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Fonaby, Lincolnshire
Anglo-Saxon Cemetery

Appendix
The Textiles

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Owing to some condition beneficial to the preservation of organic matter, unusual in sand, the inhumations of the cemetery at Fonaby retained more and larger textile fragments than have been found in any other Anglo-Saxon burial to date, apart from the Sutton Hoo ship. Instead of the usual scanty remains replaced by metal oxides, and occasional tiny scraps of fabric, several of the larger brooches had folds or layers of different weaves adhering to front and back, those from underneath in some cases protruding even beyond the protection of the metal.

Unfortunately over the years since they were excavated the objects from the different burials may have become confused, the textile remains have deteriorated, and some fragments recorded earlier seem to have disappeared. A selection of the textiles was first examined in 1956 by Audrey S. Henshall, whose notes will be found in Appendix 2, p. 15; these included some detached fragments, in particular the remains of tablet-woven braids, now catalogued under Grave 31 and US.98, and one large cruciform brooch, no. 14, US.109, with the fabrics preserved on it. By 1960, when the present author for the first time examined material from the cemetery, some of the weaves A.S. Henshall described were no longer distinguishable, and the condition of others had deteriorated. The problems that arise are mentioned in the conclusions, pp. 10-14.

Fibre determinations were carried out by H.M. Appleyard, F.T.I., for A.S. Henshall and for the present study, first at the Wool Industries Research Association laboratory, and more recently as an independent consultant.

In description of the textile items in the catalogue, the term "replaced" has been used as a convenient abbreviation for "fibres replaced by metal oxides". All measurements are given in centimetres except where otherwise stated, and counts of threads per 1 cm. The direction of spinning twist in the yarns is indicated by the letters Z and S, that of the probable warp thread being placed first. In textiles woven on the warp-weighted loom the warp threads are commonly closer than the weft, and where no border or selvedge survives the denser count is therefore placed in the first (warp) position.

Textile Catalogue : Inhumation Burials

Grave 1

7. Iron keys and rings

Lying on ring for 2 cm, replaced string of 4 threads Z spun, Splyed together; traces other Z threads alongside.

Grave 3

2. Annular brooch (781589)

- (a) Across front, 3-4 coarse Zspun threads, ?lightly Sply, 4.5 cm long.
- (b) Along pin, for 2 cm, deteriorated tablet twists, Z spun, twists S; another replaced area curves round side of ring.
- (c) Above this, deteriorated fabric, Z,Z.

7. Detached textile (781590)

Wool fragments, largest c.1.5 X 0.8, Z,Z, 2/2 twill, count c.15/14 (7-8/7 on 5 mm), regular. Lump probably same, deteriorated, some long coarse threads. HMA Fine wool, a few coarse kemp type fibres, possibly dyed.

Grave 4

3. Iron keys

Replaced, largest area 1.4 X 1.6, Z,Z, 2/2 twill, count 11/11.

Grave 5

2. Small-long brooch

Front: (a) Area c.4.0 X 1.5, largely replaced, on foot and in fold on bow, also small patch on square plate, Z,Z, coarse twill, 2/2, count c.10/10, confused by broken threads.
(b) Under this on foot and head plates, traces finer weave, Z,Z.
Back: At least two layers deteriorated textile; Z,Z, ?(a).

Grave 15

1. Bronze buckle

Back: Two layers wool textile, area c.3.0 X 1.5 at widest, Z,Z, probably regular 2/2 diagonal twill throughout, very even, count 14/12; replaced area, probably same twill, but distorted.
HMA Animal fibres with some fine, and some coarse fibres with wide lattice type medulla as in coarse fibres from British mountain breeds of sheep.
Front: Traces same twill.

Grave 16

4. Sleeve clasps

Front: Over whole area of clasp, c.3.0 X 4.0, several layers replaced fabric - (a) top, Z,Z, 2/2 twill, count 10/10.
(b) under (a) against bronze, folds finer weave, possibly tabby.
(c) under (b) at one edge, coarse threads ?sewing clasp to sleeve.
Back: Confused replaced remains over surface, particularly near ?sewing threads; Z and S threads, possibly tablet twists, ?cuff or border to sleeve (p. 13).

Grave 17

2. Penannular brooch (781591)

Replaced patch on ring, c.1.3 X 1.0, Z,Z, 2/2 twill, count c.9/8.

4. Textile

Wool fragments, in folds, best pieces 2.0 X 2.0, Z,Z, 2/2 twill, regular, count 12/12. HMA Animal fibre, mostly fine, some medium diameter medullated fibres.

Grave 231. From beads

Seven Z spun threads Splied together. HMA Probably flax.
Other fragments coarse Z spun thread, longest 3.3 cm, one with finger-knot in centre. HMA Badly damaged fibres, probably wool.

2. Cruciform brooch (Pl. ,a,b)

Back: (a) On shaft of cross, passing round to overlap to front, area 7.0 X 3.5, three layers dark brown wool, Z,Z, 2/2 twill, count 12/6-7, warp finer, harder spun than weft, well-woven but now open.

(b) Underneath this, replaced areas soft textile in folds, Z,Z, tabby weave, rather open, count 12/10.

(c) Round head of pin, two replaced fragments tablet twists, each 1.3 wide, c.2.4 long, warp Z, weft invisible, 4-hole weave in chevrons, i.e. threaded right and left alternately (fig.2.b), 8-9 twists, c.12 wefts, per cm. Two folds of braid lie partly across each other, as caught by the pin.

Front: (a) Areas as above, overlapping edges of shaft.

(b) Replaced, in folds, areas 7.5 X 4.5 on shaft, 3.5 X 3.5 on crossbar, Z,Z, tabby, surface deteriorated.

(c) Area tablet twists, 1.4 X 1.3, curving round edge onto arm of cross.

(d) Patches bright brown wool, some threads ?darker, above (b) on cross shaft, best area 2.0 X 2.0, Z,Z, twill 2/2, count 7/7.

Very HMA fine animal fibres, remnants of scale patterns, probably wool, unpigmented, stained light brown.

4. Iron ring (781592)

Curving round iron, 2.5 X 1.8, replaced coarse Z,Z, 2/2 twill, count 7/7-8, rather open weave, ?(d) above.

6. Detached textile (781593)

Loose fragments, ?(d), 4.5 X 2.0, 2.3 X 1.5 (adhering to wood), and deteriorated scraps, Z,Z, 2/2 twill, c.10/9-10, regular; some ?wefts on one fragment possibly dark, others and ?warps lighter, as on brooch 2. (see p. 16)

Grave 244. Shaft of spearhead (781594)

Deteriorated replaced textile traces over one surface, fragment 1.0 X 0.5 clear, Z,Z, 2/2 twill, count estimated 10/10.

