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The Anti-Red Shift – to the Dark Side: Changes in the Colour Patterns and Market Values of Flemish Luxury Woollens, 1300 - 1550

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Abstract: **The Anti-Red Shift – to the Dark Side: Changes in the Colour Patterns and Market Values of Flemish Luxury Woollens, 1300 - 1550**

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This study documents, though it cannot fully explain, the striking shift in the spectrum of colour patterns in woollen textiles, from those of the Black Death era in the mid to late fourteenth century to those of the fifteenth and the first half of the sixteenth century, in the southern Low Countries: a radical shift from bright red and vivid colours, especially scarlet, or mixed colours (in medley and striped woollens) to much darker, blue-based colours, ending up with overwhelmingly black colours. The evidence is taken from the annual purchases of high-grade luxury quality woollen textiles for the upper echelons of the civic governments of Bruges (from 1302 to 1496) and of Mechelen (1361-1415, and 1471 - 1550): for the burgermasters or mayors, the aldermen (*schepenen*), and the upper clerks. Thus, in the Mechelen civic accounts, 75 percent of the woollens purchased for these civic leaders, from 1471 to 1550, were black, uniformly dark black. In the first half of the sixteenth century, from 1501 to 1550, 98 percent of those woollens were black. While other colours – reds, greens, blues, browns – can also be found, they were purchased only for the lesser officials. Clearly the civic leaders, the urban 'patriciate' had acquired a decisive preference for black woollens, one also shown by the nobility.

But at Bruges, in the four decades of the mid fourteenth century, from the 1340s (just before the Black Death) to the 1370s, the bright, vivid, red or scarlet, and multi-coloured textiles clearly predominated: varying from 72.4 to 81.7 percent by number purchased, and from 77.25 to 86.19 per cent by value. The differences in percentages by number and value is explained by the decisive prominence of the most costly and luxurious of all medieval woollens: the scarlets, dyed in the extremely costly brilliant red dye *kermes* (extracted from Mediterranean insects). Scarlets often accounted for over a third of the textiles so purchased in the 14th century, but their number fell sharply in the 15th century, along with the radical shift in the colour spectrum to much darker blue and then black textiles. This study explains the differences in the production costs and values of scarlets and of other dyed woollen broadcloths, while demonstrating with comparative price and wage analyses (i.e., the purchasing power of industrial wages) that only the very rich could afford to buy these textiles: that the principal markets were the nobility, the upper mercantile bourgeoisie, and political leaders. Indeed, a master mason would have to spend more than a year's income to buy a scarlet.

The famed Johan Huizinga (*Autumn of the Middle Ages*) had indeed commented on this predilection for dark and especially black (with purples) colours in the dress of the mid-fifteenth-century Burgundian court; but he was mistaken in his supposition that by the end of this century, clothing fashions had gone more toward blues, in light of the evidence from the Mechelen accounts. Huizinga and others have suggested various theories for this shift in the colour spectrum for textiles and for the later preference for the 'dark side', but none – including any that I can offer – is convincing.

Economic historians, however, must not be so supply-side oriented that they ignore the vital question of colours and thus fashions in textiles, in creating market demand. For the subsequent victory of the New Draperies, over the costly, heavy-weight woollens of the Old Draperies, in producing lighter, cheaper, but also more brightly dyed textiles, in more vivid colours, a transformation followed by the massive influx of Asian printed calicoes (with radical floral and geometric designs), helped to create the market conditions for the 18th-century Industrial Revolution, in both geographic range and income distributions.

JEL Classifications: F10, L11, L15, L67, M30, N63, N93, O52.

The Anti-Red Shift – to the Dark Side: Changes in the Colour Patterns and Market Values of Flemish Luxury Woollens, 1300 - 1550

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Textiles Colours: the Sixteenth-century Predominance of Black

All those who are interested in the history of textiles – not just their production and trade, but also their role in providing such basic needs as warmth, protection, and modesty, as well as serving as decoration and status symbols – cannot help but be fascinated by the question of why colour patterns change. The message for economic historians, too often unheeded, is that they must always take full account of questions of fashion – and thus of colours. Indeed: Can anyone possibly imagine clothing in any society, past or present, while ignoring its colours?

Thus, for example, those studying the economic history of the early-modern Low Countries, still the pre-eminent European region for textile manufacturing, and in particular those who have observed data on textile purchases in the sixteenth-century town accounts, will be struck by the very high proportion of luxury-quality woollen broadcloths that were black, uniformly dark black, in colour. For example, as Table 1 demonstrates, black accounts for the colour of 75.04 percent of all such woollens purchased for the burgermasters and aldermen of Mechelen's town government (and 81.67 per cent, by value), in the eighty-year period from 1471 to 1550 (about 233 of 310 so purchased).[1] Even more striking is the fact, that for the more limited period from 1501 to 1550, black colours account for virtually all of those textiles: an astonishing 97.60 percent (while browns account for the remaining 2.4 percent). That does not mean, however, that other colours were absent in the civic treasurer's annual accounts. We do find many examples of red, green, blue, and other colours in the much cheaper textiles purchased for the lesser, minor officials and civic employees. The crucial point, therefore, is that the civic leaders, who sought to emulate the upper mercantile bourgeoisie

[1] Mechelen (Malines) was both a town and a feudal seigneurie, owing allegiance to the count of Flanders, though it was an enclave within the neighbouring duchy of Brabant: thus it was then technically Flemish.

and nobility in dress, had come to esteem black as the primary colour of sartorial elegance in this era. The term 'urban patriciate' to describe the political oligarchies who ruled or predominated in these towns of medieval Flanders and neighbouring Brabant has some real meaning.[2]

The problem of the medieval scarlets and multi-coloured cloths during the Black Death era

If, however, we were to go back two centuries, to the era of the Black Death, in the mid-fourteenth century, we would find – from the civic treasurers' accounts of Mechelen, Bruges, and Ghent[3] – that other colours were far more highly esteemed and, furthermore, that there were virtually no black textiles at all listed in the accounts of this period. In the Bruges civic accounts, the first purchases of black woollens (from the Douai drapery) do not appear until as late as 1389. Not until after the 1430s do black and other dark-coloured textiles – in dark blues, greens, purples, and greys – become decisively prominent. Instead, and especially in the post-Black Death era, by far the most prominent colours are bright vivid ones: various reds, and also multi-coloured textiles, known as 'medleys', made with a mélange of wools in a wide variety of colours, and striped or rayed textiles, whose weft yarns differed in colour(s) from the warps. In both medleys and striped cloths, red yarns were often predominant.

By far the most highly esteemed, most regal colour in medieval Europe, especially during the fourteenth and early fifteenth centuries, was that shade of brilliant or vivid red known as scarlet; and by far the most expensive woollen textiles (rivalling imported silks) of this era were the scarlets, everywhere – in the Low Countries, England, France, Spain, Italy.[4] The scarlet was to medieval Europe what the Imperial

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[2] See Jean Lestocquoy, *Aux origines de la bourgeoisie: Les villes de Flandre et d'Italie sous le gouvernment des patriciens, XIe - XVe siècles* (Paris: Presses Universitaires de France, 1952), especially chapter V: 'Patriciens et culture intellectuelle', pp. 212-22.

[3] Unless otherwise noted, data in this article for Mechelen, Bruges, and Ghent come from these archival sources: Algemeen Rijksarchief België (Brussels), Rekenkamer: municipal treasurers' accounts for Bruges, Ghentm, and Mechelen; Stadsarchief Brugges, Stadsrekeningen 1302-1500; Stadsarchief Mechelen, Stadsrekeningen, Series I; and Stadsarchief Gent, Stadsrekeningen Series R.400: 1-73. More detailed citations for specific sets of data appear on the corresponding tables.

[4] For a fuller explanation of the role of scarlets in medieval textile history, see 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

Purple had been to the Roman Empire. The latter contained an exceptionally expensive dyestuff extracted at enormous cost from various Mediterranean molluscs (*Murex brandaris, Purpura haemastoma*). Indeed, after the Roman Empire had secured and imposed a strict imperial monopoly on Imperial Purple, from the reign of Alexander Severus (225-235 CE), one that was mainatined by the succeeding Byzantine Empire (from the fifth century), the closest and really the only alternative dyestuff available in the medieval West, for indicating such regal status, was scarlet: a colour obtained instead from the desiccated eggs of various pregnant shield lice or scale insects of the Coccidae family (genus *Coccus*) that fed upon various species of Mediterranean oaks. The most important was the *Kermococcus vermilio* (sometimes referred to incorrectly as *Coccus ilicis*). These insects, in medieval Europe and the Islamic world, were cultivated in the Iberian peninsula (especially Portugal, Andalusia, Valencia), Provence, Languedoc, Morocco, the Maghreb, Tunisia, and Asia Minor. From the Caucasus region – i.e., present-day Armenia, Georgia, Azerbaijan – and adjacent regions of Iran, scarlet dyestuffs were also extracted from a related insect: *Porphyrophora hameli*. From the Spanish conquests of the sixteenth century, the New World provided a new and more powerful form of scarlet dyes: Mexican cochineal, which the Spanish called *Grana cochinilla* and whose modern scientific name is *Coccus cacti*, or more properly *Dactylopius coccus.*

The term scarlet itself is one of the most problematic issues in textile history, for the word has no known roots in Graeo-Roman civilization.[5] Obviously, its true meaning for textiles, in medieval society, is very important for this study. *Coccina* was the original Roman Latin term for the scarlet textile; and the related *coccum* was the term for the dye; but both terms had disappeared in early medieval (Merovingian and Carolingian) Europe. When scarlet-dyed woollens first achieved some prominence, in but not before the mid eleventh century, the dyestuff came to be most commonly called, in all West European languages, 'grain'

Studies in Textile History No. 2 (London: Heinemann Educational Books, 1983), pp. 13-7; and 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.

[5] For a detailed discussion of this etymological debate, see Munro, 'Medieval Scarlet', pp. 18-29.

(*granum, grana, grano, graine, grein*), simply because these desiccated Coccid eggs resembled fine grains of (e.g., of what or other plant seeds, of salt or of sand). Much earlier, about 390, St. Jerome, in compiling the Vulgate Bible, used the Latin term *vermiculus* to describe the scarlet fabrics appearing in Exodus 35: 6 and 35:25. That term, from which we derive the colour term vermilion, had meant 'a little worm'. That was precisely the term used in the medieval Islamic world to describe the insect-dyestuff itself: *kirmiz* (from the Armenian *karmir* and Sanskrit *kirmir*). Indeed, the technical term for this scarlet dyestuff in all West European languages is *kermes* (in English, German, Portuguese, and Dutch; *kermès* in French; *chermes* in Italian; *carmes* in Spanish). From this term is, of course, derived the English term crimson.

None of these terms, however, has any obvious relationship with any of the subsequent European words for scarlet: *scarlata* or *scarlatum* in medieval Latin; *scarlatto* in Italian; *escarlat* in Portuguese and Spanish; *écarlate* in French (*escarlate, escarlet*, etc., in medieval French); *scharlaken* in Dutch; *Scharlach* in German; *scharlakan* in Swedish). Many historians have been quick to point out that the medieval terms for and descriptions of the scarlet textile indicate that their colours were not only vivid red, but a wide variety of others, including even white and green. Because the medieval Flemish word was so commonly written as *scaerlaken* – seemingly related to the Flemish verb *scheren*, meaning 'to shear', and the noun *laken*, meaning a woollen cloth – the majority of historians, inspired by the writings of J.B. Weckerlin, who was, in turn, very much influenced by the eminent Henri Pirenne, still believe that the term originally meant a highly shorn luxurious woollen cloth; in particular, one made from the very finest English wools, subjected to multiple shearings whose supposedly high cost explains the nature, value (cost), and significance of this peculiar textile. In their view, this term came to be associated with colour scarlet only later, when economic rationality determined that such a very expensive textile should be dyed only in the costliest and most regal of all western dyestuffs.[6]

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[6] Jean-Baptiste Weckerlin, *Le drap 'escarlate' au moyen âge: essai sur l'étymologie et la signification du mot écarlate et notes techniques sur la fabrication de ce drap de laine au moyen âge* (Lyons: A. Rey, 1905), esp. p. 12, in which he states: 'Le sujet de cette étude nous fut suggéré par un entretien que nous avons eu avec M. Pirenne, il y a deux ans, et où M. Pirenne émettait l'opinion que l'étymologie du mot écarlate pourrait bien être cherchée dans le mot flamand: 'scaerlaken', 'scarlaken', drap-tondu. Nous

This still widely accepted theory has, however, no basis in factual evidence. As I have sought to demonstrate in other publications, woollen textiles called 'scarlets' were subjected to shearing processes that did not differ in quality, skill, or frequency from that used for any other fine woollen textile.[7] Furthermore, clear evidence demonstrates that rarely did the shearing costs themselves account for more than 2.5 percent of the wholesale price. For example, at Ghent in 1350-51, the costs of shearing a *scaerlaken* and a *zadblauwen lakenen* (deep blue cloth) and *moreiten lakenen* (murrey-coloured cloth) were precisely the same: 2.92s (or £0.146 *groot Flemish*) [8] per cloth of 35 ells (24.5 metres).[9] When one sees that a Ghent-made *scaerlaken* purchased in Bruges, in 1351, then cost £8.750 *groot* Flemish (Table 2), such a minuscule cost for shearing – 1.67 percent – can hardly explain the value or significance of the medieval *scaerlaken*.

The high value of medieval Flemish scarlets (*scaerlakenen*) is explained principally by the costs of the dyestuff itself, and secondarily by the costs of the highest grades of English wools used in weaving these cloths: the so-called March wools (Welsh Marches) of Herefordshire and Shropshire; the Cotswolds wools of Gloucestershire, Worcestershire, Oxfordshire; and, as the least costly, the Lincolnshire wools of the Kesteven and Lindsey districts.[10] In Mechelen, from 1361 to 1415, as may be seen in more detail in Table

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préferons le sens de drap à tondre ou à retondre'. Pirenne, however, never published his views on this subject. See also, in support of Weckerlin: Guy De Poerck, *La draperie médiévale en Flandre et en Artois* (Bruges: De Tempel, 1951), vol. I: *La technique*, pp. 213-14; vol. II: *Glossaire français*, pp. 70-71, no. 335 (*escarlate*); vol. III: *Glossaire flamand*, p. 125, no. 584 (*schaerlaken*).

[7] See n. 4 above.

[8] The pound (*pond, livre*) *groot* Flemish was a silver-based money-of-account, which became separated from and independent of the French *livre tournois* fromm 1320. Both consisted of 20s (*sols, sous, shillings*), each of which contained 12d (*deniers, penningen, pence*); and thus the pound *groot* (or the *livre tournois*) also equalled the value of 240 currently circulating silver pennies, as did the contemporary English pound sterling. In each system, therefore, the silver penny linked the actual coinage with the money-of-account as a system of financial reckoning.

[9] The ell measure varied from place to place. In Flanders, the ell was exactly 0.700 metre, but in Mechelen, it was only 0.689 metre. See Herman Van der Wee, *The Growth of the Antwerp Market and the European Economy (Fourteenth-Sixteenth Centuries)* (The Hague: Martinus Nijhoff, 1963), vol. I: *Statistics*, pp. 102-04.

