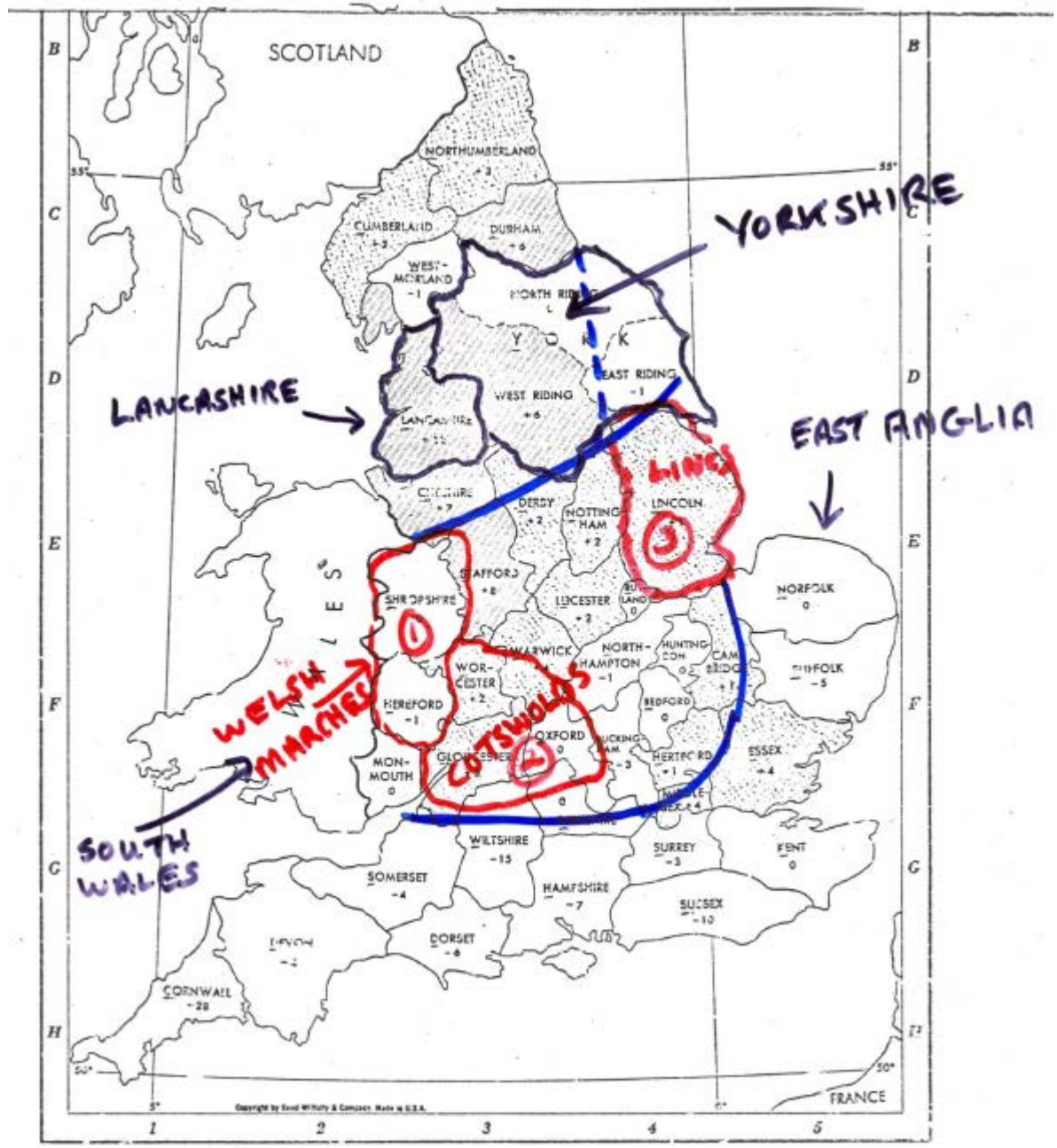
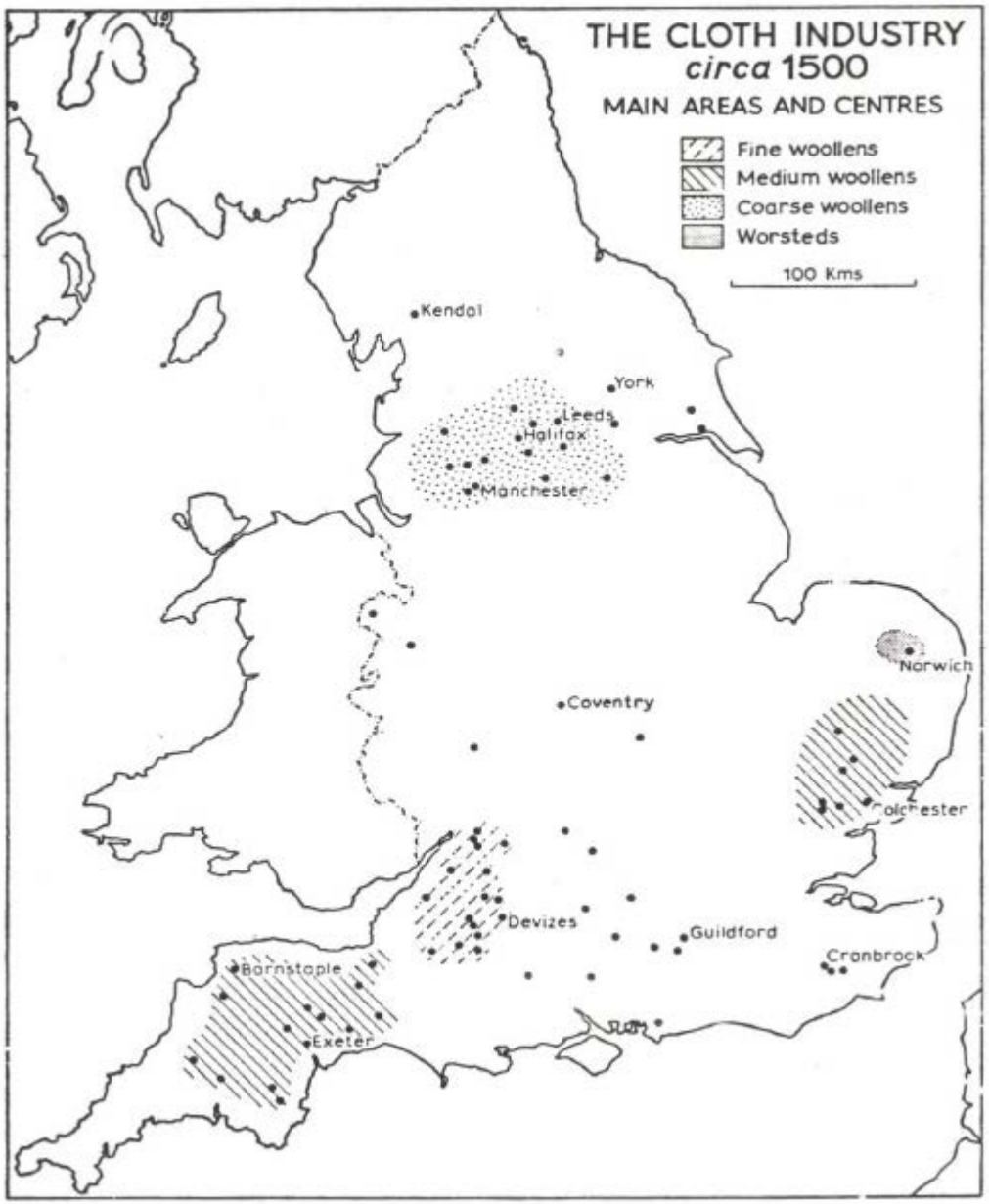


Figure 8 Early fulling mills in England and Wales. Reproduced from R. A. Pelham. *Fulling Mills* (SPAB, 1958), by kind permission of the Wind and Watermill Section of the Society for the Protection of Ancient Buildings.

From Urban to Rural Industrial Locations: later-medieval England - 4

- (4) **Cheaper wool supplies?**
- - **rural locations close to supplies of the best wools: not evidently a major reason**: less so than for metallurgy, since relative transport costs were lower than for coal & iron
- - **medieval Flemish & Italian urban industries prospered by importing English wools** – but before they became so heavily taxed
- - **England's West Country did become the chief cloth manufacturing centre:** quite close to the best wools in the Cotswold and Welsh Marches


SCOTLAND
NORTHUMBERLAND
CUMBERLAND
DURHAM
WEST-MORLAND
NORTH RIDING
YORKSHIRE
LANCASHIRE
WEST RIDING
EAST RIDING
LINCS
EAST ANGLIA
CHESHIRE
DERBY
NOTTING-HAM
LINCOLN
STAFFORD
SHROPSHIRE
LEICESTER
NORFOLK
WARWICK
NORTH-AMPTON
HUNTING-DON
CAM-BRIDGE
SUFFOLK
WOR-CESTER
WELSH MARCHES
HEREFORD
BEDFORD
OXFORD
COTSWOLDS
GLOUCESTER
MON-MOUTH
HERTFORD
ESSEX
WILTSHIRE
SURREY
KENT
SOMERSET
HAMPSHIRE
SUSSEX
SOUTH WALES
DEVON
DORSET
CORNWALL
FRANCE

