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**Necessities and Luxuries in Early-Modern Textile
Consumption: Real Values of Worsted Saws and Fine
Woollens in the Sixteenth-Century Low Countries**

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Abstract:

by John Munro (University of Toronto)

If mankind's three basic necessities have always been food, clothing, and shelter, whose production, trade, and consumption have rightly been a primary focus of economists and economic historians for many generations, we may ask this vital question: how do they distinguish between necessities and luxury products? Indeed, any examination of later-medieval, early-modern commodity prices soon reveals that for all three of these basic categories there was a seamless continuum from the very cheapest to the most expensive goods sold on the market, so that making clear cut divisions becomes virtually impossible. How, when, where, and why did the consumption of food and drink, for example, shift from being a basic necessity to ensure survival to become a luxury that enhances and enriches the quality of life? Obviously the very same considerations apply also to clothing. For many people, if only for a much smaller segment of the population, chiefly to be found in the aristocracy, the higher clergy, and wealthy bourgeoisie, clothing has also served and still serves other wants, in terms of luxury consumption: for decoration and for the assertion of personal values, and especially of one's social status. Indeed, for such people, luxury textiles may have been deemed as personal 'necessities'.

This study is based upon two statistical tables, for the southern Low Countries, in the early to mid-sixteenth century, which, together permit us to make such a valid contrast between the nature, forms, and relative values of two major types of textiles. Representing 'necessities' in clothing are light-weight, coarse, relatively cheap worsted-type *says* (from the leading producer, Hondschoote, in Flanders); and representing 'luxuries' are the heavy-weight, very fine, and very costly woollen broadcloths from Ghent (*dickedinnen*) in the county of Flanders and Mechelen (*Rooslaken*) in the neighbouring duchy of Brabant. Table 1 provides the technical features of the composition of the cloths, the type of wools used, warp-counts, the dimensions, and weights, and finally the weight per square metre in grams. The luxury woollen broadcloths in Table 2 were all made uniquely from the finest English wools, then the world's best; but Table 1 also provides, for comparison, a fine but cheaper woollen (from Armentières) made from a mixture of Spanish *merino* and English wools. The other textiles in Tables 1 are worsteds and semi-worsted *says* from several towns in sixteenth-century Flanders (including Hondschoote) and England. Table 2 presents the prices, in pounds *groot* Flemish for two types of Hondschoote says, and for the luxury woollens of Ghent and Mechelen for the decade 1535 - 1544.

Two measures have been adopted in order to calculate the 'real values' of these textiles: (1) a comparison of the prices (nominal money-of-account values) of these textiles with the value of a 'basket of consumables', the one used to compute the Van der Wee Consumer Price Index for Brabant (Antwerp region); and (2) the purchasing power of wages: i.e., the number of days' wages that a master mason in Antwerp would have had to spend to acquire each one of these textiles; and more particularly to buy 12 square metres of cloth, for a man's annual clothing requirement. In terms of the latter measure, the average number of days' wages required to purchase that same quantity of cloth would have been: 13.725 days for a Hondschoote single say; 16.958 days for a Hondschoote double say; and 5.4 times as many days, 91.413 for a Ghent *dickedinnen*, and 74.144 days for a Mechelen *Rooslaken*. That is certainly a much greater gulf in values that would be found today between every-day clothing and luxury apparel, for men at least. Consider that in Toronto, in July 2008, a journeymen carpenter earns a minimum of \$33.07 per hour. In 91.413 days (i.e., the number of days' wages to purchase that Ghent *dickedinnen*), at 8 hrs a day, that carpenter would earn \$24,184 CAD (about €15,115) and would never spend even 10 percent of that on clothing.

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Necessities and Luxuries in Early-Modern Textile Consumption:

Real Values of Worsteds Says and Fine Woollens in the Sixteenth-Century Low Countries

John H. Munro (University of Toronto)

If mankind's three basic necessities have always been food, clothing, and shelter, whose production, trade, and consumption have rightly been a primary focus of economists and economic historians for many generations, we may ask this vital question: how do they distinguish between necessities and luxury products? Indeed, any examination of later-medieval, early-modern commodity prices soon reveals that for all three of these basic categories there was a seamless continuum from the very cheapest to the most expensive goods sold on the market, so that making clear cut divisions becomes virtually impossible. How, when, where, and why did the consumption of food and drink, for example, shift from being a basic necessity to ensure survival to become a luxury that enhances and enriches the quality of life? Obviously the very same considerations apply also to clothing. For many people, if only for a much smaller segment of the population, chiefly to be found in the aristocracy, the higher clergy, and wealthy bourgeoisie, clothing has also served and still serves other wants, in terms of luxury consumption: for decoration and for the assertion of personal values, and especially of one's social status. Indeed, for such people, luxury textiles may have been deemed as personal 'necessities'.

During the medieval era, from the twelfth to fifteenth centuries in particular, the most prominent and certainly the most famous European region for the production of luxury woollen cloth was the Low Countries (Flanders, Brabant, and Holland). Less well known is the fact that in the twelfth, thirteenth, and very early fourteenth centuries this region had been equally prominent for the production of an even wider range of much cheaper and lighter textiles, the majority of which were exported to the Mediterranean basin.¹ The most

¹ See: John Munro, 'Industrial Transformations in the North-West European Textile Trades, c. 1290 - c. 1340: Economic Progress or Economic Crisis?' in Bruce M. S. Campbell, ed., *Before the Black Death: Studies in the 'Crisis' of the Early Fourteenth Century* (Manchester and New York: Manchester University Press, 1991), pp. 110 - 48; John Munro, 'The "Industrial Crisis" of the English Textile Towns, 1290 - 1330', *Thirteenth-Century England: VII*, ed. Michael Prestwich, Richard Britnell, and Robin Frame (Woodbridge, UK: Boydell Academic Press, 1999), pp. 103-41; Patrick Chorley, 'The Cloth Exports of Flanders and

prominent were worsted-type *says* produced by *sayetteries* throughout England, the Low Countries and northern France (with very similar industries in Italy).

As I have contended in other recent publications, the international trade in textiles underwent very disruptive and deleterious structural changes in later-medieval Europe: principally from the spreading stain of warfare – international, regional, and local of civil wars – beginning in the 1290s, and continuing directly into the Hundred Years' War (1337-1453). In essence, warfare and its political consequences, combined with a dramatic fall in population after the Black Death, raised the transaction costs of long-distance trade – in terms of transportation, protection, and marketing costs – while also raising the taxation of trade, to often prohibitive levels. Indeed, those rising transaction costs virtually eliminated the long-distance commerce in the cheaper textiles from north-west Europe to the far distant Mediterranean basin, all the more so since transaction costs are a function of scale economies, now much reduced by demographic decline.

That was all the more true for those who produced cheap textiles that lacked any distinguishing features, and were indeed undistinguishable from almost identical products produced in the Mediterranean basin itself. Necessarily acting as 'price takers', these northern producers thus were unable to raise prices to compensate for rising transaction costs.

Producers of luxury woollens, on the other, had always striven to differentiate their products by distinguishing superior quality over those of their competitors. Thus acting as 'price-makers', in the context of 'monopolistic competition', they were better able to raise their prices (for a much smaller, wealthier market); and in any event, rising transaction costs were a far smaller proportion of final retail prices. Consequently, the late-medieval Low Countries experienced a major reorientation in textile production and trade away from the *sayetteries* to an overwhelming concentration on heavy-weight luxury woollens, whose

Northern France During the Thirteenth Century: A Luxury Trade?', *Economic History Review*, 2nd ser. 40:3 (August 1987), 349-79; Patrick Chorley, 'English Cloth Exports During the Thirteenth and Early Fourteenth Centuries: the Continental Evidence', *Historical Research: The Bulletin of the Institute of Historical Research*, 61:144 (February 1988), 1-10; Wendy Childs, 'The English Export Trade in Cloth in the Fourteenth Century,' in Richard Britnell and John Hatcher, eds., *Progress and Problems in Medieval England: Essays in Honour of Edward Miller* (Cambridge and New York, 1996), pp. 121-47.

chief markets came to be those in the Baltic and northern Europe. Since the single most important component of luxury woollen was fine English wool, the Low Countries' draperies had no choice but to accept, from the 1330s, increasingly extortionate taxation of English wool exports.²