[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; John Munro, 'Medieval Woollens: Textiles, Textile

2, the quantities of kermes used in dyeing the best woollens ranged from 10.58 kg to 18.15 kg for cloths of this size (40 ells = 27.56 metres long), and in value from a low of 32.81 percent of the final price (50.76 percent of the cost of the unfinished cloth) to a high of 51.39 per cent per (112.80 cent of the cost of the unfinished woollen). But the total finishing costs, in the labour for *both* dyeing and shearing (with napping), ranged from a low of only 2.18 percent to a high of 3.46 percent of the final price.[11] In fifteenth-century Ypres, the costs of the grain itself (ranging from 9.28 kg to 16.24 kg per cloth) varied from a low of 29.6 percent of the final price to a high of 51.5 percent (or 118.79 percent of the cost of the unfinished woollen). Again the combined total of finishing costs, in dyeing, napping, and shearing, ranged from a low 0.9 percent to one single example of 2.9 percent; otherwise, the average was just 1.3 per cent.[12]

It is therefore absolutely indisputable that the high cost, value, and prestige attached to medieval scarlets were overwhelmingly due to the scarlet-kermes dyestuff itself, all the more so since the actual pre-finishing costs of unfinished woollen broadcloths woven from fine English wools did not differ significantly among the various cloths dyed scarlet, blue, black, green, purple (murrey, perse, violet), and brown. Thus, in fifteenth-century Ghent, the costs of dyeing the same fine woollen broadcloths, with the same fine English wools, in other colours ranged from an unusual low of 3.9 percent of the final price to a high of 15.3 percent, with an overall mean of 10.52 percent.[13]

In my view, set forth as an hypothesis, the name 'scarlet' in later-medieval Latin (*scarlata*, *scarlatum*), in all other Romance languages, as well as in English, is derived from the Arabic name for an even earlier Islamic textile, from the ninth or tenth century, whose principal feature was that it was dyed in kermes: the *siklat* or later more commonly known as *siklatūn*. It was, to be sure, a silk and not a woollen

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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.

[11] These figures are all in terms of quinquennial or five-year means, not individual years.

[12] Munro, 'Medieval Scarlet', Table 3.5, p. 41.

[13] For the years 1410-75. Munro, 'Medieval Scarlet', Table 3.6, p. 42

textile; but its name was probably derived from the late Roman or Byzantine woollen textile, the *sigillatus* (in Greek: σιγιλλατον), one decorated with seals or rings. The later Persian term for this kermes-dyed silk, the *sakirlat*, though certainly derived from *siklatūn*, was probably also influenced in its formation by the Italian term *scarlatto,* through Italian commerce. And yet, the Germanic terms – *Scharlach, scharlaken, scharlakan* – even if influenced in their formation by the Arabic term *siklatūn* are evidently also derived from an Old High German word: *scarlachen*, which first appears in the text *Summarium Heinrici*, composed between 1007 and 1032. This text is a commentary on the *Etymologiarium* of Isidore of Seville (570-636), which was widely used in Carolingian and medieval Europe. Here the term *scarlachen* can clearly mean only a shorn cloth (*rasilis*).[14]

Its use here probably signified the recent emergence of the true shorn woollen cloth, which was the product of the recently introduced horizontal treadle loom. This loom produced a far more densely woven fabric, with far greater lengths, than did the long-used 'vertical' warp-weighted loom and the related two-beam upright loom, which had been best suited for weaving worsted cloths, made from strong, long-fibred wools. The new horizontal loom was, in contrast, far more effective in weaving warp and weft yarns spun from very fine, curly, short-fibred wools. Once woven, however, these woollen cloths required extensive fulling in order to force these fine but weak wool fibress to interlace or interlock by felting and compression – with a shrinkage of up to 50 per cent of the area, so that the cloth gained cohesion, strength, and durability. Those processes fundamentally explain why woollens were so much heavier than (unfulled) worsteds. [15] After being fulled, the woollens were necessarily shorn, with razor-sharp shears, to remove the nap of the

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[14] The text in the *Summarium Heinrici* states: 'Ralla vel rullo quę vulgo rasilis dicitur – *scarlachen*'. Reinder Hildebrandt, ed., *Summarium Heinrici*, vol. I: *Textkritische Ausgabe der ersten Fassung, Buch I - X* (Berlin: de Gruyter, 1974), pp. xxxi-xxiv, 321 (Liber IX.ii). The original text is found in Isidore of Seville, *Etymologiarum*, vol. 2, book 19.22.23: 'Ralla, quae vulgo rasilis dicitur'. See also Munro, 'Medieval Scarlet', p. 28.

[15] For the importance of the new horizontal, foot-treadle loom, see Marta Hoffmann, *The Warp-Weighted Loom: Studies in the History and Technology of an Ancient Instrument*, Studia Norvegica no. 14 (Oslo; Universitetsforlaget, 1964; reissued 1974), pp. 258-77. See also Munro, 'The Woollen Industries: Textiles, Technology, and Industrial Organisation', pp. 194-97, 204-09, 212-17.

fulled cloth, a process unnecesary for the lightweight worsted textiles that had predominated in the earlier, Carolingian era. The Latin term *scarlatum* first appeared about this very same time (ca. 1050); and it is likely that those very costly kermes dyes would have been reserved – as they always were in the medieval textile industries – to such very fine, heavy-weight woollens, or for various fabrics containing silk, the most costly of all textile fibres.[16] Whatever the current status of this linguistic debate, the irrefutable fact remains that all medieval scarlets, without exception, were very woollens that were dyed, wholly or partially, 'in grain' – in kermes.

What, then, explains the fact the colours attributed to medieval scarlets were often different from red? The answer is simply this: Many woollens were dyed first in the wools, in woad (indigo), a peculiar dyestuff that did not require any mordant. Mordants (especially alum) made it difficult to comb and card wools (for warps and wefts, respectively), spin yarns, and even to weave the warp and weft yarns – a problem absent in woad-dyed wools. As the medieval accounts for the Flemish and Brabantine towns make crystal clear, many such 'blue' cloths were subsequently redyed 'in the piece', with copious quantities of kermes (grain) to produce, as the accounts so stipulate, brown and perse (a blue-greyish or ashen purple) or murrey *scaerlaken*. Only rarely is there any evidence for 'green' scarlets – and one must carefully distinguish between the Flemish words for *grein* (grain) and *groen* (green). There are no black scarlets that I can find (though occasionally grey).

What then are 'white scarlets'? According to the Flemish tripartite textile technology that distinguished between 'white' cloths, 'blue' cloths, and 'medley' cloths, white scarlets were as yet undyed,

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[16] For dyeing medieval silk fabrics with kermes, see Munro, 'The Medieval Scarlet', pp. 223-24, noting that in the medieval Islamic world, the kermes dyes were used almost exclusively for silks, especially the aforementioned *siklā tūn*. For the use of kermes in dyeing *tiretaines* in the Paris region in the thirteenth century, see Sharon Farmer, 'Biffes, Tiretaines, and Aumonières: the Role of Paris in the International Textile Markets of the Thirteenth and Fourteenth Centuries', *Medieval Clothing and Textiles*, 2 (2006), 73-79, at 75-78. That may seem astonishing to those readers who believe that medieval *tiretaines* were cheap fabrics woven from a linen warp and a woollen weft. Many indeed were such fabrics; but Farmer demonstrates that some other *tiretaines* contained a silk warp (p. 76). Furthermore, she states that 'the higher-priced *tiretaines* were almost always worn by royalty or by the highest members of the aristocracy'. (p. 77). Presumably, the silk-containing *tiretaines* were the ones dyed with kerrmes.

unfinished woollen broadcloths that were commissioned to be dyed uniquely in grain, to produce red scarlets (*roode scaerlakenen*), as the accounts also make absolutely clear. 'Medley' cloths – *geminghede* and *strijpte lakenen* - were the same fine woollens that were woven from either a mélange of variously coloured wools, both blue and red, or cloths that were woven from warp yarns whose colour was different from that of the weft yarns. In the fourteenth century, especially at Ghent, it was fairly common to redye these woollens in grain, to produce, for example *strijpte scaerlakenen*.

Did this procedure for dyeing such woollen 'scarlets' with a combination of woad, kermes, and other dyes mean that less grain was used than in producing a 'full-blooded' plain red scarlet, and thus that they were somewhat cheaper? No, for a close examination of the individual recorded prices that were used to produce the decennial mean prices in Tables 3 and 4reveals that there were never any significant differences in the values of red, brown, purple, striped or medley or any other scarlets. Instead, the only and very marked difference in prices is always between those for scarlets and for non-scarlets, without exception.

Today, we know full well from not just many paintings of this era but from the ceremonial gowns of the Papal curia what scarlet woollen broadcloths look like – i.e., how vivid and resplendent is this shade of red, even if this colour is today produced not from kermes or other insect dyes, but rather from synthetic aniline dyes (extracted from coal tars). Now such scarlet woollen broadcloths are periodically produced only for the Papal Curia. The precise nature and colour shades of the other scarlets – especially the brown, perse, and murrey scarlets, and the fourteenth-century *strijpte scaerlakene* – are unknown. One textile historian, the late Hungarian expert Walter Endrei told me that, despite all the evidence that I had marshalled, he could not believe that anyone would ever have, in his view, 'adulterated' and 'degraded' a grain-dyed scarlet cloth by using other dyestuffs as well.[17] Entrenched views may die hard, but, to repeat, the abundant later-medieval evidence that either 'white' or woad-based, wool- dyed woollens, as explained above, were redyed

[17] Walter Endrei, personal communication, August 1982. See also Walter Endrei, 'The Productivity of Weaving in Late Medieval Flanders', in Negley 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 no. 2 (London, 1983), pp. 108-19.

'in the piece' in grain to produce these various colours is irrefutable.[18] Yet, in expressing some sympathies with Endrei's views, we would have to suppose that the kermes dye would predominate in the final product, to give the woollen cloth a vividly rich and lustrous colour, rather than a sombre colour.

If one examines the difference, now, between Table 1 for Mechelen textile purchases and Tables 3-4 for the Bruges textile purchases, one must be struck by the complete absence of scarlets in the Mechelen accounts for the period of table 1, namely from 1471 to 1550. In fact, none is recorded there after 1416. That is all the more remarkable when one realizes, from the evidence and sources cited earlier, and as indic. ated in table 2, that scarlets had been so very prevalent in the Mechelen town accounts from the early 1360s (when explicit details first become available).

Similarly, in the Bruges accounts, the presence of scarlets in these annual municipal purchases radically diminished in the course of the fifteenth century, especially after 1410 (but with one anomaly noted later). Consider, on the other hand, the contrary evidence from the 1330s to about 1410. The absence of any evidence for scarlets, in the Bruges accounts, before the very first so documented, in 1332, is not, however, evidence of absence. For the extant Bruges accounts from 1302 to 1332 rarely specify the name, let alone the colour, of the cloths so purchased. Thereafter they generally do so, in fairly explicit detail, though some woollens are not specified by type or colour, as indicated in the final columns in Table 3.

As Table 3 demonstrates, generally more than a third of the woollens purchased, by number, from the 1330s to the 1370s, were scarlets. The shares accounted for by the number of scarlets ranged from a low of 30.83 percent in 1361-70 to a high of 54.10 percent in 1351-60, i.e., in the decade following the Black Death. In terms of value of the cloth purchases, scarlets obviously accounted for an even higher share of the cloth purchases: from a low of 44.31 percent in 1331-40 to a high of 72.92 percent in that post-Black Death

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[18] See Munro, 'Medieval Scarlet', pp. 13-70. For example, see also the Bruges *stadsrekening* for May 1417: 'fine witte Brugsche lakenen omme te greinene ende rood scaerlaken der af ghemaect' [in order to dye fine white Bruges cloths with grain, and thereby make them into red scarlets]. Algemeen Rijksarchief (Brussels), Rekenkamer, reg. no. 32,471, fo. 47v.; and for 1414, 'Bruxsche fine persche ghegreynde scaerlakene' (fine perse grain-dyed scarlets), reg. no. 32,468; and for 1415: 'fine groene gheminghede Bruxsche lakenen daerof deen rood [scaerlakene] ghegreyndt' [fine green medley Bruges cloths, of which one was grain-dyed to become a scarlet), reg. no. 32,469. The translations are mine.

decade, 1351-60. Those relative shares for scarlets, by number and value, declined in the later fourteenth century, to 13.60 percent by number, but still a respectable 30.17 percent value, in the decade 1391-1400. By the decade 1431-40, those shares for scarlet woollens had fallen steadily to 8.37 percent by number and 15.17 percent by value. For some inexplicable reason, during the economically depressed 1430s (following the horrible plagues, famine, and warfare of the 1430s), the share of cloth purchases in scarlets leaped back to 24.21 percent by number and 34.92 percent by value. Thereafter, however, during the entire 1450s, 1460s, and 1470s, not a single scarlet was purchased for Bruges government officials. In the 1480s, in one year only were some scarlets (expensive ones, indeed) purchased: in 1482. Thereafter, until the termination of the textile accounts in 1496, no more purchases of scarlets were recorded in the Bruges civic treasurers' accounts.

The late-medieval shift from vivid colours to the 'dark side'

Over this long period, as reflected in Tables 3 and 4, we find a similar and equally striking shift in the spectrum of colours for luxury-grade woollen broadcloths: from bright, vivid, essentially red-based but often multi-coloured textiles (i.e., the medleys and striped or rayed woollens), so predominant in the fourteenth century, to chiefly dark and sombre, and largely 'plain' (the word used in the texts) or uniform in colour. Such a dichotomy involves, of course, arbitrary choices, far more arbitrary in the Tables 3-4 for the Bruges cloth purchases than in the simpler Table 1 for Mechelen.

The category of bright, vivid, and multi-coloured woollens includes, obviously, all the scarlets, the medleys, the striped cloths, reds, browns, and yellows. The browns are included in this category because of the predominant element of red dyes – whether madder, brazilwood, or kermes – in forming their colours. Yellow-dyed woollens (dyed in weld), it must be noted clearly, were extremely rare. For they appear, generally only in single numbers, in only four years, all before the Black Death: in 1335, 1336, 1338, and 1344 (two in that year).[19] Thus their representation in these two tables, by number and value, are too negligible to deserve further comment.

The 'dark side', with darker and more sombre colours, consists of those that are fundamentally blue

[19] See below, p. xx, for an explanation of the rarity of yellow textiles.

-dyed in origin: the various blues themselves (with an increasing prominence of *zadblauwe* or deep blues, referred to also in the Mechelen accounts as double-woad dyed), greens, perses, greys, and blacks. All of these woollens were those dyed first in the wools using woad, and then redyed in the piece with more woad, and/or weld, madder, and various other additives to produce the greens, purples, blacks and greys. In the Bruges accounts, the first perse-coloured woollens appear only in and from 1370; as noted earlier, the first black woollen appears only in 1389; and the first greys, as late as 1393. In this 'dark' category, greens are the first to appear: in 1332. If some may argue that greens (as fundamentally a mixture of woad and weld) should be placed in the first category, the increasing prevalence of dark-green (*zadt groenen, donker groenen*), involving dye mixtures with woad, convinced me to place them in the 'dark' category.

Consider now Figure 1 and the comparable statistics in Tables 3 and 4, especially the summaries of the distributions of textile purchases by both number and value, as percentages of each annual total (converted into decennial means), from 1301-10 to 1491-96. In the five decades just before and following the Black Death, from the 1330s to the 1370s, woollens of the 'bright ' category accounted for generally three-quarters of the number of textiles purchased – from 72.41 percent to 81.70 percent; and by value, they accounted for a range between 77.25 percent and 86.19 percent. The cloths of the 'dark' category conversely accounted for less than 10 percent before the 1370s, when they then accounted for 18.05 percent by number and only 14.07 percent by value.

