

4. THE TEXTILES

Carol Christiansen and the late Thea Gabra-Sanders

4.1 Introduction

The following report and catalogue was initiated following a request by the National Museums of Scotland (NMS) to complete work begun in the 1990s by the late Thea Gabra-Sanders on the textile assemblage from the Siller Holes archaeological site. NMS supplied Gabra-Sanders' preliminary unpublished report and incomplete catalogue, an unpublished report on the site and circumstances of the find, some photographs, unpublished dye analysis and leather finds reports. The author was given access to most of the textile finds for analysis, except those currently on display at NMS. After an initial review of the reports, catalogue and finds, it was decided that the textiles initially analysed by Gabra-Sanders should be re-examined, owing to the incomplete nature of her catalogue, a significant number of the collection which had not been examined by her, and changes in focus and methodology of textile analysis in the last 15 years.

The finds are numbered in the present report and catalogue based on find bag numbering and following the convention used in Gabra-Sanders' catalogue. Some textiles examined by Gabra-Sanders are not included in the present report because they are presently on display at NMS or because they could not be located. Conversely, textiles which had not been examined by Gabra-Sanders now have been analysed and are included in the present catalogue. Statistical analysis included in this report is based on woven textile finds examined by the present author only.

4.1.1 Methodology

The textiles were examined by eye, hand-lens and digital microscope. Each of the textiles was analysed using standard methodology for structure and appearance. These include spin direction (s, z), spin angle (ie degree of twist), thread diameter for each system, weave pattern (twill, tabby, etc.), thread count (ie fabric density), whether pigmentation is visible in any fibres, and surface appearance suggesting original surface treatments, wear and degradation (Walton and Eastwood 1988; Emery 1994). For spin angle and thread diameter, ten

measurements were taken for each thread system; for thread count, three measurements were taken for each thread system, unless otherwise noted.

Each find was photographed using a DSLR camera and digital microscope image capture at 20× or 40× magnification. In each of the magnified images the woven textiles are situated with presumed warp threads in vertical position and the fabric is placed with the probable right (outer) side facing, unless otherwise noted.

The textiles were arranged and analysed according to visual groups based on methodology developed by Hammarlund (Hammarlund 1998; Hammarlund 2005; Hammarlund et al 2008). This convention balances the emphasis on quantitative results from standard analytical methods, and identifies qualities in the cloth that cannot be ascertained from standard analysis. Arranging the textiles by similarity of visible qualities can help to identify fragments which are similar and may have originated from the same textile.

4.1.2 The site

The Siller Holes textiles were discovered during an archaeological watching brief, in spoil heaps resulting from land development in an area of previous lead mining. The finds are reported to have been extracted from spoil over a five-year period. As such, no firm dating contexts exist. The majority of the textiles have been tentatively dated to the 13th and 14th centuries, but dye analysis suggests that at least two textiles may be modern. Some show evidence of soil, roots and sun-fading in patches due to exposure. These post-deposition conditions differ from textiles found in underground mines, where conditions were generally more stable (Stöllner 2005; Grömer et al 2013).

4.2 Woven textiles (Table 2)

The Siller Holes group of textiles discussed in this report numbers 101 woven textiles, seven examples of matted fibres, and four fragments of rope or separate thread. The majority of the woven textiles are typical medieval cloth types found throughout northern Europe. They comprise a range of extremely fine cloth to very coarse fabrics and exhibit a range of skill in terms of manufacture.

The three main weave types are represented: plain weave (tabby), 2:1 twill and 2:2 twill. There are no examples of lozenge, diamond or herringbone twills, or any other more specialised weave constructions such as tablet weaving. The Siller Holes group of textiles appears to be mainly plain fabrics with little embellishment and without requiring the skills of specialists to make. The medieval textile assemblage found at Perth is similar in this regard (Dransart et al 2012: 9–10).

In Scotland the assemblage can be compared with two other large collections from medieval contexts in Aberdeen and Perth (Gabra-Sanders 2001; Dransart et al 2012), in England from London (Crowfoot et al 1992) and from Tønsberg, Norway, Lödöse, Sweden, and Turku, Finland (Hammarlund et al 2008). Unlike these medieval urban locations however, the Siller Holes site was both industrial and rural and the textiles assemblage presents a similar but less diversified group than that seen in large urban contexts.

4.2.1 Wool preparation

The amount of processing required to prepare wool for spinning was time-consuming and could add to the cost and value of a textile. Teased or carded wool generally created a light, three-dimensional thread and more woollen cloth, with fibres going in many directions; combing was used where a smooth thread or more worsted fabric was required, since wool fibres were aligned parallel.

A number of the Siller Holes textiles show signs that fibres were combed before they were spun (Find nos 94.1, 94.3, 123.1, 136, 147, 163, 164, 265, 273, 285, 361, 452, 454.1, 631, 663). The wool fibres in both thread systems appear parallel, and the threads are shiny and smooth. These worsted fabrics could be stiff if woven tightly, or have drape if more loosely woven, but in either case they had reduced insulating properties than more woollen-prepared fabrics. Typically no finishing treatments were used on worsted fabrics and for that reason they were considered less costly to make (Crowfoot et al 1992: 39). One of these, Find no. 136, can be identified as a shirt front from the cut of the fabric, and may suggest that the other textiles with similar quality also were used for clothing. These cloths may not

have been imports from England, where worsted fabrics were commonly produced. One fragment from Siller Holes (Find no. 164) is made of very hairy wool, and others include pigmented wool fibres. These worsted fabrics may reflect fleeces taken from local sheep flocks.

4.2.2 Spin

Most of the Siller Holes woven textiles (79%) were made with differences in spin direction between the two thread systems, which was a typical medieval practice. In medieval Perth, the situation is similar, with the majority of woven cloths using single spun threads using a z/s combination (Dransart et al 2012: 7). It is most likely that z-spun threads, which are usually narrower, are the warp and the s-spun, wider, threads are the weft.

In 2:1 twills, which are not the same on both sides, the weft is more prevalent on the reverse side. In the Siller Holes group, which is almost exclusively 2:1 twill, we see many fabrics where the s-spun threads are significantly wider than the z-spun thread (Find nos 124, 135, 328, 331.1, 358, 413, 521, 533, 557). On the non-twill (reverse) side of the fabric, the wider threads predominate, and create a soft, warm fabric next to the skin. This occurs in many of the coarser fabrics, whether plain or patterned (see below).

Generally it is more common for warp threads to have more twist than the weft, since twist imparts strength and warp threads are under tension while weft threads are not. However, in the Siller Holes assemblage the s-spun (weft) threads often have a higher level of twist than z-spun, and in some cases remarkably so (Find nos 113.2: 56%, no. 124.1: 60%, no. 313: 65%, no. 328: 61%, no. 351.1: 50%, no. 374: 80%, no. 521: 54%, no. 533: 57%, no. 610.2: 60%). This is an unusual occurrence in medieval fabrics. It meant extra work for the spinner, and was probably a conscious choice given its prevalence among the assemblage. The reasons for such high twist levels in the s-thread system may be due to the quality of wool available. Short fibres require considerably more twist to hold the thread together. Low-quality or waste wool is often short and could have been obtained from a variety of sources: heavily soiled wool removed

during wool grading, fibre waste from combing longer wools, and wool removed from stillborn lambs, slaughtered animals in autumn and winter livestock casualties. Such wool appears also to have been used in the felted and matted fibres.

There are 19 examples (19%) of z/z spinning but only three fabrics (3%) with s/s spinning in the Siller Holes group. In Perth 32% of fabrics were spun z/z, with fewer than 1% spun s/s. The apparent lack of s/s spun cloth in Scotland is typical for the period, as it appears to lose favour in the medieval period. It is under-represented in the cloth found in medieval London (Crowfoot et al 1992: 27).

4.2.3 Weaves

The most cohesive aspect of the Siller Holes collection is the overwhelming number of 2:1 twill, comprising 87%, against the other two most common binding types, plain weave (tabby, 1%) and 2:2 twill (1%). The 2:1 weave type was prevalent throughout the medieval period, gaining popularity and reaching a peak during the 13th century (Crowfoot et al 1992: 27). However, by the mid-14th century it had lost favour, possibly as a result of developments in horizontal looms in this period.

The Siller Holes group is highly unusual in the almost exclusive use of this weave type as compared to the Perth and Aberdeen finds, where 69.5% and 55% respectively are identified as 2:1 twill (Gabra-Sanders 2001: 222; Dransart et al 2012: 9), although note that weave type could not be determined in 45% of the Aberdeen textiles. The reasons for this are unknown, but may indicate a more homogeneous group of textiles owing to a localised, non-urban context. The viewpoint that 2:1 twills were not suited to the use of the vertical warp-weighted loom has been discounted in recent years, and this twill type can be made on either a vertical or a horizontal loom by a skilled weaver. Therefore, the prevalence of this weave type at Siller Holes cannot shed light on the introduction or diffusion of the horizontal loom in Scotland, and its prevalence at Siller Holes may have to do with localised regional preferences over a specific, limited period.