By the early sixteenth century, however, with both a major reduction in the incidence of warfare and with renewed demographic growth, especially with a dramatic growth in urban populations that led to superior scale economies in trade, and with major innovations in transportation and marketing, transaction costs fell dramatically. Those cost reductions consequently promoted the fortunes of those engaged in producing and marketing the cheaper, lighter textiles, especially to the Mediterranean basin, and also the Spanish Americas – warmer climate zones that provided better markets for lighter textiles. By the 1530s, the most prominent textile producers, by both volume and value, in the Low Countries were the *sayetteries* (with other *draperies légères*), again led by Hondschoote.³

² See the sources cited in n. 1, and also: John Munro, 'Patterns of Trade, Money, and Credit', in James Tracy, Thomas Brady Jr., and Heiko Oberman, eds., *Handbook of European History in the Later Middle Ages, Renaissance and Reformation, 1400 - 1600*, Vol. I: *Structures and Assertions* (Leiden: E.J. Brill, 1994), pp. 147-95; John Munro, 'Anglo-Flemish Competition in the International Cloth Trade, 1340 - 1520', *Publication du centre européen d'études bourguignonnes*, 35 (1995), 37-60 [*Rencontres d'Oxford (septembre 1994): L'Angleterre et les pays bas bourguignonnes: relations et comparaisons, XVe - XVIe siècle*, ed. Jean-Marie Cauchies]; John Munro, 'The Origins of the English 'New Draperies': The Resurrection of an Old Flemish Industry, 1270 - 1570', in Negley B. Harte, ed., *The New Draperies in the Low Countries and England, 1300 - 1800*, Pasold Studies in Textile History no. 10 (Oxford and New York: Oxford University Press, 1997), pp. 35-127; John Munro, 'The Symbiosis of Towns and Textiles: Urban Institutions and the Changing Fortunes of Cloth Manufacturing in the Low Countries and England, 1270 - 1570', *The Journal of Early Modern History: Contacts, Comparisons, Contrasts*, 3:1 (February 1999), 1-74; John Munro, 'The Low Countries' Export Trade in Textiles with the Mediterranean Basin, 1200-1600: A Cost-Benefit Analysis of Comparative Advantages in Overland and Maritime Trade Routes', *The International Journal of Maritime History*, 11:2 (Dec. 1999), 1 - 30; John Munro, 'The "New Institutional Economics" and the Changing Fortunes of Fairs in Medieval and Early Modern Europe: the Textile Trades, Warfare, and Transaction Costs', *Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte*, 88:1 (2001), 1 - 47; John Munro, 'Medieval Woollens: The Western European Woollen Industries and their Struggles for International Markets, c.1000 - 1500', in David Jenkins, ed., *The Cambridge History of Western Textiles*, 2 vols. (Cambridge and New York: Cambridge University Press, 2003), Vol. I, chapter 5, pp. 228-324, 378-86 (bibliography).

³ See sources cited in n. 2 above; and also: Emile Coornaert, *La draperie-sayetterie d'Hondschoote, XIVe-XVIIIe siècles* (Paris, 1930); Emile Coornaert, *Une industrie urbaine du XIVe au XVIIIe siècle: l'industrie de la laine à Bergues-Saint-Winoc* (Paris, 1930); Emile Coornaert, 'Draperies rurales, draperies urbaines: l'évolution de l'industrie flamande au moyenâge et au XVI siècle', *Belgische tijdschrift voor filologie en gescheidenis/Revue belge de philologie et d'histoire*, 28 (1950), 60-96; Jan Craeybeckx,

Furthermore, even before the 1530s, this region's luxury woollen cloth industries had largely, succumbed, though never entirely, to the overwhelming competition from the much lower-cost and more cheaply-priced English woollen broadcloths (woven from tax-free wools) in most European textile markets. Such once renowned and very prominent luxury woollen draperies, as represented here, from both Ghent (Flanders) and Mechelen (Brabant), had managed to survive into the sixteenth century, though almost as shadows of their former selves, by serving a very narrow market niche of the ultra-rich in European society.⁴ Nevertheless, the prices of their woollens were, in the 1530s, relatively no higher (in 'real terms') than they had been in the mid-fifteenth century.⁵ Furthermore, as Table 1 demonstrates, the 1546 drapery ordinance for the Ghent *dickedinnen* indicates that it was exactly the same woollen broadcloth whose production had previously been regulated in 1456; and indeed this 'medieval broadcloth' seems to have been manufactured without any significant changes from at least the mid-fourteenth century.⁶ The other sixteenth-century

'L'industrie de la laine dans les anciens Pays-Bas méridionaux de la fin du XVIe au début du XVIIIe siècle', in Marco Spallanzani, ed., *Produzione, commercio e consumo dei panni di lana* (Florence, 1976), pp. 21-43.

⁴ See the sources cited above in n. 2.

⁵ See also n. 29 below, and the conclusion to this study. For the evidence on relative prices, from a wide variety of late-medieval draperies, see John Munro, 'The Anti-Red Shift – to the Dark Side: Colour Changes in Flemish Luxury Woollens, 1300 - 1550', *Medieval Clothing and Textiles*, 3 (2007), 55-95, and especially Tables 4.1 (pp. 58-61), Table 4.3 (pp. 68-72); Table 4.4 (p. 74). Table 4.5 (pp. 82-83); John Munro, 'The Medieval Scarlet and the Economics of Sartorial Splendour', in Negley B. Harte and Kenneth G. Ponting, eds., *Cloth and Clothing in Medieval Europe: Essays in Memory of Professor E. M. Carus-Wilson*, Pasold Studies in Textile History No. 2 (London: The Pasold Research Fund and Heinemann Educational Books, 1983), pp. 13-70; esp. Table 3.6, p. 42; Table 3.7, p. 43; Table 3.8, p. 44; Table 3.11, p. 49-50; Table 2.14, pp. 67-68; John Munro, 'Industrial Protectionism in Medieval Flanders: Urban or National?' in Harry Miskimin, David Herlihy, and A. L. Udovitch, eds., *The Medieval City* (New Haven and London: Yale University Press, 1977), pp. 229-67, Table 13.32, pp. 257-62; Table 13.5, pp. 266-67; Munro, 'Resurrection of an Old Flemish Industry', Tables 1 - 2, pp. 39-44. For the forms, nature, and technology of medieval northern broadcloths, see John Munro, 'Medieval Woollens: Textiles, Textile Technology, and Industrial Organisation, c. 800 - 1500', in David Jenkins, ed., *The Cambridge History of Western Textiles*, 2 vols. (Cambridge and New York: Cambridge University Press, 2003), Vol. I, chapter 4, pp. 181-227, and n. below.

⁶ The Flemish textile term *dickedinnen* literally means 'thick and thin'. It probably refers to the twilled weave with an alternation of two wefts and then one weft over the warp yarns, giving a slightly ribbed effect. See Guy De Poerck, *La draperie médiévale en Flandre et en Artois: Technique et terminologie*, 3 vols. (Bruges, 1951), vol. III: *Glossaire flamand*, p. 29, no. 118. Such woollens were also manufactured at

broadcloth in Table 2, the Mechelen *Rooslaken*, also seems to have been unaltered since its first appearance in the mid fifteenth century.

If we may regard the other wool-based textiles in Table 2, the light-weight and relatively cheap worsted-type Hondschoote *says*, as textile products that represent a ‘necessity’ in terms of meeting fundamental needs for clothing, and if we may regard the long predominant Ghent *dickedinnen* broadcloths and the newer Mechelen *Rooslakenen* as representative luxury-quality woollens for the early sixteenth century, then we are fortunate in having a price list that permits a comparison of not just their relative prices, but also their ‘real’ values in terms of other commodities and the purchasing power of industrial labour. The relevant price and value data for these textiles will be found in Table 2, for the decade from the mid 1530s to the mid 1540s.

To be sure, ‘homespun’ or cottage-produced textiles might better meet the test of representing ‘necessities’; and conversely, woollen scarlets and silk fabrics would be better representations for luxury – or ultra-luxury – consumption. But for none of these do we have comparative market prices. In the first place, homespun textiles by their very nature were not traded in markets. Second, scarlets had largely disappeared from northern markets by the mid-fifteenth century.⁷ Third, while silks had become even more prominent in European luxury textile markets, by the sixteenth century, we certainly do not have the data to compare prices with product sizes for the very wide variety of silken textiles (satins, damasks, velour, etc), in various and widely differing dimensions.⁸ We do, however, have such data for both luxury woollen

Bruges, Ypres, and Mechelen.