15. Iron fragment

Areas two replaced textiles, (a) largest area c.2.5 X 0.9, Z,S, twill, 2/2 where clear, count estimated 10/10, removed to show

(b) underneath, wrapped round metal in folds for length 4.5 cm, Z,Z, close tabby, count 13/12. A thin sliver of wood lay between

(a) and (b) at one edge, but did not go right across. Double Zspun thread lying across (b) in three places may have bound it to the iron.

Grave 251. From beads

Splied thread, similar to that from Grave 23.1.

5-6. Iron keys

(a) Replaced textile, area c.4.0 X 1.8, surface deteriorated, Z,S, twill, count estimated c.11/11.

7. Iron key (781595)10. Iron knife (781597)

Replaced deteriorated traces Z,Z, twill.

(Grave 25. con.)

8. Iron strips (781596)

Most pieces have traces replaced textile, two clear areas:-

(b) 2.3 cm long, Z,Z, 2/2 twill, count c.12/10.

(c) 2.0 X 1.2, Z,Z, 2/2 twill, count c.8/8.

11. Iron knife (781598)

Replaced area 1.5 X 0.8, Z,Z, 2/2 twill, could be (c) above.

12. Detached textile

Fragments rich brown wool, best 1.7 X 1.3, Z,Z, well spun, 2/2 twill, counts vary, 17/11, 13/11, could be (b) above. Some pieces have leather or skin adhering.

Grave 31

1. Cruciform brooch

Front: Replaced textile, several layers underneath beads, over area 5.5 X 4.0 below cross-bar; Z,S, 2/2 twill, simple diagonal where visible, count 9/9.

Back: Two deteriorated areas probably same twill, foot and cross-bar.

3. Annular brooch

Front: Area 3.0 X 1.3, two layers lying across pin, wool twill (a)

Detached fragments from brooch 3:

(a) 2.5 X 3.0, dark brown wool, Z,Z, 2/2 twill, count 11/8.

HMA Pigmented animal fibre.

(b) Adhering closely to (a) Z,Z, tabby, count 10/10, fibres deteriorated leaving weave open (see below, brooch 4).

(c) Fragment rich brown wool, Z,Z, 2/2 twill, count 8/7, soft, matted, spinning uneven.

4. Annular brooch

Front: Area 2.3 X 2.2, two layers replaced tabby, ?(b), Z,Z, count 10/10; beneath this, clear 1.5 X 0.5, with pin passing through it, twill ?(a) Z,Z, count 10/7-8.

Detached fragments from brooch 4 (See App.2, p.15, A.S.Henshall)

(a) Dark brown, largest c.9.0 X 3.5, Z,Z, 2/2 twill, counts 13/7, 12/8. HMA Mostly fine to medium animal fibres, naturally pigmented.

(b) Adhering to (a), some areas replaced, dark brown, deteriorated, Z,Z, tabby weave, variable, counts 12/9, 10/10.

(c) Against (b) with fragments leather or bark adhering, bright brown, Z,Z, twill, count 7/7; irregular spinning and matting suggest pile, but dissection shows only regular 2/2 twill. HMA Very fine animal fibres, similar to Grave 23 (d), some well preserved, comparatively good scale patterns visible, almost certainly wool.

(d) Small bunch S threads, lying side by side, a few Z threads passing loosely through, area c.2.0 X 1.3; on underside similar threads go round impression of pin-head, ?sewing. HMA Animal fibres, impossible to say what type due to lack of scale patterns.

(e) Fragment 3.0 cm long from whip-cord (fig.2.a) made of thread with slight Z spin used in threes, circumference 8 mm.

5. Iron ring

Very deteriorated fragments Z,Z, twill ?(a), long threads lying across; over this finer replaced fabric, Z, possibly (b).

Detached fragments from braids (See App.2, pp.15,16) (Pl.)

Braid 1. Two fragments: (i) 4.2 X 2.7. Part of one edge, 5.5 mm deep, six 4-hole tablet twists lying in chevrons, warZ, weft Z, Sply, count 10-11 twists and 12 wefts per cm; followed by 2.0 cm of diagonally patterned centre; other edge missing. The pattern weave cannot be deciphered now, and may be on 4 or 2-hole tablets; on one side the twists have only a slight waved effect, on the other

(Grave 31, con.)

(Braid 1) the plyed wefts show at intervals on the surface. Sewn to surviving edge with similar Z thread to that in the braid, fine cord or whip-cord, ? same type as (e) but much finer, made possibly with 8 Z threads in pairs.

(ii) Fragment with remains of pin in it, coiled in an S, from the border of the braid, 4.0 cm long, 0.8 deep, same six tablet-twists and cord sewn to edge.

Braid 2 Three fragments: (i) Fragment 1.4 cm wide, 1.3 long, weft loops preserved both edges, warp Z spun, 15 twists, i.e. c.10 per cm, weft Z, Sply or used in pairs, 12 per cm; probably simple chevrons throughout.

(ii) 2.2 X 1.3, 14 twists, loops protruding at both edges.

(iii) 1.5 X 0.6, 6 twists, no edges preserved.

HMA Both braids are fine wool, but with a few coarse fibres, ?dyed.

Grave 35

. Sleeve clasps

Back: Area c.2.5 X 1.2, deteriorated replaced textile, Z spun, ?twill; probably other layers beneath.

Grave 41

2. Iron buckle

On loop, two layers replaced textile, area c.2.5 X 2.3, Z,Z, 2/2 twill; top layer, count 10/8, lower layer count 12/10; possibly two fabrics, but possibly bottom layer better preserved.

(same, with)

. Iron complex

Similar replaced layers textile, on front and round edge, area c.3.5 X 4.5, twill, counts as on buckle.

. Girdle hanger

Replaced textile, best area c.7.0 X 2.0, Z,Z, 2/2 twill, variable, counts 9/9, 9/8, 10/8, in two layers round shaft; similar on front and back of broken pieces.

Grave 42

1. Buckle

(a) Replaced, over most of surface, in folds, clear 2.0 X 2.5, Z,Z, tabby, count 10/10; some broken places give appearance of double threads
(b) Lying across (a) fragment 2.0 X 0.6, deteriorated coarse Z,Z, twill, count 9 in one system.

Grave 43

2. Cruciform brooch

Front: (a) area Z,Z, tabby, surface deteriorated, replaced, count c.12/12.

(b) On pin, area c.0.8 X 2.5, curving round head, Z,Z, 2/2 twill, count estimated 10/7.