4.2.4 Finishing treatments

It was common in the medieval period to finish woollen cloth by fulling, sometimes in conjunction with napping, once the fabric had been removed from the loom. Fulling involves wetting and beating or stamping the cloth, thereafter stretching it to an even shape. It thickens and shrinks the cloth and can make it softer, more pliable and more hard-wearing, depending on the level of fulling imposed (Christiansen and Hammarlund 2014). By definition, fulling occurs to both sides of the fabric at the same time.

Napping was an additional process, which added significantly to manufacturing cost and therefore was not used on lower quality fabrics (McMillan 2012: 5). It required brushing the cloth with teazles to raise the surface fibres, then sometimes shearing the raised fibres close to the surface (Goldmann 2007). Napping could be applied to one or both sides of the fabric, but the more a fabric was napped the more expensive it became. A napped surface could wear off with use, making it difficult to recognise in the archaeological record.

Several examples (Find nos 77, 136.1, 313, 446, 454.2, 802) in the Siller Holes collection show evidence of napped surfaces. In two, Find nos 313 and 454.2, there is evidence of raised surfaces which have been sheared. Example 313 shows napped surfaces only on the underside of seams, and shirt front Find no. 136.1 has a napped surface on the inside facing of the central opening. These examples may indicate that the napped surface was used as the underside, to provide greater warmth.

In some archaeological textiles it is difficult to determine surfaces raised as part of a finishing treatment, especially where this surface has partially worn away, from woollen fibres raised during use. Certainly the thick weft threads used in the 2:1 twills, where they dominate the reverse of the fabric, achieved a disturbed surface during use. If a textile is very heavily used, any raised fibres are usually worn away until the cloth is literally threadbare. But textiles which have been discarded before they are heavily worn may show surface disturbance from use or from a finishing treatment. Such disturbed surfaces are noted in the Siller Holes catalogue.

4.2.5 Broadcloth

Three fragments (Find nos 77, 446, 802) are very hard fulled, with possible raised, napped surfaces. All are twills and one (Find no. 77) has been dyed. These qualities suggest they are broadcloth, a fabric developed in the medieval period and produced in large quantities throughout Europe by the 15th century (Coatsworth 2012: 97). Broadcloth was considered a high-quality fabric because of its intensive finishing treatments, which also made the fabric extremely hard-wearing. As such, clothing and other textiles made from broadcloth were passed down or traded for reuse (Munro 2009: 6). It is likely the Siller Holes examples are off-cuts of larger pieces of second-hand broadcloth, and because of their sturdy nature were ideal fabrics for paddings, insulation or other uses where a thick, hard-wearing cloth was required by mineworkers.

4.2.6 Colour and patterning

The use of colour in fabrics was important in the medieval period (Pritchard 1990; Dahl 2009; Vestergård Pedersen 2009). Even medium- to poor-quality fabrics at Siller Holes incorporate colour and pattern into cloth design in the form of dyed cloth, dyed yarns formed into coloured stripes, and the use of natural wool colours to create finely checked and mottled fabrics.

Dye analysis has been performed on some of the fragments where dyes appear to have been used. Dyes applied to the entire fabric, probably after weaving, have been used in some textiles (Find nos 77, 114, 454.2, 521, 555, 631). In other cases dyes are used sparingly, where dyed threads are inserted as stripes (Find nos 121.5, 139, 234, 256, 663.1) (Illus 10c; Illus 11c). The fragments are small and it is not possible to determine the extent of the use of stripes, or the original function of these cloths.

The Siller Holes collection includes a large group of fragments in which there is purposeful colour design by using one or two weft colours which differ from the colour of the warp. Like the majority of the cloth recovered at Siller Holes, these fabrics are 2:1 twill. The juxtaposition of different warp and weft colours creates a mottled effect on the twill side of the fabric, undoubtedly the right side, and a striped effect on the reverse (Find nos 94.2, 115, 156, 261,

264, 331.1, 430, 453.1, 610.2.4, 801). A 2:1 twill fabric with thick wefts and colour differences between warp and weft has been found in an Irish burial dating to the 7th century (Wincott Heckett 2013: 167). It has been interpreted as a woman's tunic because of its attachment to a rib bone. There are six examples of mottled 2:1 twill from medieval Aberdeen, although the mottling is confined to a single-coloured weft (Gabra-Sanders 2001: 223)

In nearly all cases where natural wool colour mottling has occurred, the weft threads are significantly thicker than the warp. This may have been necessary to effectively show the different weft colours on the twill (right) side of the fabric, where the warp threads dominate. An added benefit to using thick wefts, especially in a twill where these threads dominate on the reverse, is that it creates a fabric which is thicker and more three-dimensional than in plain weave, or a twill with thin wefts. Plain-coloured textiles at Siller Holes also show this feature (see above). During wear the surfaces of the weft threads become disturbed and create a soft 'flannel' effect close to the body, which provides added warmth. This property can be seen in Siller Holes examples Find nos 94.2, 115, 156, 224.2, 261, 331.1, 430, 453.1, 610.3 and 801.

4.3 Matted fibres (Table 3)

Matted fibres are found in six examples. They are loose wool fibres with no underlying textile structure, which have become pressed together through the combination of movement and moisture. Most of the examples appear not to be true felt, which is fibre (usually processed by teasing or carding) that has been purposefully beaten with moisture into a mass to create a felt 'fabric'. The Siller Holes wool shows evidence of original wool staple formation, indicating the wool was not prepared before being pressed. It is in thin layers which can be loosened and were simply clumps of wool loosely pressed together, probably through use. All of the Siller Holes examples were originally white wool, with a few having some naturally coloured fibres mixed in. The matted wool fibres in the Siller Holes material are generally short, suggesting they were waste wool.

There is evidence that padding was used at Siller Holes, as in the two textile fragments found in shoes (Find nos 801, 802). Mine workers would have

benefited from various types of pads to protect the body or ease working conditions, especially when working in wet and damp conditions in open-pit mines. It is not clear whether any of the felted or matted fibres found at Siller Holes were used for this purpose, as at another mining site where felt pads have been found, one elongated example has been interpreted as padding for a shoulder strap (Nutz 2015). Numbers 584 and 617 have distinct holes, and may have been used as cushioning or insulation for building or industrial purposes.

4.4 Rope and thread (Table 4)

Among the textile remains are a number of rope fragments, all made of hair. Several of the rope fragments may have been made by twining. This is a very simple technique, in use since the Neolithic for making cords and ropes, and can be done by one person, without the use of tools (Reichert 2013: 79–81). Rope Find nos 110.6 and 545 appear to have starting knots, especially Find no. 545, where it is clear to see how this simple rope was constructed (Illus 10d). Rope Find no. 110.6 is a more complex mass of hair, with wool thread attached. Textile Find no. 695 is a knot of woollen thread and likely to be spinner's waste. This may indicate that the spinning of threads was taking place at the site.

4.5 Discussion: textiles at a mining site

The Siller Holes site revealed a number of small, shallow pits and several larger ones, perhaps indicating that some mining may have taken place on open ground and leaving the workers exposed to the environment. An adit on the slope of Lead Law suggests mining may also have taken place underground, although the entrance has not been fully investigated. In this case mine workers would have faced a different environment – potentially damp, but protected from the weather. Indeed, miners working deep underground often required little clothing, as the body was warmed by activity and ground heat. The differences between open pit and underground mining may have affected the types of clothing, and possibly the forms of industrial textiles, required to operate the mine and carry away lead at Siller Holes.

Miners across Europe appear to have worn padded or quilted clothing and some type of headwear (Turnau 1994: 96–9). None of the Siller Holes textiles show evidence of layered fabrics sewn or quilted together and no examples of headwear could be identified.

The majority of the Siller Holes textiles appear to be discards, scraps and offcuts of larger pieces of fabric, garments or other textiles. As such, their use at Siller Holes was probably secondary (or more) to their original use.

Some heavily fulled or felted textiles show evidence of cut edges, such as two small examples of probable broadcloth, Find nos 77 and 446, and fulled fragments Find nos 94.2, 374, 454.2, which may be discards from trimmed fabrics, and which had no further use. Larger pieces such as Find nos 67, 315.1 and 423 were also probably cut from pre-used fabrics but were valuable enough to be used again. These thick and heavily fulled fabrics may have served as pads for feet, knees or shoulders when working the mine or carrying away lead. Textiles such as these may have served more than people working at the mine. A late 16th-century document relating to lead mining in Lanarkshire shows that horses equipped with 'armour clothing' were used to transport lead from Crawford Muir to Edinburgh (Cochran-Patrick 1878: 102).