⁷ See Munro, ‘The Anti-Red Shift’, pp. 73-77, 84-91 (esp. n. 49).

⁸ For the late-medieval silk industry, see John Munro, ‘Silk’, in Joseph R. Strayer, et al., eds, *Dictionary of the Middle Ages*, 13 vols. (New York: Charles Scribner's Sons/MacMillan, 1982-88), Vol. 11: *Scandinavian Languages to Textiles, Islamic* (New York, 1988), pp. 293-96; Giovanni Federico, ‘Silk Industry, in Joel Mokyr, ed., *The Oxford Encyclopedia of Economic History*, 5 vols. (Oxford and New York: Oxford University Press, 2003), vol. 4, pp. 483-91; Luca Mola, *La seta in Italia dal Medioevo al Seicento: dal baco al drappo* (Marsilio, 2000); Luca Mola, *The silk industry of Renaissance Venice* (Johns Hopkins University Press, 2000); Paola Lanaro, ed., *At the Centre of the Old World: Trade and Manufacturing in Venice and the Venetian Mainland, 1400 - 1800*, Publications of the Centre for Reformation and Renaissance

broadcloths and Hondschoote *says*, as presented in both Tables 1 and 2.

The physical composition of woollens and worsteds and the technology of their production.

But before examining these differences in prices and relative values, we must first examine the physical differences between wool-based textiles grouped into three categories: worsteds (or *says*), woollens, and a hybrid category, commonly called *serges*.⁹ Worsteds, a very ancient textile fabric, historically preceding genuine woollens, were generally the much lower-quality, lighter, and least expensive of the three types. They were woven from relatively cheap, coarse, strong, long-stapled ‘dry’ yarns (20.0 to 30.5 cm), worsted yarns in both warps and wefts; and they were generally woven on a narrow, one-man horizontal treadle-loom, often with a diamond or lozenge twilled weave.

Woollens, on the other hand, were generally the much finer-quality, much heavier, and more expensive of these three types. The principal reason for their greater weight, better quality, and higher cost (when undyed) was their wool-composition: very fine, curly, short-stapled (5.0 - 6.0 cm) ‘greased’ or ‘wet’ yarns, in both warp and weft. In medieval Europe, by far the finest and thus the most costly wools of this type were, as noted earlier, English: specifically, in order of quality and value, those from the Welsh Marches or counties of Herefordshire and Shropshire; second, from the adjacent Cotswolds counties of Worcestershire, Gloucestershire, Oxfordshire, and Berkshire; and a more distant third, those from the Kesteven and Lindsey

Studies: Essays and Studies no. 9 (CRRSS: Victoria University in the University of Toronto, 2006); Simonetta Caviacchi, ed., *La seta in Europa sec. XIII-XX*: atti della ‘Ventiquattresima Settimana di studi’, 4-9 maggio 1992, Istituto internazionale di storia economica F. Datini (Le Monnier, 1993). For prices of some silk fabrics in fifteenth-century England, see Munro, ‘Medieval Scarlet’, Table 3.15, p. 69.

⁹ For the following, see John Munro, ‘Textile Technology’, in Joseph R. Strayer, et al., eds., *Dictionary of the Middle Ages*, 13 vols. (New York: Charles Scribner's Sons/MacMillan, 1982-88), Vol. 11: *Scandinavian Languages to Textiles, Islamic* (New York, 1988), pp. 693-711; reprinted in John Munro, *Textiles, Towns, and Trade: Essays in the Economic History of Late-Medieval England and the Low Countries*, Variorum Collected Studies series CS 442 (Aldershot, Hampshire; and Brookfield, Vermont: Ashgate Publishing Ltd., 1994); Munro, ‘Medieval Woollens: Textiles, Textile Technology, and Industrial Organisation’, pp. 181-227; Patrick Chorley, ‘The Evolution of the Woollen, 1300-1700’, Negley B. Harte, ed., *The New Draperies in the Low Countries and England, 1300 - 1800*, Pasold Studies in Textile History no. 10 (Oxford and New York: Oxford University Press, 1997), pp. 7-34. For silks, see n. 8 above.

districts of Lincolnshire.¹⁰

The techniques and physical natures of wool-based textile production

The necessary techniques to prepare these fine wools for weaving also explain the much heavier weights of these woollen textiles: i.e., combing (for the warp yarns), carding (for the weft yarns), spinning (drop-spindle for warps and spinning wheels for the wefts), warp-winding on the loom, and weft-insertions in the weaving bobbins; weaving itself (wefts inserted with shuttles through heddles for the warps); and then fulling the woven cloth, prior to the finishing processes of shearing and dyeing. A major distinction between these textiles was in oiling or greasing the short, curly, scaly-fibred wools for woollens: with butter, olive oil, or herring fat (though generally forbidden), in order to protect them from entanglement and thus damages in these ensuing processes. That was all the more necessary since the natural oils or lanolin in the wool fibres had been removed in the cleansing and scouring processes of wool preparation.

Worsted wools, on the other hand, did not require any such greasing. First, they were not scoured, and thus retained their own natural lanolin. Second, they were very strong and sufficiently straight-stapled that they did not need such protection in the combing, spinning, and weaving processes. For this basic reason, in the medieval and early-modern Low Countries and France, the woollen industries were known as the ‘greased’ (or wet) draperies: *draperies ointes*; or in Flemish (Nederlands), the *gesmoutte draperie* (*lakenindustrie*). Conversely, the worsted industries were known as the ‘dry’ draperies: *draperies sèches* (and also: *draperies légères*) and, in Flemish, *droge draperie* (*lichte draperie*).

Fulling and finishing woollens

The removal of that grease, and also the starchy warp-sizing, and dirt adhering to both, explains the

¹⁰ See John Munro, ‘Wool-Price Schedules and the Qualities of English Wools in the Later Middle Ages, ca. 1270 - 1499’, *Textile History*, 9 (1978), 118-69; and ‘The 1357 Wool-Price Schedule and the Decline of Yorkshire Wool Values’, *Textile History*, 10 (1979), 211-19; both reprinted in John Munro, *Textiles, Towns, and Trade: Essays in the Economic History of Late-Medieval England and the Low Countries*, Variorum Collected Studies series CS 442 (Aldershot, Hampshire; and Brookfield, Vermont: Ashgate Publishing Ltd., 1994). See also Munro, ‘Textile Technology’, pp. 693-711; Munro, ‘Medieval Woollens: Textiles, Textile Technology, and Industrial Organisation’, pp. 181-227.

first and very necessary reason for the fulling processes that ensued when the woven woollen was removed from the loom. That was a two-man treadle-operated broadloom, producing cloths that were up to 4.0 metres in width, and up to 33 metres in length (Table 1). These woollen cloths were then placed in a fuller's vat, or large earthenware tub, containing an emulsion of warm water, fuller's earth (hydrous aluminum silicates), and also urine, even though it was widely prohibited. The fullers, usually a pair of husky journeymen, supervised by a master, then vigorously trod upon the soaking cloth, for periods ranging from three to five days, according to the quality of the cloth and the season (since the working day in summer was twelve to fourteen hours, but only eight hours in the winter).¹¹ The ammonia in the urine not only enhanced the scouring and bleaching properties of fuller's earth, but also combined with the grease to form a cleansing soap.¹²

The equally or even more important reason for fulling woollens was two-fold. The first was to force the curly, scaly and weak fibres to interlace and interlock and thus to felt, in order to give the cloth cohesion and strength; for otherwise, an unfulled cloth taken from the loom would suffer tearing, possibly to the extent of falling apart. The second and related objective was to shrink and compress the cloth, by as much as one half.¹³ Both objectives were achieved by the combination of foot-pounding (pressure), heat, water, and the

¹¹ See sources in nn. 1-2, 9-10; and also John Munro, 'Industrial Entrepreneurship in the Late-Medieval Low Countries: Urban Draperies, Fullers, and the Art of Survival', in Paul Klep and Eddy Van Cauwenberghe, eds., *Entrepreneurship and the Transformation of the Economy (10th - 20th Centuries): Essays in Honour of Herman Van der Wee* (Leuven: Leuven University Press, 1994), pp. 377-88.

¹² These scouring agents also made the wools more receptive to the dye-fixing mordant, usually alum, when the cloth was subsequently dyed in the piece. See my publications cited in nn. 2, 9, above.

