

# SUPPLEMENTARY MATERIAL

To be read in conjunction with

## A REASSESSMENT OF LEATHERWORK FROM THE SUTTON HOO SHIP-BURIAL

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## APPENDIX I

METHODS USED IN THE REASSESSMENT OF THE LEATHER  
FRAGMENTS FROM SUTTON HOO MOUND 1 AND THE  
DEPOSITION SEQUENCE*Marquita Volken*

The reassessment of the leather has permitted the identification of two flap-fronted bags and a pair of shoes. The most important diagnostic tool used to achieve this was matching the surviving fragments to Crawford's photograph 2.117. This archive photograph shows a specific moment during the excavation after the Anastasius silver dish has been lifted. In the centre, a section of the 'flock' layer, the remains of a feather pillow, has just been removed, leaving a cleared area. When the area of 'flock' was removed Bag 2 had been revealed, subsequently this had been displaced to the right and placed over the left shoe. The squared end of a wooden pick can be seen still caught between the flap and the back panel of Bag 2. Also visible are the toe of the right shoe, the medial front side of the left shoe and the back panel and the crumpled front flap of Bag 3 in situ. A buckle, inv. 149, lies below Bag 2 and at the toe of the left shoe, as reported during the excavation. Because Bag 2 has been displaced, thus loosening buckle inv. 149 from its position on the bag, the recorded position shows where it fell and not its position before excavation. This is the only metal fitting with an inventory number to be precisely documented, all others are described as being 'in the shoe area', with the exception of buckle inv. 152 found inside the silver dish.

Drawings and photographs of the leather fragments were matched to the leather visible in Crawford's photograph 2.117. Several techniques were employed to match the fragments to this archive photograph. One technique used paper models of the objects placed directly onto the photograph, revealing the various ways in which the fragments were folded and distorted. A second technique employed a computer graphics program to place reduced opacity photographs of the fragments over Crawford's photograph 2.117. The third technique, after many of the fragments not visible in the photograph had been added to the models of the bags and shoes, combined drawings of the fragments, photographs of the fragments and drawings of the metal fittings to make paper models to test against Crawford's photograph 2.117. The final technique imitated the computer graphics program, but with drawings of the assembled fragments on tracing paper. This technique was also used to reconstruct the placement of the leather fragments not visible in the archive photograph 2.117, permitting the reconstruction of the fragments' original flattened position during burial.

The position of any 'flock' and textile material still adhering to either the grain or the flesh side of certain leather fragments provided further evidence for reconstructing how the shoes and bags were deposited under the pillow and the great silver dish. The micro-stratigraphy shows topmost a layer of pinkish grey crust, a layer of compressed feather 'flock', with long hairs adhering on the lower side, and a layer of long pile wool twill. The pink crust was probably in contact with the bottom of the Anastasius dish. The 'flock' is the feather filling from the inv. 207 pillow upon which the Anastasius dish was sitting. Under the pillow was the garment made from the wool twill, which lay directly over the pile of leather items. Logically the topmost item, Bag 2, would have the greatest quantity of the 'flock'/textile layer, those items under Bag 2 would have no traces of 'flock', while areas not covered by Bag 2 would also have traces of wool twill and 'flock'.

Some of the leather fragments that were not cleaned entirely have 'flock'/textile micro-stratigraphy adhering to either the grain or the flesh side. Inv. 174.24 e, a fragment from Bag 2, fits with the leather strap base inv. 174.a and buckle inv. 149 (Fig 17), its flesh side covered with a layer of wool twill and 'flock'. This fragment had been partially cleaned which removed some of the 'flock'. The bottom portion of the fragment is folded over onto the grain side where the buckle was sewn on, the grain and the folded over flesh side show no signs of wool or 'flock'. The micro-stratigraphy thus indicates this fragment was positioned with the flesh side uppermost in the pile, with the grain side/buckle facing down, and with the leather layer folding back under itself. A second similarly folded fragment (inv.174.22a) shows the same configuration. Two fragments show the micro-stratigraphy adhering to the grain side (inv. 173.7 a, inv.174.1 c), so must have faced upwards. These fragments are considered as parts of the bag's front panel.

A second diagnostic piece (inv. 174.13) is from the left shoe's medial side (Fig 18). Its top corner is covered with textile/'flock' micro-stratigraphy while the remaining fragments – folded in on each other, grain side to grain side – are not. These fragments were only partially covered by Bag 2. The 'flock' and wool on the corner indicate it faced upwards and at the same level as parts of Bag 2. Also on the flesh side of this piece were sections of the tablet woven band SH6. The leather from the back part of the left shoe (inv. 174.24 a) also shows wool twill adhering to the lateral grain side; the 'flock' layers were presumably removed. The lateral leg front fragment (inv. 173.13 b) has the tablet woven bands of SH6 contained within the folds of the flesh side of the leather, showing that the tablet woven bands of leg gartering were tucked inside the left shoe (Fig 19). The grain layer of the back of this fragment and other fragments of SH6 have become dissociated and are now part of inv. 173.11b but were still in place for the photograph used in the textile report from 1983. The adjoining fragment, inv. 173.10, has SH6 on the flesh side and the 'flock'/twill micro-stratigraphy on the grain side (Fig

19). No other large diagnostic pieces of 'flock'/twill micro-stratigraphy have been identified.<sup>1</sup> The back half of the right shoe and Bag 3 were covered by Bag 2 and so show no textile or 'flock' adhering to the surfaces.