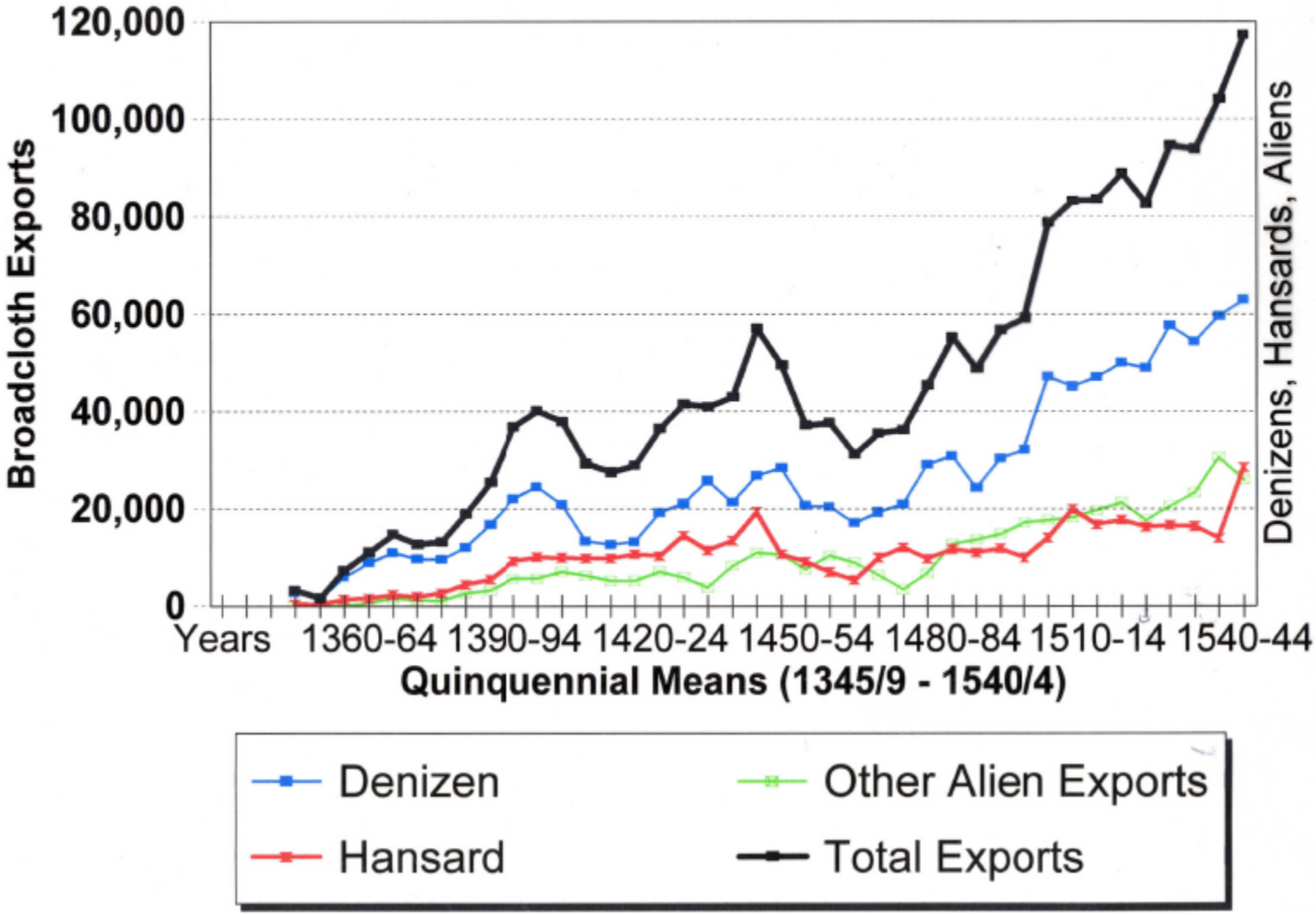

THE CLOTH INDUSTRY
circa 1500
MAIN AREAS AND CENTRES
Fine woollens
Medium woollens
Coarse woollens
Worsteds
100 Kms
Kendal
York
Leeds
Halifax
Manchester
Norwich
Coventry
Colchester
Devizes
Guildford
Cranbrook
Barnstaple
Exeter

From Urban to Rural Industrial Locations: later-medieval England - 5

- (5) **Commercial reasons for later shift of the English cloth industry's shift to rural sites:**
- a) **By 1470s, England had lost direct access to its major overseas export markets**: in the Baltic and Germany, France, Mediterranean basin
- b) **so that only Antwerp was left for such access:**
- **London dominated trade** → crippled eastern port towns and Bristol, in the West
- c) **80-year cloth trade boom, from 1460s, entirely focused on the Antwerp market:** as seen last day

ENGLISH CLOTH EXPORTS

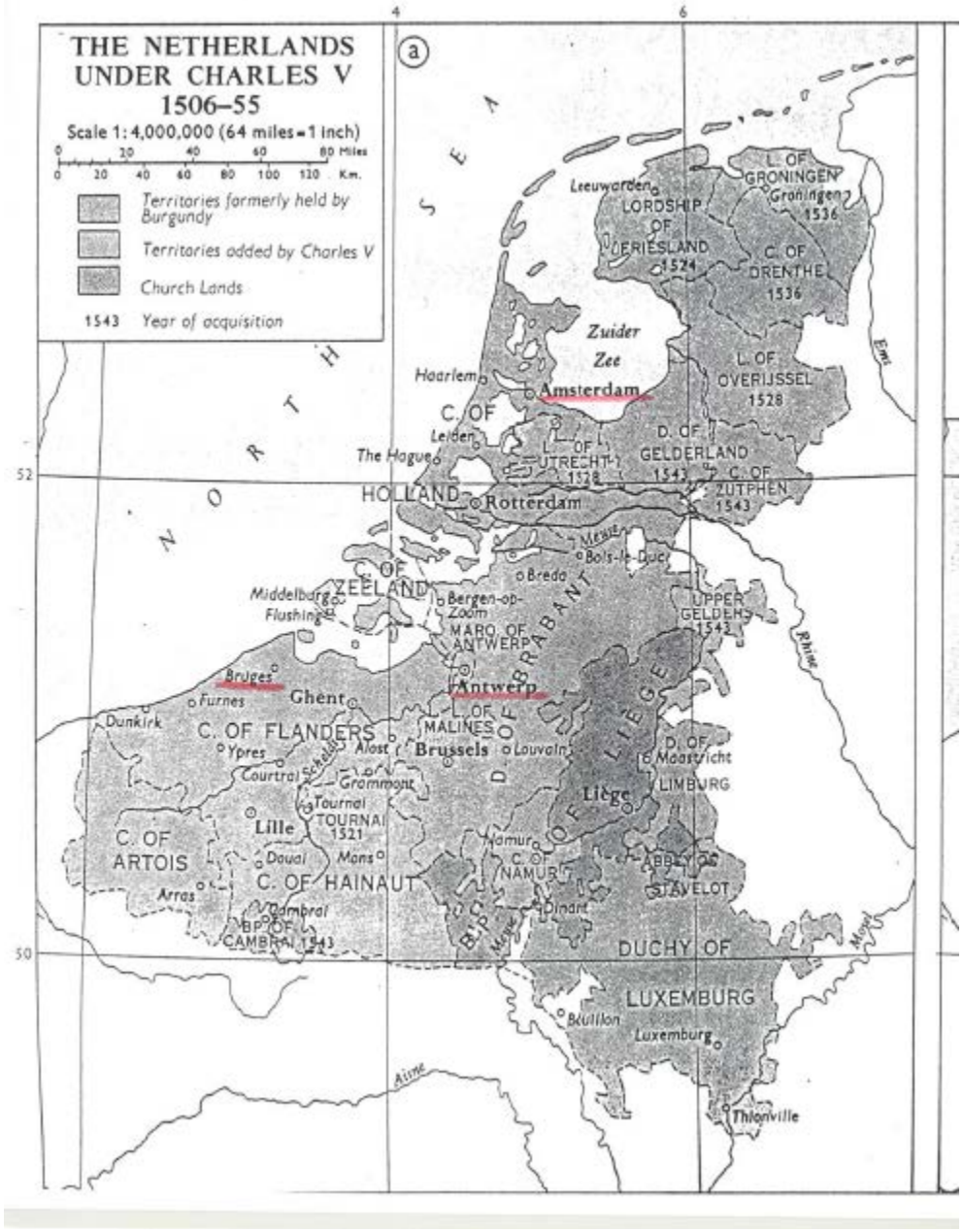
1345-49 to 1540-44: Five Yr Means



From Urban to Rural Industrial Locations: later-medieval England - 6

- d) **London Merchants Adventurers totally dominated this trade, cutting out York** and other eastern port towns and Bristol (in West): had earlier financed urban production
- e) **London merchants by-passed all traditional urban centres** to monopolize commercial relations with **the rural and small-town producers**, especially in the West Country
- f) **Shift of export-oriented cloth production to rural areas** greatly accelerated from 1470s

- **Note: The modern Industrial Revolution (ca. 1760 – ca. 1830)**: **meant a reverse shift from rural to urban industrialization:** in both cottons and woollens/worsteds