¹³ In 1458, the Bruges fullers' ordinance for *bellaert* woollens stipulated that the overall shrinkage from this compression and felting, which gave the cloth its required strength and durability, had to be at least 56 percent (from 172 to 75 square ells): in length, from 43 to 30 ells (30m to 21m); and in width, from 4.0 to 2.5 ells (2.8m to 1.75m). See Octave Delepierre and M. F. Willems, eds., *Collection des keuren ou statuts de tous les métiers de Bruges* (Ghent, 1842). The better known Ghent *dickedinnen*-broadcloths of the fifteenth and sixteenth centuries (1456, 1462, 1546) underwent a very similar shrinkage, of 54 percent (from 75.49m² to 34.91m²). Marc Boone, 'Nieuwe teksten over de Gentse draperie: wolaanvoer, productiewijze en controlepraktijken (ca. 1456 - 1468)', *Bulletin de la commission royale d'histoire [de Belgique]*, 154 (1988), 1 - 61; M.J. Lameere, and H. Simont, et al, eds. *Recueil des ordonnances des Pays Bas*, deuxième série: 1506 - 1700, V (Brussels, 1910), pp. 272-83. In both, and indeed in all such woollens, the width underwent

action of the chemicals known as *fuller's earth*.¹⁴ That compression (see Table 1) therefore also fundamentally explains why fulled woollen broadcloths were so much heavier than were worsteds (and also hybrid fabrics). Once fulled in this fashion, woollen broadcloths were virtually indestructible and could be worn by and through several generations, through inheritance or second-hand sales. At the same time, the fulling process obliterated almost all traces of the designs created by twilled weaving. That obliteration was completed by ensuing processes of cloth-tentering (to remove all wrinkles and defects, restoring some of the lost area), teaselling or napping (using thistle-like teasels to raise the naps, or loose ends of fibres), and shearing – by a repeated process of napping and shearing – so that the final product was as soft and fine as silks.

Fulling was the one and only major process of woollen cloth manufacturing that underwent powered mechanization before the modern Industrial Revolution: in woollens, really only in the mid nineteenth century.¹⁵ Water-powered fulling mills had been introduced into Italian cloth manufacturing by the tenth century CE, and had become widely diffused in English and Italian cloth making during the thirteenth and fourteenth centuries. That process, using cams and trip-hammers to convert the rotary power of the water wheel into reciprocal power, effected the fulling processes by pounding the cloth with a pair of heavy oak blocks (about 24 kg in weight), up to 40 times per minute. The economic significance of this industrial innovation can be seen in comparative production costs: traditional foot-fulling accounted for about twenty percent of the value-added pre-finishing costs (in the medieval Low Countries); but mechanical fulling (as

greater shrinkage than the length (37.5 vs 30.2 percent), because the warps were more tightly spun than the wefts.

¹⁴ Fuller's earth, a clay-like substance, is more properly known as *floridin*, whose chief hydrous aluminum silicate was usually kaolinite ($\text{Al}_2\text{O}_3\text{Si}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$). See the sources cited in nn. 2 and 9 above.

¹⁵ For this and the following see my publications cited in nn. 1-2, and 9 above, especially Munro, 'Textile Technology', pp. 693-711; Munro, 'Medieval Woollens: Textile Technology', pp. 181-227; Munro 'Industrial Entrepreneurship in the Late-Medieval Low Countries', pp. 377-88. See also Paolo Malanima, 'The First European Textile Machine,' *Textile History*, 17 (1986), 115 - 28; Eleanora M. Carus-Wilson, 'An Industrial Revolution of the Thirteenth Century,' *Economic History Review*, 1st series 11 (1941), reprinted in her *Medieval Merchant Venturers: Collected Studies* (London, 1954), pp. 183-211.

documented in Florence), combined with tentering, accounted for only about five percent of such costs. Thus, with a potential of a 75 percent savings in the fulling processes, one can readily understand why the English cloth industry had become almost completely converted to this form of mechanized fulling, by the later fourteenth or early fifteenth century.

While fulling mills can be found in the southern Low Countries in the thirteenth and early fourteenth centuries, they had largely disappeared with the radical reorientation of textile manufacturing to luxury woollen cloth production, certainly from the 1330s. The luxury-oriented draperies refused to consider using mechanical fulling mills, for fear that this pounding process would impair the luxury quality of their woollens. In any event, when one considers that the wools and dyestuffs accounted for the overwhelming proportion of manufacturing costs – often over 80 percent – the potential price-savings from mechanical fulling was very small, and not enough to compensate for the loss of the drapery's reputation and thus the loss of customers. Furthermore, any slight reduction in price would have made no significant difference when the Flemish and other Netherlander luxury woollens were selling for as much as three times the price of English woollen broadcloths (in the fifteenth century).¹⁶ Thus, even though the use of fulling mills was revived in the southern Low Countries during the sixteenth century, though principally only for cheaper woollens, the Ghent drapery continued to produce their fine luxury *dickedinnen* broadcloths with traditional foot-fulling, as did the Mechelen drapery producing *Rooslakenen*.

Finishing worsteds

In contrast, worsteds underwent no such fulling, napping, or shearing processes, but only bleaching and dyeing. The dyeing of both woollens and worsteds took place in the wools or yarns themselves, especially if woad (not requiring a mordant) had been used to produce a basic blue colour, and then in the piece, often

¹⁶ For comparative woollen cloth prices, see sources in n. 5 above. A potential gain of 75 percent from mechanized fulling would have represented, in 1435, a savings of only 3.23 percent of the sales price of a pair of Leiden's *voirwoollen halvelakenen*, at £4 9s 0d *groot* Flemish; and a savings of only 2.73 per cent of that year's price of a Ghent *dickedinnen*, at £7 0s 0d *groot*. See Munro, 'Industrial Entrepreneurship', pp. 377-88, and my other publications cited in nn. 9, 11, 15.

using more woad and then madder (with a mordant, such as alum) to produce a wide variety of colours: deep blues, greens, browns, purples, blacks, etc. Those dyed red, or in red-related colours were normally dyed only in the piece. Thus, worsteds or worsted-type fabrics were generally so much cheaper than the true, heavy-weight fulled woollens for two reasons: first and foremost, because they contained far cheaper raw materials; and secondly, because their production processes were so much simpler, requiring considerably fewer stages of manufacturing, with considerably less labour.

Comparative production costs of woollens and worsteds: wools and labour

If labour, on the other hand, accounted for a relatively higher proportion of total manufacturing costs in the worsteds industries, it constituted a correspondingly smaller share in the production of luxury woollens, especially those woven entirely from the very best English wools, whose high costs were further augmented by English export taxes, as noted earlier, reaching a peak burden in the early fifteenth century. Thus, for example, in the manufacture of a fine woollen black broadcloth at Leuven in 1434, the very fine English wools accounted for 76.2 percent of the pre-finishing manufacturing costs and for 62.5 percent of the total cost, while dyeing and dressing the cloth accounted for 18.0 percent of total costs -- most of that in the woad and madder dyes themselves – so that the remaining share of manufacturing costs in labour amounted to only 19.5 percent of total costs.¹⁷ Thus, labour's relatively higher share of total production costs in worsted manufacturing simply reflects the relatively lower costs in wools and other materials.

Hybrid woollen-worsted textiles: Flemish says and serges, and 'stuffs' of the English 'New Draperies'

The third type of wool-based textile manufacturing was simply a hybrid of the other two main

¹⁷ For another example: In the Ypres drapery, the fine Cotswold wool used in producing a black woollen broadcloth in 1500 accounted for 64.2 percent of pre-finishing manufacturing costs and for 52.0 percent of total costs (and indeed the price for Cotswolds wool at Calais corresponds to the costs in the Ypres accounts for 1500, when one adds on transport and marketing costs). In the other manufacturing costs, the finishing process of dyeing and dressing again accounted for 19.2 percent of total costs (17.7 percent in dyes and 1.5 percent in shearing costs); but this time somewhat more extensive and skilful labour in spinning, weaving, fulling, and tentering accounted for 26.2 percent of total production costs. For the data sources, see Munro, 'Industrial Protectionism in Medieval Flanders', Table 13.2, p. 256; and Munro, 'The Medieval Scarlet', Table 3.12, p. 52.

branches. Sometimes called says, serges or ‘stuffs’, these textiles were woven from a long-stapled ‘dry’ worsted warp and a short-stapled ‘greased’ woollen weft, though generally of much lower quality wools than those used in the true woollen broadcloth industry. In terms of relative weights and values, they corresponded more to worsted than to woollen manufacturing. For that reason, the hybrid or mixed-fabric *sayetteries* and similar serge-type cloth manufacturing industries were classed as part of the ‘light draperies’ or *draperies légères* (in Flemish: *lichte draperie*), in the medieval and early-modern Low Countries.

