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Summary

Study of mineralised leather remains from two cemeteries of sixth- and seventh-century date sets new standards for recording this type of evidence.

Keywords

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Evidence of leather on finds from Anglo-Saxon cemeteries at Boss Hall and Buttermarket, Ipswich, Suffolk, 1985-6

Esther Cameron and Glynis Edwards

Introduction

Objects of leather from the Pagan Anglo-Saxon period are rare. They are found with greater frequency in seventh-century contexts and in increasing quantity in urban centres such as York and London from the tenth century onwards (Cameron 1998, 45-56). Anglo-Saxon leather-work of the fifth to ninth centuries is so scarce that our understanding of Anglo-Saxon methods of leather production and the status of the industry during this period is very limited. Recent study of mineralised remains of sheaths and scabbards in England highlights certain changes in the use and character of leather in the late sixth and early seventh centuries (Cameron 2000, 72). These changes are first apparent on finds from eastern England, and some of the earliest evidence for Anglo-Saxon leather production is centred on Ipswich (Hodges and Hobley 1988, 93-100). Against this background of inquiry, leather-work from two Ipswich cemeteries, one of sixth- the other of seventh-century date, is of significance and interest.

Method

Evidence of organic remains on ironwork from the Boss Hall and Buttermarket cemeteries was preserved by mineralisation; but having endured excavation and a lengthy period of time in storage some abrasion and surface-loss had occurred. The microstructure of leather from both sites proved to be poorly preserved, but this could not have been anticipated easily since previous experience had shown that mineralised evidence from one cemetery, and even from one grave, could vary in quality.

At the outset, remains of leather were examined selectively under a binocular microscope. Some were identified as leather by their morphology while those that could not be characterised by this means were examined by scanning electron microscopy. In a few cases the presence of skin-like structures in the cross-section confirmed the identification and this is indicated in Tables 1 and 2 under the heading ‘SEM sample’. It is not possible to comment upon skin preparation or treatment from mineralised cross-sections (Cameron 2000, 22 and 33, footnote 13).

Terminology

Used in its proper sense and within the context of antiquity the term 'leather' defines a skin that has been rendered non-putrescible by a full degree of vegetable tannage. The condition of mineralised leather does not permit distinctions between types of tannage to be made and when writing scientifically about material such as this it would be more correct to use the term 'skin product'. However, the term 'leather' is used here in its popular sense meaning anything made from skin and no presumption of tannage is made.

Interestingly, variation in reports following the examination of mineralised leather from Boss Hall and Buttermarket by three separate individuals revealed a need for common recording standards. This is not altogether surprising since the characterisation of leather involves a balance of probabilities and many variables deriving from the animal, its environment and from manufacturing processes have to be taken into account. Archaeological evidence of leather is compromised by a generally poor condition and in describing leather finds it is important to be aware of the limitations of the material and to indicate where evidential weakness lies.

Leather

With this in mind, and following re-evaluation of the evidence – in some cases further removal of soil was needed to reveal the leather - this report was compiled using new standards. It is supported by tables of evidence (Tables 1 and 2) in which the term 'leather' is applied to mineralised organic remains with any of four key features:

- surface decoration such as incising, tooling or paint
- hair shaft *in situ*
- grain pattern of follicle holes *or* (if the surface is abraded or lost for some other reason)
- three-dimensional weave of connective tissue.

Probable leather

In the absence of any of the above, the term 'probable leather' describes remains characterised by at least *two* of the following features:

- fibrous quality
- position on the object suggests use of a skin product
- shape of the deposit suggests use of a skin product.

Possible leather

A final category, termed 'possible leather', indicates an amorphous deposit with no redeeming features other than its position or shape to suggest that it might have been of leather .

Judicious use of scanning electron microscopy can convert questionable analyses, that is to say the 'possible' and 'probable' leathers, to certainties if the presence of mineralised collagen bundles can be confirmed (Fig.1).
All three terms are used in the tables, but because the 'possible leather' entries cannot be scientifically corroborated, the discussion of the evidence from the two sites deals with 'leather' and 'probable leather' only.