The 1370s may mark the first transition point, because before then, woollens of the 'dark side' accounted for a very small share ranging from 0.73 percent to 9.87 percent by number; and from 0.60 percent to 7.68 percent by value. The remaining shares, both by number and value, are accounted for by those woollens, often considerable in number, whose colours and types were not specified (listed in the last two columns of Table 4).

From the 1370s, the distribution of woollen cloth purchases grouped by these two colour categories began to change markedly. The share of total purchases accounted for by the woollens in the 'bright' category fell, by numbers recorded, from 79.09 percent in 1361-70 to just 38.57 percent in 1391-1400; and

by relative values, from 84.68 percent to 50.20 percent, over the same period. Conversely, the share of those textiles grouped'dark' category rose from 9.87 percent to 41.76 percent by number, and from 7.68 per cent to 33.20 per cent by value, over this forty year period. In the first decade of the fifteenth century, however, the share of those in the 'bright' category rose back to 57.27 per cent by number and 65.89 per cent (about two-thirds) by value, while conversely those of the 'dark' category accounted for only 25.85 per cent by number and 20.26 per cent by value of purchases. Thereafter, however, the share of total purchases accounted for by woollens of the 'dark side' manifest an inexorable, continuous rise to the 90 percent range in the 1460s; and, despite a slight slippage thereafter, they end up, in the final recorded period of 1491-96 accounting for 93.51 percent of total purchases by number, and, virtually the same share, 93.84 per cent, by value. Finally, in that last recorded period, the 'bright' woollens accounted for a derisorily small share (with none now in the 'unspecified' category): 6.49 percent by number and just 6.16 percent by value. Thus, the dramatic shift in the colour spectrum to the 'dark side' in the Bruges accounts is almost identical to that shown earlier in the Mechelen accounts (1471-1550: in Table 1).

The importance of the Bruges civic accounts for textile colours and prices

Greater care should now be given to an explanation of the textiles selected for this statistical analysis from the annual accounts of the Bruges treasurers, from 1302 to 1496. Only genuine woollen broadcloths (*brede lakenen*), and never narrow cloths (*smalle lakenen*), or other textiles were selected, and recorded in these tables by price (value) and colour; and the only ones selected for this category were those purchased for the burgermasters, aldermen (*schepenen),* and the upper clerks, along with those purchased as occasional gifts for visiting princes (e.g., for Edward III in 1360). All other textiles, and those woollen broadcloths purchased for lesser ranks (descending to those of civic musicians: pipers and trumpeters), were excluded, as they were also omitted in Table 1 for the Mechelen cloth accounts.

A major reason for selecting and focusing on the Bruges accounts is that they begin as early as 1302, and have fewer gaps in the fourteenth century thando trhose of some other Flemish cities. Warfare – foreign and civil wars – and then the Black Death produced many gaps in the fourteenth century Flemish accounts.

For Bruges, we have only two accounts in 1311-20, none at all in 1321-30 (the era of the Revolt of Maritime Flanders), only five in 1371-80 (the era of the Second Artevelde Revolt); and not until 1390 are the accounts available for every year. But the status of the Ghent accounts, with many more civil disruptions, is far worse in terms of serious lacunae – too inferior to give a proper overview of the fourteenth century (and still with unfortunate gaps in the fifteenth century). The absence of any accounts for Ypres before 1406 is due instead to modern warfare: the complete destruction of the Ypres archives in World War I. But, thanks to a duplicate set deposited for the Burgundian court at Lille, we do have its town accounts from 1406 (to the French Revolution).

The records of cloth purchases in Mechelen do begin early, in 1316; but not until the 1360s are they given with sufficient details for analyses of this nature. Before the 1420s, when the Flemish money-of-account system was finally adopted in Mechelen, the prices were recorded in a very peculiar local money-of-account (*pond oude groot*), and, not until the early 1370s, have I been able to convert these Mechelen cloth prices expressed in pounds (£) *oude groot* into pounds *groot* Flemish (see the last wo columns of Table 2 for prices of scarlets in both moneys-of-account).

The second major and very important relative advantage of the Bruges town accounts lies in the detailed records that repudiate a still common and quite erroneous belief that the textile prices recorded in such town accounts were somehow fictitious or artificial or adjusted in favour of the local drapery.[20] Unlike other civic governments in the southern Low Countries, the Bruges government regularly purchased a wide variety of woollens and other textiles from across the entire southern Low Countries and also parts of northern France (but never from England).[21] In the fourteenth century, many of the best quality and highest priced

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[20] See this charge in Marc Boone, 'L'industrie textile à Gand au bas moyen âge, ou les resurrections successive d'une activité réputée moribonde,' in Marc Boone and Walter Prevenier, eds., *La draperie ancienne des Pays Bas: débouchés et stratégies de survie (14e - 16e siècles)/ Drapery Production in the Late Medieval Low Countries: Markets and Strategies for Survival (14th-16th Centuries)*, Studies in Urban Social, Economic and Political History of the Medieval and Modern Low Countries (Leuven/Appeldorn, 1993), pp. 15-61.

[21] For an explanation of why English woollens had long been banned from Flanders (since the 1350s), see John Munro, 'Industrial Protectionism in Medieval Flanders: Urban or National?' in Harry Miskimin,

woollens came from the rival draperies of Douai, Saint-Omer, Ghent, Ypres (Ieper), Mechelen, and Brussels. The fact that the prices recorded for these 'foreign' textiles in the Bruges accounts so closely correspond to the prices of the woollens recorded in the annual treasurers' accounts of those other towns that produced these textiles thus gives one sufficient confidence in their validity. So does the fact that the registers record not only the specific types and colours of these woollens, and their provenance, but also the names of the merchants who sold them to the city government; and, furthermore, annual fluctuations in prices fortifies one's confidence that these are indeed genuine market prices.

In the Bruges town accounts, from the 1340s, but especially from the 1360s, we find an increasing number of rather less expensive woollens produced by the so-called *nouvelles draperies* (*nieuwe draperien* or 'new draperies') of the southern Low Countries: from Dixmude, Kortrijk, Comines, Dendermonde, Wervik, Aalst, Diest, and many others. Most of these *nouvelles draperies* had once produced very cheap and coarse worsted or serge-like cloths; but during the great industrial transformation of the fourteenth century – which I have analysed at length elsewhere, in many publications – these *nouvelles draperies* forsook the cheaper textiles similarly to reorient and concentrate on the production of genuine heavy-weight luxury grade woollens, generally in imitation of those produced by the great urban draperies listed above (especially of the Flemish *drie leden* – i.e., the 'three cities' of Bruges, Ghent, and Ypres), but therefore sold at rather cheaper prices (if still more costly than English broadcloths).[22] Virtually never were any products of these *nouvelles draperies* considered to be valuable enough and worthy for garbing the upper echelons of the Bruges civic government (and thus do not appear in these tables). By the turn of the century, woollens of these *nouvelles*

David Herlihy, and A. L. Udovitch, eds., *The Medieval City* (New Haven and London: Yale University Press, 1977), pp. 229-68.

[22] See 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, 2003), Vol. I, chapter 5, pp. 228-324, 378-86 (bibliography); 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, 1991), pp. 110 - 48; 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.

draperies had displaced those from the greater Flemish and Brabantine urban draperies in the Bruges treasurer's accounts; and one of the very first to be displaced were those of Ghent, which had specialized in producing *strijpte lakenen* (including *strijpte scaerlakenen*). Therefore the total disappearance of this category of 'striped' cloths after 1387 is to be explained in part by this industrial and commercial transformation. Although that disappearance may also partly reflect the relative shift away from multi-coloured cloths, the Ghent town accounts nevertheless do record the purchases of that town's own *strijpte lakenen* in considerable number, each year, well into the sixteenth century.[23]

The composition and weights of medieval and sixteenth-century woollen broadcloths

Our knowledge of the physical composition of these Flemish woollen broadcloths can be verified from one set of fifteenth-century ordinances, for the Ghent drapery (the *keuren* or regulations of 1456, 1462, and 1546), and for three other sixteenth-century draperies (those of Leuven and Mechelen – both in Brabant -- and East Anglia), whose essential data are given in tables that I have published elsewhere, in various formats. [24] All of these woollens were woven exclusively from the finer English wools: those specified and defined above (see p. 5). The Flemish, Brabantine, and English broadcloths are all similar in dimensions (i.e., about 35 to 37 square metres) as well as in weights, which vary from 633.8 grams per square metre for the Ghent *dickedinnen*, to 764.4 grams for the Mechelen *gulden aeren* and 782.6 grams for East Anglian

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[23] Town accounts in Gent, Stadsrekeningen, Reeks 400: nos. 7 - 35.

[24] See Munro, 'Industrial Protectionism', tables 13.1-13.5, pp. 253-57; Munro, 'Medieval Scarlet', tables 3.1 - 3.15, pp. 32-69'; Munro, 'Industrial Transformations', table 4.1 and Appendix 4.1, pp. 141-48; and 'Woollen Industries and Struggles for Markets', tables 5.1-5.10, pp. 299-324; 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, 10 (Oxford: Oxford University Press, 1977), tables 1-5 and 7-8, pp. 39-89; Munro, 'Textiles as Articles of Consumption in Flemish Towns, 1330-1575', *Bijdragen tot de geschiedenis*, 81:nos. 1-3(1998), tables 1-4, pp. 276-85; and 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, Contrast*, 3:1 (February 1999), tables 1-2, pp. 42-51. For this Working Paper version of the paper, I have reproduced one of these tables, as Table 6, at the end of the paper.

broadcloths.[25] In contrast, sixteenth-century worsted *says* from Bergues-St. Winoc (Flanders) and Essex had far lower weights: of only 260.4 grams and 141.2 grams per square metre, respectively – i.e., under 20 percent of the weight for the heaviest broadcloths. [26] Some partial regulations for the Bruges drapery in 1408 indicate that its broadcloths must have been very similar to those of Ghent.[27] Whether or not the fourteenth-century woollen broadcloths had similar wool compositions and weights cannot be ascertained, but it seem unlikely that they were radically different, for this was a most conservative industry, as would be expected in one so luxury oriented. Nobody wears such heavy broadcloths today, save for the aforementioned cardinals in the Papal Curia, for whom such scarlet woollen broadcloths are still periodically produced. Our own wool-based suits and other clothes are essentially lighter-weight worsteds.

Textile Prices in Terms of 'Baskets of Consumables' and Real Wages

Do the cloth prices recorded in these tables really indicate that these heavy-weight woollens were genuinely luxury articles of consumption? Prices are, after all, quite useless to the economic historian, unless proper comparisons can be made, in the context of a proper understanding of the relevant monetary history. For example, the steep rise in the nominal prices of the fourteenth-century woollens, until the 1380s, tells us nothing about the real values. For that rise was due, to a very large extent, to the consequences of inflation

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[25] English broadcloths, fulled and finished, were, by statute, 1.75 yards wide and 24 yards long. Flemish woollens were generally 8 'quarters' or 2 ells wide: i.e., 1.4 metres wide; but some were as wide as 10 quarters (2.5 ells = 1.75 metres). The Ghent cloth weight – identical in the ordinances of 1456, 1462, and 1546 – is surprisingly low, even if based on the Ghent pound weight of 433.85 grams, rather than the Bruges pound weight of 463.90 grams. For more specific data on textile dimensions, see Munro, 'Woollen Industries and Struggles for Markets', table 5.7, pp. 312-15.

[26] See Munro, 'Medieval Scarlet', Table 3.2, pp. 34-35; Munro, 'Origins of the English New Draperies', Table 4, pp. 49-51; Munro, 'Medieval Woollens: the Struggles for Markets', Table 5.7, pp. 312-15, Table 5.8, p. 316. Medieval *says* were either fully worsted – with a 'dry' long-stapled, coarse, worsted warp and weft yarns – or, like those of Hondschoote (and the later English New Draperies, from the 1560s), a fabric with a 'dry' long-stapled worsted warp yarn and a short-stapled woollen weft greased with butter or oil. The former were rarely if ever fulled; the latter were partially fulled, if only to remove the grease, but without actually felting the cloth. Thus *says*, worsteds, and other products of the *draperies légères* were (as the name suggests) much lighter-weight cloths, chiefly because they were not fully felted and compressed as were fulled woollens.

[27] Octave Delepierre and Willems, M. F. eds., *Collection des keuren ou statuts de tous les métiers de Bruges* (Ghent: C. Annoot-Braeckman, 1842).

from severe Flemish silver coinage debasements, from the 1330s to the 1380s, which were aggravated by the other severely inflationary forces unleashed by warfare and the Black Death. In 1389-90, the new Count of Flanders (the first Duke of Burgundy, Philip the Bold) imposed a drastic coinage reform that strengthened the silver coinage by 31.6 per cent, which, by the law of inverse relationships, should have reduced the price of fine silver bullion by 24.0 per cent; and indeed accompanying the monetary ordinances of *renforcement* were decrees cutting money wages by 25 per cent. At the same time, other deflationary forces in the European economy, including effects from the so-called 'bullion famines', led to a general deflation, with a fall of 29.16 percent in the Consumer Price Index, from 1386-90 (CPI = 124.72) to 1401-05 (CPI = 88.35). Subsequently, from the Battle of Agincourt in 1415 to the Anglo-Burgundian War of 1436-39, the southern Low Countries experienced another series of war- and debasement-induced inflations, followed by a monetary reform and economic depression that brought about a renewed era of deflation (reducing the CPI from 140.17 in 1436-40 to a nadir of 88.71 in 1461-65 – a drop of 36.71 per cent in the composite price index); that in turn was followed by more warfare, another series of drastic coinage debasements, and further inflation until the early 1490s. Thus, the interpretation of price movements, including those for textiles, is very dependent upon these monetary factors of debasements, reforms, inflations and deflations; but this subject is far too complex to permit a complete analysis of the price changes recorded in these tables.[28]

Table 5, however, permits us to estimate the real values of these Flemish textiles – both the scarlets and the non-scarlet luxury woollens – in terms of two related measures: the annual value of a specified

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[28] For a more detailed disussion of these events and complicated monetary changes, see John Munro, *Wool, Cloth and Gold: The Struggle for Bullion in Anglo-Burgundian Trade, ca. 1340-1478* (Brussels: Editions de l'Université de Bruxelles, 1973), pp. 43-63; John Munro, 'Mint Policies, Ratios, and Outputs in England and the Low Countries, 1335-1420: Some Reflections on New Data', *The Numismatic Chronicle*, 141 (1981), 71-116; 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, '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 Caviococchi, 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, 2005), pp. 1013-76; and John Munro, 'Gold, Guilds, and Government: The Impact of Monetary and Labour Policies on the Flemish Cloth Industry, 1390-1435', *Jaarboek voor middeleeuwse geschiedenis*, 5 (2002), 153-26.

number of 'baskets of consumables' whose sum value is expressed in silver pence *groot* (a measure combined in this table with the related Flemish Consumer Price Index, or CPI, based on these values; and the purchasing power of the annual money wage income, also expressed in silver pence *groot*, for a master mason in Bruges (for 210 days employment per year).[29] Thus this table compares the decennial mean value of both scarlets and other dyed woollen broadcloths in terms of the number of such consumer baskets having an equal value to one of these woollens, and in terms of their values in the Flemish pound *groot*, with 240 pence to the pound *groot*, so that, the higher the number of such baskets, the higher was the real value of these textiles. The second measure computes the number of days' wages that a Bruges master mason would have had to spend in order to buy *one* of these textiles – about 36 square metres of cloth, which was sufficient to produce three complete sets of male clothing. Again, the greater the number of days' wages required for the purchase, the higher was the real value of each of these textiles.