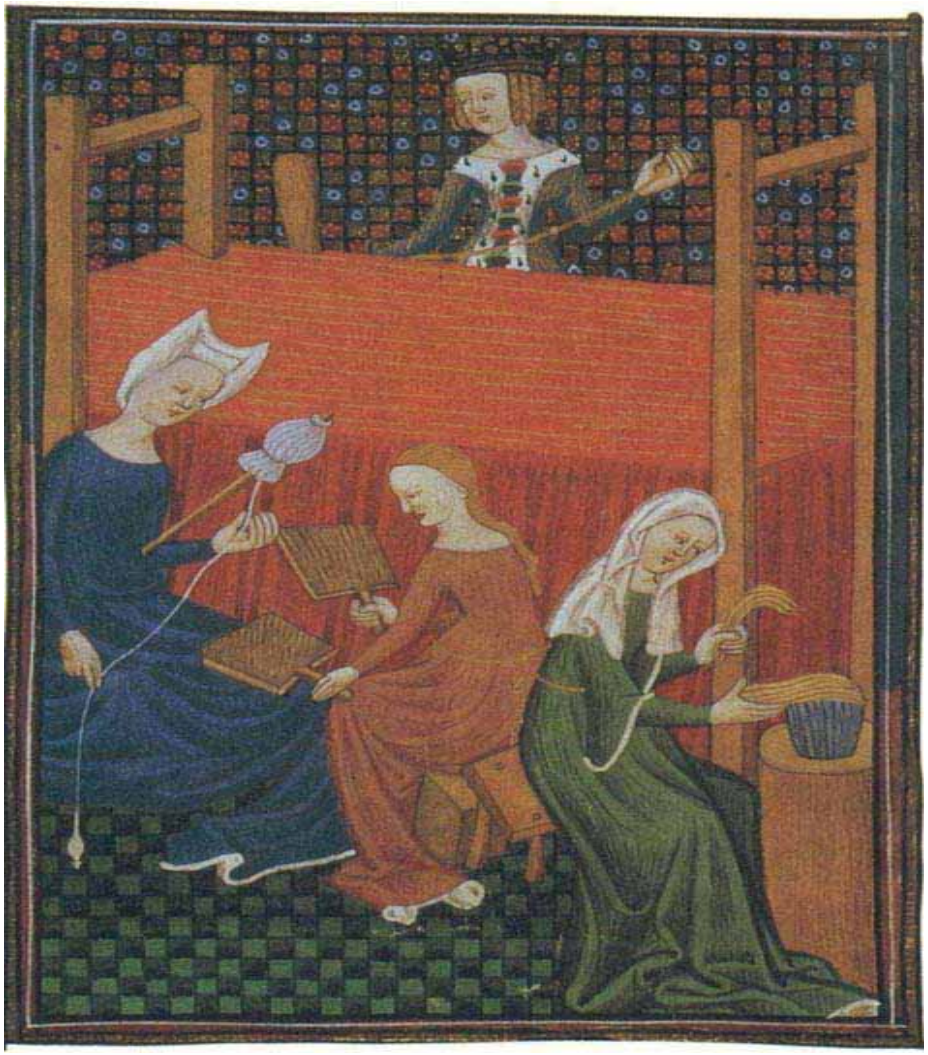

THE NETHERLANDS UNDER CHARLES V 1506–55
Scale 1: 4,000,000 (64 miles = 1 inch)
0 20 40 60 80 Miles
0 20 40 60 80 100 120 Km.
Territories formerly held by Burgundy
Territories added by Charles V
Church Lands
1543 Year of acquisition
a
4
6
52
50
NORTH SEA
Leeuwarden
L. OF GRONINGEN
Groningen
1536
LORDSHIP OF FRIESLAND
1524
C. OF DRENTHE
1536
Zuider Zee
Ems
Haarlem
Amsterdam
L. OF OVERIJSSEL
1528
C. OF HOLLAND
Leiden
The Hague
L. OF UTRECHT
1528
D. OF GELDERLAND
1543
C. OF ZUTPHEN
1543
Rotterdam
Meuse
Bois-le-Duc
Breda
C. OF ZEELAND
Middelburg
Flushing
Bergen-op-Zoom
MARQ. OF ANTWERP
D. OF BRABANT
UPPER GELDERS
1543
Rhine
Bruges
Ghent
Antwerp
Furnes
Dunkirk
C. OF FLANDERS
L. OF MALINES
Ypres
Alost
Brussels
Louvain
D. OF LIÈGE
Maastricht
LIMBURG
Courtrai
Scheldt
Grammont
Tournai
TOURNAI
1521
Liège
Lille
C. OF ARTOIS
Douai
Mons
Namur
C. OF NAMUR
ABBEY OF STAVELOT
Arras
C. OF HAINAUT
Cambrai
Dinant
BP. OF CAMBRAI
1543
Meuse
Mosel
DUCHY OF LUXEMBURG
Bouillon
Luxemburg
Aisne
Thionville

Memling, *Madonna & Child* (1490)

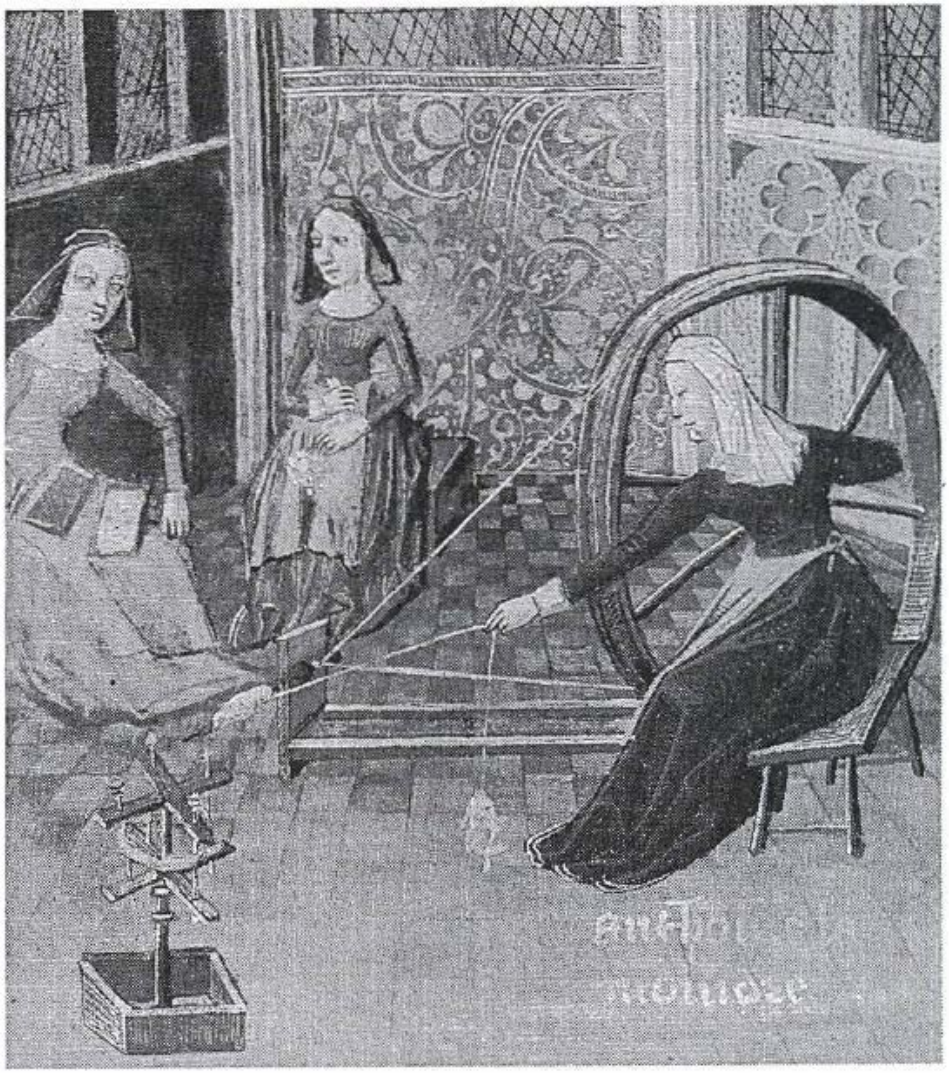
Memling: *Adoration of the Magi*

Medieval Spinning: Drop-Spindle

Medieval spinning, carding, combing



Medieval spinning at home



4 Boccaccio: *De claris mulieribus*. New York Public Library, Spencer Collection 33, f.56, illuminated in France *c.*1470. Women carding and spinning wool.

(*a*) Combing, carding and spinning with distaff.

FIGURE 164—*Roman spindles and whorls, found in London. Scale c 1/3.*

FIGURE 165—*Spinning with a short distaff. From an Italian manuscript of 1023.*

FIGURE 166—*Spinning with a long distaff supported by a belt and the crook of the arm, leaving both hands free. From a French fourteenth-century manuscript of Aristotle.*

FIGURE 173—*The cross-reel (lower left); spinning from a fixed distaff (centre). A Nuremberg symbolic woodcut of c 1490.*

Medieval Spinning Wheels

15 Early fourteenth-century miniature from Royal MS. 10 E IV, f.146. Woman spinning and man carrying loaves.
Photograph: Reproduced by permission of the British Library Board

(b) Spinning with spinning wheel.

16 Miniature from Luttrell Psalter 1338. Add. MS. 42130, f.193. Spinning and carding.
Photograph: Reproduced by permission of the British Library Board

FIGURE 167—*Spindle-wheel from the Luttrell Psalter, c 1338. On the right a woman is carding wool.*

(c) Carding and spinning with wheel.