Table 1: the data on the physical composition and weights of woollens, worsteds, and serges (says)

The nature of the physical differences, and thus differences in production costs and market prices, for the three types of wool-based textiles, in sixteenth-century England and the Low Countries, can now be better understood from the data given in Table 1. The sizes of the three luxury-quality woollens – from the draperies of Ghent (Flanders), Mechelen (Brabant), and Essex (England) – are roughly comparable in terms of the area, in square metres, of the finished cloths: 34.913 m², for the Ghent five-sealed *dickedinnen* broadcloths; 35.604 m², for the five-sealed *Gulden Aeren* (gold eagle) broadcloth woollens from Mechelen; and 37.095 m², for English ‘short’ broadcloths from Essex. Note that all three of these woollen broadcloths were woven uniquely from the finest English wools (i.e., short-stapled), still the world’s best wools.

Somewhat smaller in size, primarily because of its narrower width, with an area of 29.400 square metres, was the *Oultreffin* woollen manufactured by the relatively young Flemish *nouvelle draperie* of Armentières. Its distinguishing feature was its wool composition: two-thirds of which were Spanish *merino* wools and one-third English wools (Cotswolds, Lincolnshire Lindseys, and Berkshires). By the mid-sixteenth century, it must be noted, Spanish *merino* wools were rivalling the better English wools in quality, though they would not surpass the finest English wools until the seventeenth century.¹⁸ The weight of the Armentières *oultreffin*, however, clearly indicates that this was a genuine fulled broadcloth: indeed it was the

¹⁸ The finest wools in the world today are those produced by sheep that are the descendants of the Spanish *merinos*, especially in Australia and New Zealand. See John Munro, ‘Spanish *Merino* Wools and the *Nouvelles Draperies*: an Industrial Transformation in the Late-Medieval Low Countries’, *Economic History Review*, 2nd ser., 58:3 (August 2005), 431-84. See also my publications on wool in n. 10, above.

heaviest of all recorded in this table, with a weight of 820.503 grams per square metre of finished cloth. The next heaviest are the Essex broadcloths, with 782.58 grams per square metre; the Mechelen broadcloths are fairly close, at 746.42 grams per square metre (i.e., 97.7 percent of the latter), while the Ghent *dickedinnen*, for centuries that drapery's most renowned woollen, was only 677.66 grams per square metre (Bruges pound weight), or 633.77 grams (if the Ghent pound is used).

The lightest textile from the Low Countries was the narrow say from Bergues-St. Winoc, a pure worsted, in both warp and weft, which weighed only 260.352 grams per square metre, just 33.27 percent of the weight of an Essex broadcloth, and 34.06 per cent of the weight of Mechelen's *Gulden Aeren* broadcloth. But note, however, that the Hondschoote small double-say had a very similar weight: 266.334 grams per square metre. But even lighter was the Essex 'New Draperies' say (according to 1579 regulations): its weight of 141.193 grams per square metre was only 18.04 percent of the comparable weight of an Essex broadcloth; just over half (54.23 percent) of the weight of the aforementioned Bergues-St. Winoc say, and less than half the weight (42.49 percent of 332.307 grams per square metre) of the weight of an Essex single bay, another recent product of the English 'New Draperies'. The weight of that Essex single bay, on the other hand, was very close to that of the Hondschoote single say, which was (somewhat surprisingly) 340.052 grams per square metre (with a weight of 5.103 kg for the full-sized cloth of 15.006 square metres). It was heavier, per square metre of its area, than the small double Hondschoote say evidently because more wool was compressed into its much narrower width (0.613 metre compared to 1.138 metre for the double say). All three of these fabrics were hybrids, with 'dry', long-stapled worsted warps and 'greased' short-stapled woollen wefts. Indeed the Hondschoote *sayetterie* was probably the chief progenitor of the English New Draperies of later Tudor-Stuart England.¹⁹

Table 2: comparative prices and values of luxury woollens and says in Antwerp in the 1530s, with values in terms of a mason's daily wage

With this information on the physical compositions, sizes, and weights of these textiles, we may now

¹⁹ See Munro, 'The Resurrection of an Old Flemish Industry', pp. 35-127.

better understand the data on textile prices presented in Table 2, for the decade 1535 - 1544. These years were chosen because they are the only ones for which I have found prices for Hondschoote *says*, as well as for the Ghent *dickedinnen* and Mechelen *Rooslaken* woollen broadcloths (but none, unfortunately, for the Armentières *Oultreffin* broadcloths). Indeed, for the Hondschoote *says*, the prices run, for consecutive years, from only 1538 to 1544. For that reason, the mean values are given only for these latter seven years: in arithmetic means for the textile prices themselves, for the daily wages of an Antwerp master mason (annual mean of summer and winter wages), and for the annual value of a ‘basket of consumables’. The prices, wages, and values of the consumer baskets are given in the Flemish *groot* money-of-account, in which one pound (livre, pond) = 20 shillings (sous, sols, shillings) = 240 pence (deniers, penningen).²⁰

Prices and wages by themselves are useful for the economic historian only if they can be related not only to each other but also to the values of other commodities. Such relationships are revealed in columns 7 to 19 (inclusive – i.e., the final twelve columns). Columns 7 - 10 indicate the number of days’ wages that a master mason in Antwerp would have spent in purchasing one each of the following textiles: a Hondschoote single say, a Hondschoote double say, a Ghent *dickedinnen* broadcloth, and a Mechelen *rooslaken* broadcloth.

Thus, in summary, on average in the years 1538 to 1544, an Antwerp master mason would have had to spend 17.163 days’ wages to purchase a Hondschoote single say (15.01 square metres); 39.382 days’ wages (over twice as many) for a Hondschoote double say (27.869 square metres); but 265.954 days’ wages to purchase a Ghent *dickedinnen* broadcloth (34.913 square metres); and somewhat less, 219.987 days’ wages to purchase a Mechelen *Rooslaken* broadcloth (35.604 square metres).

Since, however, the dimensions of these four textiles varied from each other, and thus varied in the amount of men’s clothing that were produced from them, we instead ask how many days’ wages that master mason would spent to acquire 12 square metres of each, about the amount requisite to produce one suit of

²⁰ Although the wages and some of the prices were actually presented in the Brabant *groot* money-of-account, they were readily converted into Flemish money by dividing the Brabant wages and prices by 1.5 (the fixed ratio of the two currencies from 1435 to 1790). See n. 27 below.

men's clothing (about three per broadcloth).²¹ Those estimates, for each of these three textiles, are produced in columns nos. 11 - 14. For this period, the average number of days' wages required to purchase that same quantity of cloth (12 square metres) would have been: 13.725 days for a Hondschoote single say; 16.958 days for a Hondschoote double say; and 5.4 times as many days, 91.413 for a Ghent *dickedinnen*, and 74.144 days for a Mechelen *Rooslaken*.²² To provide a modern comparison: in Toronto, in July 2008, a journeyman carpenter earns a minimum of \$33.07 per hour. At 8 hours a day (vs 12 hours in the sixteenth century), that carpenter would earn \$24,184.22 CAD (about €15,115) in the 91.413 days of wage income that would have been required for the purchase of 12 sq. m. of the aforesaid Ghent *dickedinnen* in 1538-44..

Certainly this comparison provides a very vivid contrast between the consumption of 'every day' textiles and luxury woollens. Consider again, from Table 2, that the number of days' wages that a master mason would have had to spend in acquiring a single Ghent *dickedinnen* varied from a high of 348.31 days' wages to a low of 240.00, in the ten year period from 1535 to 1544; and the mean for the years 1538 to 1554 was (again) 265.954 days' wages. Consider, furthermore, that the average number of days employment for master mason in the Antwerp region was about 210 days – so that this range went from 1.66 years to 1.14

²¹ The Mechelen *stadsrekeningen* accounts for cloth purchases (see Table 2) indicate that three men's suits were made from each *rooslaken* broadcloth, i.e., about ten Flemish ells (1 ell = 0.700 metre). According to Raymond Van Uytven, 'Cloth in Medieval Literature of Western Europe', in N. B. Harte and K. G. Ponting, eds., *Cloth and Clothing in Medieval Europe: Essays in Memory of Professor E. M. Carus-Wilson*, Pasold Studies in Textile History 2 (London: Heinemann Educational Books and The Pasold Research Fund, 1983), pp. 151-83 (see p. 151), a complete outfit – 'a surcoat, a coat, a hood and a pair of trousers' – required about 15 ells (10.50 metres).