Scarlets as the ultimate woollen of luxury consumption:

Table 5 indicates that the real value of Flemish scarlets, by these measures, about doubled from the Black Death era in the 1340s to the end of the fourteenth century: from a harmonic mean value of 17.460 baskets in 1341-50 to one of 36.711 baskets in 1391-1400.[30] There are two fundamental reasons for that rise in their values: first, a steady and very substantial increase in the real burden of English wool-export taxes, rising from 38.14 percent of mean wool prices in 1356-60 to 50.30 percent in 1391-95; and second, deflation, with a sharp fall in the Flemish Consumer Price Index, from a mean of 115.22 in 1371-75 (1451-75 = 100) to one of 88.51 in 1391-95. Thus, their 'real' value rose because the nominal or money-of-account prices of

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[29] The composition and component values of this Flemish price index are presented and compared with those for southern England and southern Brabant, in Munro, 'Builders Wages', Table 1, pp. 1048-50; and in Money, 'Wage Stickiness', Table 1, p. 231. For the components of the Flemish 'basket of consumables', see Table 4, note a. The base for all these price indexes is: mean value of 1451-75 = 100.

[30] In computing quinquennial, decennial, or other such mean values, the harmonic mean must be used, not the arithmetic mean. See Harold Sloan and Arnold Zurcher, *A Dictionary of Economics*, 3rd edn (New York: Barnes & Noble, 1953), pp. 149-50: 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... In economic computation the harmonic mean is used in averaging such data as time rates and rate-per-dollar prices'.

these textiles did not fall as much as did the CPI. [31]

In the fifteenth century, the real value of scarlets, as measured in these terms, fell steadily to the 1420s, when the mean value of this textile was worth less than half of that value indicated for the 1390s: just 16.997 consumer baskets; and this time the principal factor was renewed inflation, as the Flemish Consumer Price Index rose from a mean of 88.53 in 1401-05 to 117.77 in 1426-30, and thus rising faster than did the nominal textile prices. Subsequently, however, the mean value of the woollen scarlet again increased, to be worth 21.061 baskets in 1431-40 and 19.166 baskets in 1441-50 (when their purchases for the Bruges town government virtually cease). That latter rise in the real values of dyed woollens (including scarlets) was principally due to two factors: first, a very sharp rise in the costs of fine English wools from the later 1420s, thanks to the misadventures of English fiscal and 'bullionist' policies designed to exploit the wool-export trade to the Low Countries (the Calais Staple Bullion Ordinances); and second, a very steep deflation, from the 1440s to the mid 1460s, by which time the Flemish CPI had fallen to a nadir of 88.7.[32]

The next comparison in the relative values of these Flemish woollen scarlets is achieved by computing how many of these consumer baskets a highly skilled master mason in Bruges could have purchased with his annual money wage income; and then by comparing that amount of annual 'real income' with the prices of scarlets (i.e., in terms of equivalent number of consumer baskets). In my view, this method provides the best possible measure of real wages; for, after all, the real wage represents the purchasing power of nominal, money wages in terms of such consumer goods.[33] The significance of that comparison will be

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[31] See more detailed information in Munro, 'Medieval Woollens: the Struggles for Markets', pp. 278-83, and Table 5.1, pp. 299-301; Munro, 'Wage Stickiness', pp. 213-26, and Table 8, pp. 249-50.

[32] See Munro, *Wool, Cloth, and Gold*, pp. 65-179; Munro, 'Medieval Woollens: the Struggles for Markets', pp. 228-324; Munro, 'Wage Stickiness', pp. 185-297; Munro, 'Builders' Wages', pp. 1013-76.

[33] The most common technique is to use index numbers, with some common base (e.g., in this and other studies: mean of prices in 1451-75 = 100); and thus the real wage is calculated by dividing the nominal wage index by the consumer price index: NWI/CPI = RWI. But that provides only a relative measure of changes, over time, and does not indicate any absolute levels of real wages that would permit regional comparison. See; Munro, 'Builders' Wages', pp. 1013-76; and Munro, 'Wage Stickiness, Monetary Changes, and Real Incomes', pp. 185 - 297.

enhanced if we realize that master masons ranked in the highest echelons of wage earners in this medieval society; and furthermore, if we realize that real wages for master masons in fifteenth-century Bruges were then substantially higher than for such masons in southern England and Antwerp – perhaps the very highest in northern Europe.[34]

The results of this quantitative analysis are also shown in this Table 5 (for 1348-1496). They show first that, contrary to popular opinion, real wages – here, the real wages of Bruges master masons and their journeymen – did not rise soonn after the Black Death, but fell substantially, simply because inflation outpaced the rise in nominal money wages. Thus the number of consumer baskets that such a master mason could have purchased per year fell from a harmonic mean of 16.440 baskets in 1348-50 to a low of 12.184 baskets in 1371-80 – a fall of 25.9 percent; but, with the monetary reform of 1389-90 and then deflation, that number rose to a harmonic mean of 17.160 baskets in 1401-10. Then, with the ensuing inflations in the early to mid fifteenth century, that number fell to a mean of 13.745 baskets in 1431-40. Subsequently, however, with the previously mentioned steep deflation, the number of those consumer baskets that could have been purchased with the annual money wage rose to a peak of 19.749 baskets in 1461-70, falling thereafter to a new mean low of 11.752 baskets in the warn-torn, debasement ridden, inflationary 1480s (when wages for building craftsmen also ceased to be recorded in the Bruges accounts).

Secondly, these comparative data demonstrate that throughout this entire late-medieval period the mean value of a scarlet was always worth more than the number of consumer baskets purchasable with a master mason's annual money wage. In fact, during the second half of the fourteenth century, the ratio of those values almost doubled: from 1.062:1 (i.e., one scarlet = 1.062 consumer baskets purchased yearly) in 1348-50 to 2.092:1 in 1391-1400; and while that ratio fell in the fifteenth century, the lowest level was still 1.711:1 in 1441-50. Obviously we cannot expect that master building craftsmen, let alone their journeymen, were ever in the market to purchase woollen scarlets.

An alternative approach, providing the very same conclusion, is to calculate the number of days'

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[34] See Munro, 'Builders' Wages', pp. 1013-98, especially pp. 1041-47.

wages that a master mason would have had to spend to purchase one scarlet broadcloth, on the assumption that the maximum number of days of paid employmentper year was about 210. Thus, from Table 5, we find that the number of such days' wages required to purchase a scarlet (in terms of its harmonic mean decennial value) rose from 223.64 days in 1348-50 to 445.91 days – thus, more than two years' money-wage income – in 1391-1400. Thereafter, and once again, since these measures are fully comparable, the number of a mason's day's wages required to purchase a scarlet (harmonic mean value) fell to a low of 246.63 days in 1441-50 (the last decade of recorded purchases in the Bruges accounts); but that still meant 1.17 years' money-wage income for a Bruges master mason.

Other dyed woollens as articles of luxury consumption for the upper classes

Obviously the comparison to be made with other dyed woollen broadcloths in these tables produces a somewhat different result, in reflecting their relatively lower values. Nevertheless, these comparison also reveal to what extent these woollens were also truly a luxury product, beyond the purchasing power range of any but the upper income groups of medieval Flemish society. Thus, on the basis of the first mode of comparison (as used for the scarlets), we find, for the second half of the fourteenth century, that the decennial mean number of consumer baskets whose total value matched that of the mean value of these dyed broadcloths rose from 8.057 baskets in 1348-50 to a mean of 13.286 baskets in 1391-1400: a rise in the real value of these broadcloths of 64.9 percent, for reasons already explained – an impressive rise, even if a lesser increase than that for the real values of scarlets. The real mean value of these other dyed luxury woollens in Tables 3 and 5 then fell from the 1390s to the 1420s, though by a lesser amount than did the real value of scarlets, by 32.0 percent: to a harmonic mean of 9.041 baskets in 1421-30. Thereafter, however, their real value rose again: to 12.000 baskets in 1441-50, and then to a peak of 14.136 baskets in 1461-70. It is worth noting here that, in 1473, the English government had finally and formally revoked the Calais Staple Bullion Ordinances, whose payment provisions had so severely increased the cost of fine English wools for the Low

Countries' woollen draperies.[35] But then, with ensuing civil wars, coinage debasements, and a consequent steep inflation, reflected in a rise of the Flemish CPI to a mean of 174.10 in 1486-90, the relative value of these (non-scarlet) dyed woollens thereafter fell again, to a mean of just 11.944 consumer baskets in 1481-90.

The alternative but complementary statistical comparison reveals that the ratio of the values of these broadcloths to the number of consumer baskets purchasable with a master mason's annual wage income rose from about half of that real income (a ratio of 0.490:1) in 1348-50 to a peak of 0.88:1: i.e., indicating that a dyed (non-scarlet) Bruges broadcloth had been worth 49 per cent of the mason's annual money-wage income in 1348-50, but was worth 88 percent in 1381-90. That ratio then fell of a low of 0.614:1 in 1411-20, and then rose again to a fifteenth-century peak of 1.016:1 in 1481-90 (i.e., a value in excess of the mason's annual wage income).

Finally, the third statistical measure of the high values of these luxury woollens similarly shows that the number of days' of wage income that a master mason in Bruges would had have to spend to acquire one of these (non-scarlet) dyed woollens rose from 103.20 days in 1348-50 to 175.150 days in 1381-90 and then fell to a corresponding low of 129.76 days in 1411-20, while thereafter again rising to a peak of 192.27 days in war-torn, inflation-ridden 1480s, as just noted. The most striking contrast, which can be made only much later, is a comparison of textile prices and wages in Antwerp in the years 1538 to 1544, indicating that a master mason there would have required, on average, the following number of days' wages to purchase 12 square metres of the following textiles (enough for a full suit of men's clothing): 13.725 days' wages for a Hondschoote single *say*, 16.958 days' wages for a Hondschoote double *say*, 74.144 days' wages for a Mechelen *rooslaken* broadcloth, and 91.413 days' wages for a Ghent *dickedinnen* broadcloth.[36]

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[35] See Munro, *Wool, Cloth, and Gold*, pp. 65-179; Munro, 'Woollen Industries: the Struggles for Markets', pp. 228-324.

[36] 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: Table 6K, p. 672. The Hondschoote *says* had a worsted warp and a woollen weft. Both had a final, finished length of 24.5 metres (35 Flemish ells), but the single *say* had a final width of 0.6125 metres and thus an area of 15.006

What explains the anti-Red shift to the 'dark side': the victory of blacks?

If we may now establish that by this era black had become the supreme colour symbol of luxury woollen broadcloths – when, to repeat, purchases of scarlets are no longer recorded in these town accounts -- what explanation do we have for this victory of the 'dark side'? Nothing more than some unsatisfying and incomplete hypotheses may be offered.

In view of the evidence that the 1430s marked a turning point in the Bruges accounts for colours in cloth purchases, one might speculate on the role of an Iberian or Spanish influence. For, in January 1430, Duke Philip the Good of Burgundy (r. 1419-67) took, as his third wife, the beautiful young princess Isabella of Portugal (daughter of King John I) – possibly influenced by the Jan Van Eyck's famous portrait. Two years earlier, in 1428, Philip had also signed one of Flanders' most important commercial treaties of the fifteenth century: with Castile. Spanish merchants had long been important in supplying Flanders with wine, citrus fruits, salt, iron, metal manufactures; but now they were bringing increasing quantities of fine *merino* wools, at the very time when English wools had suddenly become so much more expensive (because of the aforementioned Calais Staple Bullion Ordinances). By the end of the century, the *merinos* had won a clear victory over the English wools in the economy of the southern Low Countries.[37] Then, in 1496, the Habsburg Archduke Philip the Fair (r. 1482-1506), son of the last Burgundian ruler of the Low Countries, Marie de Bourgogne (r. 1477-1482), married Joanna the Mad of Castile; and their first-born son (in Ghent, in 1500) was the famed Charles, who became King Charles I of Spain in 1516 and then, in 1519, Holy Roman

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square metres, while the double *say* had a final width of 1.1375 metres and thus an area of 27.869 metres. The single *say* weighed about 5.1 kg, with about 340 grams per square metre; the double *say* weighed about 7.4 kg, with about 266 grams per square metre. The double *say* was just over 78 percent of the area of the Mechelen *gulden aeren* broadcloth (and presumably the proportion of the *rooslaken*), whose finished dimensions were 20.67 metres by 1.7225 metres (35.604 square metres); but a square metre of a double *say* weighed less than 35 percent of a square metre of that Mechelen broadcloth (which, as noted earlier, weighed about 764 grams).

[37] See Munro, 'Spanish *Merino* Wools', pp. 431-84. The fully-evolved Spanish merino wools were similar to the finest English March and Cotswolds wools in having very short and curly fibres, about 2.0 to 2.5 inches in length (ie., about 5.1 to 6.4 cm). Both the medieval English March and Cotswolds and the early modern Spanish merino wools had excellent felting properties. See also Munro, 'Wool Price Schedules', pp. 118-69.

Emperor, to become known as Charles Quint (V). His abdication in 1556, relegating the rule of the Habsburg Low Countries to his thoroughly Spanish son Philip II (r. 1556-1598), set in motion those events that would lead to the Revolt of the Low Countries against overbearing Spanish rule and to the Eighty Years War of 1568-1648.

What role therefore did Spanish culture, dress, fashion, and colours play in the Burgundian-Habsburg court and in the society of the early-modern Low Countries? Is the pre-eminence of black owed to such Spanish or more generally Mediterranean influences? What role did Moorish or more generally Islamic culture have in favouring this pre-eminence of black?[38] It has been observed that in Islamic society married women almost universally wore and still wear black as a symbol of their special revered status (and unattainability); but so did Italian and Greek women.

We may also ask why such brilliant, vivid, red and scarlet based colours had, on the contrary, just as decisively predominated in the mid and later fourteenth century, at least in Flanders (with the best documentation). Perhaps the resort to such brilliant, vivid colours, especially with the varieties of scarlets, reflected a natural human desire to escape the terrors of the Black Death and almost incessant and murderous warfare. Since the plague — whatever form of bubonic or other disease it may have been – manifested itself in starkly black pustules, as inflammatory swellings of the buboes or lymph glands, black textiles would hardly be favoured under these circumstances, all the more so since so many associated black with death and evil (while in Islamic cultures white symbolized mourning for the dead).[39] Brightly vivid and multi-coloured textiles may also have symbolized a morbidly hedonistic atmosphere following the Black Death: as in the

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[38] See Françoise Piponnier and Perrine Mane, *Dress in the Middle Ages*, translated by Caroline Beamish (New Haven and London, 1997), p. 90, for an assertion that in late-medieval Spain 'the Islamic influence [in its textiles and in the styling of some of its clothes] remained strong until the end of the Reconquest [in 1492]'. Original French title: *Se vêtir au moyen âge* (Paris, 1995).