3. Cruciform brooch

Front: Replaced area 4.5 X 2.5, Z,Z, probably twill; surface with fibres suggesting a nap, but possibly hair or grass lying across; other traces on foot.

Back: Scraps, Z,Z, tabby, deteriorated, possibly (a). HMA vegetable fibre. Near pinhead, again hairy surface traces.

Grave 441. Annular brooch

Front: Visible within circle of brooch, area 1.5 X 0.8, replaced fine tablet twists, 10 per cm, all turned in same direction.

Back: Area 2.7 X 1.7 and impression, same twists; in one place crossed by an Sply thread.

3. Small-long or cruciform brooch

Back and front, replaced remains, Z,Z, deteriorated surface.

4. Iron rod with bronze plates

Over area 6.0 X 2.0, round iron under plates, two replaced textiles in folds: (a) Small clear fragment, 0.8 X 0.7, Z,S, 2/2 twill, count 4/4 on 5 mm.

(b) Under this, Z,S, three shed twill, ?weft face (1/2) lying uppermost, count 12/10 (6/5 on 5 mm), (fig.1.g)

5. Sleeve clasps

Back: Area 3.0 X 0.7, deteriorated replaced Z and S threads, ?tablet.

Front: Area c.3.0 X 2.8, replaced textile, probably three layers, or folds, Z,S threads.

7. Bronze fragment

Confused replaced textile both sides, front 1.5 X 1.2; back 1.3 X 0.7, Z threads suggesting a fringe.

Grave 451. Annular brooch

Front: (a) Area 1.2 X 2.8, Z,Z, coarse twill, passing round to back at pin head (see below, detached pieces).

Back: (b) Along pin, 2.4 X 1.2, deteriorated fine tablet weave.

2. Annular brooch

(a) Replaced traces twill.

(b) Area tablet woven braid, c.2.5 X 2.0, round pin area, visible front and back, in at least two folds; 4 tablet twists in chevrons (see below, border ii), followed by 0.8 cm central pattern, surface deteriorated, some blue-green threads noticeable, followed by first two twists of second border and 5 mm exposed wefts.

Detached textiles from annular brooches:

(a) Fragments ?wool, largest c.5.5 X 1.5, Z,Z, 2/2 twill, count 10/9. HMA Badly degraded animal fibre.

(b) Pieces from fine tablet-weave braid. HMA Badly degraded animal fibre. (i) c.3.0 X 1.4, including one edge; warp Z, weft loosely Sply, twists 10, wefts 11-12 per cm; this border, in 4-hole tablet weave, may have 9 twists, lying 1Z,1S,6Z,1S, but there is some confusion, and only the first four may be border; centre is patterned (only 5-6 mm preserved) in 4 or 2-holed tablet weave. Tablets 1 and 9 are threaded blue (or green), the rest red (or purple).

(ii) c.0.9 X 0.4, four rows twists, Z,S,Z,S, with edge loops present at one side; probably from second border of braid.

(iii) 2.2 X 1.2, part of patterned centre of braid, with one simple 4-hole twist from border.

Three other small confused scraps from patterned centre and edge.

Grave 46. Keys

Replaced textile, three folds or layers, top 2.0 X 2.0, Z,S, 2/2 twill, clearly, from second area 1.0 X 2.7, broken diamond, count 16/14; one paired weft across best preserved area (fig.1.b).

On underside of largest fragment, coarse loosely spun Z threads, plied or possibly plaited, fastened round part of key; one thread goes under twill on front.

Grave 48

. Sleeve clasps

- Front: (a) Area, replaced, 2.3 X 1.5, Z,S, weave too deteriorated to be identified.
 (b) Detached fragments textile in layers, largest 1.5 X 0.7, most deteriorated, one clear Z,Z, 2/2 twill, broken and missing threads; two layers beneath Z,Z, possibly same.

Grave 49

2. Annular brooch (781599)

- (a) On ring, and impression on iron pin, fine replaced textile, clear 0.8 X 0.7, Z,S, 2/2 twill, yarns fine, weave pulled diagonally, count c.12/12 (6/6 on 5 mm), all remaining simple diagonal.

3. Iron strips (781600)

- (b) Replaced area 1.0 X 0.5, Z,Z, 2/2 twill, count estimated 12/12.
 (c) Two fragments, 0.9 X 2.3, 0.8 X 1.2, 4-hole tablet weave, Z spun; twists start in chevrons, alternate Z,S near edge, then probably all lie S, but damaged or irregular; coarse Z wefts protruding suggest this may be a starting or ending border.

Unstratified Material

9. Cruciform brooch (US. 2 and 83) (Pl.)

- Front: (a) Replaced on cross bar, 5.5 X 3.0, and smaller areas neck and foot, lying in soft folds, Z,Z, tabby, count 11/9, well spun; upper folds weave deteriorated and open, but under layers close.
 (b) Above (a) in patches, neck and top of cross bar, largest area 3.0 X 1.2, coarser Z,Z, twill.
 Back: Patches (a) near foot and one arm of cross; cross and neck, twill (b) here clear 2/2, count 9/8.

12. Cruciform brooch (US.107)

- Front: On surface and round pin, remains coarse Z,Z, twill, ?2/2.
 Back: Above pin, fragment cord or plait of coarse S thread.

13. Cruciform brooch (US.108)

- Areas replaced textile, surface deteriorated:-
 (a) Best area 2.0 X 3.0, wrapping round arms of cross and neck, next to bronze, and also passing round back and under pin, Z,Z, twill, probably simple 2/2, count estimated c.8/8.
 (b) Lying in tight soft folds over (a) on front, tucked under neck and end of brooch and under pin on back, overlapping to front edges of shaft, Z,Z, tabby, count 12/10.
 (c) Across plate at pin head on back, area tablet weave 2.5 X 0.5, warp Z, weft Sply or Z pairs; broken fragment shows 4-hole tablet weave, chevrons, 4 twists and 3 wefts per 5 mm; ?possibly border of twill (a).

14. Cruciform brooch (US.109) (See Appendix, A.S.Henshall) (Pl.)

- Back: (a) Next to metal, layers textile almost entirely replaced, largest clear area 1.5 X 1.0, Z,Z, twill 2/2, count 8-9/8-9.
 (b) Over this, area c.4.0 X 2.5, partly replaced, Z,Z, tabby, soft, count 16/12. HMA Vegetable fibres. Appearance in whole mount and cross section suggests flax.
 Front: (a) Twill from back, overlapping edges of cross and shaft.
 (c) All over front, replaced patches, largest 3.0 X 2.0 in two layers on plate and patches on foot, Z,Z, tabby, count c.10/10.
 (d) Across foot, 1.5 X 0.7, tablet weave, 6 twists c.1 mm each, first 4 clear chevrons.