The Saxony Spinning Wheel (late 15th century)

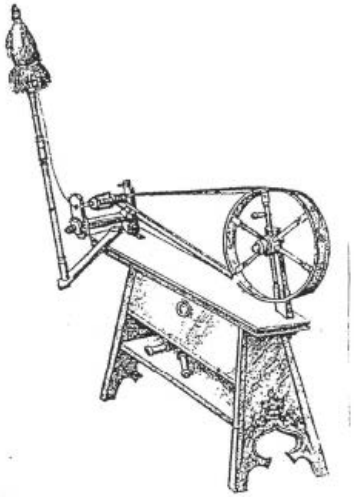
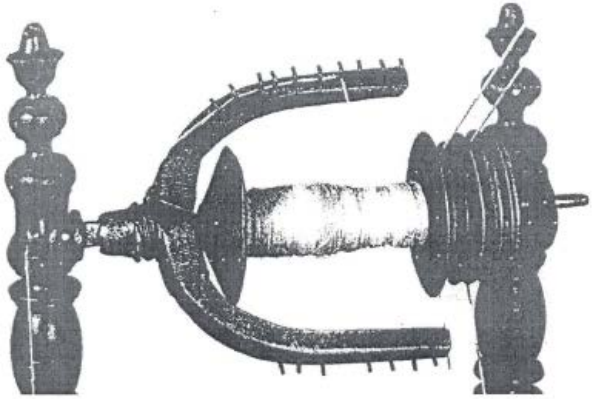


FIGURE 168—*Spinning-wheel with flyer illustrated in* Das Mittelalterliche Hausbuch, c *1480*.

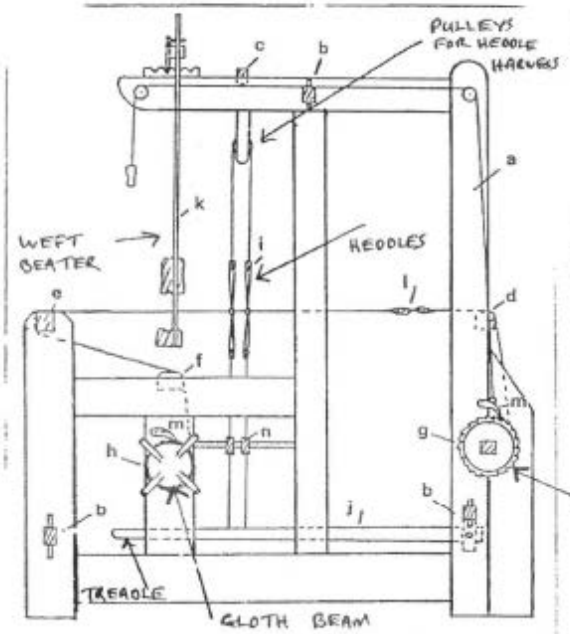


26 Detail of the flyer mechanism showing a bobbin lead, doubled band drive.

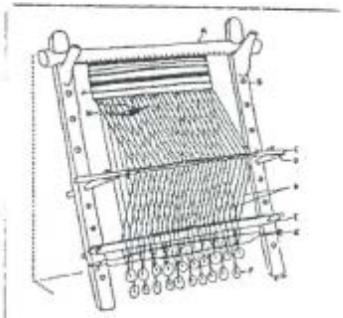
Photograph: Crown Copyright, Science Museum, London

The Saxony Spinning Wheel: Dutch drawing, 1513

31 A young woman spinning, 1513. Engraving by Lucas van Leyden (1494?–1533).
Photograph: Cliché des Musées Nationaux



11, fig. 13. Construction of the ordinary treadle or shaft loom



11, figs 10–11. Diagram of warp-weighted loo shedding procedures.

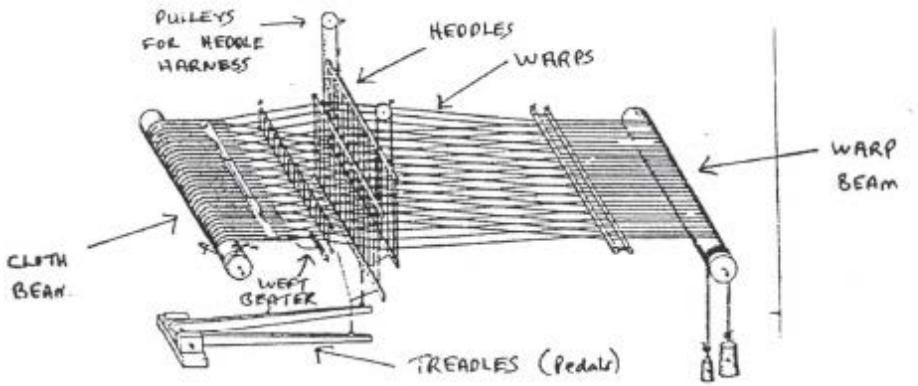


Fig. 87. Loom with pedals.

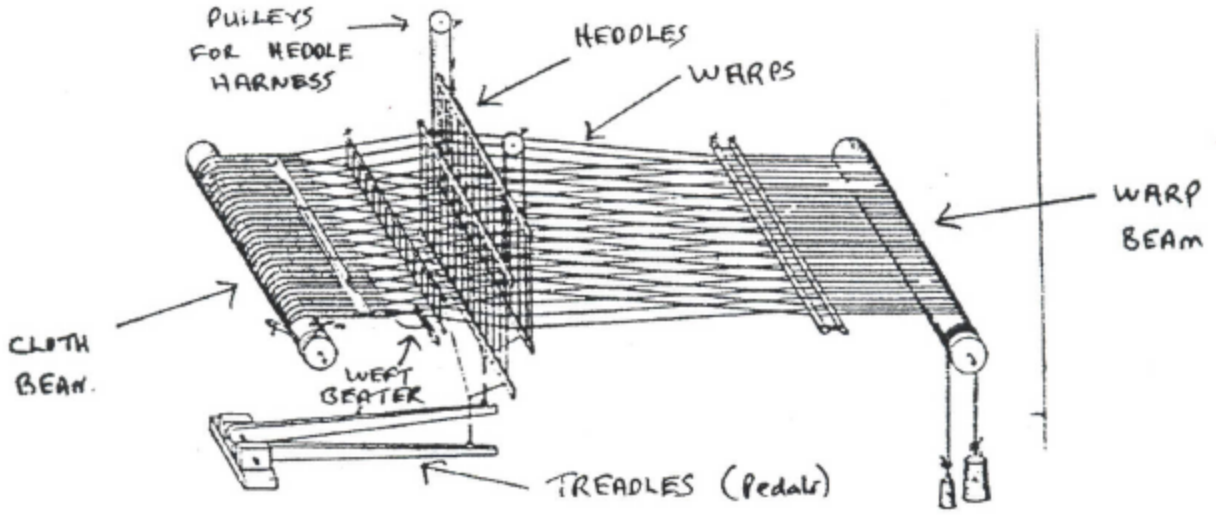


Fig. 87. Loom with pedals.

Medieval Looms

FIGURE 181—*Horizontal loom with shedding-mechanism operated by treadles. From a thirteenth-century manuscript.*

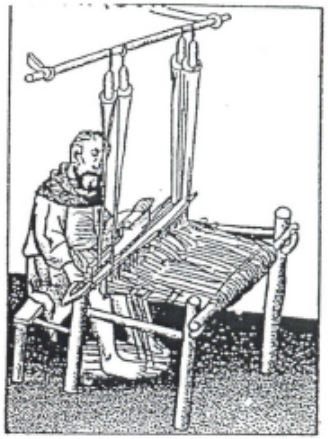


FIGURE 182—*Four-heddle loom of c 1400, from the Mendel* Brüderbuch. *The illustration is of the fifteenth century.*