[39] For a very convincing case that the Black Death was not the bubonic plague that the world came to know from the pandemic that struck China and India from 1894 to the 1940s, and was not disseminated by rat fleas, see Samuel K. Cohn, Jr., *The Black Death Transformed: Disease and Culture in Early Renaissance Europe* (London: Arnold, 2002), chapters 1-3, pp. 7-54. For the traditional theory that it was bubonic plague (with the bacillus *Yersinia pestis*), see Ole J. Benedictow, *The Black Death, 1346 - 1353: The Complete History* (Woodbridge, UK: Boydell, 2004), which overlooks Cohn and his arguments.

admonition 'eat, drink, and be merry, for tomorrow we die'. Evidently the large cash balances and assets that the fortunate few survivors inherited may have promoted such patterns of lavish, conspicuous consumption.[40]

When we come to the fifteenth century, we may draw, as generations of cultural historians have done, upon Johan Huizinga's insights in his famed *The Autumn of the Middle Ages*.[41] Though ostensibly covering the later Middle Ages, this classic monograph focuses on the mid fifteenth-century culture and art of the Burgundian Low Countries. In his chapters on 'The Vision of Death' (five) and 'Art in Life' (twelve), Huizinga depicts the now strong tendencies towards more sombre displays in costume, decoration, and art, though without providing a convincing explanation for this cultural and artistic transition. For clothing and dress, he notes the very strong predilection for greys, blacks, and violets (purples): stating that 'a preference for darkly glowing and muted combinations is unmistakable'. He contends that yellows and browns were rare, 'because they were held to be ugly' and furthermore that 'yellow already signified enmity'. Evidence presented earlier in this study (see p. 11) has shown that yellow was extremely rare, to be found only in the 1330s and 1340s (in the Bruges accounts); and the great difficulty of producing a weld-yellow that would hold fast with exposure to rain, perspiration, and the bleaching effects of the sun provide good technical reasons for their rarity in medieval costume and dress.

Greens and blues were much more common, in Huizinga's portrait of Burgundian clothing styles; but he believed them to be unsuitable for formal dress, in that green symbolized a state of love, and blue, of

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[40] See in particular: Harry Miskimin, *The Economy of Early Renaissance Europe, 1300 - 1460* (Cambridge, 1975), pp. 25-32; David Herlihy, *Medieval and Renaissance Pistoia: The Social History of an Italian Town, 1200 -1430* (New Haven, 1967), pp. 55-71, 180-212; Robert Lopez, 'Hard Times and Investment in Culture', in Wallace Ferguson, et al., eds., *The Renaissance* (New York, 1962), pp. 29-52; Giovanni Boccaccio, *The Decameron*, trans. J.M. Rigg (London, 1921): introduction, esp. p. 7; Anthony Cassell, 'Boccaccio, Giovanni', in Joseph Strayer, et al, eds., *Dictionary of the Middle Ages*, 13 vols. (New York: Scribner, 1982 - 89), Vol. II, pp. 277-90.

[41] Johan Huizinga, *The Autumn of the Middle Ages*, translated by Rodney Payton and Ulrich Mammitzsch (Chicago: University of Chicago Press, 1995): translated from the second Dutch edition of *Herfsttij der middeleeuwen* (Haarlem: H.D. Tjeenk Willnik, 1921). See chapters 5, pp. 156-72, and 12, pp. 294-328. More familiar to older scholars was the first English translation, authorized by Huizinga, but one that badly truncated the original Dutch text (and, according to these translators misrepresented his meanings in many places): *The Waning of the Middle Ages: A Study of the Forms of Life, Thought, and Art in France and the Netherlands in the XIVth and XVth Centuries* (London: E. Arnold & Co., 1924).

fidelity; but 'blue, if used with hypocritical intent, could also signify infidelity .... and also the victim of unfaithfulness'; and it could also serve 'as the color of folly'. Thus Huizinga gives he greatest emphasis to the role of black colours in clothing:[42]

> It is remarkable that black and violet are more popular for clothing than green and blue..... Black, above all black velvet, undoubtedly represents the proud, somber splendor that the time loved, with its arrogant distance from the gay wealth of color found everywhere. [Duke] Philip the Good, after having passed the days of his youth, always wore black and had his entourage and horses in the same color. The favorite colors of King René [of Anjou], even more eager for distinction and refinement, were gray-white-black.

Huizinga also notes the importance of greys during this period, in terms of this same sombre theme: 'as a color of sadness'.[43]

Further evidence for the increasing prevalence and then predominance of black and grey woollens can be found in Françoise Piponnier's study of fashions in this same court of Anjou, during the second half of the fifteenth century, though without offering any convincing explanation for this fascinating phenomenon.[44] In a subsequent publication, however, she and co-author Perrine Mane contend that 'the habit of wearing black mourning clothes, attributed to the Spanish, was adopted by French and English royalty'; and they also speculate in particular that Duke Philip the Good's insistence of the exclusive use of black colours was a 'sign of mourning after the assassination of his father', Jeans the Fearless, in 1419.[45] Yet elsewhere they contend that the fifteenth-century preference for black emanated from the 'black silks [that had] originated in Italy' – a speculation that still does not explain the colour itself; and theyfurther comment

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[42] All quotations are from Huizinga, *Autumn of the Middle Ages*, pp. 325-27.

[43] *Ibid*., p. 328

[44] Françoise Piponnier, *Costume et vie sociale: la cour d'Anjou, XIVe- XV siècle* (Paris-The Hague: Mouton, 1970), pp. 188-94, 212-18. For her other observations on the 'deep shades so popular in the late Middle Ages: dark greens and blues, violet and especially black', see Piponnier and Mane, *Dress in the Middle Ages*, p. 17, and pp. 71-76; on the earlier preference for scarlets and red – 'red being the colour then considered most prestigious', see p. 57. For other observations on fashions in the court of Anjou, and colour preferences, see Raymond Van Uytven, 'Rood-wit-zwart: kleurensymboliek en kleursignalen in de Middeleeuwen', *Tijdschrift voor geschiedenis*, 97 (1984), 447-69, especially pp. 448-49.

[45] Piponnier and Mane, *Dress in the Middle Ages*, pp. 113, 73, respectively (for the quotations).

that 'the use of black in the fifteenth century appears to have been a reflection of fashions in clothing rather than any idea of mourning or sadness', an assertion that contradicts both their earlier expressed views and those of Huizinga, as well.[46]

In his own conclusion on fifteenth-century court fashions, Huizinga contends that 'from the middle of the century on, the use of black and white [and greys] seems temporarily to be in decline, while that of blue and green is on the rise'. That view is not, however, substantiated by the evidence on textile colours presented here, up to the 1550s; and Huizinga himself qualified this remark by stating: 'but this is only a preliminary impression that is in need of further supporting evidence.'[47]

Finally, some scholars have suggested that black came to be favoured because dyeing in black was supposedly more expensive than dyeing in other traditional colours. Thus their argument proceeds, as the following: that since value was attached to cost, and since prestige was attached to value, the aristocracy and the wealthy, upper bourgeoisie (including town mayors and aldermen) came to prize and esteem black over other less costly colours (i.e., in dyed woollens). This argument or hypothesis is wholly fallacious for two reasons. First, there is absolutely no statistically significant difference in the costs of dyeing woollens in any of the colours other than those created by using the scarlet *kermes*: i.e., the prices for black-dyed woollens are no higher or lower than those for greys, browns, purples, greens, standard reds, and for medley and striped woollens.[48] Second, even if this argument had any validity, why would such wealthy consumers come to

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[46] *Ibid*., quotations from pp. 72, 119, respectively.

[47] Huizinga, *Autumn of the Middle Ages*, p. 328. He also notes that reds were still commonly used, and predominated 'in festive and official dress', an observation not substantiated by the evidence. For more general comments on the relative importance of red, white, and black in late-medieval clothing, heraldry, and adornment, see Raymond Van Uytven, 'Cloth in Medieval Literature of Western Europe,' 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, 1983), pp. 151-83; and Van Uytven, 'Rood-wit-zwart: kluerensymboliek en kleursignalen', pp. 447-69.

[48] This argument was raised both by participants in the 2005 International Medieval Congress at Leeds, where I presented this paper (note 1) and by a referee for this journal. Evidently this myth about the cost of dyeing in black is widely held by textile historians. I have examined all of the cloth prices for the variously coloured (dyed) woollens purchased for the upper echelons of the Bruges civic government during the entire fifteenth century, and then applied a Difference of Means test to demonstrate that there was no statistically

prefer black woollens over the indisputably far more expensive scarlets, i.e., those dyed solely in *kermes* or dyed first with woad (in the wools or yarns) and then in the piece with *kermes* and sometimes with other dyes as well? As this study also demonstrates, such very costly 'scarlets' virtually disappeared from the accounts of cloth purchases in Bruges, Mechelen, Ghent, and other cities by the later fifteenth century. Why scarlets then fell out of favour, at least in northern Europe, is question not easily answered.[49]

Early-modern techniques of dyeing black: logwood

Subsequently, however, in the early-modern era, dyeing in black became more cost effective with the introduction of a new dye first known, in England, as Bluewood or Blackwood, and subsequently better known as Logwood: a dye extracted from the dark heartwood of the small, thorny tropical tree *Haematoxulym capechianum* of the family *Leguminosae*.[50] Sometime in the early to mid-sixteenth century, the Spanish had discovered large stands of this tree in the Campeche region (hence the Latin name) of Mexico's Yucatan Pensinsula. Subsequently, from the 1640s, the English established logging camps on the adjacent, swamp infested (and thus unsettled) Caribbean region known as the Golfo de Honduras, later British Honduras (modern-day Belize), to become major suppliers of this new dyestuff. According to Kenneth Ponting, logwood 'was one, and probably the most important, of the new dyes introduced into Europe following the

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significant difference in prices for these woollens, over the entire century, as determined by the colours. See Tables 3 and 4 for the sources of the data that were employed in this test.

[49] See Tables ; and also Munro, 'The Medieval Scarlet', pp. 13-70. The last purchase of a scarlet recorded in the Mechelen town accounts was in 1416 (as noted earlier); in the Bruges town accounts, the last was in 1482; in Ypres, in 1486. In fifteenth-century Italy, however, scarlets certainly continued to be popular. In the years 1451–76, the Florentine woollen cloth industry accounted for 13,528 of the total of 27,210 woollens sold in Rome (virtually half: 49.72 percent); and of these Florentine woollens, 5,354 (39.58 percent) were extremely costly kermes-dyed scarlets (*panni di grana*). See Hidetoshi Hoshino, *L'Arte della lana in Firenze nel basso Medioevo: Il commercio della lana e il mercato dei panni fiorentini nei secoli XIII–XV* (Florence: Leo S. Olschki Editore, 1980), tables XLII–XLIII, pp. 286–87.

[50] Wayne P. Armstrong, 'Logwood and Brazilwood: Trees That Spawned Two Nations', *Pacific Horticulture*, 53 (Spring 1992), 38-43: 'The actual dye from logwood is hematoxylin, a complex phenolic compound similar to the flavonoid pigments of flowers. The chemical structure of hematoxylin is practically identical with the dye brazilian from brazilwood, except that hematoxylin has one additional atom of oxygen.'

discovery of America'.[51]

Initially, however, the new dye was not well received. In England, Parliament prohibited its use from 1581 (23 Elizabeth I) to 1662 (14 Charles II), ostensibly because of its 'inferior colour'. Possibly the ban was due to the prejudice and protectionism of traditional woad dyers. Or it may have been due, as Ponting suggests, to dyeings that 'were badly done' particularly for 'blue, in which form it compared very badly for fastness properties both with itself as black and even more noticeably with indigo [or woad], the traditional blue'.[52] As he also notes, before dyeing with logwood had become perfected, black-dyeing was a very complicated process that required either a repeated immersion of the woollen cloth into a vat with woad or indigo dyes, to develop the proper shade with 'repeated oxidations in the air', ultimately yielding a deep navy blue. This colour was then transformed into back by applying an alum mordant (or other metallic salt) to the cloth, which was then immersed into a vat with the dissolved madder and/or weld. Black-dyeing with logwood ultimately proved to be much simpler when used with a ferrous sulphate ($FeSO_4.7H_2O$) mordant, better known as copperas. Even better results were obtained by using a chrome mordant.[53] As Wayne Armstrong also states, 'the presence of a considerable amount of tannin in the purplish-red dy bath allow the logwood extract to react with iron salts to give a permanent black colour', especially for woollens.[54] Finally, Ponting comments that 'many old wool dyers would still maintain that it was the best black ever

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[51] Kenneth G. Ponting, 'Logwood: an Interesting Dye', *Journal of European Economic History*, 2:1 (Spring 1973), 109-19 (quotation on p. 109). See also Arthur M. Wilson , 'The Logwood Trade in the Seventeenth and Eighteenth Centuries', in Donald C. McKay, ed., *Essays in the History of Modern Europe* (New York: Harper and Bros, 1936), pp. 1-23.

[52] Ponting, 'Logwood', p. 115, citing Clement Bolton, *The Dyer*, 13 April 1936: 'compared with indigo navy blues they [logwood dyes] are almost worthless'.

[53] Ponting, 'Logwood', p. 110, 117. In the copperas process, 'the wool was mordanted for 1 ½ - 2 hours with 4-6% ferrous sulphate, 2% copper sulphate, 2% alum, and 8-12% Argol; then taken out, left overnight and dyed the next day with 40-50% Logwood'. In the chrome process, the wool was mordanted 'with 3% bichromate of potash and 1% sulphuric acid', then washed and dyed in 'a separate bath with 35-50% of Logwood.'

[54] Armstrong, 'Logwood and Brazilwood', 38-43.

dyed', despite the modern use of synthetic aniline dyes.[55] Obviously, however, this superior method of black-dyeing with mordanted logwood was developed long after the period examined in this study, in which the combined processes of woad and madder dyeing remained the only effective method.

Economic historians amd questions of colour and textile fashions

Why should the economic historian, as opposed to a cultural historian – and they certainly should not be opposed – be concerned with such seemingly immaterial concerns as colours? The answer is that colour is an essential element of fashion, and that fashions, especially often mercurial changes in fashion, play a major role in changing market demand. Unfortunately, too many economic historians today focus on supply-side problems as the chief progenitors of economic change and development. Some unfairly deride those who look to demand factors, as agents of economic changes, somewhat sarcastically citing Say's Law: that supply creates its own demand. Even those concerned with demand and market forces are too often concerned with issues of real wages and income distributions, and relative prices in determining market choices, without paying due concern to the role of human desires, tastes, wants, and thus fashions, in formulating demand – perhaps because they are factors not so amenable to econometric analysis.

Indeed modern cliometricians (econometric historians) may anathematize anecdotes, but one may serve a useful purpose for this argument. In the 1540s, the Antwerp-based Van der Molen firm, which specialized in selling Hondschoote *says* in Italy, instructed its factors in the Antwerp market to select the *says* solely on the basis of their colours, 'for it is the colours that sell the *says,* not their quality'.[56] Indeed, the firm recommended the selection of rich, vibrant colours for a product that now represented a very distinct change in fashion from those luxury woollen broadcloths that have been the object of this study. The rise – or rather the revival and rapidly renewed expansion – of the Flemish *sayetteries* and other branches of the old

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[55] Ponting, 'Logwood', p. 117.