Leather from Boss Hall

A total of 61 items examined from Boss Hall were of the following types: knives, buckles, purse and chatelaine-groups, shield fittings, and shears.

Sheaths of knives
Out of a total of twenty-one knives, two produced clear evidence of leather sheaths surviving on the backs of the blades (G.87, cat. 12; G. 505, cat. 5) although the evidence of three others suggests with less certainty that there may have been more. Some blades supported textile remains only.

Belts
There were sixteen buckles and buckle-plates containing preserved remains of belts or straps. In two cases leather was confirmed as the substance of the straps (G.13, cat.5; G.74, cat.11).

Case
A sample of organic remains from a fragmented pair of shears (G.315, cat.10) described upon excavation as being in a leather case, was confirmed as leather.

Shields
Traces of leather were found upon the fittings of six shields; including shield bosses, iron grips, and disc-headed rivets. All six shield-boards had been covered on the outside with a skin product, 1.5mm thick. Two of these boards (G.96 and G.152) show evidence of having been lined on the inner face with a thinner skin, 1mm thick. Leather or skin had been used on three of the grips, though in rather different ways. The bifurcated grip (G.87, cat.5) was supported by wood but wrapped with leather while another (G.95, cat.3) showed a trace of leather, 1mm thick, in association with textile, including a possible braid, all on the inner face. The third grip (G.96, cat.2), which is flanged, had a part-leather, part-wood fill, but was wrapped with textile. There are traces of what appear to be straps, 6mm wide and 1.5mm thick, upon a fourth grip (G.74, cat.2-5).

Purse or pouch
A stud and iron fitting (G.74, cat.13&15) are likely to have been part of a purse or pouch.

Discussion
Evidence of leather upon the shields supports existing published data (Dickinson and Härke 1993, 51). Other examples of leather from this sixth-century site – two knife sheaths and two belts – are interesting but so incomplete that they convey nothing of their form or style. A leather case for a pair of shears from Grave 315 is fragmentary but other examples have been found in Saxon cemeteries at Harford Farm, Norfolk (Penn 2000, 34), and St Peter's Tip, Broadstairs, Kent (Cathy Haithe, pers.comm.). The exact nature of these objects remains obscure but the example from Broadstairs was decorated with tooled parallel lines and chevrons. Similarly, details of the structure of Anglo-Saxon pouches also elude us. Pouches are not unusual finds in Anglo-Saxon graves and particulars of their size and outline may sometimes be observed from shadowy stains in the soil, such the D-shaped satchel from Sheffield's Hill, North Lincolnshire (Leahy and Williams 2001).

Leather from Buttermarket

A total of 57 items examined from Buttermarket were of the following types: knives and seaxes, buckles, purse and chatelaine-groups, shield fittings, and miscellanea.

Sheaths of knives
Out of a total of 24 knives, leather sheaths were partially preserved upon 17 with the probability extending to a further two. Although grain patterns and hairs were looked for, the types of leather used could not be established. As far as it was possible to tell, the style of the sheaths was generally close fitting, with leather folded over the blade back and joined along the cutting edge by a sinuous (G.1356, cat.2) or a puckered (G.3571, cat.3) seam without visible stitches. Although incomplete, 5 sheaths overlapped knife-handles by at least 30mm. Two loosely fitting sheaths of unusual width may have been shortened and reused, having originally been made for larger blades. One of these (G.968, cat. 2) is 28mm wide at the handle/blade junction (where the knife is only 14mm in width) and appears to have been truncated, the other (G.3571, cat.3) is also wider than its blade by 12mm. In nearly all cases the thickness of leather used for sheaths was between 1-2mm, but there are two notable exceptions (G.1306, cat.7; G.968, cat.2) where 3mm and 4mm thickness was used respectively. Decoration, consisting of finely scored parallel lines, occupies one face of the sheath from G.968 (cat.2) and contributes to its unusual character (Fig. 2).

Sheaths of seaxes
The seax from G.1306 (cat.16) has a blade length of 368mm and a hilt of horn. The outline of its leather sheath, originally 487mm in length, 100mm in width, was plotted from soil stains and *in situ* positions of metal fittings and must, therefore have extended over the hilt. The leather is 3mm thick, and coarsely fibred as though from a large animal. It is folded over the blade back and closed along the cutting edge by numerous copper alloy nails. There is no evidence of a stitched seam.