Three textiles were found associated with shoes (Find nos 110.5.1, 801, 802) (Illus 10a) and indicate that mine workers benefited from padding and insulation for their feet. The open nature of the pit mines, located in cool and damp central Scotland, may have driven mine workers to reuse thick cloth fragments underfoot, or possibly as protection and warmth for the upper part of the foot.

A number of seams survive, but often without much surrounding fabric remaining (Find nos 124.1, 163, 285, 313). The seams, being two to four layers of fabric stitched together, were the strongest part of a sewn textile. The surviving seam fragments are certainly scraps of clothing or other sewn textiles which were discarded once they had become threadbare and no longer usable.

An exception is the left yoke front of a shirt, Find no. 136.1 (Illus 10b), which was cut away from the rest of the garment. It had been repaired at least once, having a diamond-shaped patch of similar fabric carefully and artfully sewn onto the shirt front

at the midriff. This textile provides valuable evidence as to the quality of cloth used for shirts in central Scotland and may indicate the type of clothing worn by mine workers.

The largest shaped fragment, Find no. 124, may be a sleeve. It is hemmed on the long edge and on a short section of the lower edge (Illus 11a).

Another fragment which may be a remnant of a shirt is the dyed and gathered fabric Find no. 631 (Illus 11d). No dye analysis was undertaken on this textile, but the wool appears combed and the sewing threads are made with skill. Together these features indicate this was a quality fabric.

A number of the Siller Holes textiles are thick and coarse, but one textile, 67, stands out as similar to textiles identified as carrying cloths or bags in other mines. This textile is probably too coarse for clothing, but ideal as heavy sackcloth, either as sewn bags or as flat cloth bundled at corners into bags. It is similar in quality to 15th- to 17th-century hauling bags found at gold mines in Salzburg and Carinthia (Nutz 2015).

4.5.1 Bias strips

The Siller Holes textiles contain an unusual group of narrow fabric strips, cut on the bias (Find nos 99, 110.6, 224.1, 234, 315.2, 331.3, 377, 524, 612, 654, 803) (Illus 10c). There are no common features as to the quality of these textiles, other than that they are twills. Many of this group show one edge turned under, even those which are heavily fullled. These strips were purposely cut on the bias. In this way they resemble facings or bindings for textile edges, such as at the neck and wrist, or reinforcement for the tops of sacks. The bias cut would indicate they were meant to be placed on round openings, or their purpose required stretch.

Strips have been found at other mining sites, although they are not necessarily cut on the bias, as at Siller Holes. At Hallstatt and Carinthia these have been interpreted as fragments discarded or laid aside as part of a 'rag chest' to be used by mine workers for many purposes. In some cases they may have served

miners directly as headbands, fingerstalls and other protective wraps for hands, and wound dressings (Stöllner 2005: 171; Grömer et al 2013: 130, 132; Nutz 2015). A brass relief from Clearwell Chapel in Newland Church, Forest of Dean, shows a 15th-century miner in work dress. He wears garters at his knees, and carries a container on his back, fitted over his shoulder with a strap (Nicholls 1858: [iii], 217).

In other cases cloth strips may have been used for operations in the mine. Indeed, a direct correlation between areas of discarded axe handle fragments and textiles at the Dürrnberg mining site strongly indicate that textile fragments were reused in the repair and hafting of tools (Stöllner 2005: 166). Evidence of looped and knotted strips, such as Find no. 118.2 (Illus 11b), have also been found at Dürrnberg and are thought to have served for hauling or hoisting (Stöllner 2005: 171).

4.5.2 Cloth qualities

Of the woven cloth, the most striking aspects of the Siller Holes assemblage are the nearly exclusive use of 2:1 twill, the preponderance of thick, tightly spun wefts and the application of surface treatments such as fulling. In addition, overall there is a lack of embellishment or decorative, complex weaves. Such fabrics can be made more quickly and cheaply than finer cloths.

These qualities indicate that the majority of fabrics at Siller Holes were designed to be soft, thick fabrics that could provide added insulation and warmth on the reverse side of the fabric. These fabrics would have been ideal for workers' clothing in open-pit mines, where they had to work outdoors in the damp, cool climate of central Scotland.

Some of the fabrics found at Siller Holes are likely to be second-hand off-cuts and scraps from larger pieces of fabric, to be used for purposes specific to work at the mine. These may have served as pads and insulation for the body or for industrial use. The preponderance of bias strips suggests that rags and cut lengths of fabrics were required for various purposes on site.



a



b



c



d

Illus 10 Textile finds. (a) Find no. 110.5.1: A leather shoe with its thick, felted lining (© National Museums of Scotland); (b) Find no. 136.1: A diamond-shaped patch has been carefully sewn into this shirt front (photograph: Carol Christiansen; © National Museums of Scotland); (c) Find no. 234: Dyed threads have been inserted as stripes in this bias-cut strip (© National Museums of Scotland); (d) Find no. 545: Starting knot in a piece of rope (photograph: Carol Christiansen; © National Museums of Scotland)



a



b



c



d

Illus 11 Textile finds. (a) Find no. 124: Possibly a sleeve, this fragment is hemmed on the long edge and on a short section of the lower edge (© National Museums of Scotland); (b) Find no. 118.2: This looped and knotted strip may have served for hauling or hoisting (© National Museums of Scotland); (c) Find no. 256: Dyed threads have been inserted as stripes (© National Museums of Scotland); (d) Find no. 631: This fragment's wool appears to have been combed and it has skilfully made sewing threads (photograph: Carol Christiansen; © National Museums of Scotland)

Table 2 Catalogue: wovens

Light blue cell highlight indicates textiles examined by TGS but not CC; * indicates missing

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
32	Thick, heavy and compact dark brown 2:1 twill; hairy fibres on both surfaces; edge around half of fragment turned under to wrong side in even width (5–7mm) and heavily felted in folded state	24.0 × 17.5	2:1 twill	z/s	42.8/52.4	0.87/1.1	9/6	medium-dark brown/medium-dark brown	x	probably felted: very thick and felted; some surface areas heavily disturbed on both sides	
50.1	Very fragmented and worn stained fragment patched with 2 different fragments; weaving mistakes; two z-spun yarns paired at intervals; s-spun floats over 3 warps	28 × 23	2:1 twill	z/s			11/6	brown		felted on both sides	roots
50.2	Patch 1 of 50–1; stained fragment; has 3 hems which have a raw edge folded back and oversewn onto fragment 50/1. Sewing irregular.	10.5 × 6	2:1 twill	z/s			9/7	brown			sewing thread: 2 z-spun yarns
50.3	Patch 2 of 50–1; stained fragment with 3 pleats	0.5 × 3	2:1 twill	z/s			10/6	brown			sewing thread z-spun
52	2 pieces of fine, even 2:1 twill of same fabric, one piece with selvedge edge; selvedge edge turned under as if seam edge; very brittle; some roots	4 × 10; 3.5 × 8	2:1 twill	z/s	38.5/35.6	0.41/0.63	17/12–14	black-brown/black-brown		smooth	analysis of larger piece only
57*	Circular fragment, heavy medium weight; cut.	1.8 diameter	twill	z/z			10/?	mid-brown		fulled, some wear	
58*	2 fragments of same material, light medium weight, soft to touch; 3 sides cut.	3.2 × 1.5; 2.5 × 1.1	twill	z/s			10/12	reddish brown		felted on one side	
59*	Triangular-shaped fragment, medium weight; 3 sides cut.	1.6 × 3.6	2:1 twill	z/s			10/8	reddish brown		felted on one side; some wear	

Table 2 cont

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
60*	Triangular-shaped fragment; about 1/3 of the singed part is missing; heavy medium weight; harsh to touch; 3 sides cut.	5.5 x 1.0	2:1 twill	z/s		s-spun thicker	10/8	reddish brown		felted, worn on both sides	
61*	2 fragments, medium weight, soft to touch; both fragments worn and have 3 sides cut.	1.5 x 2.2; 1.5 x 1.8	2:1 twill	z/s			10/8	reddish brown		felted on one side	
62*	3 fragments same material, with different coloured yarn, medium weight; 2 fragments 2 sides cut.	3.1 x 1.0; 2.6 x 1.1; 2.2 x 2.1	2:1 twill	z/s			10/6	light brown/ dark brown		felted on one side	
63*	Rectangular fragment 3/4 missing, medium weight, heavily fulled; two sides cut.	3.5 x 5.5	twill	z/z		??		dark brown		heavily fulled	
64*	2 fragments, medium weight, soft to touch; both fragments have 2 sides cut	1.5 x 3.3; 1.2 x 3.5	twill	z/s			10/8	dark brown		fulled, worn on one side	
65*	4 strips cut into different shapes, medium weight	4.0; 3.5; 3.0; 2.5	twill					mid-brown		heavily fulled	
67	Thick 2:1 twill with thin warp and thick weft, and uneven spinning in weft	15 x 9 cm	2:1 twill	z/s	37.7/54.2	0.73/1.4	9/6	medium light brown/medium light brown	x	surface disturbance on both sides but more so on twill (right) side	
71	Hard, compact 2:1 twill with thin, dense warp and thick, unevenly spun weft; slightly crepey; but hard; some wool hairy	18 x 26	2:1 twill	z/s	39.3/55.3	0.69/1.05	13/8	medium dark brown/medium dark brown	x	more disturbance and felting of surface fibres on non-twill (wrong) side	
77	Triangular piece of heavily felted twill, dyed blue; very compact and dense; medium-fine fabric; 2 cut edges, the 3rd is narrowly folded, possibly original seam edge. Broadcloth type	5.5 x 11	twill	z/s	not possible	not possible	not possible	medium brown overdyed blue, dye now appearing uneven; dye analysis: indigo/tin	x	heavily fulled and felted on both sides	most elements obscured by surface disturbance, not possible to determine twill type