[56] 'Ick bidde U wilt bovenal altijts naer die scoen colueren sien, want de coluer doet 't saij vercopen ende niet de duecht'. From Florence Edler, 'Le commerce d'exportation des sayes d'Hondschoote vers Italie d'après la correspondance d'une firme anversoise, entre 1538 et 1544,' *Revue du Nord*, 22 (1936), 249-65: at pp. 254, 259.

draperies légères ('light draperies', producers of worsteds or mixed worsted-wollen stuffs) had succeeded in supplanting the traditional woollen broadcloth draperies, and those upstart imitators, the aforementioned *nouvelles draperies*, even before the mid sixteenth century. Evidence from the 1560s indicates that the textile output from the *sayetteries* and other *draperies légères* in the southern Low Countries was about 3.64 million metres (measured by fabric length): about 76 percent more than the estimated output of 2.07 metres from the *nouvelles draperies* and the few remaining traditional luxury-oriented woollen draperies.[57]

In other publications I have sought to explain this radical industrial transformation in the Low Countries and England in terms of comparative advantage, involving changes in relative costs for wool and labour, demographic changes, combinded with disproportionate urbanization, and, finally, dramatic reductions in transportation and transaction costs that permitted sufficiently favourable commercial scale economies to make long-distance trade in much lower priced textiles once again profitable, especially to the Mediterranean bsin and the New World.[58] That discussion also involved, though to a much lesser extent, possible changes in income distributions and real wages that may have fostered the expansion of these much cheaper, lighter textile products.

I did not, however, give sufficient attention to changing fashions – and thus to colours. There can be little doubt that a very major factor promoting demand and market expansion for these *sayetteries* and *draperies légères*, producing worsteds or mixed woollen-worsted stuffs, was the novelty of radically new fashions, in varieties and shades of many colours, in some novel dye mixtures, in weave patterns (visible in worsteds, but not in fulled and shorn woollens), and designs. That was true not only in the southern Low Countries, but also in England, and Holland, from the 1570s, when the Revolt of the Low Countries led to

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[57] Hugo Soly and Alfons Thijs, 'Nijverheid in de zuidelijke Nederlanden', in J.A. Van Houtte, et al., eds., *Algemene geschiedenis der Nederlanden*, 12 vols. (Haarlem: Fibula-Van Dishoeck, 1979), Vol. 6, pp. 27-57.

[58] Munro, 'The Origins of the English New Draperies', pp. 83-87; Munro, 'The Woollen Industries: Struggle for Markets', pp. 288-98. See also, in this same volume, Herman Van der Wee (in collaboration with John Munro), 'The Western European Woollen Industries, 1500 - 1750', in David Jenkins, ed., *The Cambridge History of Western Textiles*, 2 vols. (Cambridge and New York: Cambridge University Press, 2003), Vol. I, pp. 397- 472.

a rapid outflow of skilled artisans both to the north, into the now independent Protestant Holland, and across the Channel to East Anglia (also Protestant), where these transplanted crafts rapidly developed under the name of the New Draperies (which must not be in any way confused with the Flemish *nouvelles draperies*).[59]

Furthermore, their very cheapness itself promoted experiments in fashion changes and designs, while the extremely high price of traditional woollen broadcloths – representing an investment to be bequeathed to children and relatives – promoted a retention of very conservative and uniform colours and designs (as is the case with today's tuxedos, for men). In other words, many consumers willingly risked buying radically new fashions in textiles since the cost was such a much lower or even insignificant proportion of their incomes. A combination of cheapness and lightness in the products of the Flemish *sayetteries* and the subsequent English New Draperies (essentially the same textiles) may explain their marketing success in the Mediterranean basin and the New World. We should not, however, assume that the primary consumers of these low-priced textiles were necessarily those in the lower income strata of these societies, for we find that the Van der Molens of Antwerp were selling large quantities of Hondschoote *says* to aristocratic households in Italy, perhaps to clothe their servants, .[60] Furthermore, and possibly for similar reasons, we also find that consumers in the upper income strata in colder, northern Europe also proved to be important customers for these new worsteds and stuffs of the socalled New Draperies.

The colour and fashion origins of the modern Industrial Revolution

The historical importance of these early-modern *sayetteries* and the English New Draperies was in developing new markets, in terms of geographic dispersion and income distributions (i.e., among the lower middle classes, at least), a development that was further and even more dramatically fostered by the importation of South Asian cotton-based textiles known as calicoes and muslins, which, from the 1660s, were

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[59] See in particular 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); and Ursula Priestley, *The Fabric of Stuffs: The Norwich Textile Industry from 1565*, Centre of East Anglian Studies, University of East Anglia (Norwich, 1990).

[60] See Edler, 'Le commerce d'exportation des sayes d'Hondschoote', pp. 49-65.

marketed in vastly growing quantities by both the Dutch (VOC) and English East India Companies.[61] Their success was again a function of colours and fashions, particularly in the Asian industries' use of wooden block-printing to produce these comfortable light, relatively cheap fabrics with various exotic, multi-coloured designs – but of course, not in black! The Europeans, beginning with the Swiss, French, Dutch, and then English, soon mastered the art of block-printing calicoes with exotic, multi-coloured designs.

What Europeans could not do, however, was successfully spin fine cotton warps with the strength and quality of those produced in South Asia, and were limited to producing coarser fustians, with linen warps and cotton wefts. The whole story of the modern Industrial Revolution, beginning in Great Britain in the 1760s, revolves around the success of British innovators in resolving this problem: finally with the steam-powered mules (Roberts Mule of 1825), to process in 135 hours, 100 lb. of very fine, very strong cottons warps, a task that had taken Indian hand-spinners (using drop spindles) over 50,000 hours to achieve.[62] One might well argue that the requisite technological changes had been based on a supply-side problem: namely the disruption in the supply of South Asian cotton warp yarns, with the decay and then collapse of the Mughal Empire in the 1720s. For the Wyatt and Paul water-powered spinning roller, developed by 1733, while a commercial failure, was the crucial prototype for the later successful inventions: Arkwright's Water Frame (1769) and then Crompton's Mule (1774-79).

Nevertheless why would British entrepreneurs have been concerned about resolving such problems if there had not been the opportunity to exploit already established markets for such fashionable textiles? One

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[61] See Chandra Mukerji, *From Graven Images: Patterns of Modern Materialism* (New York, 1983), chapter 5, 'Culture and Industrialization, Part I: the Fashion for Calicoes', pp. 166-209; Javier Cuenca Esteban, 'Factory Costs, Market Prices, and Indian Calicos: Cotton Textile Prices Revisited, 1779 - 1831', *The Economic History Review*, 2nd ser., 52:4 (November 1999), 749 -55; Beverly Lemire, 'Reflections on the Character of Consumerism, Popular Fashion and the English Market in the Eighteenth Century', *Material History Bulletin*, 31 (Spring 1990), 65 - 70; Beverly Lemire, *Fashion's Favourite: The Cotton Trade and the Consumer in Britain, 1600 - 1800*, Pasold Studies in Textile History (Oxford: Oxford University Press, 1991); Lorna Weatherill, 'Consumer Behaviour, Textiles and Dress in the Late Seventeenth and Eighteenth Centuries', *Textile History*, 22:2 (Autumn 1991), 297 - 310.

[62] Stanley Chapman, *The Cotton Industry in the Industrial Revolution*, Studies in Economic History Series (London, 1972),Table 2, p. 20, from H. Catling, *The Spinning Mule* (Newton Abbot, 1970, p. 54

such markets was West Africa, which, in the 1720s had curtly rejected the poor quality cotton fabrics that were then being produced (as an experiment) in England and offered for sale by the Royal African Company. Those markets were to a very considerable extent the product of innovations in fashions and colours, beginning with the Flemish *sayetteries* and then the English New Draperies, and it was greatly expanded by the East India Companies' commerce in calicoes. Finally, it is worth noting that, in the attempt to resolve the problems of spinning cotton warps, one consideration was to develop a yarn that would hold fast those dyes known as Turkey Reds, which were now in great demand, i.e., so that the spun cotton fibres would absorb and retain the vivid dyes without fading when subjected to water and even bleaching.[63] One might say, therefore, that such market conditions that had promoted the beginnings of the modern Industrial Revolution represented the importance of a new Red Shift, in textile colours.

[63] Mukerji, *From Graven Images,* chapter 6: 'Culture and Industrialization, Part II: The British Cotton Industry', pp. 210-42 (esp. pp. 232-33).

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Table 1. Mechelen Woollen Cloths, 1471 - 1550:
The Town Government's Purchases of Luxury Woollen Textiles, manufactured in Mechelen,
For the Aldermen of the Mechelen Civic Government:
Annual Distributions by Colour, Value, and Prices, in £ groot Flemish,
in decennial means: 1471-80 to 1541-50

Part A

Decade	No. of Years	Total Annual Mean No. of Woollens Purchased for aldermen	Total Annual Mean Value of Cloth Purchases in £ groot Flemish	Mean Value of the Cloth £ groot Flemish	Blacks: number of cloths purchased each year	Blacks: Mean Price per cloth in £ groot Flemish	Blacks: Annual Mean Value Purchased in £ groot Flemish
1471-80	10	5.375	37.160	6.913	2.525	6.933	17.505
1481-90	7	6.321	41.892	6.627	1.190	7.567	9.008
1491-00	10	2.100	18.943	9.021	1.267	9.317	11.802
1501-10	10	2.117	21.521	10.167	1.658	10.151	16.833
1511-20	10	3.208	35.496	11.064	3.208	11.064	35.496
1521-30	10	4.592	50.008	10.891	4.592	10.891	50.008
1531-40	10	4.583	51.148	11.160	4.583	11.160	51.148
1541-50	10	4.583	53.655	1.166	4.583	11.707	53.655
1471-1550	77	309.833	2972.565	9.838	232.500	10.242	2427.540

Decade	No. of Years	Total Annual Mean No. of Woollens Purchased for aldermen	Total Annual Mean Value of Cloth Purchases in £ groot Flemish	Mean Value of the Cloth £ groot Flemish	Blacks: number of cloths purchased each year	Blacks: Mean Price per cloth in £ groot Flemish	Blacks: Annual Mean Value Purchased in £ groot Flemish
					75.04%		81.66%
1501-1550	50	190.833	2,118.287	11.100	186.250	11.122	2,071.412
					97.60%		97.79%

Part B:

Mechelen Decade	Purples: number of cloths purchased each year	Purples: Mean Price per cloth in £ groot Flemish	Purples: Annual Mean Value Purchased in £ groot Flemish	Blues: number of cloths purchased each year	Blues: Mean Price per cloth in £ groot Flemish	Blues: Annual Mean Value Purchased in £ groot Flemish	Greens: number of cloths purchased each year	Greens: Mean Price per cloth in £ groot Flemish
1471-80	1.100	6.759	7.435	1.650	6.935	11.443	0.000	0.000
1481-90	2.988	7.480	22.351	1.000	4.667	4.667	0.857	4.150
1491-00	0.400	9.610	3.844	0.000	0.000	0.000	0.000	0.000
1501-10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1511-20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1521-30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1531-40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Mechelen Decade	Purples: number of cloths purchased each year	Purples: Mean Price per cloth in £ groot Flemish	Purples: Annual Mean Value Purchased in £ groot Flemish	Blues: number of cloths purchased each year	Blues: Mean Price per cloth in £ groot Flemish	Blues: Annual Mean Value Purchased in £ groot Flemish	Greens: number of cloths purchased each year	Greens: Mean Price per cloth in £ groot Flemish
1541-50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1471-1550	35.917	8.051	269.247	23.500	5.909	147.100	6.000	4.150
	11.59%		9.06%	7.58%		4.95%	1.94%	
1501-1550								

Part C

Decade	Greens: Annual Mean Value Purchased in £ groot Flemish	Greys: number of cloths purchased each year	Greys: Mean Price per cloth in £ groot Flemish	Greys: Annual Mean Value Purchased in £ groot Flemish	Browns: number of cloths purchased each year	Browns: Mean Price per cloth in £ groot Flemish	Browns: Annual Mean Value Purchased in £ groot Flemish
1471-80	0.000	0.100	7.767	0.777	0.000	0.000	0.000
1481-90	3.557	0.000	0.000	0.000	0.000	0.000	0.000
1491-00	0.000	0.000	0.000	0.000	0.333	7.891	2.630
1501-10	0.000	0.000	0.000	0.000	0.458	10.227	4.688

Decade	Annual Mean Value Purchased in £ groot Flemish	number of cloths purchased each year	Mean Price per cloth in £ groot Flemish	Annual Mean Value Purchased in £ groot Flemish	number of cloths purchased each year	Mean Price per cloth in £ groot Flemish	Annual Mean Value Purchased in £ groot Flemish
1511-20	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1521-30	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1531-40	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1541-50	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1471-1550	24.900	1.000	7.767	7.767	7.917	8.899	73.178
	0.84%	0.32%		0.26%	2.56%		2.46%
1501-1550					4.583	10.227	46.875
					2.40%		2.21%

Part D: Decade	**Unspecified: cloth colors number of cloths purchased each year**	**Unspecified: cloth colors Mean Price per cloth in £ groot Flemish**	**Unspecified: cloth colors Annual Mean Value Purchased in £ groot Flemish**
1471-80	0.000	0.000	0.000
1481-90	0.286	8.083	2.310
1491-00	0.100	6.667	0.667
1501-10	0.000	0.000	0.000
1511-20	0.000	0.000	0.000
1521-30	0.000	0.000	0.000

Decade	number of cloths purchased each year	Mean Price per cloth in £ groot Flemish	Annual Mean Value Purchased in £ groot Flemish
1531-40	0.000	0.000	0.000
1541-50	0.000	0.000	0.000
1471-1550	3.000	7.375	22.833
	0.97%		0.77%
1501-1550			

Sources: Stadsarchief Mechelen, Stadsrekeningen, SeriesI: nos. 148 - 226; Algemeen Rijksarchief België (Brussels), Rekenkamer, reg. nos. 41,260 - 41,285.

Table 2 **Costs of Dyeing Scarlets at Mechelen, 1361 - 1415, in pounds groot oude of Brabant and pounds groot Flemish, in quinqennial means, 1361-54 to 1411-15**

\ **40 ells long = 27.56 metres (1 ell = 0.689 m)**

Years (5 Yrs) Mechelen	Whites or Blues: Costs	Percent of Final	lb of Grain*	kg of Grain	Price in d per lb	Price in d per kg	Cost of Grain in £ oude groot	Grain as Percent of total	Grain as Percent of cost of white cloth
1361-65	1.741	64.65%	22.548	10.580	9.41	20.05	0.884	32.81%	50.76%
1366-70	2.137	52.03%	24.906	11.687	18.12	38.62	1.881	45.79%	88.00%
1371-75	2.446	57.59%	30.275	14.207	13.38	28.52	1.688	39.76%	69.04%
1376-80	2.534	45.56%	38.688	18.154	17.73	37.78	2.858	51.39%	112.80%
1381-85	2.473	53.88%	32.663	15.327	14.46	30.81	1.968	42.88%	79.57%
1386-90	2.523	56.66%	25.063	11.761	17.00	36.23	1.776	39.87%	70.37%
1391-95	2.796	62.85%	23.389	10.975	15.69	33.44	1.529	34.38%	54.70%
1396-1400	2.945	64.22%	23.625	11.086	15.56	33.16	1.532	33.40%	52.01%
1401-05	3.705	64.07%	30.616	14.367	15.23	32.46	1.943	33.60%	52.44%
1406-10	3.993	64.19%	30.482	14.304	16.24	34.60	2.062	33.16%	51.65%
1411-15	4.107	55.70%	35.289	16.559	20.69	44.09	3.042	41.25%	74.07%

Years (5 Yrs) Mechelen	Dyeing and Shearing £ oude gr	Finishing Costs of Percent of Total	Total Costs and Price	Price in £ groot Flemish
1361-65	0.068	2.54%	2.694	
1366-70	0.089	2.18%	4.107	
1371-75	0.113	2.66%	4.247	10.553
1376-80	0.170	3.05%	5.561	14.371
1381-85	0.149	3.24%	4.589	12.279
1386-90	0.154	3.46%	4.453	12.947
1391-95	0.123	2.77%	4.448	9.929
1396-1400	0.109	2.37%	4.586	10.318
1401-05	0.135	2.33%	5.783	13.011
1406-10	0.165	2.66%	6.220	13.996
1411-15	0.225	3.05%	7.374	17.470

* ‘grain’ (*granum* in Latin) means the scarlet dyestuff kermes. See the text for a fuller explanation.