(14. Cruciform brooch, con.)

Loose textile fragments: Probably (a), largest piece c.4.0 X 1.5, dark brown, Z,Z, 2/2 twill, count 10/10. HMA All animal fibres, some fine, some coarse. Some coarse fibres are medullated, all are naturally pigmented. The scale pattern was not visible.

. Annular brooch (Us.44) (781601)

Area c.2.1 X 0.5, replaced, deteriorated, Z and S threads.

. Annular brooch (US.74-75)

Front: Area Z,Z, probably tabby; at pin end, 1.0 X 1.3, deteriorated tablet twists, Z warp, Z wefts c.5 per 5 mm.

. Annular brooch (US.112)

Front: (a) Replaced fragment, Z,Z, 2/2 twill, count 12(6 on 5 mm)/10.

Back: (b) Confused replaced textile, area c.4.0 X 5.0, along pin, including broken tablet-weave edge, 7 mm long.

(c) Under textile, fragment whip-cord, probably tied round brooch. Detached from brooch:

(d) Fragment dark brown, 0.5 X 1.0, Z,Z, tabby, count 12(6 on 5mm)/10, HMA Animal fibres, some very dark, possibly dyed, mostly fine; one fibre was ribbon type with a wide medulla.

. Fragments of two Annular brooches (US.113)

Both have replaced textile traces, probably twills, one Z,S, the other Z,Z spinning; further identification impossible.

. Buckle (US.80) (Pl.)

Clear replaced textile both surfaces, Z,Z, regular 2/2 twill, count 14/13; on best piece, back, 2.5 X 2.0, one throw of two threads in the same shed (Cf. Grave 46 and , US.48), probably simply mistake or mend, as no sign of pile on underside; 16 normal throws before and 9 after the double weft.

. Buckle (US.82)

Area replaced textile 3.5 X 2.5, round back to front of loop, Z,Z, 2/2 twill, count 10/10.

. Buckle (US.115)

Replaced textile, surface deteriorated, Z,Z, ?twill, count estimated c.8/8; traces finer fabric on top.

. Iron girdle hanger (US.90)

Replaced textile, best area 7.0 X 2.5 round shaft, Z,Z, 2/2 twill, count 9/9.

. Iron key (US.48 a & b)

Several areas well preserved replaced textile, best c.5.5 X 2.0, round two sides of shaft, Z,Z, fine twill, regular spinning and weaving, count 12-13/12, clear areas 2/2 diagonal, but broken threads and confused parts suggest broken diamond. One fault of two threads lying in one shed (Cf. .US.80 and Grave 46).

. Sleeve clasps (US.43)

Front: (a) Area 3.5 X 1.8, largely replaced, Z,S, deteriorated, but where clearest ?tabby, count 5/4 on 5 mm; possibly 1/2 side of three-shed twill (see p.11, fig.1.g)

Back: (b) 2.3 X 1.4, and other small patch, decayed 4-hole tablet weave; 4 twists per 5 mm clear, and 6 wefts per 5 mm at broken edge; weave turned under, with Sply sewing threads going through, i.e. a braid sewn to the edge of the sleeve and the clasp.

(c) Deteriorated remains, Z,Z, above this, probably fabric of sleeve.

Spearhead (US.91)

On socket, replaced textile c.6.5 X 2.5, Z,Z, 2/2 twill, count 7/7. Another area, 6.0 X 2.0, which probably lay across this, shows a tubular selvedge on the twill, 6 threads clear on 5 mm, i.e. selvedge probably on 12 or 13 warps; wefts 4 per cm on edge, i.e. c.8 in main weave. The long jumps the weft makes entering some sheds of the twill are noticeable (fig.1.c,d).

Detached textile fragments

- US.95 (a) Deteriorated layers, at least five thicknesses, largest area c.2.5 X 4.0, dark brown, Z,Z, open tabby, count 8/8. One small fragment has selvedge, with a double Z spun thread run loosely along, over 2, under 1 wefts (fig.1.e); the edge loops are not crossed, so probably side edge; the double thread may have been decorative, or more probably sewing from a selvedge seam. HMA All stained animal fibres, some of the coarser ones medullated.
- (b) A layer of long fibres, unspun, not attached to (a). HMA Animal origin, some naturally pigmented, some stained; although the scale pattern could not be seen, the type of medulla and the cross-sectional shape suggest that the fibres may be cow body hair. A number of root ends were found, suggesting that the fibres may have been plucked. This could also agree with a suggestion that the fibres came from a cow-hide laid over the body, from which the skin had rotted away.
- (c) Small fragment c.2.0 X 1.0, tablet weave from braid, warp decayed, Z, weft Z, loosely S plyed, 4-hole tablet weave in chevrons, one edge present, 12 twists and c.12 (6 on 5 mm) wefts per cm.
- US.96 Fragment, bright brown ?wool, folded double, c.3.0 X 3.0, Z,S, twill, 2/2 but surface deteriorated, weave loose, count c.14/14, possibly part of US.98 (b).
- US.97 (a) Scrap from starting border (?), length c.4.0 cm, width 4 mm, two 4-hole twists tablet weave, Z spun, lying right and left, 16 wefts per cm, crossed where they emerge from tablet-woven edge to become warps of main weave, i.e. tabby, of which nothing remains (see fig.2.b).
- (b) Mass coarse Z spun thread, perhaps remains small ball of wool.
- (c) Deteriorated Z spun threads, possibly from twill.

US.98 (See Appendix 2, A.S.Henshall, pp.15-16)

- (a) Several pieces, largest c.2.5 X 2.5, dark brown, Z,Z, 2/2 twill, count 9/9. HMA All animal fibres, mostly fine with some coarse medullated fibres; all naturally pigmented.
- (b) Fragments, some very matted and deteriorated, best 3.0 X 2.0, bright brown, Z,S, 2/2 diagonal twill in clear parts, but with reverses in warp and weft, i.e. broken diamond, many broken threads, count c.14/12. HMA Animal fibres, stained and not pigmented, similar to sample US.95(a).

These textile remains were said to be found with an iron buckle, but the correct item has not been identified. Weave (b) may be A.S.Henshall's broken diamond twill (fig.1.a) though her fibre sample there was said to be pigmented (p.16). She writes that it is possible the fragment she saw was removed to clean the buckle.