Table 2 cont

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
94.1	Fine and even 2:1 twill; crepe-like, hard; crease along length, with wear to crease edge and evidence of sewing holes, probably former hem edge; additional fold at narrow end	8.5 x 16	2:1 twill	z/z	41.7/32.4	0.44/0.43	19-21/15-17	medium dark brown/medium dark brown	x	smooth	sun-bleached in patches
94.2	Triangular fragment of 2:1 twill with alternating dark and light weft and cut edges; weft much thicker than warp and with large noil on reverse	8.5 x 11.5	2:1 twill	z/s	33.8/43.4	0.73/0.91	8/8	mottled light brown; warp is light; weft is one light, one black	x	surface disturbance on both sides, more so on pointed end of triangle shape but especially on reverse	
94.3	Large fragment of fine, smooth, even 2:1 twill; wool very shiny and smooth, probably combed; crepey; weaving errors	37 x 38	twill	z/z	35.1/31.5	0.41/0.56	24/15	light brown/light brown		very smooth	small dark brown stain; numbered as 94 on paper storage envelope and not examined by TGS, so number given 94-3 in this catalogue to differentiate from 94-1 and 94-2 examined by TGS
97.1.1	Frayed, coarse fragment; weaving mistakes: in system 2, 2 light brown yarns paired, 2x; unreinforced selvedge	15 x 7	2:1 twill	z/z			8/6	brown			
97.1.2	Very frayed patterned fragment; z-spun dark brown yarn is used double in system 2. Weaving mistakes: system 1 has 2 yarns paired 2x. System 2, mistake in pattern: 2 dark brown yarns used instead of one. This fragment is sewn onto 97/1.1 with a running stitch.	16 x 7.5	2:1 twill	z/s			7/7	light brown/dark brown			sewing thread, worsted light brown S-ply; 'run and felt' noted by TGS, probably referring to run and fell seam type

Table 2 cont

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
97.2	Compact 2:1 twill in smooth warp and weft and fragment of white woollen thread; wool shiny; defined hole in middle; rolled selvedge edge	10 x 26.5	2:1 twill	z/s	42.0/43.4	0.68/0.82	11/12	medium brown/ medium brown	x	smooth on both sides except on inside of former seam	short fragment of 2-ply white woollen thread: z/s, each strand 0.5mm wide.
99	3 thin strips of very dark 2:1 twill; coarse fibres; even, smooth, tightly twisted yarns; even weaving; 2 smaller fragments appear to be seam remains; largest fragment has selvedge edge on one side; cut on bias; some ?sewing holes visible	a) 0.5 x 15.5; b) 0.5 x 5.0; c) 0.5 x 4.5	2:1 twill, warp?-faced	z/z	55.2/45.1	0.44/0.76	12/10-11	black/black; no dye detected	x	smooth	analysis of largest fragment only; seam fragment; only 1 measurement for warp? thread-count possible and measured over 0.5mm.
107.1	Very dense, compact, heavily felted twill in 2 colours; very coarse, hairy wool; 2-ply thread visible in places – sewing thread?	2.5 x 12.5	twill	z/s	not possible	not possible		original fabric with stripe; piece is medium light brown and medium dark brown with clear distinction between two colours	x	very dense, thick and heavily felted on both sides	most elements obscured by surface disturbance, not possible to determine twill type
107.2	Even, medium-fine 2:1 twill; wool shiny; weft is significantly thicker than warp and is a greater mix of fibre colour than warp.	10.5 x 16.5	2:1 twill	z/s	29.8/42.2	0.65/0.95	10/10	medium brown/ medium brown	x	some disturbance and felting of surface fibres on edges of both sides, otherwise smooth	
107.3	Fine, even black 2:1 twill; spin pattern anomaly: tiny circles are formed on surface by smooth yarn and high spin.	3 x 16	2:1 twill	z/z	31.4/46.9	0.55/0.6	9/12	black-brown/ black-brown; no dye detected	x	very smooth	
109	Large fragment of hard and coarse 2:1 twill with very coarse, overspun weft and fine, thin warp; wool shiny in some areas; many roots; warp missing in some areas	10 x 32.5	2:1 twill	z/s	45.7/58.8	0.6/1.3	11/6	medium brown/ medium brown	x	surface of wrong side felted and more compact than right side	

Table 2 cont

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
110.4.1	Fine, wrinkled gauze fragment with fringe; selvage, 8 ends closer set; weaving mistake: 2 weft threads paired; length of fringe 5mm.	15 x 13.5	tabby	z/z		20/16	20/16	darkish brown			
110.4.2	Fine, wrinkled gauze fragment; the selvage of this material is sewn around a coarse woollen fragment 110.4/3	36 x 8	tabby	z/z	warp and weft tightly spun	20/16	20/16	darkish brown			raw edges overcast with brown sewing thread, S-pliced, 5 stitches/30mm
110.4.3	Coarse fragment; cut on both sides	18 x 3.2	2:1 twill	z/s		8/6-7	8/6-7	brown		fulled	
110.5.1	Almost complete felt lining for boot, comprising sole, vamp and quarters, all in 1 piece, and top band. Impression of stitching along top edge of quarters/leg. Trace of stitching on topband. Crack down centre of vamp, identical to one on shoe vamp, suggesting a deliberate slit. No apparent join in felt	25 x 7						brown			on display with leather shoe, leather Cat no. 1
110.6.1	Length of very dense, thick, heavily felted twill, cut on bias; fibre is very coarse; many dark fibres mixed in both thread systems	2.3 x 32	twill	z/s	30.8/not possible	1.1/not possible	not possible	medium brown/ medium brown	x	extremely felted and compact	most elements obscured by surface disturbance, not possible to determine twill type
113	Thin strip of 2:1 twill; wool shiny; warp is lighter than weft	1.0 x 13.5	2:1 twill	z/s	34.9/36.2	0.8 /1.04	8/8	medium brown/ medium brown; warp lighter than weft		smooth on both sides	noted by TGS as SH 113
113.1	Square fragment of compact, heavily fulled, very stiff 2:1 twill; some very hairy fibres; some creases	9 x 12	2:1 twill	z/s	30.5/45.2	0.53/1.15	11/8	medium brown/ medium brown	x	worn, surface of weave disturbed; brittle	noted by TGS as 113, 1

Table 2 cont

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
113.2	Fine, even and open 2:1 twill with overlapping seam	13 x 7	2:1 twill	z/s	29.6/46.3	0.58/0.71	15/9	light brown/light brown		stiff and brittle	noted by TGS as 113, 2; fabrics sewn together appear to be same; sewing thread very hidden but appears to be z-spun singles, doubled, with no pigmentation.
114	2:1 twill with z-system thicker than s; blue staining in areas, esp. on edges; compact; slightly curved through wear	14.8 x 5.0	2:1 twill	z/s	37.3/50.3	0.59/0.6	13/12	medium brown/medium brown, with blue stain		wrong side much disturbance, fuzzy	
115	2:1 twill fragment with alternating dark and light weft; warp may have been combed; weft significantly thicker and softer than warp; compact – beaten hard on loom, possibly full, creating thick, 3-dimensional fabric	8 x 10	2:1 twill	z/s	36.6/47.9	0.64/0.86	12/9	mottled light brown; warp is light, weft is one light, one black	x		areas of sun-bleaching
118.1	Frayed fragment patterned with narrow bands and stripes; weaving mistake in system 2; 2 yarns paired; pattern: weft 6 blue/black, 2 red, 6 blue, 2 red	12.5 x 4.5	2:1 twill	z/s			12/12-14	dark green brown/dark green brown; dyes: indigotin, luteolin and indigotin + carminic acid			
118.2	Very felted strip of material has been knotted into a loop with a 'granny' knot; length of loop 70mm, width 40mm	1.5?	?	z/s			?	felted			
120	2:1 twill; weft uneven with many weft threads considerably thicker than warp; wool very shiny in warp and weft	27.5 x 12.5	2:1 twill	z/s	41.1/51.9	0.77/0.97	11/8	medium brown/medium brown	x	more surface disturbance on wrong side	