²² The reasons for choosing the wages of an Antwerp master mason are three-fold. First building craftsmen were members of about the only occupation for which we possess a continuous series of time-rate (daily) wages for both the Low Countries and England, from the later medieval to modern eras, during which period most wage-earners earned piece-work wages (i.e., payment for the quantity of work produced); and for such craftsmen, masons' wages are the most prevalent and continuous. Second, this was an occupation that was basically unchanged in its technology and productivity over this period, and up to the nineteenth century, thus permitting reasonable comparisons of nominal and real wages over time. Third, the Antwerp market was one in which all these textiles were bought and sold in the sixteenth century.

years of employment.²³ In terms of perhaps the more useful comparative measure, the number of days' wages needed to purchase 12 square metres of woollen cloth, that number varied from a high of 119.718 days to a low of 79.055 days, with the aforesaid mean of 91.413 days (for 1538-44).

It is difficult to believe that any comparable wage-earner in today's society would ever spend that much on luxury apparel – not even for a 'Sunday Best'. Thus, we may reasonably expect that the principal market for these *dickedinnen* were the aristocracy and very wealthy bourgeoisie – not master building craftsman (let alone their journeymen). The number of days' wages to purchase the Hondschoote says, whether single or double – a mean of 17.163 days for the single and a mean of 39.382 days for the double – is certainly much more in line with contemporary expenditure patterns on clothing, for the lower middle classes. Certainly, when we consider that the nature of a mason's trade, in terms of technology, labour, and capital, was virtually unchanged from the thirteenth to nineteenth centuries (see n. 22), this technique based upon the purchasing power of skilled industrial labour provides a very valuable means of estimating the 'real' values, and comparative values, of such textiles. But it is not the only means.²⁴

²³ For the estimate of 210 days annual employment, see Herman Van der Wee, *Growth of the Antwerp Market and the European Economy (fourteenth-sixteenth centuries)*, 3 vols. (The Hague, 19653), Vol. I: *Statistics*, Appendix II: Wages, pp. 457-60; and Appendix 48, pp. 540-44; John Munro, 'Builders' Wages in Southern England and the Southern Low Countries, 1346 -1500: A Comparative Study of Trends in and Levels of Real Incomes', in Simonetta Caviacocchi, ed., *L'Edilizia prima della rivoluzione industriale, secc. XIII-XVIII*, Atti delle "Settimana di Studi" e altri convegni, no. 36, Istituto Internazionale di Storia Economica "Francesco Datini" (Florence: Le Monnier, 2005), pp. 1013-76, esp. pp. 1028-31; John Munro, 'Urban Wage Structures in Late-Medieval England and the Low Countries: Work-Time and Seasonal Wages', in Ian Blanchard, ed., *Labour and Leisure in Historical Perspective, Thirteenth to Twentieth Centuries*, Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte Beiheft series, no. 116 (Stuttgart: Franz Steiner Verlag, 1994), pp. 65-78.

²⁴ A note about the statistical technique of calculating the mean in Table 2. For columns 7 - 14, and 16 - 19: the harmonic mean was used: i.e., in measuring the quantity of the four textiles in terms of the purchasing power of a mason's daily wage, and then of the value of a Brabant 'basket of consumables' (see below). To quote one statistical authority on this issue: the harmonic mean is 'a calculated average computed by finding the reciprocal of the arithmetic mean of the reciprocals of the numbers to be averaged'; and 'in economic computation the harmonic mean is used in averaging such data as time rates and rate-per-dollar prices' – or here, rate per daily wage or value of the consumer basket. The harmonic mean is always slightly less (by varying amounts) than the corresponding arithmetic mean; but it is the only method that provides consistently valid results. The mathematical equation is: $HM = 1 / [\sum (1/r_1 + 1/r_2 + 1/r_3 + \dots + 1/r_n)] / N$, where r is the value and N is the number of years in the series averaged. It can also be used in index numbers for,

Price Indexes and the ‘Basket of Consumables’ in measuring cloth values

We now turn to a different measure of comparison of textile values, with perhaps limited use for this period, but of very great value in comparing the ‘real’ value of such textiles over several centuries: the value of a ‘basket of consumables’. Column 15 provides the aggregate value of the various commodities, in Flemish pence *groot*, as contained in the Prof. Herman van der Wee’s ‘basket of consumables’ for Brabant (Antwerp-Lier-Brussels region).²⁵ He constructed his ‘consumer price index’ on the model of the famous Phelps Brown and Hopkins ‘basket of consumables’.²⁶ For the years following 1500, the Van der Wee Brabant price index has been used for Flemish textile values, on the grounds that by then the two economies, having undergone monetary unification in 1433-35, were sufficiently well integrated, within a relatively

say, real wages: the purchasing power of the nominal, money wage = Nominal Money Wage Index divided by the Consumer Price Index. If five-year means of real wages were calculated for the base period of this index – i.e., 1451-75 = 100, then the mean value as the average of the five 5-year periods in this base period would equal exactly 100.00 only if the harmonic mean is used. See Harold Sloan and Arnold Zurcher, *A Dictionary of Economics*, 3rd edn (New York, 1953), pp. 149-50; and also F.C. Mills, *Introduction to Statistics* (New York, 1956), pp. 108-12, 401.

²⁵ Herman Van der Wee, ‘Prijzen en lonen als ontwikkelingsvariabelen: Een vergelijkend onderzoek tussen Engeland en de Zuidelijke Nederlanden, 1400-1700,’ in *Album aangeboden aan Charles Verlinden ter gelegenheid van zijn dertig jaar professoraat* (Gent, 1975), 413-47; reissued in English translation (but without the tables) as ‘Prices and Wages as Development Variables: A Comparison Between England and the Southern Netherlands, 1400-1700,’ *Acta Historiae Neerlandicae*, 10 (1978), 58-78; and reprinted in Herman Van der Wee, *The Low Countries in the Early Modern World* (1992), 223-41. The Van der Wee Brabant consumer price index (1400-1700), contains ten commodities: wheat (126.0 litres), barley-malt (162.0 litres), beef (23.5 kg), herring (40 in number), butter (4.8 kg), cheese (4.7 kg), charcoal (162.0 litres), candles (1.333 kg), linen cloth (1.800 metres), and low-grade coarse woollens (1.125 metres). Grains (rye and barley) account for 18.24 % of the basket by value; drink (barley malt), for 17.08 %; meat (beef), for 23.53 %; fish (herring), for 4.30 %; butter and cheese together, for 11.05%; fuel and light (charcoal and candles), for 7.82 %; and textiles (linen and coarse woollens), for 18.00 %.

²⁶ E. Henry Phelps Brown and Sheila V. Hopkins, ‘Seven Centuries of the Prices of Consumables Compared with Builders’ Wage-Rates,’ *Economica*, 23:92 (November 1956), 296-314; reprinted in E.M. Carus-Wilson, ed., *Essays in Economic History*, 3 vols. (London, 1954-62), vol. II, pp. 179-96, and also in E.H. Phelps Brown and Sheila V. Hopkins, *A Perspective of Wages and Prices* (London, 1981), pp. 13-59, containing tables not presented in their earlier publications. The Phelps Brown & Hopkins index contains 16 commodities: wheat (45.461 l); rye (36.369 l); barley (18.184 l); peas (24.243 l); barley-malt (163.659 l); pigs (0.500); sheep (0.500); beef (14.696 kg); herrings (40 in number); butter (4.536 kg); cheese (4.536 kg); charcoal (154.567 l); candles (1.247 kg); lamp oil (0.284 l); linen (0.610 m); shirting (0.457 m); coarse woollens (0.304 m). Farinaceous products account for 20.00% of the basket; drink (malt), for 22.50%; meat, for 21.00%; fish, for 4.00%; fuels, for 7.50%; and textiles, for 12.50%.