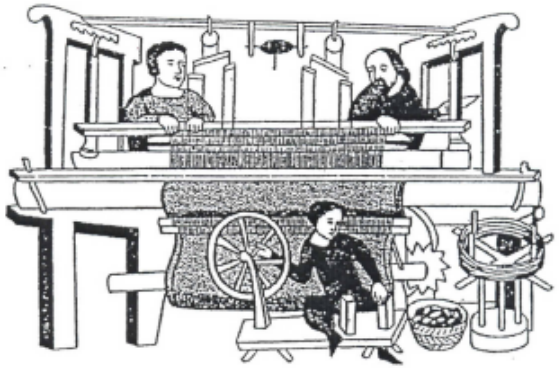
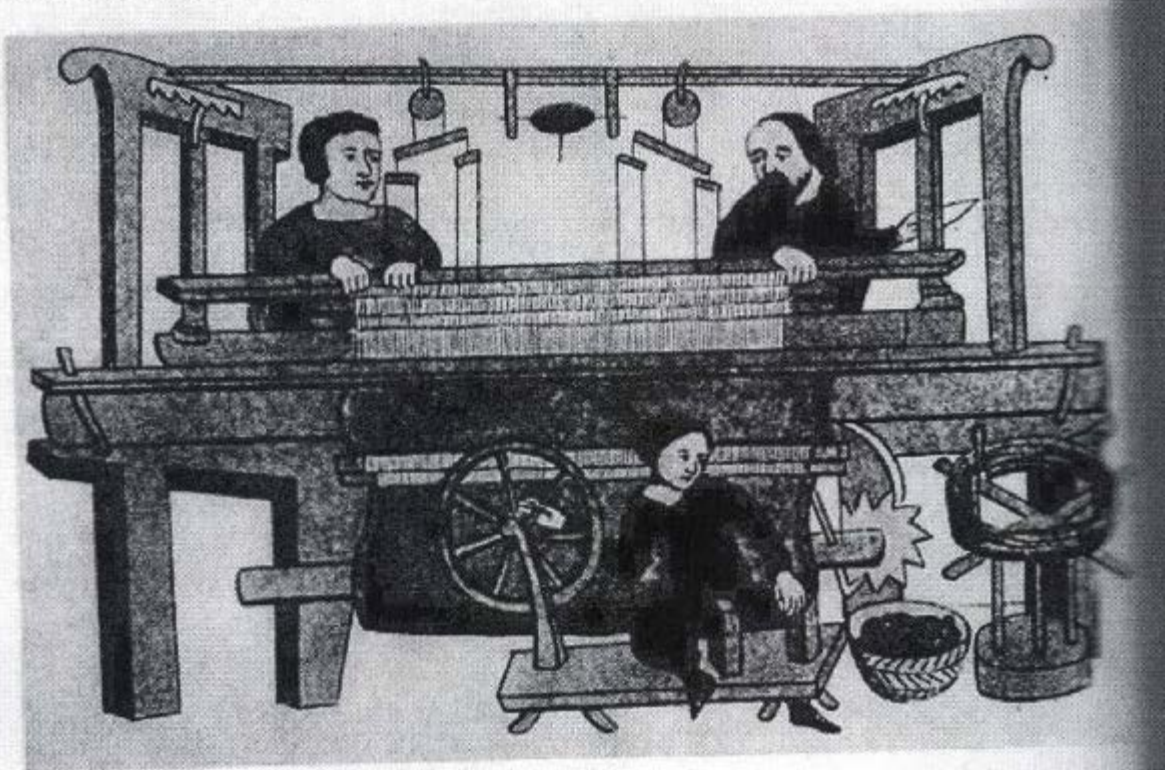


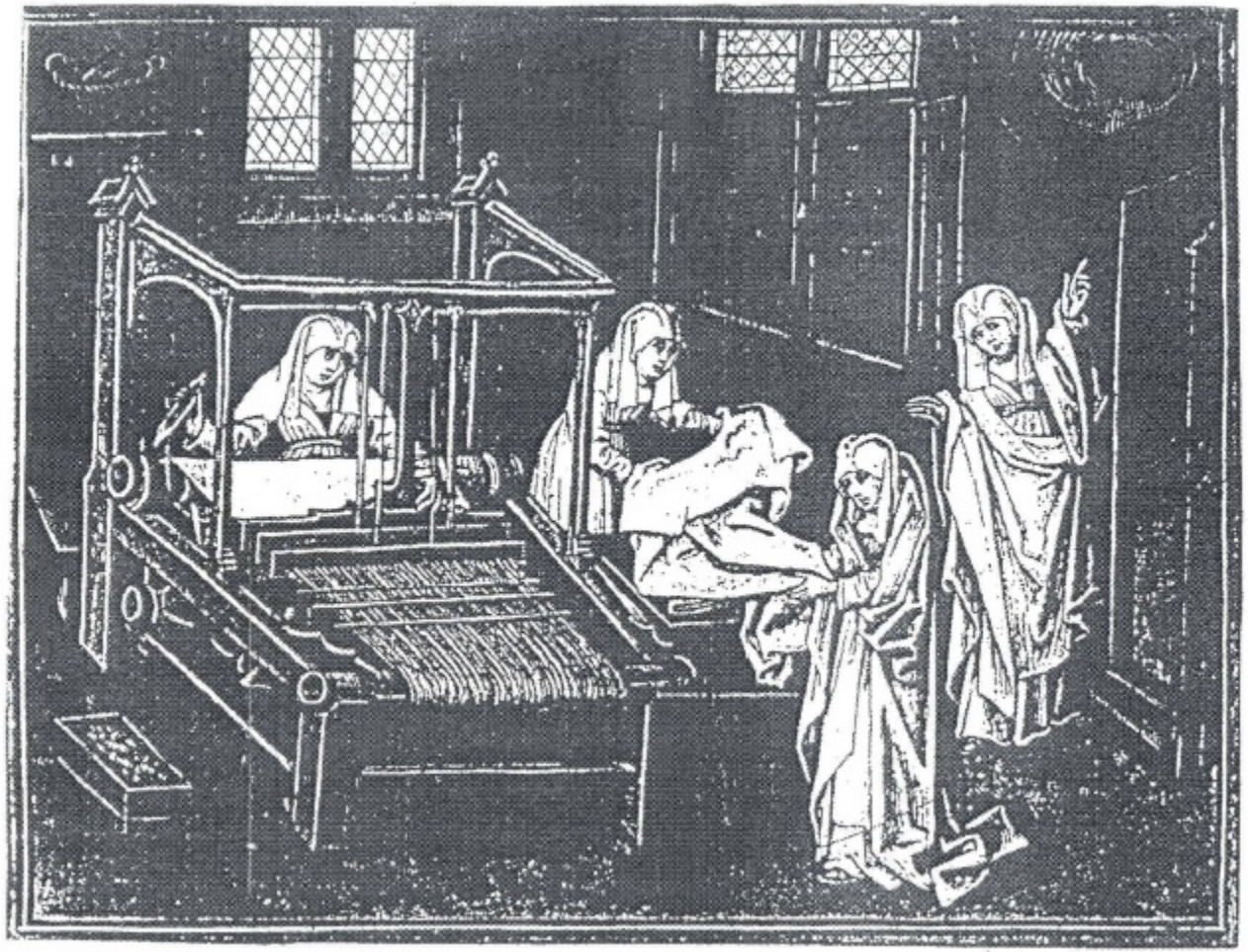
FIGURE 183—*Weavers at work, with a framed horizontal loom.* Below, *winding spools from a rotary reel on the right. From the Ypres 'Book of Trades'. c 1320.* 1365

Medieval Horizontal Loom: with foot-powered treadles

30. Ourdissage sur cadre en bois pour le tissage des draps (*Keurboek*, Ypres, vers 1320)



31. Première figuration du métier à deux tisseurs (*Keurboek* d'Ypres)



Medieval Cloth Fulling: By Foot and By Water-Powered Fulling Mill

FIGURE 186—*Fuller trampling cloth in the vat. From the painted window of the Clothiers' Guild, Semur-en-Auxois cathedral, Côte d'Or. c 1460.*

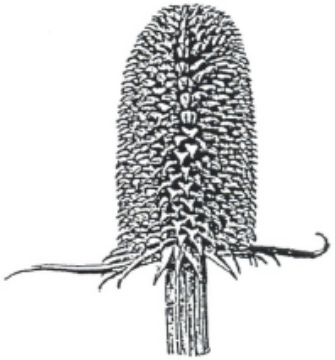


FIGURE 155—*Fuller's teazel,* Dipsacus fullonum. *Scale 1/2.*

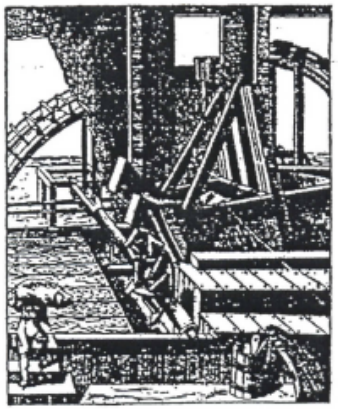


FIGURE 187—*Water-driven fulling-machine, as illus-*

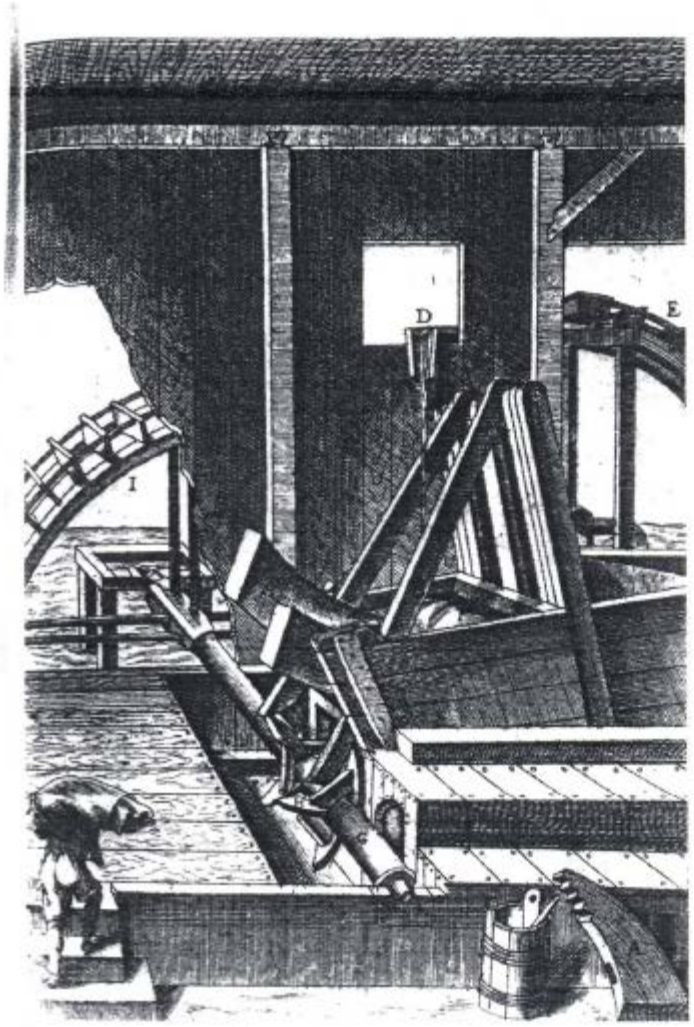


FIGURE 2–22. One of the earliest extant illustrations of a fulling mill, Zonca, 1607. The water wheel, *I*, the camshaft, *G*, the cams, *H*, and the recumbent trip-hammers, *A*, *B*, are visible. The earliest fulling mills may have used vertical trip-hammers instead of recumbent hammers.