Fibres

With three exceptions - bead thread (Grave 23) and two tabby weaves (Grave 43; US.109) - which are of vegetable fibre, probably flax, animal fibre had been used for all textiles on which identifications could be made. This in most cases was probably sheep's wool, often with very fine fibres; the occasional coarser fibres had in two cases a wide lattice type medulla, as found in British Mountain breeds of sheep. Two other types of animal fibre were present. Samples sent by A.S.Henshall from twill fragments (US.98) and loose fibres with the fabrics from Grave 31, were identified by H.M.Appleyard as possibly goat; the latter may be the threads (d) from this burial, which in later examination were too deteriorated for the type of animal fibre to be identified. Among the detached fragments US.95 fibres of cow body hair with root ends were found in a layer against one side of a wool tabby, possibly the remains of a cow hide cloak or covering laid over the burial.

Weaves

The weaves represented are those normally found in Anglo-Saxon cemeteries, twills, four-shed and three-shed, tabby (plain) weaves, and tablet weaves.

Twills. Nearly two-thirds of all textiles catalogued from Fonaby are twills, and by far the largest group of these, thirty-four examples, are four-shed 2/2 weaves with Z spun yarn in warp and weft, and thread counts varying from 15/14 (Grave 3) and 17/11 (Grave 25) to 7/7 per cm (Grave 23; US.91), the majority being around 10/10. The yarns are well spun and the standard of weaving good, though in some coarser pieces occasional looseness results in diagonal pulling. In one case confusion suggests that the weave may have had reverses (US.48), but apart from this, as far as can be seen, all this Z spun group were simple diagonal weaves. Variations in colour in some yarns may indicate that fragments from Grave 23 were striped, as in a coarse twill from Broomfield Barrow,¹ though the differences are irregular and may be due to staining. A.S.Henshall describes the twill on brooch 14 (US.109) as having a raised hairy surface (p.15); when examined later the yarns had deteriorated and the weave thinned out so that this was no longer visible, but the appearance of one replaced fragment (Grave 43) also suggested a raised nap. Finishing of this type, though known in Roman contexts, is rare in Anglo-Saxon weaving, though it has been noted, particularly from two cemeteries where there had been earlier Roman occupation.² It has to be borne in mind that

in replaced pieces it is possible that surface deterioration before replacement may give a raised appearance.

One selvedge, preserved on coarse fabric from a spearhead (US.91, fig.1.c,d), is a tubular construction with a long European history stretching from the Danish Bronze Age to the 18th century mechanisation of weaving³ that reflects its practical value as a neat edge, less likely to catch and fray than a simple selvedge. Anglo-Saxon examples have been found on twills and tabbies in flax and wool⁴.

A smaller group of twills, nine altogether, have Z spinning in one system (warp) and S in the other, a combination popular in earlier Anglo-Saxon textiles for twills with herringbone or lozenge patterns. In two cases here (Grave 46; US.98) this was certainly the latter, a lozenge with displaced meeting, sometimes called "broken diamond" or "crystal" twill, of which numerous examples have been found in other Anglo-Saxon cemeteries⁵ and from Scandinavian and German sites.⁶ A.S.Henshall fortunately made a draft of the weave of one US.98 fragment (fig.1.a) which may have disappeared in cleaning the buckle; the remaining scraps are deteriorated, though it can still be seen that the weave had reverses in warp and weft. The fibres differ in two samples sent to H.M.Appleyard, the 1956 threads being pigmented, those sent in 1960 stained but unpigmented; if the surviving fragments were from the same twill this suggests that the pattern was emphasised by the use of different coloured threads in warp and weft, or stripes in one or both systems.⁷

There are only three possible examples of three-shed twills (fig.1.f,g) in the Fonaby material. A tiny piece mentioned by A.S.Henshall lying under other fabrics on a cruciform brooch (no.14.US.109) can no longer be distinguished; the other two examples are small replaced fragments (Grave 44; US.43). This weave has attracted some interest as being represented in England in Roman and Anglo-Saxon finds, but not apparently in Scandinavian textiles until the Viking period.⁸ The Fonaby scraps are unusual in that the spinning is Z and S, a combination so far found only in one other three-shed Anglo-Saxon twill, the well-preserved woollen from ^{Mitchell's Hill,} ~~Middenhall~~, though very common in medieval material.

Tabby weaves Of the twelve tabby (plain) weaves preserved, all are Z spun in both systems. Two, as mentioned above, have been identified as of vegetable fibre; the soft folds of three replaced examples also suggest flax (Grave 24; 9.US.2,83; 13.US.108). Three of the coarser pieces are of animal fibre (Grave 31; US.95; 14.US.109), though in the last of these this weave, described by A.S.Henshall, only exists now in replaced patches. There is no indication if the other tabbies are likely

to have been flax or wool.

Only two selvages have been noted on tabby weaves, one by A.S. Henshall (p.) on a weave described as ?wool or linen, now missing (Grave 31), the other from a wool tabby, with thread run along it that may be remains of sewing from a selvedge seam (US.95(a), fig. 1.e).^{8a}

Tablet weaves Tablet-weaving is a braid and border technique popular in antiquity and in folk-weaving for its strength and firm texture, and the variety of decoration in texture and colour than can be simply produced by the way the tablets - thin plates, usually of wood, hide or card, with holes for the passage of the warp yarns - are threaded and manipulated. Surface brocading is frequently an added decoration, put in during or after the weaving.

A starting border is a necessity on the warp-weighted loom, and simple tablet-woven examples, often of only three or four twists, have been found in Scandinavian material;⁹ the warps of the main weave are the wefts of the tablet-band, drawn out in loops and extended round pegs to the length desired for the woven length of fabric. The tiny scrap from US.97 has only two twists of the border left and no wefts from the main weave, but the way the warps cross as they lie broken suggests this comes from a starting border. The technique can be used to close all four edges of a cloth, and possible examples of these have been found from Anglo-Saxon sites.¹⁰ on a tabby cloth (fig.2.b).