Table 2 cont

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
121.5	Soft 2:1 twill with 2 red stripes in weft; wool very shiny; some weft threads missing; red stripes are 4 wefts wide	5.0 x 6.5	2:1 twill	z/s	33.4/38.0	0.83/1.05	9/10	ashen pale brown/golden pale brown, red; no dye detected		smooth on both sides; one edge very felted	
122*	Fine, 2:1 twill, very fragmented and worn, folded L-shaped strip; unreinforced selvedge; weaving mistakes	38.5 x 36.5	2 : 1 twill	z/s			12/13	light brown			
123.1	Fine, even 2:1 twill with folded edge, possibly seam edge; fibre very shiny; open weave in some areas due to wear and stretch; numerous weaving faults	24 x 6.5	2:1 twill	z/s	49.5/43.6	0.45/0.56	12/14	light brown/light brown		some areas of surface disturbance, especially at probable seam edge	
124	Shaped fragment, worn, with holes, 2 tears, hem on 2 sides, matted on one side, probably inside	58 x 32-5.5cm	2:1 twill, mottled effect	s/s			10/9	light brown/dark brown			? sleeve, cut on 2 sides
124.1	Coarse 2:1 twill with hem; at centre of fragment fabric is bound together and tied in knot; warp threads very thin and spaced wide apart in some areas; hem edge along selvedge; hem folded over 1 cm max and stitched with doubled sewing thread	5 x 27	2:1 twill	z/s	27.5/44.0	0.48/0.89	5-11/8	medium dark brown/medium dark brown; slight green tinge to fabric	x	very worn and gaps where warp threads have broken or disappeared	sewing thread: z-spun; 0.66 wide; 29.7 degree twist.
124.2	Coarse 2:1 twill, densely woven	1.7 x 13.5	2:1 twill	z/s	39.4/42.3	0.81/1.3	10/7	medium brown/medium brown		worn, brittle	only 5 measurements of weft possible
133	10 small fragments of extremely fine and even 2:1 twill; 1 weaving fault: missed shed, on largest fragment	5.2 x 7.8cm (largest frag.)	2:1 twill	z/z	36.0/40.5	0.35/0.42	18/19	pale light brown; pale light brown		very smooth, no surface fibres	

Table 2 *cont*

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
134.1	Fragmented and worn fragment patterned with 2 maroon stripes 5mm wide and a yellow stripe 10mm wide. Red brown 5 s-spun yarns, yellow 10 s-spun yarns; weaving mistake system 2: 2 weft yarns paired, 2x. 2 stripes each 5mm, 5 picks yellow stripe 10mm wide 10 picks mottled	16.5 x 5.5	2:1 twill	z/s	44.8/37.25	1.07/1.16	8/10	brown		felted on one side	
134.2	Small very fragmented and frayed fragment	1.5 x 6.5	2:1 twill	z/s	44.8/37.25	1.07/1.16	7/6-8	medium-brown/ medium-brown; very shiny yarns	x	smooth; some s-system yarns disturbed	only 6 measurements possible for width and angle of s-system; thread-count measured over 5mm
135	Medium coarse open twill with thin, light warp and thick, dark weft; worn, open and stretched due to use	5 x 14	2:1 twill	z/s	43.1/41.5	0.9/1.62	7/5-6	light brown/ medium brown	x	smooth, with some felted areas	
136.1	Large fragment of 2:1 twill in with unevenly spun weft, with square patch; cut indicates it is left side of shirt front, with shoulder edge (where there is a seam), neck and opening to mid-chest. Edge of neck and front opening on wrong side is heavily felted. Patch is same fabric; laid diagonally and sewn with blind running-stitch, fabric underneath is worn through at one end; includes thread fragment	15 x 42	2:1 twill	z/s	44.8/41.3	.88/1.32	9/7	medium-brown/ medium-brown	x	smooth on right side, very disturbed on wrong side; many noils in unevenly spun weft	

Table 2 *cont*

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
139	2:1 twill with uneven weft and 2 blue weft stripes; worn and stretched in some areas; blue stripes are more visible on 'wrong' side; stripes made of 3 weft threads each, which are narrower than main colour wefts; 5 wefts of main colour between stripes	7 x 13.5	2:1 twill	z/s	45.27/53.7	0.63/1.33		medium brown/medium brown, blue; dyes: indigotin, possible flavonoid		smooth on right side, more surface disturbance on wrong side	
147	Fine and even 2:1 twill; threads from 1 system missing in areas	6.5 x 21.5	2:1 twill	z/z	36.9/30.5	0.46/0.51	18–20/13–15	medium brown/medium brown		very smooth; fabric brittle.	
156	2 coarse 2:1 twills with alternating dark and light wefts, sewn together in overcast stitch; dark weft 25% thicker than light weft; many weaving faults; noils on reverse in light wool; weft in secondary piece very worn and non-existent in many areas. Like 413	22.5 x 15.5	2:1 twill	z/s	41.4/44.0	0.65/0.92	9–11/8–10	light brown, dark and light brown; weft is generally 1:1 alternating dark and light yarns	x	quite smooth but very worn and stretched; felting around seam	2-ply sewing thread very smooth zz/s.
163	2 pieces of the same fabric sewn together; fine and even 2:1 twill, hard, crepe-like; flat-fell seam, neatly executed; sewing thread same colour as fabric; neat stitching on either side of seam edge	7.5 x 13.5	2:1 twill	z/z	41.2/48.6	0.45/0.49	12/14–15	medium dark brown/medium dark brown	x	smooth; fabric very wrinkled	
164	Medium 2:1 twill, wool very shiny; fabric crepe-like	12 x 16	2:1 twill	z/s	26.5/38.6	0.66/0.97	10/8	medium brown/medium brown	x	smooth on both sides	
176.3	Same fabric as 282, 412, 464.1, 464.2, see 282 entry for construction measurements; dye analysis on 412 suggests synthetic dye = modern	includes very large fragment, 30 x 33, and many smaller fragments in 33 bags									

Table 2 cont

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
224.1	Very compact and full or felted 2:1 twill; 2 light wefts alternating with 2 dark wefts; cut on the bias like 261	6.5 × 1.0	2:1 twill	z/s	36.5/51.6	.72/1.96	count not possible; approx 8	medium light brown/medium light brown and medium dark brown	x	very felted on one side so that fabric structure is obscured completely	only 5 measurements taken for width and angle for both systems
224.2	Small single-colour 2:1 twill fragment	2.5 × 5.5	2:1 twill	z/s	53.2/64.8	.62/1.5	9–10/6	medium light brown/medium brown	x	very disturbed on one side	only 7 measurements possible for system 2 on width, 6 for angle, and 1 for count
234	Thick and dense twill with colour striping, including 2 bands of white; 1 system face-dominant; possibly float-weave; cut on the bias	2.8 × 13	twill	z/s	not possible	not possible	not possible	?/black and russet-brown with 2 bands of white; dyes: 1) red-brown = carminic acid; 2) black = indigotin, carminic acid-like anthraquinone	x	felted and compact; surface disturbance on wrong side	not stained by burial – white stripes are white; measurements not possible due to size and only partially visible on white area
256	Square fragment patterned with narrow bands; stained on both sides; 2 sides cut	5.5 × 5.5	2:1 twill	z/s			10/14–16	off white/off white, brown and red		felted on both sides	TGS notes below 'white' – 12, below 'brown' – 14, white 4, 2 red; ?check pattern
260	Fine and even 2:1 twill; compact; brittle, s-system overtwisted in many areas	5.5 × 8.0	2:1 twill	z/s	39.8/55.3	0.39/0.54	17–20/10–13	medium dark brown/medium dark brown	x	smooth, some surface dirt, more worn on reverse	
261	Small fragment of multi-coloured twill; like 224-1	8.5 × 1.5	twill	z/s	30.8/not possible	0.82/not possible	not possible	z-system mainly light; s-system light and dark fibres?	x	heavily disturbed on wrong side	thread diameter and twist angle on z-system averaged over only 8 measurements

