

Ancient Monuments Laboratory
Report 84/87

IDENTIFICATION OF MINERAL PRESERVED
ORGANIC MATERIAL ASSOCIATED WITH
METALWORK FROM THE ANGLIAN
CEMETERY AT BROUGHTON LODGE,
NOTTINGHAMSHIRE.

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Summary

Identification of organic material preserved by contact with metal corrosion products. Includes a short discussion of the results and a catalogue of the objects examined at Nottingham Castle Museum. Four electron micrographs are included.

Keywords: Organic material, mineral preserved, iron, copper alloy, knife, spear, shield, bucket, wood, leather, textile, horn, Anglian.

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The Identification of Mineral Preserved Organic Material
Associated with Metalwork from the Anglian Cemetery at
Broughton Lodge, Nottinghamshire.

From this Anglian cemetery, over 200 groups of objects were examined at Nottingham Castle Museum for traces of mineral preserved organic material. Many of the objects, especially the brooches, had been conserved in the late 1960's and in the process much of the organic material had either been removed or consolidated with wax or polymers. Consolidants obscure fine surface detail on organic material, and make them unsuitable for SEM examination as shown in Fig.1. Consequently there was little textile remaining for study, and because of this most of the attention has concentrated on the ironwork. Identifications were made with the aid of a x10 hand lens, or samples were taken from the objects and brought to London for SEM examination.

Using the scanning electron microscope (SEM), it was possible to identify the majority of the woods preserved, either because the structures were only lightly coated with corrosion products (Fig.3) or the detail was preserved as negative impressions (Fig.4). Most of the samples were heavily contaminated by fungal hyphae, which probably colonised the wood soon after burial and were then preserved by metal corrosion products.

The largest group to be examined were the 43 knives, of which 18 had the remains of horn handles and 26 traces of leather sheaths. One of the non-provenanced knives (NP:33) had a wooden handle, of willow or poplar, and if this really has an Anglian date it would be one of the few knives found in this country with a wooden handle.

Of the 24 spearheads it was only possible to identify the wood species of 10 of them. All were hafted with typical coppice woods, although only one was definitely made of a coppiced pole (103:1). The woods used were willow or poplar-4; ash-2; alder-2; and hazel-2.

From the cemetery 9 shields are represented by various fittings, but it was only possible to identify the shield boards of 5, 3 of which were lime and 2 willow or poplar. On 3 sets of fittings were traces of leather, suggesting that these shield boards were covered in leather before the metal fittings were applied. Not enough detail was preserved to suggest how any of these shields were constructed. On one set of shield studs (88:6) were the remains of straw or grass, and depending on the position of this shield in the grave this may suggest that the grave was covered with straw or grass before burial. In addition to the 9 identified shield groups were 2 sets of studs with mineral preserved leather under the heads.

There are 26 iron buckles from the site, of which 19 have traces of leather and 10 of textile. The leather

probably represents the remains of the original belts.

There was only one group of tools, a set of 8 awls with wooden handles (NP:42). 7 of these were found to be hazel and one alder, 3 were made from branch wood or young coppiced poles as pith was present, e.g. Fig.2.

Two copper alloy bound stave buckets were found associated with burials. 58:1 was made of yew, which was commonly used for this type of object, and 36:1 was probably of pine which is rarer.

All the identifications are consistent with the organic material reported on from other Anglo-Saxon cemeteries, and all the wood species represented are indigenous to Britain.

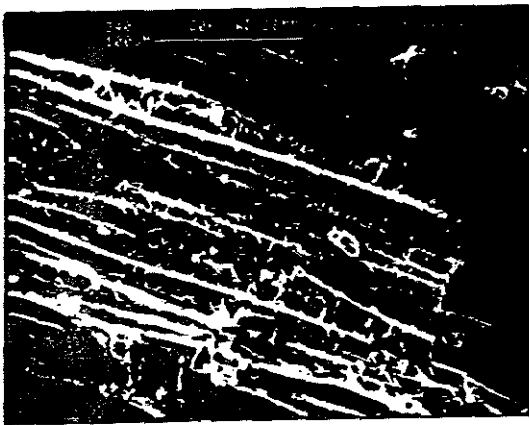


Fig.1

Fig.1 U/S109. Wood consolidated with wax, from spearhead socket.

