7.1.4

Sutton Hoo Research Project.

Intervention 54

Carried out by Philip Bethell, July 1991.

Intervention 54 consisted of the excavation of a number of artefacts buried in 1984, to examine the rate and nature of decay and diagenesis on the site. This report will begin with a recap of the original burial notes, and continue with a description of the 1991 recovery of the artefacts.

Original Burial:

The following is reproduced from a document entitled "Burial of various objects in XXII, Saturday 13th October 1984". (The Intervention in question was a long 2m-wide trial trench in Zone D (cultivated field) at the SW corner of the site).

"Objective: To test how quickly finds of various materials decay in the ground. This is not a "burial chamber" experiment, it is just to see how long the buried objects will survive.

Method: We chose 8 different types of material, and had 2 pieces or collections of each to bury (a total of 16 buried objects). These we buried in some of the completely excavated features of XXII, prior to backfilling. These features cut into the natural (sand and gravel), so the objects were buried on top of natural sand, and then the features were filled with darker, more humic sandy soil from the soil heap. The ground was damp at the time of burial.

All the objects were photographed as a group before burial, and then one of each type of material was photographed in its position in the ground.

Objects collected for burial

1) 2 pieces granary loaf. 10 x 7 x 5cm

2) 2 pieces wood painted white (not brand new). 15 x 5 x 5cm

3) 2 pieces wood not painted. 10 x 9 x 5cm, & 23 x 7 x 4cm

4) 2 bunches white goose feathers. Tied with blue plastic/wire freezer tag.

5) 2 pieces leather. 8 x 1.5 x 0.2cm (1 piece has holes; 1 piece has metal buckle)

6) 2 lots of 10 iron nails (brand new). 8cm long

7) 2 pieces raw stewing lamb (total weight = $11^{5}/_{8}$ oz)

Buried Object	**Feature No.**	**Photgraphed**
Granary loaf	F33	+
Granary loaf	F15	
White-painted wood	F30	
White-painted wood	F5	+
Unpainted wood	F23	+
Unpainted wood	F24 *	
White goose feathers	F26	
White goose feathers	F1	+
Leather	F3	
Leather + buckle	F24 *	+
Iron nails	F7	
Iron nails	F2	+
Lamb	F16	+
Lamb	F43	
Red cloth	F28	+
Red cloth	F12	

(* = sic. Original paper puts two items in F24)

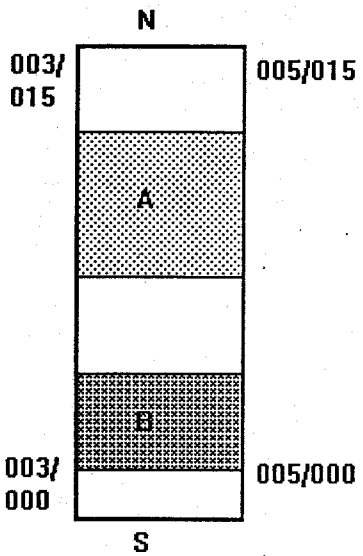
The whole length of XXII was backfilled completely on Wednesday 7th November 1984. The finds are therefore buried at various depths around 50cm deep, placed flat on the bottoms of the excavated features."

It is understood that this operation was carried out by Cathy Royle and Andrew Copp.

Re-excavation was carried out in July 1991 by Philip Bethell.

Intervention 54 - Site Record.

Work begun 17/07/91. Permission was secured to remove an area of turf approximately 7m x 2m in what was originally Intervention 22. The pattern of features to be examined meant that this area could be divided into 2, thus minimising the area of turf to be removed. The two areas are approximately 2m x 1.7m at the S. end, and 2m x 3m at the N. end (see diagram).



Because there were 2 of each item buried, it was decided to excavate only one set of items. The features to be excavated were chosen in order to disturb the minimum area of turf, and these all lie at the N end of the section of trench (Int. 22) in which the whole array was buried. Hence this area was called Intervention 54 N end.

This N end area contained the buried artefacts. These fall into two sets, contained in the a\sub-areas A and B shown here. Area B was left, to continue the experiment. Area A was the one excavated. There is in fact one anomalous feature (F43) which lies outside both of these sub-areas, which was left. F7, which lies within A, was also left, as excavating it would have meant digging up all the iron nails. The following table describes which features were included in the 1991 fieldwork:

Features excavated:	Features left:
F1 - Feathers	F7 - Iron nails
F2 - Iron nails	F23 - Unpainted wood
F3 - Leather	F24 - Unpainted wood + leather/buckle
F5 - Painted wood	F26 - Feathers
F12 - Red cloth	F28 - Red cloth
F15 - Granary loaf	F30 - Painted wood
F16 - Lamb	F33 - Granary loaf
	F43 - Lamb

From this it can be seen that the only material not to be recovered was unpainted wood. Practical difficulties made it impossible to excavate F23 or F24, as both lay in B.