Table 2 cont

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
264	Soft and thick 2:1 twill with dark and light warp and weft threads	23 x 6	2:1 twill	z/s	48.3/59.8	.96/1.08	11/7-8	warp and weft both alternating light and dark threads	x	smooth in some areas, but some felting of surface fibres, especially dark wool	
265	Large fragment of 2:1 twill, with reinforced selvedge edge; wool smooth and shiny, possibly combed	20 x 27	2:1 twill	z/z	35.9/43.5	0.63/0.88	13/11	medium brown/ medium brown	x	smooth	
273	Large piece of fine, even, dark 2:1 twill; regular weaving faults; some noils; very wrinkled; colour slightly mottled on surface as though had been dyed and surface dye has worn off in areas.	18 x 34	2:1 twill	z/s	33.0/35.7	0.43/0.57	18/14	medium dark brown/medium dark brown	x	smooth, little wear	
279	Fine, even 2:1 twill, compact, possibly full; weft-dominant	9 x 22.5	2:1 twill	z/s	39.8/41.1	0.66/0.55	12/13	light brown/ light brown	x	smooth, but more surface wear on twill side; roots especially on twill side	light sun-bleaching, especially on twill side
282	4 fragments (1 large, 3 small) of dark twill, evenly spun and woven; soft and thick, but not strong; many roots; large fragment has evenly folded edge and distinct hole; same as 412 – dye analysis of 412 suggests synthetic dye = modern	16 x 13	2:1 twill	s/s	11.6/36.1	0.44/0.99	7/8	black/black; dye: probably synthetic		measurements taken from largest fragment	
285	2 pieces of fine, even 2:1 twill sewn together with double-strand sewing thread	8.5 x 4.7	2:1 twill	z/z	42.3/50.2	.45/.59	19/16	medium brown/ medium brown		smooth	sewing thread is smooth, z-spun, .5mm wide, 34.1 degree twist
307	Medium-brown 2:1 twill with weft thicker than warp, dense	8.5 x 5.5	2:1 twill	z/s	44.1/44.1	0.51/.68	14/12	medium brown/ medium brown		more surface disturbance on wrong side, including one large noil	

Table 2 cont

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
313	Length of seam edges, comprising same fine, even cloth type sewn together; 1 of the fabrics has been folded at the seam edge, the other abuts it and is sewn with running stitch; probably fulled with raised nap on one side	17.5 × 2	2:1 twill	z/s	30.6/50.6	0.48/0.54	14/14	light brown/ light brown		smooth; underside of seam edges are fulled and raised	thread-count for s-system taken from 2 measurements over 5mm; noted as 313/1-2 by TGS
315.1	Fine and even 2:1 twill, compact, hard, tight weave; crepe-like, wrinkled	8.5 × 9	2:1 twill	z/z	29.8/44.7	0.53/0.48	16/16–19	black-brown/ black-brown	x	smooth	
315.2.1	Medium-sized fragment: fine and even 2:1 twill; open weave, soft and pliable, cut on the bias	3 × 8	2:1 twill	z/s	44.2/30.2	0.61/0.81	9–11/9–11	medium brown/ medium brown	x	some wear to surface of threads	
315.2.2	Smaller fragment: 2:1 twill, slightly felted	0.5 × 3	not possible	z/s	32.3/35.7	0.58/0.76	not possible	medium brown/ medium brown; slight red tinge?		very worn; surface disturbed	
328	Very coarse 2:1 twill with brown warp and black weft; threads very shiny; weft thread is slightly felted (as yarn) and is significantly larger than thin warp; includes 2-ply white sewing thread	4.5 × 10	2:1 twill	z/s	36.2/38.5	0.71/2.33	8/5	medium brown/ black	x	mainly smooth but slightly disturbed on wrong side	sewing thread is 2-ply, z/z/s; about 1mm wide each ply, 1.5mm wide as 2-ply. Only 5 measurements taken for width and twist angle for s-system; only 1 count taken for each system's thread-count
331.1, 331.2	2 fragments of 2:1 twill with thick weft and open weave	14 × 12; 17.5 × 8	2:1 twill	z/s	45.1/52.9	0.55/1.5	9–10/7–8	light brown/ dark and light brown; weft alternating dark and light yarns	x	more surface disturbance on wrong side; much stretched with wear; surface dirt	
331.3	Dark brown, even 2:1 twill, cut on the bias	7.5 × 2.5	2:1 twill	z/z	35.6/32.5	0.6/0.9	11/10	medium dark brown/medium dark brown	x	smooth, no apparent wear	

Table 2 cont

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
352	2:1 twill with light-coloured thin warp and darker thick weft; very dense, compact and felted; some surface fibres very shiny	18 x 16	2:1 twill	z/s	43.2/62.1	0.66/1.02	9/8	light brown/ medium dark brown	x	much wear on surface, especially reverse has much felting of surface fibres	
358	Triangular fragment of multicoloured twill with cut edges and 1 side turned under	13 x 10.5	2:1 twill	z/s	35.0/47.0	0.92/1.0	9/9	mottled light brown; warp is light, weft is 1 light, 1 black	x	twill side disturbed but less raised than reverse; on front some matting and mixing of surface fibres which obscure weave, this is much more prominent on reverse where areas are felted; some large noils on reverse	
361	Medium coarse open weave 2:1 twill with thin warp and thick weft; weaving faults; great variation in s-thread thickness; very worn and thin in places, especially s-thread	9.5 x 21.5	2:1 twill	z/s	39.6/31.4	0.91/1.29	8/5-6	medium brown/ medium brown	x	felting in areas, especially on reverse	
374	Triangle of thick, full fabric with alternating dark and light weft threads; light weft thinner than dark; wool very hairy in places; cut edges, gusset-shape, no evidence of sewing	9 x 16	2:1 twill	z/s	29.7/53.6	0.73/1.2	8/8	mottled light brown; warp is light; weft is one light, one black	x	heavily disturbed on both sides, especially reverse; disturbance on right side more at wide end than narrow end, with clear demarcation line at crease	some roots
377	Open 2:1 twill; weft significantly thicker than warp; weft very variable in width and more worn than warp; folded edge on most of one side, cut on the bias	9 x 44	2:1 twill	z/s	35.9/32.9	0.78/1.24	10/8	medium-brown/ medium brown	x	worn, some disturbance but loose fibres on surface mainly worn away	

Table 2 cont

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
378	Dark twill fragment, smooth, even, crepey; yarns in both systems even and shiny, possibly combed	9 × 18	2:1 twill	z/s	34.1/50.1	0.69/0.77	12/8	dark brown/ dark brown	x	few signs of surface treatment or wear; some soil and many roots	
389	Patterned strip with a fringe on one side; pattern: one dark brown s-spun yarn, one light brown s-spun yarn etc. Very felted fringe – difficult to see how it was made, but seems to be made up of 4 groups of 4 ends which are tied together with a z-spun yarn in places	24 × 7.5	2:1 twill	z/s			12/12	light brown/ dark brown		felted	389 also in fibre catalogue, which is a different fragment
397	Narrow strip of multicoloured twill on bias; cut edge	14.5 × 0.8	2:1 twill	z/s	26.5/not possible	0.84/not possible	not possible/ not possible	?light warp/light and dark weft?	x	heavily disturbed on reverse side	
405	Soft 2:1 twill with dark weft thicker than warp; compact but with drape, soft; wool shiny	5 × 9.5	2:1 twill	z/s	36.1/35.1	0.89/1.04	9/8	medium-brown/ medium brown; slight green tinge to some weft yarns; dye: indigotin		more worn, surface disturbance on right side	
412	Same fabric as 176.3, 282, 464.1, 464.2, see 282 entry for construction measurements; dye analysis on 412 suggests synthetic dye = modern										
413	Medium twill with thin warp and thick weft in slightly darker colour; many weaving faults; much stretched with wear; includes small fragment in bag. Like 156	20 × 15	2:1 twill	z/s	47.3/53.0	0.71/1.16	9–12/8–10	light brown/ medium brown; weft is darker than warp	x	more surface disturbance on wrong side; plant material adhering to edges	
423	Coarse, thick and dense 2:1 twill; very compact and dense, many slubs and noils	15.5 × 21	2:1 twill	z/s	52.5/55.7	0.81/1.05	10/8	medium brown/ medium brown	x	worn and disturbed the same on both sides	