Incised decoration upon one side of the sheath appears as concentrically arranged lines delineating the shape of the blade. The incisions are approximately 1mm deep and spaced 1-2mm apart. An element of this design extends along part of the joined edge of the sheath as three parallel lines.
The sheath has four types of metal fittings:
i) Copper alloy nails with bulbous heads, 2mm in diameter. Shaft-length 10mm, the tips protrude at the back of the sheath where they are bent over and pressed back into the leather. Few of the nails hold their original positions, but their relationship to the blade was recorded by radiography before the seax was separated from its soil-block. Their arrangement was linear, 3mm outside the cutting edge of the blade and parallel to it, and positioned so closely that they touched each other. The nails underwent an abrupt change of alignment as the sheath widened to accommodate the suspension flap.
ii) Eight disc-headed nails (diam.8mm) divided the flap into equal sections, accompanied by lateral rows of the small, bulbous-headed nails.
iii) Five large bosses (diam.20mm) with milled edges and deeply cast abstract designs were centred between the first to sixth of the lateral rows.
iv) An L-shaped fitting of U-shaped cross-section (length 80mm), decorated with lines and regular indentations and fastened by a nail and two rivets, terminated the corner of the suspension flap.

The seax from Grave 2297 (cat.1) consists of two fragments belonging to portions of the handle and blade, giving a total extant length of 260mm. The handle is of wood. The leather sheath, lined with animal hair (not well enough preserved to identify) overlapped the handle by at least 60mm. Traces of textile, which seem to have been wrapped around the handle of the seax, extend from beneath the sheath, but are not thought to be part of it. These remains, recorded by Dr.G. Turner-Walker, were in a poor state of preservation.

The seax from Grave 3243 (cat.4) has a blade length of 245mm and a hilt of horn. The dimensions of its leather sheath are unknown, but it partially covered the hilt and, like the sheath from Grave 1306, may have extended to a suspension flap. The leather, 1.5mm thick, is laminating, but along the cutting edge of the blade is a tunnel-stitched seam with a stitch interval of 4-5mm. Immediately outside this, a second seam using copper alloy wire produces a distinctive 'chainstitch' effect: wire (diameter 1mm), cut into 14mm lengths, was bent double and pushed through the leather so that the cut ends of the wire lay flush with its surface. The protruding loop, bent at right-angles in the direction of the seam, anchored its neighbouring stitch, which was passed through it. Fragments of copper alloy, leather and horn and traces of a band across the hilt indicate that the mouth of the sheath had once been reinforced with metal. This feature, which had a minimum width 7mm, was attached with rivets. Decoration on the sheath is by incised lines delineating the shape of the blade in a triple border. The enclosed field is in-filled with transverse, parallel strokes.
There are no belt fittings associated with this seax, but two fragmentary ring-mounts with rivetted plates may belong to its suspension.

Belts and straps

Seventeen buckles were examined and evidence for leather belts or straps found in four cases. First, a buckle and buckle-plate of iron (G.968, cat.4) has part of a leather belt *in situ*. The belt is 13mm in width, 3mm in thickness, and is decorated with parallel, longitudinal grooves at 1mm intervals (Fig. 3). Second, a strap-end from G.1306 containing leather (cat. 15) may relate to a simple copper-alloy buckle rather than the elaborate suite of belt fittings also found in this grave. Third, a strap-end from G.4275 (cat.1) contained the remains of a leather strap. Fourth, a plain leather strap of variable width (approximately 8mm) was tied through the loop of a belt-fitting (G.2297, cat.6) (Fig. 4).

In another three cases traces of leather were identified on front or back faces of belt-fittings as though they had been worn over or under leather garments (or within the folds of a single garment). Five belt-fittings from Grave 2297 (cat.3-6) carry traces of textile, but four of them also have traces of leather on front and back. A small buckle (G.2297, cat.2) encased in textile has leather upon one surface, as does the copper-alloy buckle from Grave 3659 (cat.6), and although the evidence is slight, these might equally be interpreted as traces of leather garments as of belts.