Tablet braids made separately for belts and for the decoration of garments are often elaborate. The Fonaby braids are fine, made of hard shiny wool which A.S.Henshall at first thought might be silk, originally probably highly coloured. Two had diagonal pattern in the centre part of the braid, unfortunately already too deteriorated for even A.S. Henshall, a very skilled tablet-weaver, to work out the exact passage of the threads. Braid 1 (Grave 31), which she examined, was probably c.3.0 cm, and the braids from Grave 45 perhaps only 2.0 cm wide; in the latter colour can still be seen, red(?purple) edged with blue twists for one wide edge, c.9 mm, and red for the other narrower border after the diagonal centre, in which traces of blue or green are visible. In both cases the designs seem to have been of the same type as those of braids from Evebo and Snartemo, Norway, 5th-6th centuries, some worked with two holes of each tablet threaded, others with four.¹¹ Of five scraps with diagonal pattern from Mucking, Essex, one (Grave 935) also still showed colour, red twists at the edges and blue and ?yellow in the patterned centre.¹² Only one of the latest Anglo-Saxon braids, the 10th century silk gold-brocaded "Girdle" among the relics of St.Cuthbert at

Durham Cathedral, is sufficiently well preserved for the weave to have been worked out and reproduced.¹³

From their position the braid on annular brooches in Grave 45 must have been a decorative border sewn to the neckline of the garment they fastened; sewing threads and holes left by the needle can be seen on similar braids from Mucking (Grave 814) and from Finglesham, Kent (Grave 203). On simpler braids preserved in sleeve clasps (Grave 16; US.43) the threads that sewed the clasps on are visible, and the turned-under cut end of braid, held down by stitching, is clear on one of the US.43 clasps.¹⁴

The wide braid from Grave 31, now detached, probably also decorated a garment; sewn to one edge is a small round cord, which would have been a weak feature on a girdle or belt. Another coarser fragment, a whip cord made with four bobbins of a type common in the north,¹⁵ was found detached in the same grave (fig.2.a). /or simply by hand-cording,

Costume

From the position of the textiles it is obvious that some women at Fonaby must have worn a garment with long sleeves edged with braid fastened by sleeve clasps, and others one with braid edging to the neck, fastened with a pair of annular brooches. This arrangement, familiar from other Anglo-Saxon cemeteries in eastern England, suggests a costume somewhat similar to that shown on the Pannonian reliefs of the early centuries A.D. with a long-sleeved undergarment fastened at the neck, and a thicker gown, like a rectangular tube of cloth, caught on the shoulders by a pair of brooches. In most of the Anglo-Saxon graves the size of the centre brooch suggests a cloak fastening rather than that of a light undergarment, but even the sleeve fragments in clasps are solid woollen fabrics suitable to the raw climate of eastern England. 16

The possible disturbance of the grave groups and unstratified position of four of the large cruciform brooches means that interpretation of the considerable textile remains on these handsome objects can only be tentative. Only one has been assigned to a grave with a full complement of brooches, Grave 31; this has remains of a medium Z,S spun twill, unlike the fabrics on and with the annular brooches - woollen tabby and two twills, one medium, one coarse, both Z spun, now present; two tabbies and one Z twill recorded by A.S.Henshall - and none of the brooches has any trace from the tablet-weave braids also assigned to this grave. As the finer twill is pinned by one annular brooch (p.4) it seems likely to be gown fabric; the tabby, replaced on the front of this brooch, perhaps a head-veil rather than the undergarment, and the coarser twill, adhering to loose pieces of the tabby and fragments of leather or bark, a cloak or blanket-shroud laid overall.

The cruciform brooch is rather small and could perhaps have pinned the neck of the undergarment; its different twill, with the necklace of beads lying across it, suggests folds touching front and back of the brooch as the woman lay, but the lack of sleeve clasps prevents any confirmation of this suggestion.

The large cruciform brooch now assigned to Grave 23 has replaced tablet-weave fragments very like Grave 31, Braid 2, and three fabrics strikingly similar in style, colour and count to those from the Grave 31 annular brooches. Whichever grave this brooch belongs in, the finer twill, in folds on the back and overlapping the front edges, could come from gown or cloak, bordered by the tablet weave, which lies as folded by pinning; the tabby, lying in folds on the front and tucked under at the back, the head-veil; and the patches of coarser twill uppermost on the front the cloak or shroud.

Of the four unstratified cruciform brooches one (no.12) has only traces of coarse twill; nos.9 and 13 have part of the same textile arrangement as the Grave 23 brooch - soft folds from a tabby veil or headcloth across the front and tucked under the pin, twill from gown or cloak pinned by the brooch and lying on the front edges; no.13 in addition has a tablet braid or border, probably on the twill. Brooch no.14 was seen by A.S.Henshall in 1956; from her notes (p.15) the twill weave was certainly pinned by the brooch, and from its raised nap, and the way she describes it as "folded back from the pin" it seems most likely to have been a cloak; the flax tabby (?head-veil) again is tucked under the brooch, to lie against the underside; the ?wool tabby, of which only scattered traces now remain, though in 1956 it was visible "in two layers on the upper side of the brooch" might come from a shrouding blanket, and the (now missing) fragment of 2/1 twill from the gown. Unless there is another missing fragment, it seems possible that the animal fibre sample she mentions from the foot, which appeared to come from the finer tabby (later identified as flax), may have been contaminated by fibres from the coarser wool tabby mostly replaced below.

In spite of the confusion due to disturbed excavation conditions and delay in study and publication, the Fonaby remains are a valuable addition to our knowledge of Anglo-Saxon textiles.

Appendix 2.Textiles from Fonaby, near Caister, Lincolnshire

Audrey S.Henshall

1. The large brooch (no.14.US.109)

Preserved by impregnation of the metal oxide.

- a. Plain weave. Wool. Z-spun. About 18 X 20 threads per inch, rather open. In 2 layers on the upper side of the brooch.
- b. Plain weave. ?linen. Z-spun. About 28 X 40-44 threads per inch. A much finer yarn and cloth than (a). There is only one small area which can be seen clearly, but the cloth seems to have been over all of the inside of the brooch.
- c. 2/2 twill. Wool. Z-spun. 28 X 20, the former count being much harder spun. This is a compact, close cloth and seems to have had a raised hairy surface. This cloth is against the brooch on the under side, but appears to have extended over only half the brooch and to have folded back from the pin which passed through it.
- d. In one small area a tiny piece of similar quality cloth but a 2/1 twill can just be seen under the plain weave (b).

2. Foot of brooch

- a. Plain weave, similar to 1a. In two layers next to brooch on the under side, preserved by impregnation by metal oxide.
- b. Plain weave, dark brown, ?linen or wool. Lightly spun Z. About 44 X 24 threads per inch, but this is very approximate. It is loosely woven with a very fine yarn. In 2 layers. Very decayed. WIRA. no.3.