Table 2 cont

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
430	Large multi-coloured twill fragment with large cut hole in centre; mottled appearance on right side due to colour mixing; weft high twist and overtwisted in area; includes small strip fragment of same cloth, 13 x 0.5cm and small bag of 'vegetable matter', likely roots	20.5 x 14.5	2:1 twill	z/z	40.4/54.7	0.68/1.2	9/7	mottled medium brown; warp is light, weft is 1 light, 1 black	x	twill side disturbed but less raised than reverse; on front some matting and mixing of surface fibres to obscure weave, this is much more prominent on reverse where areas are felted; some large noils on reverse	roots
446	Thick, compact heavily felted fabric; fibre coarse; long edge is original fabric selvedge, other edges cut; broadcloth?; very similar to No. 801, shoe lining	18.0 x 6.4	probably twill	z/s	not possible	not possible	not possible	medium dark brown/medium dark brown	x	extremely felted and compact, dense and thick	
448	Large fragment of medium brown 2:1 twill; drapery; large difference between warp and weft yarn thickness; fibres still very shiny, esp. in warp yarns; warp even, prepared; fabric fullled.	34 x 22.5	2:1 twill	z/s	35.6/38.8	0.92/1.3	10/6	medium dark brown/medium dark brown	x	creased; wrong side has numerous patches of surface fibre and noils.	
452	Black 2:1 twill, very even spinning and weaving; dye analysis suggests synthetic dye – late 19th-century date?	2.0 x 12.5	2:1 twill	z/s	35.4/41.7	0.5/0.7	16/11	black-brown/black-brown; dye: probably synthetic	x	smooth, no apparent wear	not possible to get 10 discrete measurements on z-system because of narrowness
453.1.1	2:1 twill with light warp and dark and light weft; soft, pliable	8.0 x 8.5	2:1 twill	z/s	42.7/46.5	.95/1.0	8/8	pale brown/pale brown and dark brown	x	smooth, little disturbance	
453.1.2	2:1 twill with light warp and dark and light weft; soft, pliable	14 x 6	2:1 twill	z/s			8/8	pale brown/pale brown and dark brown	x		

Table 2 cont

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
453.2	Fine and even 2:1 twill	2.5 x 4.8	2:1 twill	z/z	38.6/47.4	0.5/0.45	17/14	black-brown/black-brown	x	smooth; some dirt patches	
454.1	Length of twill with uneven spinning; seam and hem corner; worn and misshapen	11 x 30.5	2:1 twill	z/s	35.1/44.4	0.86/1.15	10/7	medium brown/medium brown	x	more disturbed on wrong side	
454.2	Triangular fragment of thick, compact, heavily fulled fine and even twill with blue tinge; heavily fulled; edges appear cut; dyed with indigotin?; probably broadcloth	6 x 8	2:1 twill	z/s	33.8/42.8	0.45/0.73	14/10	medium brown/medium brown with overall blue tinge	x	both sides have napped surface but more so on wrong side, indicating raised and napped surface, which has worn away during use.	thread-count measurement an average of only 2 measurements for each system
464.1, 464.2	Same fabric as 176.3, 282, 412, see 282 entry for construction measurements; dye analysis on 412 suggests synthetic dye = modern										
482.1	2 fragments knotted together with an overhand knot; a) Folded fragment; z-spun thread fine and appears combed; reinforced selvedge, 45mm, 1 edge cord of 5 ends; paired warps. b) Fragment; z-spun fine and appears combed; fragmented reinforced selvedge, 60mm, 1 edge cord of 5 ends; paired warps	13 x 3 total length; a) 4.5 x 2; b) 7 x 3	a) ; b) ?	a) z/s; b) z/s			a)12/5; b)12/5	a) brown; b) brown		a) very felted on both sides; b) felted	
482.2	Loose fragment, z-spun is fine and appears combed; this is a different material	6 x 2.5	2:1 twill	z/s			10/6	brown			
519	2:1 twill with system 1 lighter than system 2; soft, drapes; slightly compact due to use; much surface dirt	12 x 15	2:2 twill	s/s	42.7/59.4	1.03/1.08	7-8/6	light brown/medium light brown		disturbed surface on both sides	

Table 2 cont

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
520	Medium fine 2:1 twill, warp-dominant, very even warp	20.5 × 17.5	2:1 twill	z/s	38/35	0.62/0.86	14/7	light brown/light brown		Some felting in very small patches on right side; much more felting on wrong side	only 5 measurements of weft spin angle, and these in worn areas on wrong side
521	Coarse and uneven 2:1 twill with nobs and felted surface; blue staining, as though leached dye or in contact with dyed material; very worn; 1 edge turned under as seam edge	13.5 × 23.5	2:1 twill	z/s	40.8/62.9	0.55/1.0	15/8	medium brown/medium brown; blue staining throughout		very felted surface on right side	
524	Coarse, thick and compact 2:1 twill; fulled, or felted through use; fold on 1 side, where it is more felted, cut on the bias	3 × 12	2:1 twill	z/s	43.4/38.8	0.89/1.19	8–9/6–7	medium brown/medium brown		wear and disturbance, especially on reverse	
533	Small fragment of 2:1 twill with thin warp and thick weft; compact; hairy fibres in both systems	3.0 × 6.5	2:1 twill	z/s	30.72/48.3	.64/1.38	11/6–7	medium brown/medium brown	x	slightly felted on both sides	only 1 thread-count measurement possible for z-systems
552	Small fragment of very frayed coarse, loosely woven twill of thick, dark brown and black threads; hairy and coarse fibres	1.0 × 3.0	twill	z/z	not possible	not possible		dark brown-black/dark brown-black	x	smooth	
555	2:1 twill with decorative raised thread, probably warp-wise; blue dye staining	9.2 × 2.0	2:1 twill	z/z	37.8/36.4	.45 / .58	17/13	medium brown/medium brown, with blue stain		smooth	decorative raised thread is z; 0.92 wide, 36.5 spin angle, dyed
557	Small dark 2:1 twill fragment with fine warp and thick weft; slightly crepey; yarns very smooth, possibly combed; overtwisting in some areas	6 × 8	2:1 twill	z/s	43.5/41.6	0.61/0.96	9/9	dark brown/dark brown	x	smooth	

Table 2 cont

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
559.2	Coarse, open tabby, with 1 system thicker than the other; soft, with drape; some patches of darker staining; weft more disturbed than warp	13 x 15	tabby	<i>z/s</i>	46.2/66.8	1.07/1.72	7/4-5	light brown/light brown		worn and disturbed in areas on both sides; stretched and pliable, not compact	
578	Fine, even 2:1 twill with open weave; occasional warp or weft thread is thicker than rest, forming what appears as self-check in fabric but fragment too small to determine if intentional weave pattern or spin anomaly	6.5 x 8.5	2:1 twill	<i>z/z</i>	35.3/39.1	0.43/0.45	14/20	pale brown/pale brown		smooth	
595	Large triangle of coarse 2:1 twill with wefts thicker than warp and some noils	27.5 x 19.5	2:1 twill	<i>z/s</i>	34.1/44.2	0.83/1.1	9/8	medium brown/medium brown	x	noils on wrong side	
610.1	Hard and compact 2:1 twill with seam on 1 long edge and hem? On other long edge, with gathering at short end; tight gathers sewn with 4 rows of 2-strand sewing thread in running stitch; 8.5 cm between seam edges	11 x 25	2:1 twill	<i>z/z</i>	38.4/40.5	0.51/0.52	13/12	medium dark brown/medium dark brown	x	smooth on both sides	roots
610.2	Triangular twill fragment with multicoloured thick weft and very thin warp	4.5 x 12.5	2:1 twill	<i>z/s</i>	31.4/50.4	0.61/1.21	8/8	very light beige to medium brown/medium brown to black	x	very worn and stretched	
610.3	Narrow strip of multicoloured twill on bias, folded in half; very worn and frayed; possibly same fabric as 610.2	4 x 22	2:1 twill	<i>z/s</i>	28.2/42.0	0.54/1.33	12/6	very light beige to medium brown/medium brown to black	x	smooth on right side, disturbed on wrong side	
610.4	Narrow strip on the bias and folded in half	1.4 x 23.5	2:1 twill	<i>z/s</i>	31.1/43.2	0.7/0.67	9/10	medium light brown/medium light brown	x	disturbed on right side, fabric becoming soft and velvety; heavier disturbance on wrong side	s-system thread-count taken from only one measurement

Table 2 cont

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
612	Narrow strip cut on the bias with folded edge, very even	3 × 28	2:1 twill	z/z	36.6/38.8	0.57/0.57	19/14	dark brown/ dark brown	x	smooth, little wear	
623	Even, open 2:1 twill; loosely spun thread system has opened out in the weave and is more worn	5.3 × 2.5	2:1 twill	z/z	29.9/42.3	.66/.65	11/12	medium brown/ medium brown		smooth	
631	Red medium-fine hard-spun 2:1 twill, with dark brown and white stitching; red tint is more apparent in folds, is absent from frayed edges; possible folds or pin-tucks at 1 end; crepey, possibly due to overtwisting and fairly open weave	10 × 34.5	2:1 twill	z/z	39.9/49.5	.39/.50	17/11–12	medium brown with red tint/ medium brown with red tint; no dye analysis	x	very smooth	seam edge stitched with white thread: zz/s, single 0.5-0.9, 1.75-1.85 ply, 35 degrees each single ; dark brown sewing thread (as top-stitching?); zz/s, single: 0.5, ply: 1.1; single 30 degrees, very smooth
639	Small fragment of 2:1 twill, showing little wear; warp smooth and shiny, possibly combed; fibres still lustrous	5 × 6	2:1 twill	z/s	41.1/37.1	0.69/0.76	11/9	medium light brown/medium light brown	x	smooth with little wear or disturbance but some raised fibre surface on reverse; surface soil on reverse	
654	2 narrow strips of heavily felted 2:1 twill, cut on bias; probably same fabric; compact; very hairy fibres; twisted with use	1) 9.5 × 1.5; 2) 9.5 × 1.0	2:1 twill	z/s	40.0/48.2	0.76/0.69	not possible/10	medium dark brown/medium dark brown; some dark staining – dye?	x	heavily felted, especially on one side	all measurements taken from sample 1; only 4 counts for angle and width for system 1; dirt obscuring some elements
655	Small square fragment of fine and even 2:1 twill; weft-dominant	4.8 × 3.5	2:1 twill	z/s	39.9/38.4	0.5/0.53	14/15	medium brown/ medium brown		more worn on twill side	