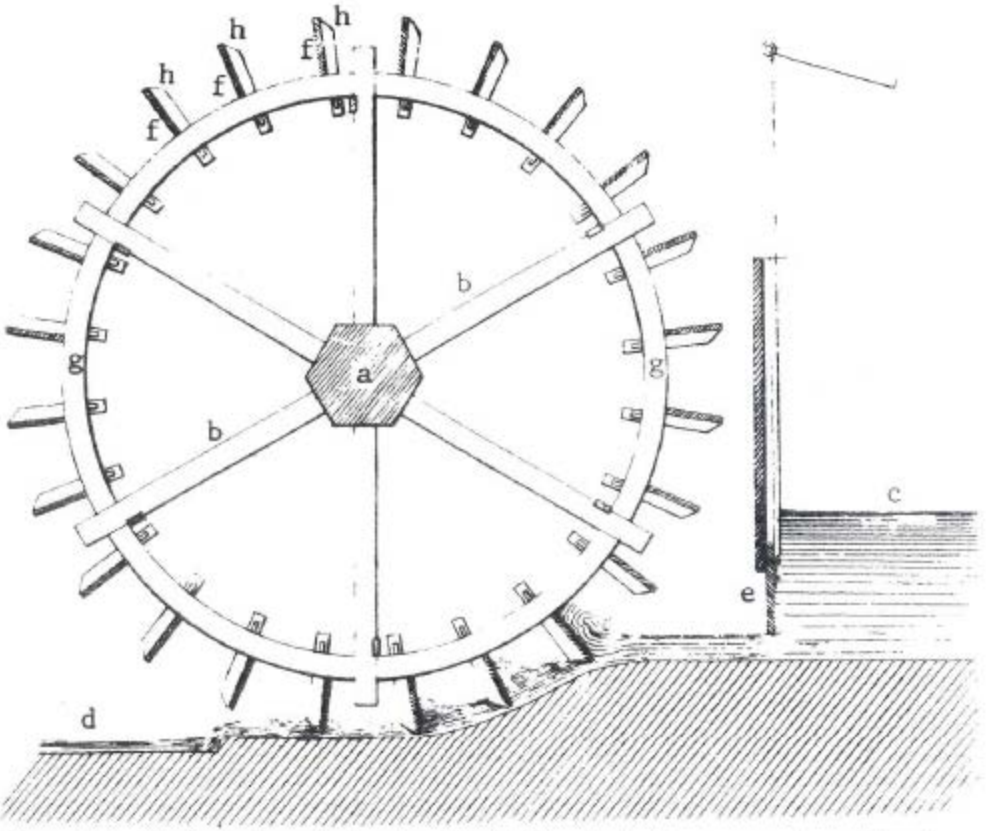


FIGURE 1–1. Undershot vertical water wheel. The principal components are (*a*) axle or shaft; (*b*) spokes or arms; (*c*) head race; (*d*) tail race; (*e*) sluice gate or chute, the device which regulates the admission of water onto the water wheel; (*f*) floats, floatboards, blades, or paddles; (*g*) rim (the circular built-up felloes to which the arms are mortised and the floatboards attached); (*h*) starts or supports, pieces of wood or metal projecting from the rims to which the floatboards or blades are secured.

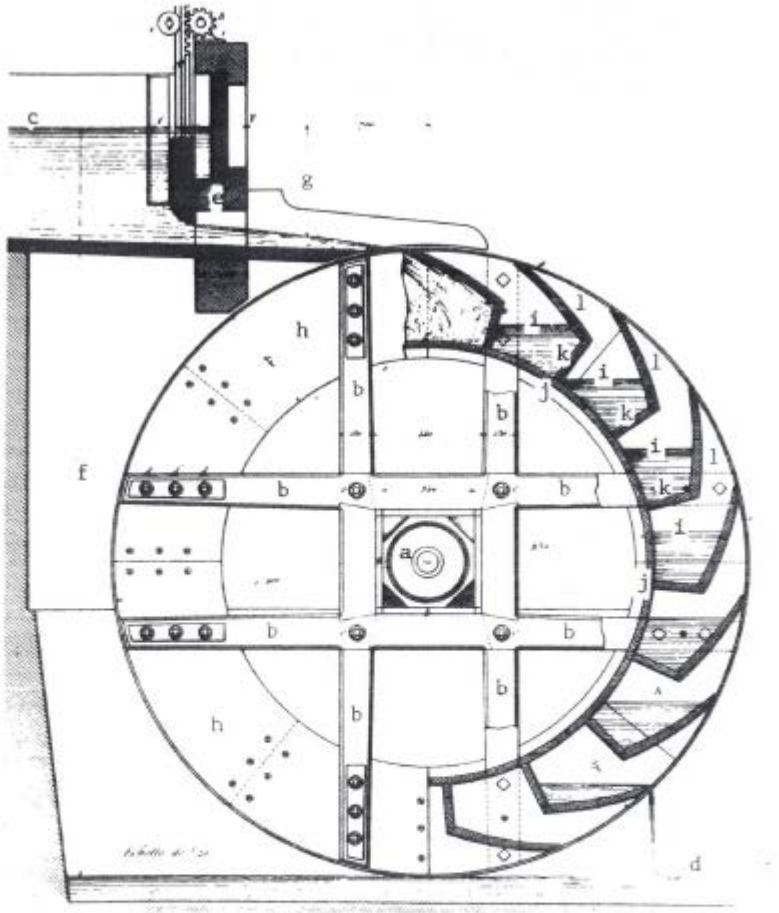


FIGURE 1–2. Overshot vertical water wheel. The principal components are (*a*) axle or shaft; (*b*) spokes or arms; (*c*) head race (flume); (*d*) tail race; (*e*) penstock or chute; (*f*) head or fall; (*g*) impact or velocity head, the portion of an overshot wheel's fall which provides velocity to the water prior to its entrance to the wheel; (*h*) rims or shrouds, the rings which form the sides of the buckets of overshot wheels (some undershot wheels may also have shrouds); (*i*) buckets, the peripheral compartments used to retain water on the working side of the overshot wheel; (*j*) soal or sole, the boards parallel to the shaft which form the inner enclosure of the buckets and to which the buckets are attached; (*k*) rising boards, boards radial to the shaft in overshot wheels, nailed to the soal and forming the bottom of the buckets; (*l*) bucket boards, boards which form the sloping, as opposed to the radial, component of buckets in some overshot wheels.