The deposit sequence for the shoes and the bags can be reconstructed with the information from Crawford's photograph 2.117 combined with the fragments matching the visible leather surfaces and the hidden fragments (see figures 6 and 7). The pair of shoes was placed in an upright position, side by side. Bag 3 was dropped onto the back section of the right shoe and partially over the medial side of the left shoe; the lower part of the flap lay folded in half and twisted, the back panel of the bag lay alongside, with the top edge of the bag also folded at the centre, creating a fold inside of which lay one of the suspension buckles. Bag 2 sits on top of Bag 3, also in a folded position, with the grain side of the flap folded over so it faces the grain side of the bag's back panel, with a wooden stick sandwiched between the two grain layers. Bag 2's top edge with the suspension buckles was rolled under, exposing the flesh side of the front flap and half of the bag's front panel. The fastening strap, riveted to the bag's front panel with mount inv. 155, appears to have crossed the bag's front panel, the bronze strap end resting on the instep of the left shoe, leaving copper oxide staining and an impression of a square end and two round rivet heads on fragment inv. 174.9 c, which also has fragments of wool twill on the grain side (Fig. 20). A detailed analysis of the textile layers and the feather 'flock' could certainly provide a clearer picture of the pillow's construction and a secure identification of the micro-stratigraphy of the wool twill and other possible textiles.

Besides the indications provided by the 'flock'/textile micro-stratigraphy sequence and the interpretation of Crawford's photograph 2.117, identification of the various qualities of leather used for each object was also used whenever possible, though the multiple cleanings, treatments and conservation products often rendered visual comparison between fragments impossible. The actual thicknesses of the leather fragments have little meaning.<sup>2</sup> In general, the shoes were found to be of large-grained, thick cow leather, the sole leather being of thick but finer-grained cow leather, showing signs of delamination. Bag 2's flap and front panel were of a similar quality but the back panel is made of finer calfskin. Bag 3 is uniformly calf leather, with the flap being slightly thicker.

The adhering grit or sand on some fragments also offered clues to the placement of the fragments suggesting they had been on the lower levels where earth had slowly infiltrated the pile of leather objects. Staining, either yellowish red or green copper oxides, was also utilised for fragment placement. Folds and creases also played an important role in determining the relation between fragments and the overall positions of the objects. Some folds and distortions may have been

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<sup>1</sup> Most of the leather from the front/toe areas of both the right and left shoes were cleaned and conserved with thick wax, leaving no traces of the textile or 'flock' layers.

introduced during post excavation handling and, when these could be recognised, were omitted from the reconstruction process (Fig 21). Between 30 and 45 paper model reconstructions were made for each object.

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<sup>2</sup> Dry, untreated fragments can be between 0.4mm to 1.2 mm and cannot be compared with the leather covered with a yellow wax, which may be as thick as 3.0 mm.

## APPENDIX 2

‘RE-DISCOVERY’ OF THE LEATHER BAGS FROM SUTTON  
HOO MOUND 1*Marquita Volken*

Leather bags, found during the 1939 excavation are mentioned by Phillips. They were included in Piggott's field plan and entered in the inventory, but were not recognisable when the material was unpacked after the war. Bag 1 is only visible as a smooth surface covering the fluted silver bowl in Crawford's photograph 2.113 and described as a 'fair sized leather bag'. An associated buckle and slider (strap end) in the excavation drawing were positioned in the middle of the silver fluted dish. Buckle inv. 152 was found in the silver fluted bowl. Bag 1 fragments could not be identified among the existing collection.

Phillips' excavation diary and Piggott's sketch locates a second leather bag (Bag 2) south of the shoe mass and associates it with a silver mount (C-8) and a bronze buckle (C-9 /inv. 149) at the toe of the left shoe. The buckle inv. 149 and its short leather strap inv. 174a fit to leather fragment inv. 174.24e, and as discussed above, the flesh side is covered with 'flock' and wool twill textile. The short strap (inv. 174a) was sewn to inv. 174.24e, the strap's cut off end shows it was repurposed from another item. The silver strap mount identified by inventory number C-8 might be the bronze triangular strap mount inv. 155 found near 'shoe 2'. This strap mount has 3 rivet posts on the back for joining the strap and the base leather together, the remains of a leather strap and a plain cut edged base layer have been separated from the mount but are still extant. The impression of the strap mount and the corresponding rivet holes can be seen on fragment inv. 174.22g, which is part of the front panel of Bag 2 (Fig 22 a b). The pair of buckles inv. 150 and 151, with fragments of leather between the plates, were found near 'shoe 3'. The plain cut edge of the leather extends on two sides of the plates indicating they were fixed to an angled edge and not a strap; this feature was observed and recorded during the first inventories. The leather on these buckles appears to match that of the front flap of Bag 2 (Fig 23).