Table 2 *cont*

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
661.1	2:1 twill with 1 thread system narrower and more even than the other; spinning even in thickness and twist on system 1; soft, pliable	8.5 x 11.5	2:1 twill	s/s	41.1/56.6	.91/1.44	6-7/4-6	light brown/ light brown		slightly disturbed on both sides; protruding section is more disturbed and felted	
661.2*	Patterned folded strip, ? part of a hem; cut on the bias; fawn colour was originally white	23 x 1.0	twill	z/s		10/7		fawn/dark brown		felted on both sides	
663.1	Open weave 2:1 twill with red weft thread every third shed; extremely worn and threadbare; fabric stretched and misshapen; some weft threads very highly twisted but others have lost twist due to wear and stretch, opening weave; red thread slightly thicker than other weft threads	4.5 x 8	2:1 twill	z/s	34.8/38.6	.65/.71	9-11/6-8	medium brown/ medium brown and pale coral red; dye: anthraquinone, purpurin = wild madder?		threads very worn on surface and worn through in places	only 2 measurements possible on thread-count for both systems.
663.2	Evenly spun and woven 2:1 twill; z-system slightly smoother and more even than s-system; s-system yarns have higher differentiation in width than z-system; worn with some stretching, and open areas of weave from use	7.5 x 7.5	2:1 twill	z/s	42.1/40.9	.61/.67	12/10-12	medium brown/ medium brown		smooth; some areas of caked dirt	
665	Rectangular fragment of 2:1 twill with brittle appearance; threads made of variable coloured fibres	12 x 15	2:1 twill	z/s	29.8/43.2	0.85/0.61	12/11	medium brown/ medium brown	x	apparent surface wear and fibre breakage in places; some fullled areas with raised surface, which appear darker	roots

Table 2 cont

Find no.	Description	Maximum dimensions (cm)	Weave	Spin direction	Spin angle	Thread diameter (mm)	Thread-count (cm)	Colour (each system)	Pigmentation	Surface	Remarks
670	Large fragment in 3 pieces of fine, open weave; gauze-like, even spinning; largest fragment has several seams where same textile is sewn on; medium-sized fragment has seam edge with stitch holes visible but no sewing thread; brittle, very misshapen and stretched with use	35 x 14 (largest fragment)	2:1 twill	z/s	42.5/33.6	0.57/0.54	12/16	light brown/light brown; some red staining in areas but appears to be rust		surface more disturbed on wrong side; caked with dirt in some areas	sewing thread is 2 strands, z-spun, 0.5mm wide each strand.
697	Medium-fine and worn 2:1 twill with felted surfaces; stretched and misshapen	12 x 6.5	2:1 twill	z/s	38.0/43.3	0.63/0.81	12/9	light brown/light brown		twill side slightly fulled from wear and surface of threads worn and disturbed; reverse side heavily felted surface due to wear; evidence of mildew and area caked with soil	
801	Very coarse 2:1 twill with light warp and thick wefts in alternating 2 dark/2 light threads; 1 side is selvedge edge; drapery feel but compact in areas due to use; numerous weaving faults	12 x 24.5	2:1 twill	z/s	44.0/39.8	1.12/1.55	7/5	light brown/light brown and dark brown-black	x	more disturbed on wrong side; felted through use	from leather shoe
802	extremely compact and felted twill; stiff and very thick; long edge appears to be selvedge	11.5 x 27.5	twill	z/s	not possible	not possible	not possible	medium dark brown/medium dark brown	x	heavily felted on both sides	felted lining, shoe, not possible to determine twill type
803	Heavily felted narrow strip of twill fabric, cut on bias; twisted with use	23.5 x 1.1	twill	z/s	not possible	not possible	not possible	medium brown/medium brown		heavily felted or fulled on both sides	most elements obscured by surface disturbance, not possible to determine twill type

Table 3 Catalogue: fibres

Light blue cell highlight indicates textiles examined by TGS but not CC; * indicates missing

Find no.	Description	Maximum dimensions (cm)	Colour	Pigmentation	Remarks
71.2*	Tuft of hair	5 (length)	dark brown		
110.5.2*	Loose cattle hair, fine and coarse				
114	Tuft of horse hair, shallow wave	9 (length)	black		
132	A mixture of light/dark brown hair, at one end a pluck of very fine fibres	9 (length)	light and dark brown		
193	Tuft of hair, mixed with fine fibres	10 (length) × 1.5	black		
207	Large, very thick fragment of felted fibres in several layers; distinct edges in places; some dark brown fibre masses felted in; some wool still in partial staple formation	15 × 30	mainly light brown	x	pigmented fibres generally distinct and not well blended
210	Irregular-shaped fragment of felted fibres, some still partially in original staple formation	8.5 × 10	light brown		
235	Tuft of hair, with plant remains	7 (length)	brown		
389	Very small fragment of felted fibre	2.5 × 3	light brown		see also woven textile 389 entry (on display) catalogued by TGS
464.1	Length of matted and felted fibre, one side is distinct scalloped edge, where wool forms waves and curls	5 × 19	light brown	x	pigmented fibres very few and coarser than non-pigmented
485	Hair, probably horse	17 (length)	dark and light brown		
559.1*	Two mats of similar fibre, not hard felted	5 × 10	light brown		

Table 3 *cont*

Find no.	Description	Maximum dimensions (cm)	Colour	Pigmentation	Remarks
560	Dark and light brown hair, mixed with wavy white wool; hair in soil	9 (length of hair); 4 (length of wool)	dark and light brown/ white		
584	Large, irregular-shaped piece of felted fibres; two holes of similar size and shape; similar in quality to 210	15 x 24	light brown		
617	Irregular-shaped fragment of thick felted fibres, some still in partial staple formation, with crimp visible; one hole	12 x 16	light brown	x	pigmented fibres not well blended

Table 4 Rope and thread (see also sewing thread under Remarks in Table 2)

Light blue cell highlight indicates textiles examined by TGS but not CC; * indicates missing

Find no.	Description	Maximum dimensions (cm)	Spin direction	Spin angle	Thread diameter (mm)	Colour	Pigmentation	Remarks
70	Cabled rope fragment; unravellled at one end into 3 z-plied ends. The other end has an overhand knot through which a 180mm-long rope with an overhand knot at either side is added, s2/z3/s; horse hair	107 x 0.9	s2/z3/s			black		on display
110.6	Hair and wool rope of several strands, tied in large knot; main strand is 3-ply twined hair, with 1 strand protruding from ply 5cm from knot, leaving remaining rope strand only 2-ply; additional strand of dark brown hair, untwisted, protruding from knot; 3rd strand of medium brown hair, unspun, protruding from top of knot; short length of light brown wool protruding from knot	33 cm long	zz/s	ply: 35 degrees	main strand: 4.75–5.5cm wide	dark brown	x	white papery substance on some hairs

Table 4 cont

Find no.	Description	Maximum dimensions (cm)	Spin direction	Spin angle	Thread diameter (mm)	Colour	Pigmentation	Remarks
117	Cord with an overhand knot on one end and frayed at the other end; combed wool	16 x 2.5	ss/z			dark brown		on display
185	Short length of 2-ply hair rope	10.5cm long	ss/z	34.6/49.9	4.7/6.6	dark brown	x	fibres now very broken
545	Length of 2-ply twined hair rope with starting knot, wound in a circle	approx. 40cm long	zz/s	22.8/ply angle not possible	2.3/ply diameter not possible	medium dark brown, with slight variation in fibres	x	thread diameter over 8 measurements; spin direction over 5 measurements
632	Group of loose hair fibres, unspun	11 cm long	n/a	n/a	n/a	dark brown	x	not formed into thread
695	Short length of overspun woollen thread, and has twisted back on itself and become knotted; spinner's waste	approx. 12 cm long	s	59.8	0.75	black	x	thread diameter over 4 measurements; spin angle over 2 measurements