small geographic area, to permit its use for this purpose.²⁷

The purpose of these commodity price-indexes must be fully understood. Money-of-account prices and wages – what are known as *nominal* prices and wages – are useless by themselves, because the value of coined money itself (here: the Flemish and Brabantine silver pence) changed so radically during the later-medieval and early modern eras, especially with often radical coinage debasements, and then, from 1515, with the general onset of the inflationary Price Revolution era.²⁸ For example, the mean price for a Ghent *dickedinnen* in the years 1538-44, in Table 2, was £13.657 *groot* Flemish; but a century earlier, in 1441-45, the mean price for the same *dickedinnen*, in the same currency, was ‘only’ £8.008 *groot* Flemish – i.e., in ‘nominal’, rather than in ‘real’ terms.²⁹

When economists discuss, for example, economic problems involving both commodity prices and wages, they utilize the term ‘real wages’ in order to ‘discount’ or obviate the problems caused by such inflationary factors. The formula for calculating the ‘real wage’ in terms of index numbers is: $RWI = NWI/CPI$, i.e., the Real Wage Index is computed by dividing the Nominal (Money) Wage Index by the Consumer Price Index, when all three have a common base period – the years 1451-1475, in this study. The

²⁷ See John H. Munro, *Wool, Cloth and Gold: The Struggle for Bullion in Anglo-Burgundian Trade, 1340-1478* (Brussels: Editions de l'Université de Bruxelles; and Toronto: University of Toronto Press, 1973), pp. 100-103; Peter Spufford, *Monetary Problems and Policies in the Burgundian Netherlands, 1433-1496* (Leiden: E.J. Brill, 1970), pp. 152-63; Van der Wee, *Growth of the Antwerp Market*, Vol. I, Tables XIII - XV, pp. 123-29.

²⁸ See John Munro, ‘Bullion Flows and Monetary Contraction in Late-Medieval England and the Low Countries’, in John F. Richards, ed., *Precious Metals in the Later Medieval and Early Modern Worlds* (Durham, North Carolina: Carolina Academic Press, 1983), pp. 97-158; John Munro, ‘Wage Stickiness, Monetary Changes, and Real Incomes in Late-Medieval England and the Low Countries, 1300 - 1500: Did Money Matter?’ *Research in Economic History*, 21 (2003), 185 - 297; John Munro, ‘Patterns of Trade, Money, and Credit’, in James Tracy, Thomas Brady Jr., and Heiko Oberman, eds., *Handbook of European History in the Later Middle Ages, Renaissance and Reformation, 1400 - 1600*, 2 vols. (Leiden: E.J. Brill, 1994-95), Vol. I: *Structures and Assertions* (1994), pp. 147-95; John Munro, ‘The Monetary Origins of the “Price Revolution:” South German Silver Mining, Merchant-Banking, and Venetian Commerce, 1470-1540’, in Dennis Flynn, Arturo Giráldez, and Richard von Glahn, eds., *Global Connections and Monetary History, 1470 - 1800* (Aldershot and Brookfield, Vt: Ashgate Publishing, 2003), pp. 1-34; John Munro, ‘Price Revolution’, in Steven N. Durlauf and Lawrence E. Blume, eds., *The New Palgrave Dictionary of Economics*, 2nd edition, 6 vols. (London and New York: Palgrave Macmillan, 2008), vol. 6, pp. 631-34.

²⁹ See the sources for comparative textiles prices in n. 5, above.

real wage therefore represents the purchasing power of the nominal or money wage (in coin), in terms of some defined basket of commodities, or in our modern era, goods and services.

In several recent publications, I have calculated real wages for building craftsmen in late-medieval England and the Low Countries: by both the traditional method, using index numbers, according to the formula just given; and also by an entirely new method. That new method is to compute the number of comparable baskets of consumables that masons (masters and journeymen) could have purchased with their annual money wage-income (in silver coin), for a standard work-year of 210 days.³⁰ In this study, I have utilized the same technique to provide better estimates of the ‘real’ values of these luxury woollens, with two related measures: (1) the values of these textiles in terms of the money-of-account values of Brabantine ‘baskets of consumables’ (with annual value in pence *groot* Flemish); (2) the method just used in the previous analysis: the quantity of these textiles that a master mason could have purchased with his money-wages, or rather the number of days’ wages that were necessary to acquire one t of those textiles (or some fixed unit). These ‘baskets’ do not, however, represent any fixed requirement for annual consumption.³¹

The final four columns of Table 2, nos. 16 to 19, calculate the equivalent value of each of these four textiles in terms of the number of these Brabantine ‘baskets of consumables’, i.e., the number of such consumer baskets whose aggregate value, in Flemish pounds *groot*, equals the value of just one of each of

³⁰ See Munro, ‘Wage-Stickiness’, pp. 185-97; Munro, ‘Buiilders’ Wages’, pp. 1013-76; John Munro, ‘The Usury Doctrine and Urban Public Finances in Late-Medieval Flanders (1220 - 1550): Rentes (Annuities), Excise Taxes, and Income Transfers from the Poor to the Rich’, in Simonetta Cavaciocchi, ed., *La fiscalità nell’economia Europea, secc. XIII - XVIII/ Fiscal Systems in the European Economy from the 13th to the 18th Centuries*, Atti della ‘Trentanovesima Settimana di Studi’, 22 - 26 aprile 2007, Fondazione Istituto Internazionale di Storia Economica “F. Datini”, Prato, Serie II: Atti delle “Settimane de Studi” et altri Convegni 39 (Florence: Firenze University Press, 2008), pp. 973-1026; John Munro, ‘Money, Wages, and Real Incomes in the Age of Erasmus: The Purchasing Power of Coins and of Building Craftsmen’s Wages in England and the Southern Low Countries, 1500 - 1540’, in Alexander Dalzell and Charles G. Nauert, Jr., eds., *The Correspondence of Erasmus, Vol. 12: Letters 1658 - 1801, January 1526- March 1527* (Toronto: University of Toronto Press, 2003), Appendix: pp. 551-699.

³¹ Instead, according to Phelps Brown and Hopkins, their model basket represents ‘what a hundred pence [sterling] would buy in 1451-75’. This observation was a careless after-thought on their part. I have calculated that the actual mean value of their ‘basket of consumables’ for the base period 1451-75 was, instead, 112.08d sterling (9.340 shillings).

these textiles. For the period 1538 to 1544, the mean values of these four textiles, expressed as their value or worth in the numbers of the Brabant ‘baskets of consumables’ are, as follows: for Hondschoote single says, 0.689 basket; for Hondschoote double says, 1.580 baskets; for Ghent *dickedinnen* broadcloths, 10.685 baskets; and for Mechelen *rooslaken* broadcloths 8.804 baskets.

Obviously this measure of comparison, involving the values of baskets of consumables in relation to textile prices, does not differ in any significant terms from the alternative measure, i.e., the purchasing power of wages in terms of the quantity of these textiles. Both clearly and successfully demonstrate the very great, indeed enormous, gulf between the values of says, as ‘necessities’ in clothing, and luxury woollen broadcloths in the early sixteenth-century Low Countries.

Nevertheless, this statement about the comparability of these two measures for estimating the ‘real values’ of textiles is true only in the very short run, such as in this decade 1535-44. If we compare such textile values a century apart, we find, however, a lack of congruity, and thus a measure of statistical indeterminacy. Thus, the mean prices (five-years), in Flemish pounds *groot*, for absolutely identical Ghent *dickedinnen* broadcloths were earlier shown to be as follows: in 1441-45, £8.008; and in 1535-44, £13.657. Are the price differences purely the result of the intervening inflations over this century, or are there any ‘real’ differences? That depends on how the measure chosen. For in 1441-45, the mean value of such a *dickedinnen* was 13.330 commodity baskets, but in 1535-44, it was significantly less – 10.685 baskets. However, if the measure is the purchasing power of wages, we find that in 1441-45, a master mason (Bruges) would have had to spend 174.258 days’ wages to purchase one such cloth; but, in 1535-44, an Antwerp mason would have had to spend much more – 265.954 days’ wages.³² These differences represent the very sharp fall in ‘real’ industrial wages over this century (and perhaps regional differences as well), on the one hand, but also a relative decline in the value of Ghent *dickedinnen* woollens in relation to other consumer commodity prices by the 1540s, when the Price Revolution was well under way, with steeply rising food

³² See sources in n. 5 above; and in my online Working Paper: ‘Luxury and Ultra-Luxury Consumption in Later Medieval and Early Modern European Dress (Tables 2-5):

http://repec.economics.utoronto.ca/repec_show_paper.php?handle=tecipa-243

prices in particular.³³

³³ See sources cited in n. 26 above.