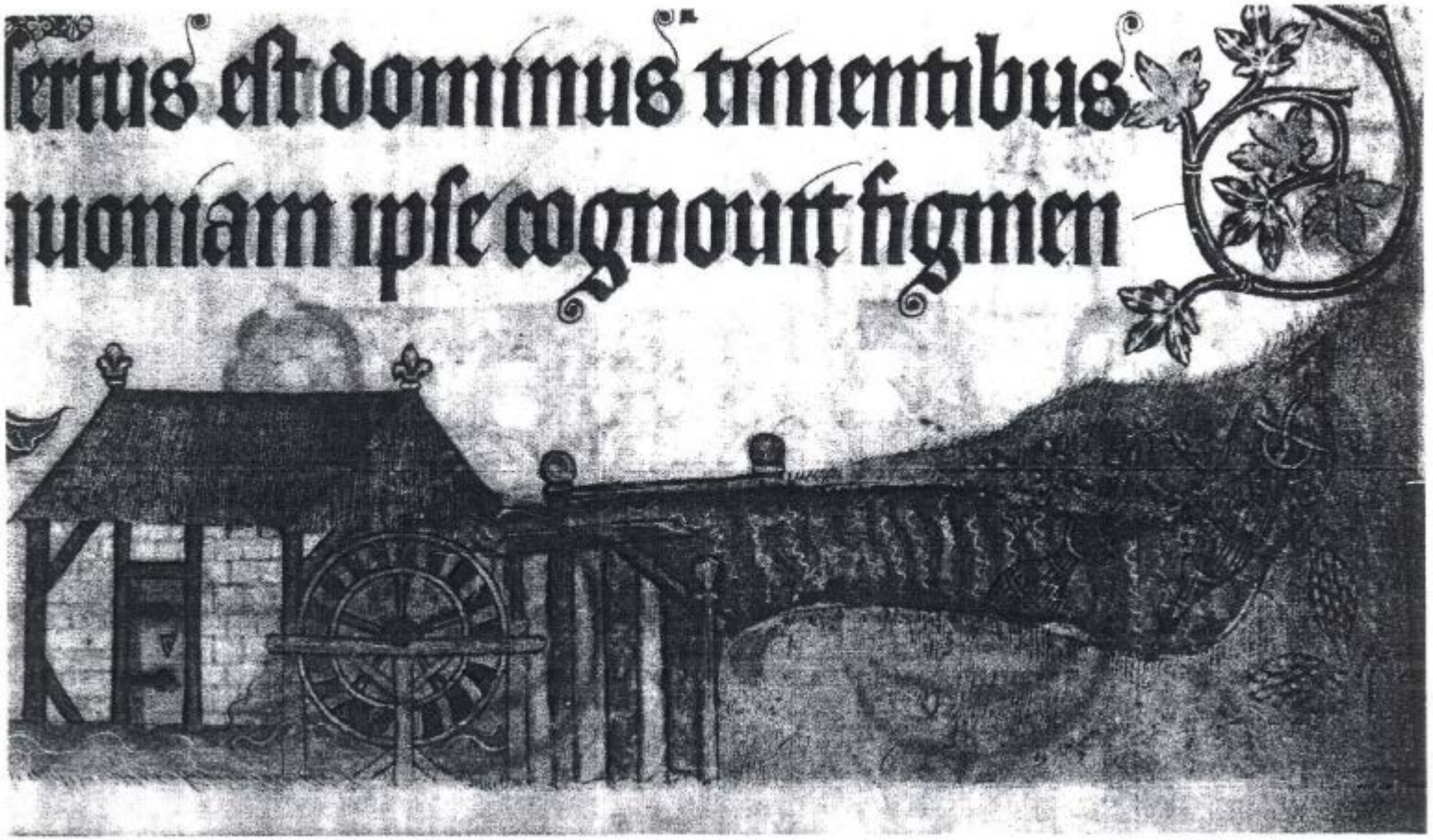


Plate 3 A fourteenth-century watermill from the Luttrell Psalter (British Library Add. Ms. 42130 fo. 181). The mill-pool contains traps for eels and other fish. Reproduced by kind permission of the British Library.

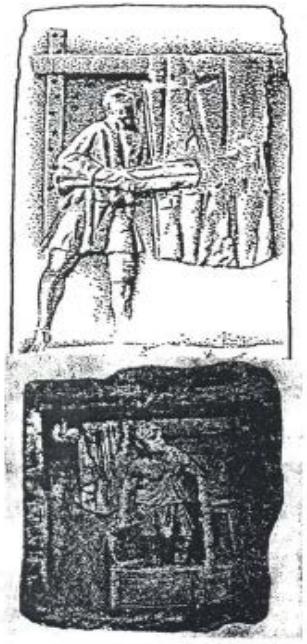


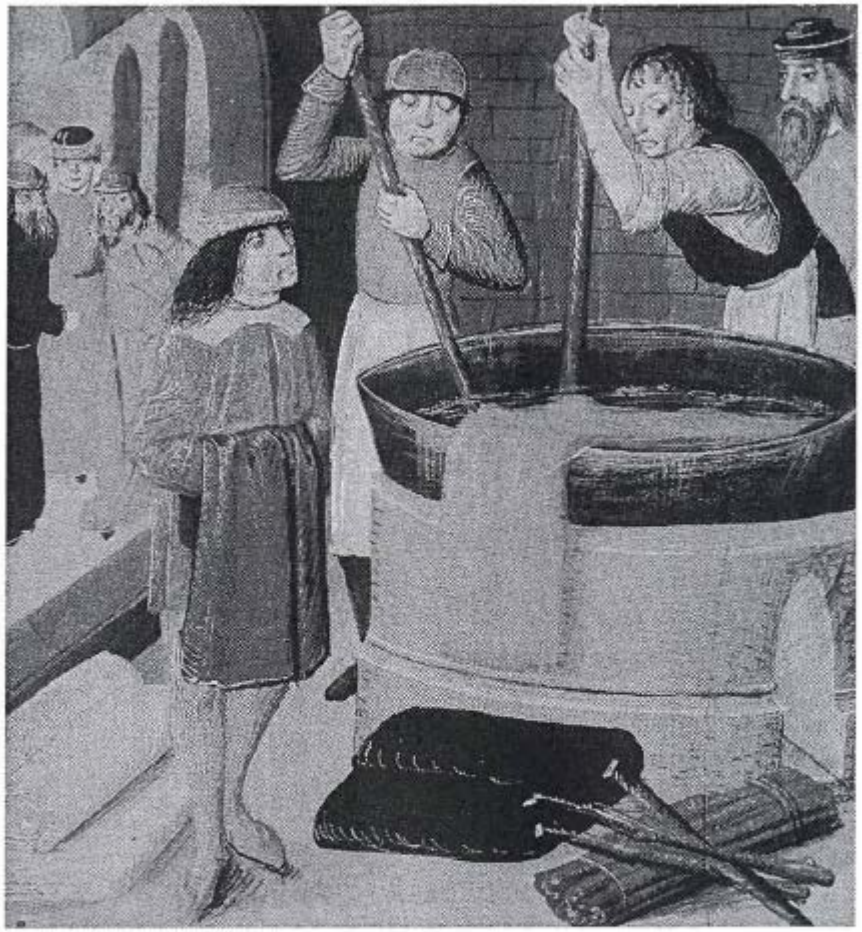
FIGURE 183—(Above) *Cloth shears; (below) fulling. From a Gallo-Roman tomb at Sens.*

FIGURE 184—*Cloth finishing in a monastery:* (right) *removing imperfections from the fabric;* (left) *stretching cloth on a tenter-frame. From an Italian manuscript of 1421.*

(*d*) Dyeing in the piece.

FIGURE 189—*Raising cloth before cropping. From the Clothiers' window at Semur-en-Auxois. c 1460.*

FIGURE 190—*Shearing (or cropping) cloth. From the Clothiers' window at Semur-en-Auxois.*



5 Barthélemy L'Anglais: *Livre des propriétés des choses*. British Library, London, Royal 15 E III, f.269, illuminated in Lille *c.* 1482. Dyeing woollen cloth: kermes, a very expensive dye, produced a range of reds used only on woollen cloth of the highest quality. Woad, much less expensive, produced blue or, in combination with other dyestuffs, green.

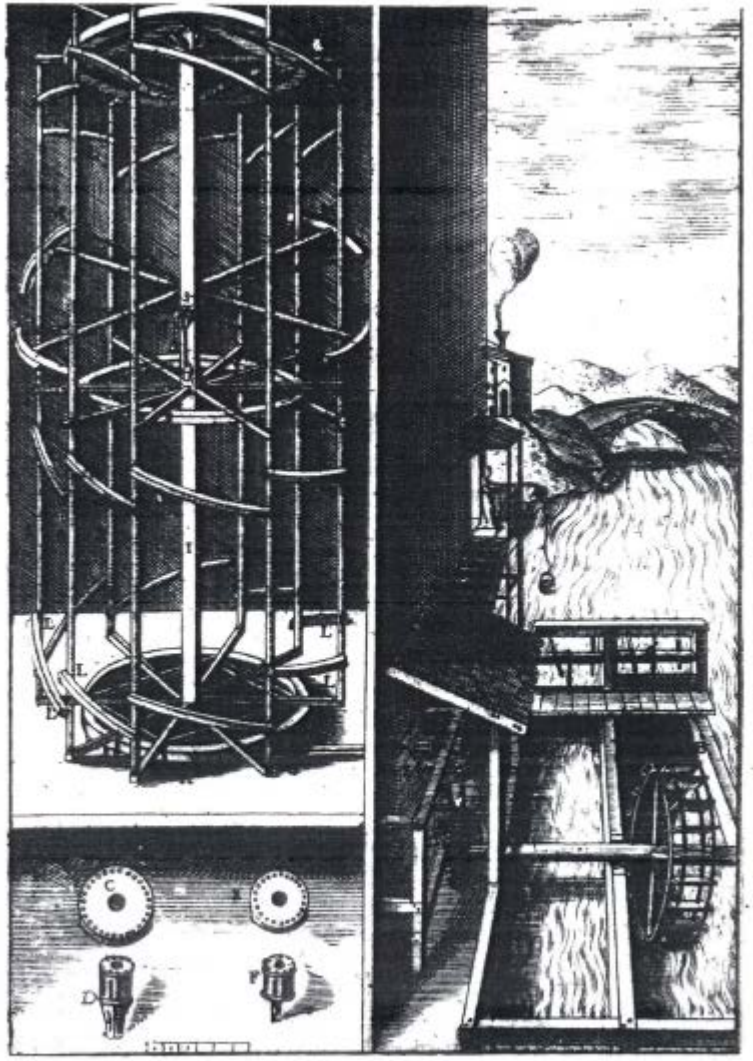


FIGURE 2–20. Silk-spinning mill from Zonca, 1607. The spindles (not shown) were fixed on the "garland" (the device on the left side of the illustration). Although there is no definite evidence that hydropowered silk-spinning mills like this were in operation before 1500, there are strong indications that they were.