Sources: Stadsarchief Mechelen, Stadsrekeningen, Series I: nos. 3 - 92; Algemeen Rijksarchief België (Brussels), Rekenkamer, registers nos. 41,218 - 222.

Table 3 **Changing Colour Patterns in Medieval Flemish Woollen Cloths:**

Mean Annual Distributions of Flemish Luxury Woollen Broadcloths: by colour types and by values (in Flemish £ groot) in the records of cloth purchases for the burgermasters, aldermen, and upper clerks of the Bruges civic government, in decennial means, 1301-10 to 1491-96

Part A

Decade	No. of Years	Mean Number of Cloths per year	Mean Value/year purchases in £ groot Flemish	Mean Price in £ groot Flemish	percent non-Scarlets by number	percent non-Scarlets by value	mean value of non-Scarlet Cloths in £ groot	Scarlets: percent by Number	Scarlets: percent by Values	Scarlets: £ groot Mean Value
1301-10	8	6.563	14.677	2.236	100.00%	100.00%	2.236	0.00%	0.00%	0.000
1311-20	2	11.500	19.679	1.711	100.00%	100.00%	1.711	0.00%	0.00%	0.000
1321-30	0	0.000	0.000	0.000	0.00%	0.00%	0.000	0.00%	0.00%	0.000
1331-40	9	19.389	34.746	1.792	61.32%	55.69%	1.628	38.68%	44.31%	2.053
1341-50	7	22.643	57.395	2.535	68.45%	51.57%	1.910	31.55%	48.43%	3.891
1351-60	8	17.020	98.252	5.773	45.90%	27.08%	3.406	54.10%	72.92%	7.781
1361-70	8	40.542	259.833	6.409	69.17%	49.62%	4.597	30.83%	50.38%	10.473
1371-80	5	45.067	375.705	8.337	82.69%	70.19%	7.076	17.31%	29.81%	14.361
1381-90	8	33.281	316.256	9.503	79.72%	64.00%	7.629	20.28%	36.00%	16.866
1391-00	10	51.850	407.521	7.860	86.40%	69.83%	6.352	13.60%	30.17%	17.440
1401-10	10	58.150	420.668	7.234	82.69%	68.12%	5.959	17.31%	31.88%	13.323

Decade	No. of Years	Mean Number of Cloths per year	Mean Value/year purchases in £ groot Flemish	Mean Price in £ groot Flemish	percent non-Scarlets by number	percent non-Scarlets by value	mean value of non-Scarlet Cloths in £ groot	Scarlets: percent by Number	Scarlets: percent by Values	Scarlets: £ groot Mean Value
1411-20	10	52.400	310.783	5.931	88.74%	80.40%	5.373	11.26%	19.60%	10.325
1421-30	10	39.917	249.954	6.262	69.77%	62.30%	7.219	10.77%	19.56%	11.371
1431-40	10	39.450	285.193	7.229	91.63%	84.83%	6.692	8.37%	15.17%	13.114
1441-50	10	42.483	348.808	8.210	75.79%	65.08%	7.050	24.21%	34.92%	11.845
1451-60	10	44.850	298.252	6.650	100.00%	100.00%	6.650	0.00%	0.00%	0.000
1461-70	10	28.033	193.138	6.890	100.00%	100.00%	6.890	0.00%	0.00%	0.000
1471-80	10	26.317	192.133	7.301	100.00%	100.00%	7.301	0.00%	0.00%	0.000
1481-90	10	31.500	370.434	11.760	96.51%	94.49%	11.514	3.49%	5.51%	18.554
1491-96	6	25.667	218.367	8.508	100.00%	100.00%	8.508	0.00%	0.00%	0.000

Part B:

Decade	Medleys: percent by Number	Medleys: percent by Values	Medleys: £ groot Mean Value	Striped: percent by Number	Striped: percent by Values	Striped: £ groot Mean Value	Reds: percent by Number	Reds: percent by Values	Reds: £ groot Mean Value
1301-10	11.43%	11.68%	2.285	1.90%	1.99%	2.333	0.00%	0.00%	0.000
1311-20	0.00%	0.00%		0.00%	0.00%		0.00%	0.00%	
1321-30	0.00%	0.00%	0.000	0.00%	0.00%	0.000	0.00%	0.00%	0.000
1331-40	20.06%	20.06%	1.793	17.77%	14.37%	1.450	0.57%	0.42%	1.300
1341-50	22.40%	17.34%	1.963	25.24%	18.41%	1.850	1.26%	0.86%	1.725
1351-60	5.14%	2.98%	3.343	15.42%	10.29%	3.852	0.00%	0.00%	0.000
1361-70	31.65%	23.30%	4.718	14.03%	8.98%	4.102	1.64%	1.05%	4.107
1371-80	33.21%	28.05%	7.042	18.49%	17.05%	7.687	1.63%	1.12%	5.732
1381-90	20.38%	18.92%	8.825	1.03%	0.58%	5.305	2.25%	2.29%	9.662
1391-00	10.22%	9.49%	7.294	0.00%	0.00%	0.000	14.37%	10.31%	5.641
1401-10	29.72%	27.70%	6.742	0.00%	0.00%	0.000	10.06%	6.16%	4.430
1411-20	20.23%	20.30%	5.953	0.00%	0.00%	0.000	10.88%	9.68%	5.276
1421-30	30.19%	29.74%	6.168	0.00%	0.00%	0.000	0.00%	0.00%	0.000
1431-40	11.15%	10.53%	6.823	0.00%	0.00%	0.000	7.35%	6.87%	6.759
1441-50	4.24%	3.61%	7.000	0.00%	0.00%	0.000	2.47%	2.41%	8.000

Decade	Medleys: percent by Number	Medleys: percent by Values	Medleys: £ groot Mean Value	Striped: percent by Number	Striped: percent by Values	Striped: £ groot Mean Value	Reds: percent by Number	Reds: percent by Values	Reds: £ groot Mean Value
1451-60	3.12%	3.13%	6.679	0.00%	0.00%	0.000	0.00%	0.00%	0.000
1461-70	4.99%	4.53%	6.254	0.00%	0.00%	0.00%	0.00%	0.00%	0.000
1471-80	9.50%	8.04%	6.178	0.00%	0.00%	0.000	0.00%	0.00%	0.000
1481-90	0.00%	0.00%	0.000	0.00%	0.00%	0.000	0.00%	0.00%	0.000
1491-96	3.25%	2.75%	7.200	0.00%	0.00%	0.000	0.00%	0.00%	0.000

Part C: Decade	Browns: percent by Number	Browns: percent by Values	Browns: £ groot Mean Value	Yellows: percent by Number	Yellows: percent by Values	Yellows: £ groot Mean Value	Blues: percent by Number	Blues: percent by Values	Blues: £ groot Mean Value	Greens: percent by Number	Greens: percent by Values	Greens: £ groot Mean Value
1301-10	0.00%	0.00%	0.000	0.00%	0.00%		0.00%	0.00%	0.000	0.00%	0.00%	0.000
1311-20	0.00%	0.00%	0.000	0.00%	0.00%		0.00%	0.00%	0.000	0.00%	0.00%	0.000
1321-30	0.00%	0.00%	0.000	0.00%	0.00%	0.000	0.00%	0.00%	0.000	0.00%	0.00%	0.000
1331-40	0.00%	0.00%	0.000	1.72%	1.02%	1.058	1.72%	1.19%	1.242	4.01%	4.03%	1.802
1341-50	0.00%	0.00%	0.000	1.26%	0.73%	1.475	4.73%	2.99%	1.603	0.00%	0.00%	0.000
1351-60	0.00%	0.00%	0.000	0.00%	0.00%	0.000	0.00%	0.00%	0.000	0.73%	0.60%	4.750
1361-70	0.92%	0.96%	6.667	0.00%	0.00%	0.000	4.62%	3.40%	4.715	3.70%	2.88%	4.992
1371-80	1.78%	1.21%	5.700	0.00%	0.00%	0.000	10.50%	8.40%	6.667	7.54%	5.67%	6.261
1381-90	10.33%	6.31%	5.807	0.00%	0.00%	0.000	19.53%	14.66%	7.133	8.08%	5.49%	6.465
1391-00	0.39%	0.23%	4.650	0.00%	0.00%	0.00%	20.15%	14.56%	5.678	10.70%	8.98%	6.594
1401-10	0.17%	0.15%	6.300	0.00%	0.00%	0.000	2.64%	2.67%	7.316	12.93%	9.57%	5.356
1411-20	5.63%	5.89%	6.210	0.00%	0.00%	0.000	9.92%	9.14%	5.460	9.54%	7.86%	4.888
1421-30	2.00%	1.70%	5.325	0.00%	0.00%	0.000	8.27%	5.73%	4.342	13.53%	14.99%	6.937
1431-40	0.00%	0.00%	0.000	0.00%	0.00%	0.000	0.25%	0.18%	5.250	12.04%	11.84%	7.111
1441-50	0.00%	0.00%	0.000	0.00%	0.00%	0.000	6.83%	6.29%	7.569	10.95%	10.56%	7.925

Part C: Decade	Browns: percent by Number	Browns: percent by Values	Browns: £ groot Mean Value	Yellows: percent by Number	Yellows: percent by Values	Yellows: £ groot Mean Value	Blues: percent by Number	Blues: percent by Values	Blues: £ groot Mean Value	Greens: percent by Number	Greens: percent by Values	Greens: £ groot Mean Value
1451-60	2.23%	2.51%	7.500	0.00%	0.00%	0.000	16.39%	17.96%	7.286	7.13%	7.99%	7.447
1461-70	1.78%	1.78%	6.875	0.00%	0.00%	0.000	14.27%	16.71%	8.066	24.79%	25.99%	7.223
1471-80	7.22%	6.88%	6.953	0.00%	0.00%	0.000	8.36%	8.93%	7.798	19.38%	21.35%	8.044
1481-90	8.25%	8.03%	11.435	0.00%	0.00%	0.000	2.54%	2.50%	11.563	3.17%	3.06%	11.350
1491-96	3.25%	3.42%	8.950	0.00%	0.00%	0.000	5.84%	4.85%	7.065	3.57%	4.20%	10.000

Part D: Decade	Perse/ Purples: percent by Number	Perse/ Purples: percent by Values	Perse/ Purples: Mean Value	Blacks: percent by Number	Blacks: percent by Values	Blacks: £ groot Mean Value	Greys: percent by Number	Greys: percent by Values	Greys: £ groot Mean Value
1301-10	0.00%	0.00%	0.000	0.00%	0.00%	0.000	0.00%	0.00%	0.000
1311-20	0.00%	0.00%	0.000	0.00%	0.00%	0.000	0.00%	0.00%	0.000
1321-30	0.00%	0.00%	0.000	0.00%	0.00%	0.000	0.00%	0.00%	0.000
1331-40	0.00%	0.00%	0.000	0.00%	0.00%	0.000	0.00%	0.00%	0.000
1341-50	0.00%	0.00%	0.000	0.00%	0.00%	0.000	0.00%	0.00%	0.000
1351-60	0.00%	0.00%	0.000	0.00%	0.00%	0.000	0.00%	0.00%	0.000
1361-70	1.54%	1.40%	5.800	0.00%	0.00%	0.000	0.00%	0.00%	0.000
1371-80	0.00%	0.00%	0.000	0.00%	0.00%	0.000	0.00%	0.00%	0.000
1381-90	1.13%	0.76%	6.400	3.19%	4.51%	13.417	0.00%	0.00%	0.000
1391-00	0.00%	0.00%	0.000	0.00%	0.00%	0.000	10.90%	9.66%	8.718
1401-10	0.40%	0.29%	5.143	6.53%	5.15%	5.704	3.35%	2.58%	5.573
1411-20	0.00%	0.00%	0.000	2.10%	2.30%	6.500	9.64%	8.63%	5.311
1421-30	0.00%	0.00%	0.000	0.00%	0.00%	0.000	17.20%	15.32%	5.576
1431-40	0.51%	0.36%	5.075	14.45%	14.68%	7.343	21.04%	20.46%	7.031

Part D: Decade	Perse/ Purples: percent by Number	Perse/ Purples: percent by Values	Perse/ Purples: Mean Value	Blacks: percent by Number	Blacks: percent by Values	Blacks: £ groot Mean Value	Greys: percent by Number	Greys: percent by Values	Greys: £ groot Mean Value
1441-50	6.12%	5.54%	7.438	8.04%	7.52%	7.675	23.62%	20.38%	7.086
1451-60	0.45%	0.47%	7.000	8.03%	8.68%	7.190	26.98%	26.52%	6.537
1461-70	14.92%	15.58%	7.193	7.85%	7.88%	6.914	29.61%	25.59%	5.955
1471-80	16.34%	19.43%	8.680	9.50%	9.24%	7.100	29.70%	26.14%	6.425
1481-90	21.90%	22.84%	12.261	30.32%	33.96%	13.172	30.00%	23.83%	9.340
1491-96	9.09%	8.22%	7.693	42.21%	43.25%	8.718	32.79%	33.32%	8.644

Part E: Decade	Undyed or Unspecified colour: percent by number	Undyed or Unspecified: percent by value	Undyed or Unspecified: Mean Value in £ groot	Whites: White Bruges Keurlaken percent by number	Whites: £ groot percent by value	Whites: £ groot Mean Value in £ groot
1301-10	86.67%	86.34%	2.228	0.00%	0.00%	0.000
1311-20	100.00%	100.00%	1.711	0.00%	0.00%	0.000
1321-30	0.00%	0.00%	0.000	0.00%	0.00%	0.000
1331-40	15.47%	14.60%	1.691	0.00%	0.00%	0.000
1341-50	13.56%	11.23%	2.098	0.00%	0.00%	0.000
1351-60	24.60%	13.21%	3.099	0.00%	0.00%	0.000
1361-70	11.05%	7.64%	4.431	0.00%	0.00%	0.000
1371-80	9.54%	8.69%	7.588	0.00%	0.00%	0.000
1381-90	13.80%	10.48%	7.213	0.00%	0.00%	0.000
1391-00	19.67%	16.60%	6.631	0.00%	0.00%	0.000
1401-10	13.33%	11.64%	6.318	3.55%	2.21%	4.500
1411-20	0.00%	0.00%	0.000	20.80%	16.59%	4.731
1421-30	0.00%	0.00%	0.000	18.04%	12.96%	4.500
1431-40	5.83%	5.82%	7.217	19.01%	14.08%	5.355

Part E: Decade	Undyed or Unspecified colour: percent by number	Undyed or Unspecified: percent by value	Undyed or Unspecified: Mean Value in £ groot	Whites: White Bruges Keurlaken percent by number	Whites: £ groot percent by value	Whites: £ groot Mean Value in £ groot
1441-50	1.41%	1.20%	7.000	12.12%	7.55%	5.115
1451-60	20.07%	21.01%	6.961	15.61%	11.73%	4.998
1461-70	0.00%	0.00%	0.000	1.78%	1.94%	7.500
1471-80	0.00%	0.00%	0.000	0.00%	0.00%	0.000
1481-90	0.32%	0.28%	10.300	0.00%	0.00%	0.000
1491-96	0.00%	0.00%	0.000	0.00%	0.00%	0.000