Chatelaine

An iron object from a chatelaine complex (G.4275, cat.47) carried a trace of leather beneath textile. Evidential remains were in this case insufficient for any meaningful interpretation.

Discussion

In style and construction the knife sheaths from Buttermarket are similar to an early seventh-century group from Snape, Suffolk. Knife sheaths from Eastern England, including Snape (grave 2063); Broomfield, Essex (BM 1894.1216.8); Castledyke, South Humberside (grave 94.6); and from the ship burial at Sutton Hoo (BM 1939.1010.163 and 164) are decorated by linear incisions similar to that upon the knife sheath from Buttermarket, Grave 968. A seventh-century knife-blade from Field Farm, Berkshire, (Butterworth and Lobb, 1992, fig.17) has parallel grooves near to the back edge and it may be that designs such as these upon the blades were sometimes reflected in the decoration of sheaths.

The type of leather used for the seax sheaths could not be identified. While their exact original outlines cannot be restored it is certain that they were seamed along the cutting edge of the blade and that they extended over the grip, leaving only a small part of it protruding. At least one of the sheaths (G.1306) had a suspension flap (a widening along one edge) used for attaching strap fittings. The lining of the sheath from Grave 2297 is an unusual feature; hair linings are a feature of group 1*a* English seaxes (Cameron 2000, 51) but, unlike the Buttermarket example, these seem to have been housed in scabbards of wood. The closure of the seam by stitching is normal (G.3243) but the additional line of wire stitching, used so distinctively on the same sheath, is unique to seventh century English contexts. Nails with rounded or domed heads used in close formation, such as those on the sheath from G.1306, occur among remains of the sheath from Ford, Laverstock (Musty, 1969), but are otherwise unknown. A single nail associated with the seax from D2 Marina Drive, Dunstable (Matthews,

1962) and a short line of small rivets found with another at Shudy Camps, Cambridgeshire (Lethbridge, 1936) might be related examples. Large decorative metal studs, such as those found with the sheath from G.1306, are known from Shudy Camps and Marina Drive, but are otherwise rare (Hinton, 1993). Reinforcement of the mouth of the sheath with a metal band (G.3243) is found on three other English examples; Winchester (Andrew and Smith 1931), Burwell (Lethbridge 1931) and Ford, Laverstock. Further reinforcement of the suspension flap (G.1306) with an L-shaped fitting has no parallel in England. The linear style of incised decoration found on two of the seax sheaths is similar to others found at Castledyke, South Humberside (Drinkall *et al* 1998, 62); Harford Farm, Norfolk (Penn 2000, 25); and Ozengell, Kent (Cameron 2000, Corpus no.297, fig.34).

Although some features of these sheaths can be compared with elements of others found elsewhere in England from seventh-century contexts, there is no straight match for any of them. A glance at finds from Merovingian cemeteries of the Mosel valley near Trier (Bohner 1958), and of the Maas near Maastricht, as well as on the lower Rhine near Nijmegen (Ypey 1983; van Es and Hulst 1991) reveals the existence of a group of seaxes with sheaths which seem to offer a parallel to the one from Buttermarket Grave 1306. Linear grooves upon some of the Merovingian blades are of particular interest because this is mirrored in decoration of two of the leather sheaths of seaxes from Buttermarket. These sheaths need to be seen in the context of Rhineland trade, perhaps through Dorestad, which resulted in the import of large knives with impressive leather sheaths into eastern England in the first half of the seventh century. At time of writing, similar finds have recently been discovered at Saxon Southampton (St Mary's Stadium). It is unclear at present whether we should also view some of the smaller knife sheaths from eastern England in the same light.

As well as the occurrence of leather sheaths with knives and seaxes, four belts were identified and these contribute to the general fluorescence of surviving leather from the late sixth and seventh centuries.