Intervention 54

The area was surveyed on the morning of 16/07/91 (PHB + AC). Grid points were established at 003/985 and 005/985. Area A was marked out, from 003/006 + 005/006 to 003/012.5 + 005/012.5. This is illustrated below on drg. nos 1-4. The distribution of the features meant that Area A was more easily investigated in two parts, N + S. The southern part was deturfed on 17/07/91. Turves 40cm wide were removed and rolled to the S edge. The turves came up quite easily, and comprised 10 - 15 cm of dense roots below the surface. Below this, 20-25cm of ploughsoil was removed, to reach the top of the natural. This consisted of a bright yellow-orange sand, making level detection very easy. The backfilled features were clearly visible as dark shapes within the clean natural.

The two features within this deturfed area, F3 and F16 were excavated, and the hole backfilled, before the other part of A, at the N end, was similarly opened. It was found quite straightforward to backfill, level, and replace turves. The excavated areas were visible after this operation, but did not interfere with the cultivation and harvesting of the rest of the crop. A total of 8-9 m^2 of turf was disturbed. Care was taken throughout to deposit spoil on plastic sheeting, and minimise damage to the crop.

Only a limited time was available for this operation (2 weeks total), and much weather-induced interruption was encountered. All features were excavated in the following way: the surface was cleaned, and the fill half-sectioned; a column of samples was taken at 2cm intervals from the top of the fill to below the level of the artefact; the artefact residue was removed, and a general sample of fill taken. Several samples of the natural, and a column of samples at 5cm intervals from the top of the ploughsoil to c. 15cm into the natural was collected. Descriptions of the individual features and artefacts follow:

F3 - Strip of leather: On initial trowel contact, it was immediately apparent that this was a leather object, from the texture and hardness. On cleaning, it was seen to be largely intact, and could be lifted whole. The surface was very pitted, and many fine roots had grown into it. There was a fastening hole clearly visible and still clearly delineated. No staining was observed in the soil adhering to the leather either above or below the object. Roots seemed to be the major cause of damage to the material.

F16 - Lamb: The lamb buried consisted of a piece of bone and attached meat, basically two or three unseparated lamb chops. The material was located at the bottom of the feature, and was easily distinguishable from the fill. The bone appeared to be in very good condition. It was quite solid, and not penetrable with a steel leaf point. The butchered edge visible *in situ* revealed fully intact trabecular structure. There was some staining/discolouration on the outer bone surface. On the other hand the meat had been altered completely. It had become amorphous, but the edge could be followed quite easily, ie. there was a sharp boundary between

"meat" and fill. There was no sign of meat structure, (eg. no visible muscle fibres), as it had become a distinctly black, quite plastic material. It would be better described as a soil - it was very clayey, and barely intermixed with the sand. Evidence of arthropod disturbance was visible in the form of several larvae (unidentified) seen on and around the "meat". Whether these larvae and others were a responsible agent in the degradation of this meat cannot be proved, but it seems quite likely. The ploughsoil had quite a high visible population of soil fauna. Whether this would occur in the area of the mounds, where the soil is more acid, is not known.

The degraded meat was not fixed to the bone in any way - in fact it was very loose and fragile, and easily dislodged by a fine paintbrush. Some cavities were visible beneath the upper surface of the "meat", and it was not compacted. There was hardly any of the paler greyish halo of flesh seen on the sand bodies - this is probably due to lack of fat/skin on the item buried, and also the time factor.

The whole item was lifted fairly easily, but did not retain its shape - the meat came away from the bone on moving.

F1 - Feathers: The feathers were very heavily degraded. No intact feathers could be found, and no specific area of staining. There were a few recognisable fragments of the central spine of a couple of feathers, but the rest was reduced to a few dark brown lumps. These consisted of 1cm needle-like pieces in clumps - presumably the outer, finer vanes degraded and stained (ie. the fine strands of the feather running perpendicular to the spine, and forming the main surface). They would not have been instantly recognisable if the original material had not been known. The blue plastic tie originally used to hold the bunch together was easily found, and appeared unchanged. A few pieces of "spine" were still in the plastic tie, and were collected. No plan could be made of the position of the feathers, as the few remaining pieces seemed to be spread throughout the feature.