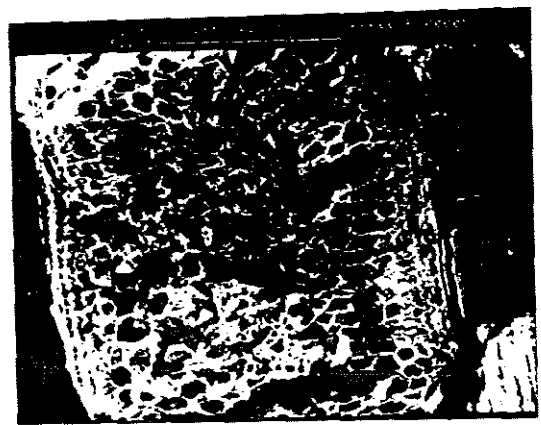


Fig.2

Fig.2 103:1. Mineral preserved pith from spearhead socket.



Fig.3

Fig.3 103:1. Wood preserved by light coating of iron corrosion products (alder).

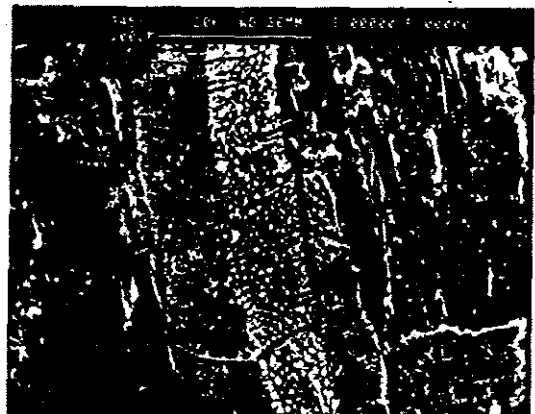


Fig.4

Fig.4 88:6. Wood preserved as a negative impression in iron corrosion products (lime).

Catalogue of the objects from Broughton Lodge examined for traces of mineral preserved organic material.

1:3a

The iron objects have almost disintegrated, with no identifiable organic material remaining.

1:4

Iron knife with mineral preserved horn on tang.

2:2

Iron rod with no mineral preserved organic material.

3:7

Iron knife with mineral preserved horn handle and possible leather sheath.

3:11

Two iron rings corroded together, and covered in large pupae cases approximately 5-7mm long. The rings are also covered in non-iron spirals which could be copper.

3:12

Iron shield stud with no identifiable organic material remaining.

3:13a,b,c

Iron objects, possibly keys, associated with purse mount. One of the keys is possibly covered in leather.

4:4

Iron buckle with traces of the belt that could be leather.

6:4

Three iron nails, but no mineral preserved wood remaining.

7:2

Small iron buckle with mineral preserved textile and possibly leather.

7:2a

Iron shield stud with mineral preserved wood: Salix sp. (willow) or Populus sp (poplar).

SEM No. B91.

8:6

Knife tip with no mineral preserved organic material.

8:9

Iron nails with no mineral preserved organic material.

8:10

Iron buckle with mineral preserved textile.

8:11a,b

Iron knife with mineral preserved horn on tang.

9:5

Iron nail with no mineral preserved organic material.

10/11:1

Iron knife with mineral preserved leather sheath that partially covers the handle which may have been horn. On one side the sheath is covered by textile.

10/11:2,4

Iron fragments with no mineral preserved organic material.

10/11:3

Large iron buckle and plate with leather preserved between the plates and covered in textile.

12:9

Two iron studs with mineral preserved leather on the back - could they have been shield studs?

13:2-5

Various iron objects with no mineral preserved organic material.

14:2

Iron knife tang with mineral preserved horn and a fragment of the blade with part of the leather sheath.

14:4

Iron ring with no mineral preserved organic material remaining.

15:1

Iron ring with mineral preserved textile.

19:1

Iron spearhead with mineral preserved wood in socket : Salix sp. or Populus sp..

SEM No. B92

20:7,10

Iron nails with no mineral preserved organic material.

20:9

Two copper alloy plates with mineral preserved leather between them.

21:1

Iron spearhead with mineral preserved wood in socket : Alnus sp. (alder).

SEM No. B93

22:1

Iron spearhead with mineral preserved wood in socket : probably Salix sp. or Populus sp..

SEM No. B94

22:2

Small iron nails with no mineral preserved organic material.