Prices of Bruges Scarlets and Other Dyed Woollen Broadcloths Purchased for the Upper Echelons of the Bruges Civic Government and their values in relation to the price of a basket of Flemish consumables and to the purchasing power of the annual money-wage income of a Bruges master building craftsman in pence (d) and pounds (£) groot Flemish, in quinquennial means, 1331-35 to 1496-1500

Years 5 yrs	Woollens £ groot Mean Value	£ groot mean value of non-Scarlets	Scarlets Mean Price in £ groot	Value of Basket of Consumables in d groot Flem.	Consumer Price Index (in baskets) Mean 1451-75 =100 = 126.295d	Daily Wage of a Master Mason in Bruges in d groot Flemish	Annual Money Wage Income in £ groot Flem (210 days)
1331-35	1.616	1.417	1.888				
1336-40	1.886	1.690	2.175				
1341-45	2.093	1.733	3.447				
1346-50	3.318	2.274	4.086	63.868	50.571	5.000	4.375
1351-55	5.187	3.496	7.393	76.593	60.646	5.200	4.550
1356-60	6.892	3.757	8.171	118.935	94.172	6.000	5.250
1361-65	5.881	4.194	8.574	119.255	94.425	6.850	5.994
1366-70	6.626	4.678	12.092	135.641	107.401	8.000	7.000
1371-75	8.345	6.804	15.450	145.519	115.222	8.000	7.000
1376-80	8.438	7.226	14.048	141.024	111.662	8.800	7.700
1381-85	7.838	7.004	13.781	150.534	119.193	8.800	7.700
1386-90	9.592	7.662	17.151	157.514	124.719	10.867	9.508
1391-95	8.180	6.280	18.004	111.784	88.510	9.000	7.875
1396-1400	7.663	6.353	17.025	113.407	89.796	9.850	8.619
1401-05	7.780	6.245	15.430	111.810	88.531	10.000	8.750
1406-10	6.879	5.755	11.635	132.939	105.261	10.000	8.750
1411-15	6.264	5.474	11.263	120.370	95.309	10.000	8.750
1416-20	5.815	5.417	10.863	135.616	107.381	10.000	8.750
1421-25	5.459	5.459		141.680	112.182	10.000	8.750
1426-30	6.674	5.653	11.150	148.741	117.773	10.000	8.750
1431-35	7.352	6.474	13.114	155.989	123.512	10.800	9.450
1436-40	7.135	7.135		177.022	140.166	11.000	9.625

Prices of Dyed Bruges Woollen Broadcloths Purchased for the the Bruges Government and their values in relation to the price of a basket of Flemish consumables and the purchasing power of the annual money-wage income of a Bruges master building craftsman in pence (d) and pounds (£) groot Flemish, in quinquennial means, 1346-35 to 1496-1500

Years 5 yrs	No of Baskets of Consumables with value of a scarlet	No of Baskets of Consumables with value of a non-scarlet dyed broadcloth	No. of Days' Wages of a Master Mason Required to buy one Scarlet Woollen Broadcloth	No. of Days' Wages of a Master Mason Required to buy one non-Scarlet Woollen Broadcloth	No. of baskets of consumables to be purchased with annual money wages of a master mason
1346-50	15.352	8.544	196.105	109.133	16.440
1351-55	18.614	10.525	287.679	154.970	14.188
1356-60	15.701	7.321	314.248	144.418	11.397
1361-65	18.791	9.184	310.076	152.610	11.956
1366-70	21.008	8.137	352.687	136.456	12.386
1371-75	22.772	10.527	462.661	201.022	11.545
1376-80	24.558	12.869	330.649	173.321	12.898
1381-85	17.063	10.638	277.122	188.442	12.053
1386-90	24.931	11.358	363.710	168.039	14.152
1391-95	37.231	13.313	476.300	165.136	16.908
1396-1400	36.206	13.260	419.161	152.614	18.241
1401-05	32.875	13.383	368.758	149.766	18.782
1406-10	19.655	10.173	267.693	136.895	15.797
1411-15	21.537	10.900		130.932	17.446
1416-20	18.226	9.352	260.368	128.612	15.485
1421-25		9.058		127.591	14.822
1426-30	16.967	9.025	262.470	134.726	14.118
1431-35	21.061	9.965	285.972	143.786	14.519
1436-40		9.762		154.920	13.049
1441-45	17.416	12.179	230.575	159.035	16.114

Prices of Dyed Bruges Woollen Broadcloths Purchased for the the Bruges Government and their values in relation to the price of a basket of Flemish consumables and the purchasing power of the annual money-wage income of a Bruges master building craftsman in pence (d) and pounds (£) groot Flemish, in quinquennial means, 1346-35 to 1496-1500

Years 5 yrs	No of Baskets of Consumables with value of a scarlet	No of Baskets of Consumables with value of a non-scarlet dyed broadcloth	No. of Days' Wages of a Master Mason Required to buy one Scarlet Woollen Broadcloth	No. of Days' Wages of a Master Mason Required to buy one non-Scarlet Woollen Broadcloth	No. of baskets of consumables to be purchased with annual money wages of a master mason
1346-50	15.352	8.544	196.105	109.133	16.440
1351-55	18.614	10.525	287.679	154.970	14.188
1356-60	15.701	7.321	314.248	144.418	11.397
1361-65	18.791	9.184	310.076	152.610	11.956
1366-70	21.008	8.137	352.687	136.456	12.386
1371-75	22.772	10.527	462.661	201.022	11.545
1376-80	24.558	12.869	330.649	173.321	12.898
1381-85	17.063	10.638	277.122	188.442	12.053
1386-90	24.931	11.358	363.710	168.039	14.152
1391-95	37.231	13.313	476.300	165.136	16.908
1396-1400	36.206	13.260	419.161	152.614	18.241
1401-05	32.875	13.383	368.758	149.766	18.782
1406-10	19.655	10.173	267.693	136.895	15.797
1411-15	21.537	10.900		130.932	17.446
1416-20	18.226	9.352	260.368	128.612	15.485
1421-25		9.058		127.591	14.822
1426-30	16.967	9.025	262.470	134.726	14.118
1431-35	21.061	9.965	285.972	143.786	14.519
1436-40		9.762		154.920	13.049
1441-45	17.416	12.179	230.575	159.035	16.114

Prices and Values of Scarlets Manufactured in Mechelen:

in Pounds Oude Groot and Pounds Groot Flemish
compared to the Wages of a Bruges Master Mason and the Values of a Flemish Commodity Basket:
in pence and pounds (£) groot Flemish
Index: 1451-75 = 100

one scarlet was 40 ells long = 27.56 metres

Years	Price in £ Oude groot	Price in £ groot Flemish	Wages of a Master Mason in Bruges: in d groot Flemish	Value of a Flemish Commodity Basket in in d groot Flemish	Value of a Flemish Commodity Basket in In £ groot Flemish	Flemish Commodity Price Index 1451-75=100	No. of Days' Wages for a Master Mason to Purchase a Mechelen Scarlet	Value of the Mechelen Scarlet in Flemish Commodity Baskets
1361-65	2.694							
1366-70	4.107		8.000	135.641	0.565	107.401		
1371-75	4.247	10.553	8.000	145.519	0.606	115.222	315.160	17.376
1376-80	5.561	14.371	8.800	141.024	0.588	111.662	373.371	22.973
1381-85	4.589	12.279	8.800	150.534	0.627	119.193	327.037	19.412
1386-90	4.453	12.947	10.867	157.514	0.656	124.719	273.942	18.514
1391-95	4.448	9.929	9.000	111.784	0.466	88.510	262.899	21.061
1396-1400	4.586	10.318	9.850	113.407	0.473	89.796	245.142	22.069
1401-05	5.783	13.011	10.000	111.810	0.466	88.531	309.947	27.676

Prices and Relative Values of English Woollen Broadcloths at Cambridge and Winchester in pounds sterling, and values expressed in equivalent number of 'baskets of consumables' and the number of days wages for master masons required to purchase one cloth in quinquennial means (arithmetic and harmonic), 1361-65 to 1556-60

5 yr periods	Cambridge 1st quality in £ sterling	Winchester 1st quality in £ sterling	Cambridge 1st Quality: No. Days Wages	Winchester 1st Quality: No. Days Wages	Value of Cambridge 1st Quality: in PBH Baskets	Value of Winchester 1st Quality: in PBH Baskets
1361-65	2.232	2.030	101.600	92.396	3.311	3.011
1366-70	2.437	2.216	113.554	103.266	3.660	3.328
1371-75	2.200	2.001	101.566	92.364	3.475	3.161
1376-80	2.430	2.210	115.769	105.281	4.701	4.275
1381-85	2.808	2.553	133.491	121.398	5.232	4.758
1386-90	2.140	1.946	101.565	92.364	4.458	4.054
1391-95	1.952	1.867	93.658	89.161	3.986	3.781
1396-1400	2.033	2.050	97.403	98.353	3.899	3.940
1401-05	2.128	2.080	100.149	97.892	4.018	3.924
1406-10	2.160	2.443	89.050	100.114	4.174	4.721
1411-15	2.136	2.464	85.384	97.783	4.193	4.802
1416-20	2.100	2.349	84.000	93.941	3.933	4.405
1421-25	2.113	2.314	84.499	92.553	4.333	4.746
1426-30	2.423	2.185	92.705	87.373	4.330	4.132
1431-35	2.468	2.240	97.878	89.579	4.770	4.365
1436-40	2.080	2.218	83.150	88.696	3.566	3.799
1441-45	2.273	2.360	89.012	94.389	5.092	5.424
1446-50	2.502	2.398	98.059	95.900	5.166	5.039
1451-55	2.380	2.400	93.873	96.000	4.905	5.019
1456-60	2.758	2.400	109.254	96.000	5.921	5.213
1461-65	2.933	2.400	112.166	96.000	5.872	5.031
1466-70	3.375	2.520	129.444	100.478	6.685	5.202
1471-75	2.520	2.520	100.414	100.645	5.536	5.556