3. Iron buckle and cloths (US.98)

- a. 2/2 twill. Wool. Z-spun. About 22 X 24 threads per inch. Similar to 1c. Preserved on buckle due to oxidation.
- b. 2/2 twill, very similar to (a). Black. The largest fragment just over 1 inch square. (a) and (b) may well be parts of the same cloth. WIRA.no.2.
- c. 2/2 crystal twill. ?wool. Brown. Z- and S-spun. About 42(Z) X 36(S) threads per inch. A fine and regular cloth, the best preserved piece only $1\frac{1}{4}$ X $\frac{3}{4}$ inch. The pattern turns at every 14 threads of the Z-spun system, and every 9 of S-spun. There are more threads in the pattern in the system which has more threads per inch, so that in the woven pattern the diamonds will tend to look the same length and width. WIRA.no.1.

4. Group marked F/S 12 (Detached fragments from Grave 31)

- a. Plain weave. Wool. Z-spun. About 28 threads per inch. A firm fairly fine cloth. WIRA.no.4.
- b. Plain weave. Black. ?wool or linen. Z-spun. About 28 X 26 threads per inch. There seems to be a selvedge (making the former count the warp). This is quite simple, and there does not seem to be even a double thread in the outside place. It is a fine rather open cloth, attached to other fabrics, on the reverse side is the "silk".
- c. 2/2 twill. Wool. Similar to 1c and 3a and b.
- d. Silk ? WIRA.no.5. ?goat.
- e. Tablet weave. Probably wool. There are 5 fragments which appear to be from the edge of the braid represented by only one larger piece, $1\frac{2}{8}$ X $1\frac{1}{8}$ inch. The selvedge is made with 5 or 6 4-hole tablets, turned constantly, "V" threaded, 36 turns per inch.

(Tablet weave)

The warp and weft are very fine 2ply, the warp is tightly spun Z and tightly plyed S. The alternate rows of the tablet "cords" appear as different thicknesses, but this seems merely to be due to those which are turned. The centre of the band, of which the opposite edge is missing and the width is unknown, is woven in a different technique, apparently one of the 4 or 2-hole "diagonal" weaves. WIRA.no.6.

All cloths very decayed and small fragments.

Note: (E.C.) The five fragments of braid are in fact from two different braids, one unpatterned, see catalogue, pp.4-5.

WIRA report. H.M.Appleyard.

Samples from Fonaby are badly degraded and are very friable. However, it was possible to detect small portions of the scale pattern on some of the fibres, fibres from sample 2 showed the patterns most clearly. Many of the fibres were pigmented, others were stained brown.

We cannot be absolutely sure of the identity of these fibres because of the amount of damage, but sample 6 is not silk - it is most probably wool. Sample 3 is stained brown, the scales are not visible, and we are unable to say what they are except that they are animal fibres. Samples 1,2,4 and 5 all contained pigmented fibres, some fibres are very fine and in samples 2 and 5 there were some fairly coarse medullated fibres. On some of the coarse fibres it was possible to see very small portions of scale pattern where the margins were crenate, on the finer fibres the scale margins were smooth. From the general appearance of the fibres in whole mount it is most probable that they are goat hair.

Notes

- 1 E.Crowfoot, IX, The Textiles in R.L.S.Bruce-Mitford, The Sutton Hoo Ship Burial III (19), Appendix 4.A. B3.
2. J.P.Wild, Textile Manufacture in the Northern Roman Provinces (1970) 82-86, 99. Unpublished: Mucking, Essex, Grave 989 (Late Roman), Graves 784, 878 (Anglo-Saxon); Stretton-on-Fosse, Graves 1, 13, 49, 51.
- 3 M.Hald, Olddanske Tekstiler (1950) 155-156, figs. 150-155. A.Nahlik, "Tekstiny wsi wschodnioeuropejskiej, X-XIII w", Acta Archaeologica lodziensia, nr.13 (1965) 99.
- 4 Bruce-Mitford (19) Appendix 4.A. B2; E.Crowfoot "The Textiles" in B.Green & A.Rogerson, East Anglian Archaeology 7, Bergh Apton (1978) 106, fig.110.5a,b; unpublished, examples from Barrington, Haslingfield, Sewerby, Wakerley.
- 5 G.M.Crowfoot, "Textiles of the Saxon period in the Museum of Archaeology and Ethnology", Proc.Camb.Antiq.Soc. XLIV, (1951) 30-32; E.Crowfoot, "The Textiles" in H.E.R.Davidson & L.Webster, "The Anglo-Saxon burial at Coombe, Kent", Med.Arch. XI. (1967) 37-9; E.Crowfoot, "Textiles" in P.J.Tester "Excavations at Fordercroft, Orpington", Arch.Cant. LXXXIV, (1969) 50-3; E.Crowfoot (1978) 103-5, fig.110.1; R.L.S.Bruce-Mitford, The Sutton Hoo Ship Burial I (1975) 445, 447; unpublished examples from Dover, Mucking, Worthy Park, Buckden, Sewerby, Finglesham, Welbeck Hill (Irby).
- 6 M.Hoffmann, The Warp-weighted Loom (1964) 187-194, 229-257.
- 7 Bruce-Mitford (19) IX, ^{SK9,} Appendix 4.A, B1; unpublished, Ganton Wold.
- 8 G.M.Crowfoot, "Anglo-Saxon Tablet weaving" Ant.Journ. XXXII (1952) 190; G.M.Crowfoot in Leeds & Shortt, An Anglo-Saxon Cemetery at Petersfinger (1953) 61; E.Crowfoot in P.Hutchinson "The Anglo-Saxon Cemetery at Little Eriswell, Suffolk" Proc.Camb.Ant.Soc. LIX. (1966) 29; E.Crowfoot (1978) 105, fig.110.3a,b; Bruce-Mitford (1975) 446; unpublished examples from Horton Kirby, Welbeck Hill, Ozingell, Dover, Bifrons, Hwletts. See Wild (1970) 50, Table A, no.50; Hoffmann (1964) 200-204.
- 8a E.Crowfoot (1978) 106, fig.110.6, a sewing thread with knots run along a selvedge.
- 9 Hoffmann (1964) 63-67, 151 ff, figs.69,70,73,74.
- 10 A.S.Henshall "Textiles on the back of a brooch from Blewburton Hill, Berks", Berks.Arch.Journ. LVII (1959) 17-21; E.Crowfoot (1967) 37-38, fig.6; Bruce-Mitford (19) IX, Appendix 4.A. B2; unpublished, Stretton-on-Fosse, F.102, Mucking, Graves 245, 622, 975.
- 11 H.Dedekam, "To tekstilfund fra folkevandringstiden" Bergens Museums Aarbok (1924-25) Pls.I, II, VI, VII; B.Hougen, Snartemofunnene (1935) 114-115, pla.X, XI, XIII-XV, XVII, XVIII.
- 12 Mucking, Graves 609, 814, 843, 935, 936.
- 13 G.M.Crowfoot, "The Braids" in C.F.Battiscombe (ed.) The Relics of Saint Cuthbert (1956) 435-438.
- 14 Cf. G.M.Crowfoot (1951) 26-28; G.M.Crowfoot (1952) 189-191.
- 15 Hald (1950) 243-247.
- 16 J.Garbsch, Die Norisch-Pannonische Frauentracht im 1. und 2. Jahrhundert (1965) 11 ff., pls.1, 8, 13, 16.1; Hald (1950) 377 ff; C.Blindheim, "Vernesfunnene og kvinnedrakten i norden i