**The Dimensions and Compositions of Selected Woollens and Says
in the 16th Century: England and the southern Low Countries**

Drapery: City/Region	GHENT	MECHELEN	ESSEX	ARMENTIERES	BERGUES- ST.WINOC
Date of Ordinance	1456 and 1546	1544	1552	1510, 1546	1537
Name of Textile	Dickedinnen	Gulden Aeren	Short Broadcloth	Oultreffin	Narrow Say
Additional Names	Five Seals	Five Seals	Suffolk, Essex		Fine
Origin of Wools	England	England: Herefords.	England	Spanish Merino (2/3)	Flanders, Artois
Wool Types	March, Cotswolds	'Lemster Ore'	short-stapled	English Cotswolds (1/3)	long-stapled
Length on Loom: ells/yds	42.500	48.000	n.s.	42.000	n.s.
Length on Loom: metres	29.750	33.072	n.s.	29.400	n.s.
Width on Loom: ells	3.625	4.000	n.s.	3.000	n.s.
Width on Loom: metres	2.538	2.756	n.s.	2.100	n.s.
Weight on Loom: lb.	88.000	n.s.	n.s.	88.000	n.s.
Weight on Loom: kg.	38.179	n.s.	n.s.	40.823	n.s.
Final Length: ells/yds	30.000	30.000	24.000	30.000	40.000
Final Length : metres	21.000	20.670	22.555	21.000	28.000
Final Width: ells/yds	2.375	2.500	1.750	2.000	1.000
Final Width: metres	1.663	1.723	1.645	1.400	0.700
No. of Warps	2066.000	3120.000	n.s.	1800.000	1400.000
Warps per cm (fulled)	12.427	18.113	n.s.	12.857	20.000
Area in square metres	34.913	35.604	37.095	29.400	19.600
Final Weight in lb.	51.000	58.000	64.000	52.000	11.000
Final Weight in kg	22.126	27.217	29.030	24.123	5.103
Weight per m2 in grams	633.766	764.421	782.575	820.503	260.352

Table 1b

Drapery: City/Region	HONDSCHOOTE	HONDSCHOOTE	ESSEX (Colchester)	ESSEX (Colchester)
Date of Ordinance	1571	1571	1579	1579
Name of Textile	Single Say	Double Say	Says:	Bays:
Additional Names	Small	Small	broad	Single
Origin of Wools	Flanders, Friesland	Flanders, Friesland	English:	English:
Wool Types	Scotland, Pomerania	Scotland, Pomerania	long-stapled	worsted warp; woolen weft
Length on Loom: ells/yds	40.000	40.000	n.s.	n.s.
Length on Loom: metres	28.000	28.000	n.s.	n.s.
Width on Loom: ells	n.s.	1.438	n.s.	n.s.
Width on Loom: metres	n.s.	1.006	n.s.	n.s.
Weight on Loom: lb.	n.s.	n.s.	n.s.	n.s.
Weight on Loom: kg.	n.s.	n.s.	n.s.	n.s.
Final Length: ells/yds	35.000	35.000	10.000	35.000
Final Length : metres	24.500	24.500	9.398	31.953
Final Width: ells/yds	0.875	1.625	1.000	1.000
Final Width: metres	0.613	1.138	0.940	0.940
No. of Warps	n.s.	1800.000	n.s.	n.s.
Warps per cm (fulled)	n.s.	15.824	n.s.	n.s.
Area in square metres	15.006	27.869	8.833	30.029
Final Weight in lb.	11.000	16.000	2.750	22.000
Final Weight in kg	5.103	7.422	1.247	9.979
Weight per m2 in grams	340.052	266.334	141.193	332.307

a. Flemish ell in metres	0.700
b. Ghent pound in grams	433.850
c. Bruges pound in grams	463.900
d. Mechelen ell in metres	0.689
e. Mechelen pound in grams	469.250
f. English pound avoirdupois	453.593
g. English cloth yard (37 in):	0.940

Note: the areas, in square metres, and the weights per square metre are calculated on a computer up to seven decimal places; because of rounding areas, calculations using just the three decimal places in this table may give different, and faulty, results.

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Table 2 **Prices of Hondshoote Says, Ghent Dickedinnen and Mechelen Rooslaken Woollens, compared with the Purchasing Power an Antwerp Master Mason's Daily Wages, and with the value of a basket of consumables: in pounds and pence groot Flemish, 1535 - 1544**

1	2	3	4	5	6	7	8
Year	Hondshoote Single Says: Prices in £ groot Flemish (240d = £1)	Hondshoote Double Says: Prices in £ groot Flemish (240d = £1)	Ghent Dickedinnen Woollens: Prices in £ groot Flemish (240d = £1)	Mechelen Mean Values of Rooslaken (various colours) in £ groot Flemish (240d = £1)	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 one Double Say
1535			14.150	11.025	9.750		
1536			14.250	11.025	10.250		
1537			14.500	10.942	10.250		
1538	0.967	2.278	14.500	11.400	11.000	21.098	49.702
1539	0.945	2.184	15.000	11.400	12.000	18.900	43.680
1540	0.835	1.961	11.500	11.705	12.000	16.700	39.220
1541	0.879	2.015	12.000	11.705	12.000	17.580	40.300
1542	0.838	2.005	14.600	11.200	12.000	16.760	40.100
1543	0.783	1.775	14.000	11.316	13.000	14.455	32.769
1544	0.908	1.942	14.000	10.009	13.500	16.142	34.524

1	2	3	4	5	6	7	8
Year	Hondschoote Single Says: Prices in £ groot Flemish (240d = £1)	Hondschoote Double Says: Prices in £ groot Flemish (240d = £1)	Ghent Dickedinnen Woollens: Prices in £ groot Flemish (240d = £1)	Mechelen Mean Values of Rooslaken (various colours) in £ groot Flemish (240d = £1)	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 one Double Say
Mean of 1538-44	0.879 arithmetic	2.023 arithmetic	13.657 arithmetic	11.248 arithmetic	12.214 arithmetic	17.163 harmonic	39.382 harmonic

1	9	10	11	12	13	14
Year	No. Days' Wages of a Master Mason to Buy one Ghent Dicke- dinnen	No. Days' Wages of a Master Mason to Buy one Mechelen Rooslaken	No. Days' Wages of a Master Mason to buy 12 sq metres: Hondschoote Single Say	No. Days' Wages of a Master Mason to buy 12 sq metres: Hondschoote Double Say	No. Days' Wages of a Master Mason to buy 12 sq metres: Ghent Dicke- dinnen	No. Days' Wages of a Master Mason to buy 12 sq metres: Mechelen Rooslaken
1535	348.308	271.396			119.719	91.471
1536	333.659	258.157			114.684	87.009
1537	339.512	256.199			116.696	86.349
1538	316.364	248.727	16.872	21.401	108.739	83.831
1539	300.000	228.000	15.114	18.808	103.115	76.845
1540	230.000	234.109	13.355	16.888	79.055	78.904
1541	240.000	234.109	14.058	17.353	82.492	78.904
1542	292.000	224.000	13.403	17.266	100.365	75.497
1543	258.462	208.917	11.560	14.110	88.837	70.414
1544	248.889	177.943	12.909	14.866	85.547	59.974
Mean of 1538-44	265.954 harmonic	219.987 harmonic	13.725 harmonic	16.958 harmonic	91.413 harmonic	74.144 harmonic

1	15	16	17	18	19
Year	Value of the Brabant Basket of Consumables in d. groot Flemish	Value of Single Say in Baskets of Consum- ables	Value of Single Say in Baskets of Consum- ables	Value of Ghent Dickedinnen in Baskets of Consum- ables	Value of Mechelen Rooslaken in Baskets of Consum- ables
1535	268.733			12.637	9.847
1536	297.467			11.497	8.895
1537	254.333			13.683	10.325
1538	295.533	0.785	1.850	11.775	9.258
1539	300.400	0.755	1.745	11.984	9.108
1540	291.133	0.688	1.617	9.480	9.650
1541	278.000	0.759	1.740	10.360	10.105
1542	293.600	0.685	1.639	11.935	9.155
1543	324.200	0.580	1.314	10.364	8.377
1544	351.067	0.621	1.328	9.571	6.843
Mean of 1538-44	304.848 arithmetic	0.689 harmonic	1.580 harmonic	10.685 harmonic	8.804 harmonic

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