The fragment inv. 174.10 is the lower edge of the front flap and has the remains of a flat wooden stick still adhering to the grain side. The back panel (inv. 174.24b) has the other half of the wooden stick adhering to the grain side (Fig. 24). A small fragment of the stick (inv. 173.7h) joins to the breakage on the wooden stick fragment on the back panel. These three fragments of the flat stick show that the grain sides of the flap and back panel must have been facing each other, sandwiching the stick between both grain layers. The relationship between the stick, the front flap and the back panel is documented from the earliest records concerning the leather fragments, though their misidentification

as shoe fragments created much confusion. Also adhering to the flesh side of the back panel is a fragment of the tablet woven band SH 6. All other fragments of this textile are located inside the left shoe, but as the flesh side of the flap rested directly above the left shoe with the SH 6 textile bands tucked into the shoe's opening, the transfer of SH6 to the back panel during the excavation is likely.

Bag 2 is a suspension bag with a long front flap, covering and extending below the bag section, which is composed of two panels, a longer one for the back and a shorter one for the bag front. A reconstruction of Bag 2 was made in inches as the metrological norm; the width of the front flap is six by ten inches. The fastening strap, fixed in place by mount inv. 155, would have passed through a slot in the flap to fasten to buckle inv. 149. The precise bronze strap end is not identifiable among the metal finds from the shoe complex.

A puzzle, yet to be solved, is the worked hazel stick, covered with a thin leather, described by East as a 'cigar shaped piece' and apparently decorated with pressed lines. This thin leather covering and the worked hazel stick, shown in East's article, are not recognisable among the leather fragments housed at the British Museum now. In a photograph, the worked hazel stick is clearly round in section, while the stick associated with Bag 2 is flat. This difference indicates there were two sticks. The small fragment from the middle of the flat-sectioned stick is included in inv. 173.7h. The third fragment is firmly stuck to the grain side of inv. 174.10, the flap to Bag 2. This piece has been heavily treated with wax, making it difficult to identify, but the impression of an angled pointed end is visible on the leather surface. The three fragments together show the original length of the flat stick as having been six inches long (15.5 cm) by one half inch wide (1.3 cm) and a quarter inch thick (0.6 mm). These culturally significant metrological proportions are very close to those of late sixth and early seventh century wooden picks found in France.

Bag 3 was identified during the reconstruction process when separating the various leather fragments into the groups for the shoes and the second bag. Apart from the leather fragments matching to the very distinctive folds of the front flap visible in Crawford's photograph 117, two fragment groups from the front and back panels of the bag could also be recognised. The fragment inv. 173.12 was probably identified by J Thornton as a delaminated turn shoe sole with grain and flesh sides present, or as a lining sock in leather, and published as such by East. It has been spuriously associated with inv. 174.11d, identified as a 'rand' for turn shoes, but which is a beading strip possibly belonging to Bag 2. While the fragment does have a similar shape to a damaged turn shoe sole, examination under a microscope shows this piece to be two layers of leather of the same thickness, both grain-side out, sewn together with very small stitches in a closed seam. This fragment is the lower right corner of the bag. The breakage along the side and its grain/surface appearance matches fragments inv. 174.2b1-2, which are still stuck together, grain to the outside. As the fragment inv. 174.2b-1 is from the back panel of the bag, visible in Crawford's photograph 117, logically inv. 174.2b-2 is from the front panel.

The front panel of the bag also incorporates the fragments from inv. 173.1, 173.2 and 173.5, notably fragment 'inv. 173.5a' with the triangle of stitch holes shown by East in association with the left sole. Currently, the grain side of this fragment is unavailable for examination since it is glued to a support, so the montage presents the flesh side reversed to show the outline of the grain side. The stitched triangle is here interpreted as the base where the fastening strap was sewn to the bag's front panel. Much of the seams joining the bag front to the back panel survive, allowing the placement of many fragments. The fragment inv. 173.9d fits well to the top of the back panel; it shows a row of large stitch holes, presumably a flat seam joining the top of the back panel to the front flap.

Bag 3 is made in the same way as Bag 2 but is slightly smaller. A second pair of buckles, inv. nos. 145 and 146, found in the shoe complex may be the suspension buckles for Bag 3. As the buckle inv. 149 is the single buckle on the flap of Bag 2, it cannot be the second in a pair with buckle inv. 154, as had previously been presumed, so the latter may be the necessary buckle for Bag 3's flap.