Mineralised Leather from Boss Hall

GRAVE	CAT. No.	OBJECT TYPE	SEM SAMPLE	ID.LEVEL	TYPE OF REMAINS
13	2	knife		possible	sheath
13	3	knife		possible	sheath
13	4	buckle	26 not confirmed	possible	strap
13	5	buckle	27 confirmed	leather	strap
32	1	buckle		possible	strap
74	2-5	shield		leather	shield-board outer layer
74	11	buckle	36 confirmed	leather	strap
74	13	stud		leather	belt
74	14	knife		possible	sheath
74	15	purse-mount	2 not confirmed	probable	purse
74	18	clasp frag.		probable	a 'fold'
74	19	knife		possible	sheath
74	20	buckle	34 not confirmed	possible	strap
74	22	knife		possible	sheath
87	12	knife		leather	sheath
87	5	shield-grip	37 confirmed	leather	wrapping on grip
87	4, 6-9	shield		leather	shield-board outer layer
87	10	buckle		possible	strap
87	11	ring		possible	strap
93	3	knife	38 not confirmed	probable	sheath
94	5	latch-lifters		possible	strap/thong
95	3	shield-grip	28 confirmed	leather	wrapping/lining on grip
95	3-7	shield		leather	shield-board outer layer
95	9	buckle		possible	strap
96	2-5	shield		leather	shield-board outer layer
96	2-5	shield		leather	shield-board lining
96	2	shield-grip		leather	single layer behind grip
96	2	shield-grip		probable	strap
96	6	buckle	1 not confirmed	possible	in buckle-loop, ?strap
96	9	buckle		possible	in buckle-loop, ?strap
97	17	knife	42 not confirmed	possible	sheath
152	1-3	shield		leather	shield-board outer layer
152	1-3	shield		leather	shield-board lining
152	1	shield-grip	25 not confirmed	possible	wrapping on grip
152	4	buckle		possible	strap
301	26	knife	39 not confirmed	probable	sheath
313	104	knife		possible	sheath (trace)
315	10	shears	43 confirmed	leather	case
315	2	shield		leather	shield-board outer layer
315/1	2	shield-grip		probable	wrapping on grip
315/1	9	lozenge		probable	?
U/s	88F.300	knife		probable	sheath
505	5	knife		leather	sheath

Table 1

Mineralised Leather from Buttermarket

GRAVE	CAT no.	ITEM	SEM SAMPLE	ID.LEVEL	TYPE OF REMAINS
968	2	knife		leather	sheath
968	1	knife		leather	sheath
968	4	buckle		leather	strap
1306	16	seax		leather	sheath
1306	7	knife		leather	sheath
1306	15	strap-end	21 confirmed	leather	strap (trace)
1356	1	knife		leather	sheath
1356	2	knife		leather	sheath
1356	3	buckle	22 not confirmed	possible	strap (trace)
1484	3	ring, wire		possible	trace
1484	6	(unattached)		possible	trace
1760	1	knife		leather	sheath
2203	1	buckle		possible	strap
2297	1	seax		leather	sheath
2297	2	buckle	15 confirmed	leather	trace on back
2297	4	belt-fitting	16 confirmed	leather	trace
2297	6	belt-fitting		leather	strap, knotted
2297	3	buckle		leather	traces on front and back
2297	5	belt-fitting		leather	traces on front and back
2339	1	knife		possible	sheath
2962	17	latch-lifter	7 not confirmed	possible	trace on shaft
2962	18	knife		leather	sheath
3243	4	seax		leather	sheath
3243	3	knife	6 not confirmed	probable	sheath
3571	2	knife	12 confirmed	leather	sheath
3571	3	knife		leather	sheath
3659	4	knife	19 confirmed	leather	sheath
3659	6	belt-fitting	17 confirmed	leather	trace on one face
3659	2	cleat		possible	trace
3659	3	cleat		possible	trace
3871	2-3	belt-fittings	9 not confirmed	possible	trace on back
3871	1	knife	4 confirmed	leather	sheath
3889	1	knife	1 not confirmed	probable	sheath
4054	1	knife	20 not confirmed	leather	sheath
4152	1	knife		leather	sheath
4269	1	knife	11 confirmed	leather	sheath
4269	3	stylus		probable	case or holder
4275	46	knife		leather	sheath
4275	47	chatelaine		leather	trace (beneath textile)
4275	1	strap-end		leather	?strap
4344	1	knife	5 confirmed	leather	sheath
4543	1	knife		leather	sheath

Table 2

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