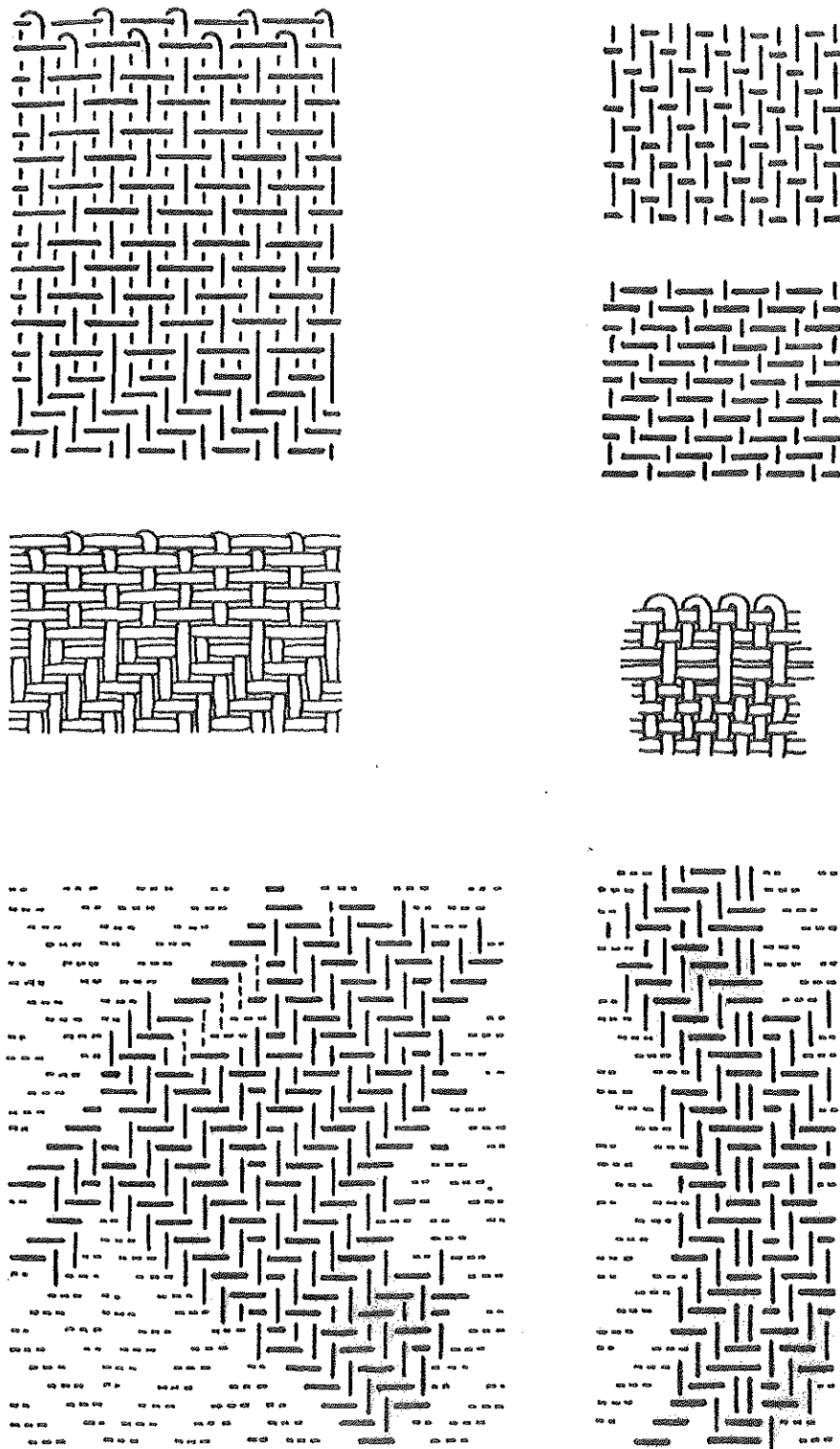


Fig.1. (a) Broken diamond (crystal) twill, from draft by A.S.Henshall. See Appendix 2.3.c and US.98 (b).
 (b) Broken diamond twill with paired weft. Grave 46.
 (c) Tubular selvage on 2/2 twill. US.91.
 (d) Diagram of (c) flattened to show passage of wefts in tubular selvage.
 (e) Selvage with paired thread, ?sewing, on tabby. US.95(a).
 (f) Three-shed twill, 2/1 (warp face). Appendix 2.1.d.
 (g) Three-shed twill, 1/2 (weft face). Grave 44; US.43.

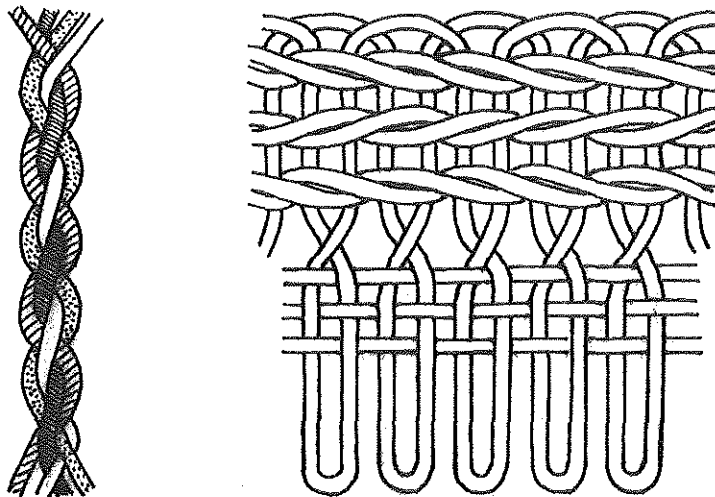


Fig.2. (a) Whip-cord. Grave 31 (e). Page 13.
 (b) Starting-border with three 4-hole
 tablet twists threaded right and left
 (chevrons) on tabby weave. See p.12
 and US.97. The edge loops (missing
 in US.97) are taken from Henshall
 (1959) fig.8.A.