Part F: Decade	Multi-Coloured or Bright Colours percent by number	Multi-Coloured or Bright Colours percent by value	Dark Colours percent by number	Dark Colours percent by value	Undyed Unspecified percent by number	Undyed Unspecified percent by value
1301-10	13.33%	13.66%	0.00%	0.00%	86.67%	86.34%
1311-20	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
1321-30	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1331-40	78.80%	80.18%	5.73%	5.22%	15.47%	14.60%
1341-50	81.70%	85.78%	4.73%	2.99%	13.56%	11.23%
1351-60	74.66%	86.19%	0.73%	0.60%	24.60%	13.21%
1361-70	79.09%	84.68%	9.87%	7.68%	11.05%	7.64%
1371-80	72.41%	77.25%	18.05%	14.07%	9.54%	8.69%
1381-90	54.27%	64.10%	31.92%	25.42%	13.80%	10.48%
1391-00	38.57%	50.20%	41.76%	33.20%	19.67%	16.60%
1401-10	57.27%	65.89%	25.85%	20.26%	16.88%	13.85%
1411-20	48.00%	55.48%	31.20%	27.93%	20.80%	16.59%
1421-30	42.96%	51.00%	39.00%	36.04%	18.04%	12.96%
1431-40	26.87%	32.57%	48.29%	47.52%	24.84%	19.90%

Part F: Decade	Multi-Coloured or Bright Colours percent by number	Multi-Coloured or Bright Colours percent by value	Dark Colours percent by number	Dark Colours percent by value	Undyed Unspecified percent by number	Undyed Unspecified percent by value
1441-50	30.91%	40.94%	55.55%	50.30%	13.53%	8.76%
1451-60	5.35%	5.65%	58.97%	61.61%	35.67%	32.74%
1461-70	6.78%	6.31%	91.44%	91.75%	1.78%	1.94%
1471-80	16.72%	14.91%	83.28%	85.09%	0.00%	0.00%
1481-90	11.75%	13.54%	87.94%	86.19%	0.32%	0.28%
1491-96	6.49%	6.16%	93.51%	93.84%	0.00%	0.00%

Sources: Stadsarchief Brugge, Stadsrekeningen, 1302 - 1496; Algemeen Rijksarchief België, Rekenkamer, registers nos. 33,147-238.

Table 4 **The Distribution of Woollen Broadcloths, Purchased for the Upper Echelons of the Bruges Civic Government, by Colours, in Decennial Means: 1310-10 to 1491-96**

Decade	Multi-Coloured or Bright Colours percent by number	Multi-Coloured or Bright Colours percent by value	Dark Colours percent by number	Dark Colours percent by value	Undyed Unspecified percent by number	Undyed Unspecified percent by value	Scarlets percent by Number	Scarlets percent by Values
1301-10	13.33%	13.66%	0.00%	0.00%	86.67%	86.34%	0.00%	0.00%
1311-20	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	0.00%	0.00%
1321-30	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1331-40	78.80%	80.18%	5.73%	5.22%	15.47%	14.60%	38.68%	44.31%
1341-50	81.70%	85.78%	4.73%	2.99%	13.56%	11.23%	31.55%	48.43%
1351-60	74.66%	86.19%	0.73%	0.60%	24.60%	13.21%	54.10%	72.92%
1361-70	79.09%	84.68%	9.87%	7.68%	11.05%	7.64%	30.83%	50.38%
1371-80	72.41%	77.25%	18.05%	14.07%	9.54%	8.69%	17.31%	29.81%
1381-90	54.27%	64.10%	31.92%	25.42%	13.80%	10.48%	20.28%	36.00%
1391-00	38.57%	50.20%	41.76%	33.20%	19.67%	16.60%	13.60%	30.17%
1401-10	57.27%	65.89%	25.85%	20.26%	16.88%	13.85%	17.31%	31.88%
1411-20	48.00%	55.48%	31.20%	27.93%	20.80%	16.59%	11.26%	19.60%
1421-30	42.96%	51.00%	39.00%	36.04%	18.04%	12.96%	10.77%	19.56%

Decade	Multi-Coloured or Bright Colours percent by number	Multi-Coloured or Bright Colours percent by value	Dark Colours percent by number	Dark Colours percent by value	Undyed Unspecified percent by number	Undyed Unspecified percent by value	Scarlets percent by Number	Scarlets percent by Values
1431-40	26.87%	32.57%	48.29%	47.52%	24.84%	19.90%	8.37%	15.17%
1441-50	30.91%	40.94%	55.55%	50.30%	13.53%	8.76%	24.21%	34.92%
1451-60	5.35%	5.65%	58.97%	61.61%	35.67%	32.74%	0.00%	0.00%
1461-70	6.78%	6.31%	91.44%	91.75%	1.78%	1.94%	0.00%	0.00%
1471-80	16.72%	14.91%	83.28%	85.09%	0.00%	0.00%	0.00%	0.00%
1481-90	11.75%	13.54%	87.94%	86.19%	0.32%	0.28%	3.49%	5.51%
1491-96	6.49%	6.16%	93.51%	93.84%	0.00%	0.00%	0.00%	0.00%

Sources: see the sources for Table 2.

Table 5. Prices of Dyed Flemish Woollens 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 decennial means, 1301-10 to 1491-96

Part A:

Decade	No. of Years data	Annual Mean of Total No. of Cloths Purchased	Annual Mean of Total Values in £ groot	Annual Mean Price in £ groot	Annual Mean no. of non-Scarlet Broadcloths Purchased	Mean Value of non-Scarlet Broadcloths Purchased in £ groot	Mean Price of non-scarlet Broadcloths purchased in £ groot	Mean number of Scarlets Purchased	Mean Value of Scarlets Purchased in £ groot	Mean Price of Scarlets in £ groot
1301-10	8	6.563	14.677	2.236	6.563	14.677	2.236			
1311-20	2	11.500	19.679	1.711	11.500	19.679	1.711			
1321-30	0									
1331-40	9	19.389	34.746	1.792	11.889	19.350	1.628	7.500	15.396	2.053
1341-50	7	22.643	57.395	2.535	15.500	29.600	1.910	7.143	27.795	3.891
1351-60	8	17.020	98.252	5.773	7.813	26.607	3.406	9.208	71.646	7.781
1361-70	8	40.542	259.833	6.409	28.042	128.918	4.597	12.500	130.915	10.473
1371-80	5	45.067	375.705	8.337	37.267	263.689	7.076	7.800	112.016	14.361
1381-90	8	33.281	316.256	9.503	26.531	202.412	7.629	6.750	113.844	16.866
1391-00	10	51.850	407.521	7.860	44.800	284.566	6.352	7.050	122.955	17.440
1401-10	10	58.150	420.668	7.234	48.083	286.551	5.959	10.067	134.117	13.323
1411-20	10	52.400	310.783	5.931	46.500	249.865	5.373	5.900	60.918	10.325

Part A: Decade	No. of Years data	Annual Mean of Total No. of Cloths Purchased	Annual Mean of Total Values in £ groot	Annual Mean Price in £ groot	Annual Mean no. of non-Scarlet Broadcloths Purchased	Mean Value of non-Scarlet Broadcloths Purchased in £ groot	Mean Price of non-scarlet Broadcloths purchased in £ groot	Mean number of Scarlets Purchased	Mean Value of Scarlets Purchased in £ groot	Mean Price of Scarlets in £ groot
1421-30	10	39.917	249.954	6.262	27.850	155.730	7.219	4.300	48.895	11.371
1431-40	10	39.450	285.193	7.229	36.150	241.917	6.692	3.300	43.276	13.114
1441-50	10	43.283	353.583	8.210	32.200	227.001	7.050	10.283	121.807	11.845
1451-60	10	44.850	298.252	6.650	44.850	298.252	6.650	0.000	0.000	0.000
1461-70	10	28.033	193.138	6.890	28.033	193.138	6.890	0.000	0.000	0.000
1471-80	10	26.317	192.133	7.301	26.317	192.133	7.301	0.000	0.000	0.000
1481-90	10	31.500	370.434	11.760	30.400	350.025	11.514	1.100	20.410	18.554
1491-96	6	25.667	218.367	8.508	25.667	218.367	8.508	0.000	0.000	0.000

Part B: Decade	Mean Price of Scarlets in £ groot Flemish	Value of a Basket of Consum-ables in d groot Flemish [a]	Daily Wage of a Master Mason in Bruges in d groot Flemish	Annual Money Wage Income: £ groot Flemish	No. of Baskets of Consum-ables with value of one scarlet	No of Baskets of Consumables with value of a non-scarlet dyed broadcloth	No. of Days' Wages of Master Mason to buy one Scarlet Broadcloth	No. of Days' Wages of Master Mason to buy one dyed Broadcloth	No. of baskets of consumables purchased with master mason's annual wage
1301-10									
1311-20									
1321-30									
1331-40	2.053								
1341-50	3.891	63.868	5.000	4.375	17.460	8.057	223.636	103.200	16.440
1351-60	7.781	93.576	5.600	4.900	17.403	9.041	297.099	150.837	12.640
1361-70	10.473	127.448	7.425	6.497	20.118	8.501	335.403	142.096	12.167
1371-80	14.361	143.271	8.400	7.350	23.631	11.016	385.671	188.943	12.184
1381-90	16.866	154.024	9.833	8.604	22.029	11.453	333.902	175.150	13.019
1391-00	17.440	112.596	9.425	8.247	36.711	13.286	445.907	158.628	17.549
1401-10	13.323	122.374	10.000	8.750	24.602	11.559	310.201	143.041	17.160
1411-20	10.325	127.993	10.000	8.750	20.307	10.067	259.108	129.762	16.407
1421-30	11.371	145.211	10.000	8.750	16.967	9.041	262.470	131.061	14.462
1431-40	13.114	166.506	10.900	9.538	21.061	9.862	285.972	149.146	13.745

Part B: Decade	Mean Price of Scarlets in £ groot Flemish	Value of a Basket of Consum-ables in d groot Flemish [a]	Daily Wage of a Master Mason in Bruges in d groot Flemish	Annual Money Wage Income: £ groot Flemish	No. of Baskets of Consum-ables with value of one scarlet	No of Baskets of Consumables with value of a non-scarlet dyed broadcloth	No. of Days' Wages of Master Mason to buy one Scarlet Broadcloth	No. of Days' Wages of Master Mason to buy one dyed Broadcloth	No. of baskets of consumables purchased with master mason's annual wage
1441-50	11.845	141.127	11.000	9.625	19.166	12.000	246.630	153.933	16.368
1451-60	0.000	138.140	11.000	9.625	0.000	11.493	0.000	144.394	16.722
1461-70	0.000	116.965	11.000	9.625	0.000	14.136	0.000	150.057	19.749
1471-80	0.000	134.649	11.000	9.625	0.000	13.011	0.000	158.767	17.156
1481-90	18.554	215.563	11.000	9.625	18.181	11.944	404.818	192.269	11.752
1491-96	0.000	154.860			0.000	11.765			

a. The physical composition of the Flemish basket of consumables, with their values in Flemish pence (d) *groot* for the base period, 1451-75: 45.461 litres of wheat (13.279d), 36.369 litres of rye (7.062d), 18.184 litres of barley (2.867d), 24.243 litres of peas (7.341d); 163.659 litres of barley for brewing malt (25.805d), 13.610 kg of butter (36.087d), 13.610 kg of cheese (8.578d), 1.225 metres of coarse woollen cloth (25.276). Total value of the basket in 1451-75 = 126.295d *groot* Flemish.

Sources: see the sources for Table 2; and also 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, '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 Caviococchi, 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, 2005), pp. 1013-76.

Sources: Stadsarchief Mechelen, Stadsrekeningen, Series I: nos. 3 - 92; Algemeen Rijksarchief België (Brussels), Rekenkamer,

registers nos. 41,218 - 222.

Table 6:

The Physical Composition of Woollen Cloths in the Low Countries and England during the Fifteenth and Sixteenth Centuries

	LEUVEN	MECHELEN	GHENT	ENGLAND
Ordinance Date	**1519**	**1544**	**1456/62, 1546**	**1552**
Name of Woollen	Oppersten Zegel [1st Seal]	Gulden Aeren [Golden Eagle]	Dickedinnen Five Seals	Coloured Short-cloths of Suffolk, Norfolk, Essex
Wools Used	English: Cotswolds, Middle March Berkshire	English: Leominster (Hereford) only	English: Fine March, Cotswolds, Berkshire	English: Unspecified [short staple]
Warp-Count	2400	3120	2066	not specified
Length on Loom	43 ells[a]	48 ells[b]	42.5 ells[c]	n.s.
Width on Loom	16 qrtrs.[d]	16 qtrs.	14.5 qtrs.	n.s.
Weight on Loom	90 lb.[e]	n.s.	n.s.	n.s.
Length After Fulling	30 ells	30 ells[f]	30 ells	32.22 ells = 24 yards[g]
Width After Fulling	10 qtrs.	10 qtrs.[f]	9.5 qtrs.	9.4 qtrs. = 7 qtr. yds.
Warps per cm.	13.81	18.11	12.46	n.s.
Final Weight	n.s.	58 lb.[h]	51 lb.[i]	64 lb.[j]
Area: in metres²	36.227 m.²	35.604 m.²	34.913 m.²	37.095 m.²
Weight: per metre² in grams	n.s.	764.4 g.	633.8 g.	782.6 g.

Notes:

a. 1 Brabant ell [Brussels, Antwerp] = 0.695 metre = 27.362 inches

b. 1 Mechelen ell = 0.689 metre = 27.226 inches

c. 1 Flemish ell [Bruges] = 0.700 metre = 27.559 inches

d. Quarter ell: here one quarter of the Brabant ell = 0.174 m. = 6.84 in.

e. 1 Brussels pound (lb.) = 467.670 grams = 1.03 lb. avoirdupois English

f. Estimated: prescribed dimensions after tentering but before final shrinkage (retrayage) were 32 ells by 11.5 quarters.

g. 1 English yard of cloth assize = 37.0 in. = 0.9398 metre = 1.343 ell.

h. 1 Mechelen pound (lb.) = 469.25 grams = 1.03 lb. avoirdupois

i. 1 Ghent pound (lb.) = 433.85 grams = 0.96 lb. avoirdupois

j. 1 pound avoirdupois English = 453.593 grams

SOURCES for Table 6

Leuven (Louvain):

Stadsarchief Leuven, no. 1526, fo. 203r-v, 210v.

Mechelen (Malines):

M. G. Willemsen, ed., 'Le règlement général de la draperie malinoise de 1544,' *Bulletin du cercle archéologique de Malines*, 20 (1910), 156-90.

Ghent (Gand, Gent):

Marc Boone, ed., 'Nieuwe teksten over de Gentse draperie: wolaanvoer, productiewijze en controlepraktijken (ca. 1456 - 1468),' *Bulletin de la commission royale d'histoire*, 154 (1988), 1 - 61.

M. J. Lameere, H. Simont, et al, eds., *Recueil des ordonnances des Pays Bas,* deuxième série, *1506 - 1700,* Vol. V (Brussels, 1910), pp. 272-83.

England (woollen shortcloths):

Great Britain, Parliament, *Statutues of the Realm*, Vol. IV:1, pp. 136-37 (statute 5-6 Edwardi VI, c. 6).