F12 - Cloth: The cloth was first encountered as a single bright red thread, completely unstained. It is assumed this was of man-made fibre, and had survived where the rest of the garment - of red cotton - had perished.

The main body of the cloth could be discerned as a thin black layer on the bottom of the feature, resembling fine-grained charcoal. Of irregular outline, on initial cleaning it had a mottled black and yellow appearance on the surface. This was due to undulations in the deposit - tiny folds in the cloth - being filled with sand, which could be emptied to reveal an all-black surface. This "folded" surface was a good visual indicator of degraded cloth, and should be born in mind for the future.

The thin cloth stain was removed, and it surprisingly came up in quite large sheets. It was discovered that this was due to a consolidated layer on the bottom of the feature which had been treated with Vinamul.

F5 - Painted wood: The piece of wood - 15cm x 5cm x 5cm - painted with white gloss paint, was discovered intact. Indeed, the paint layer was hardly damaged, let alone the wood itself. As it was part of one of the grid marker posts, it had presumably been preserved as well as painted. Not even the unpainted ends of the wood showed any kind of deterioration. (This should be compared with the state of "Longworth's Box" excavated previously).

F15 - Granary Loaf: The bread had decomposed to a rectangular patch of very dark brown/black humified silt/sand. It was of different texture to the meat or the cloth, having a high proportion of roots/rootlets in its makeup. It thus appeared much more humic than the other organic residues. No sign of whole preserved grains was found, but they might be there. The deposit measured 10cm x 5cm x 0.5cm.

F2 - Iron nails: The nails were clearly definable, and although corroded on the surface, seemed robust and solid. Some were adhering to each other, but were easily parted. There was a small amount of orange staining beneath the most clustered area of nails, but it did not appear that corrosion was very far advanced. Three nails were removed, the rest replaced and reburied.

All the features had been treated with Vinamul (PVA emulsion used as a soil consolidant), and a thin layer of consolidated soil was present on the bottom of the features.

Discussion:

It is true to say that the excavation described above was not recorded in immense detail. There are several reasons for this, the most important being that the original experiment was not well designed enough to make subsequent analysis of the artefacts of much use in modelling degradation conditions in the cemetery area. For example, all the feature bottoms had layers of Vinamul in them. It is quite likely that this has contaminated all of the residues, and altered the drainage pattern through the fill. Furthermore, the selection of materials was not a good reflection of those likely to be present in Anglo-Saxon graves; for example, the wood was chemically preserved and painted with a modern paint, the cloth was cotton and man-made fibre, the iron nails were made by modern processes and of a modern alloy, and so on. In addition, the objects were buried in an area subject to ploughing and intense chemical agriculture, the effects of which are impossible to gauge. Finally, there are no control samples to compare what has actually happened to the buried artefacts, although comparable fresh material can be used to a limited extent.

However, these negative points do not mean that the exercise was in vain. Some very useful examples of how certain materials look after burial in the Sutton Hoo soil were seen, particularly the meat, bread and cloth. These can give us general pointers for future reference. As for the chemical analyses, it is proposed to extract the lipid content from the samples, partly in order to see if the degraded objects do have a clear signature, and partly to refine the methodology for use on subsequent burial experiments. It will be most useful to examine the general levels of lipids in the soil at the site, and establish what sample sizes will be needed in the future, etc. It is also hoped to examine the residues microscopically.

What has emerged from the recovery of these samples is further evidence of the rapidity of decay of organic materials in the Sutton Hoo environment. Given the provisos noted above (chemical farming, more soil fauna, etc.) it is not a completely parallel situation to burial in the cemetery area. But the general conditions are similar to the rest of the site in many ways, and we can conclude that organic materials in general decay pretty soon after burial in these conditions. Seven years is not a long time in the life of most of the buried artefacts recovered from the site, but it seems safe to assume that the majority of physico-chemical changes which take place in organic material after burial occur during the early years.

The archaeological implication of this is that if chemical traces of organic objects are recovered from excavations, it is fairly safe to assume that they come form the original burial. By this it is meant that any subsequent disturbance, (for example robbing of a burial chamber) that does not actually remove the soil in which the chemical residue is located, will not remove all evidence of the original site of burial of the object. This further strengthens the conclusions from the chemical assay of Mound 2 burial chamber floor, that the elemental enhancements noted reflected the original position of body and grave-goods.

This exercise has also provided a lot of useful information to assist with designing a larger and more elaborate burial experiment. In addition, the second set of samples are still there for future comparison.

PHB Sept. 1991