- 22:4
Iron knife with possible mineral preserved leather sheath covered in pupae cases.
- 23:1
Purse mount with mineral preserved textile and possible leather.
- 23:2a,b
Iron ring and girdle hanger with no mineral preserved organic material.
- 23:3
Iron knife with no mineral preserved organic material.
- 23:5
Iron buckle with possible traces of the leather belt.
- 24:1,2,3
Miscellaneous iron with no identifiable organic material.
- 25:3
Buckle with no organic material remaining.
- 26:1
Iron knife with possible leather sheath, the organic material on the tang was too deteriorated to identify.
- 27:1
Iron buckle with either leather or degraded textile.
- 27:2
Iron knife with possible leather sheath, but the organic material on the tang is too degraded to identify.
- 27:3a,b
Iron nails with no identifiable organic material.
- 28:1
Iron stud with mineral preserved leather on the underside, may have belonged to a shield?
- 28:2
Iron strap with no identifiable organic material.
- 28:3a-h
Miscellaneous iron some with mineral preserved organic material that was probably leather.
- 28:3i
Fragment of copper alloy with possible mineral preserved leather.
- 32:12b
Iron nail with no mineral preserved organic material.
- 33:4
Two fragments of iron with no mineral preserved organic material.

33:9

Tip of knife with the remains of a possible leather sheath.

33:14

Fragment of iron strap with possible mineral preserved leather on one side.

33:15

Broken iron loop with no mineral preserved organic material.

33:18

Iron belt plate decorated with three possible silvered rivets, has the remains of the leather belt between the plates. Mineral preserved textile on the upper side.

33:20

Fragment of iron latchlifter with no mineral preserved organic material.

33:21

Fragment of iron with possible mineral preserved textile.

34:2

Iron ring with no identifiable organic material.

34:3a,b,c

Small iron nails with no mineral preserved organic material.

34:5a,b

Iron stud and shank with possible mineral preserved textile.

34:7a

Iron ring with no remaining organic material.

34:7b

Two iron nails with no identifiable organic material.

34:9

Iron knife with mineral preserved horn handle and possible leather sheath.

35:5

Iron buckle plate with possible mineral preserved leather on both sides.

36:1

Wooden bucket with copper alloy bindings. Staves made from a conifer, probably Pinus sp. (pine).

SEM No. B95

36:2,8

Iron spearhead with mineral preserved wood in the socket, but sample not sufficient to identify the species.

SEM No. B97

36:4

Iron buckle with possible mineral preserved leather.

36:5

Iron spearhead with mineral preserved wood in socket, possibly Corylus sp. (hazel).

SEM No. B96

37:3a

Iron buckle and plate with silvered iron rivet, covered in mineral preserved textile and leather.

37:3b

Fragments of iron knife probably with a mineral preserved horn handle and possible leather sheath.

40:1

Iron object with tang, covered in mineral preserved organic material that may have been leather or textile.

41:5

Iron knife with mineral preserved organic material, but too degraded to identify.

41:6a,b

Iron buckle fragments with some mineral preserved leather and degraded textile.

44:1

Iron spearhead with no remaining organic material.

45:1

Copper alloy disc with mineral preserved leather on the reverse.

45:2

Iron buckle loop with no mineral preserved organic material.

45:3

Iron buckle plate with mineral preserved textile on the outer side and possibly leather between the plates.

45:4

Four iron shield studs with leather preserved between the iron head and the wood. The shield boards are possibly Salix sp. or Populus sp.

45:5a

Miscellaneous iron with mineral leather and textile.

45:5b

Iron buckle with possible mineral preserved leather, but could be degraded textile on the loop.

46:13

Iron buckle with the possible remains of the leather belt.

45/46:1
Iron knife with no organic material remaining.

45/46:2
Iron knife with possible leather sheath.

49:1
Three iron nails with no identifiable organic material.

50:2
Iron nail with no mineral preserved organic material.

51:1
Iron loop with possible folds of degraded textile.

51:2a-d,h,i
Shield fittings with no mineral preserved organic material remaining.

51:4
Iron buckle with the remains of a possible leather belt.

53:1
Iron knife with mineral preserved organic material, but too degraded to identify.

53:2a
Iron buckle and plate with the remains of a possible leather belt.

54:3,6a
Iron girdle hangers with no mineral preserved organic material.

54:6b
Iron knife with possible leather sheath.

54:8a,b,c
Iron objects with no identifiable organic material.

54:10
iron spearhead socket with mineral preserved wood, possibly Salix sp. or Populus sp..
SEM No. B99

54:11
Two iron nails with no mineral preserved wood.

55:4b
Silver disc with mineral preserved leather.

55:5
Iron rod with no mineral preserved organic material.

56:7c
Ivory purse ring with fragment of iron knife corroded onto it. There is no mineral preserved organic material on the knife blade.

57:5

Iron nail with no mineral preserved organic material.

58:1

Wooden bucket with copper alloy bindings. Staves made of Taxus sp. (yew).

SEM No. B100

58:6

Iron object covered in mineral preserved organic material including pupae cases, originally this may have been leather.

58:16

Iron knife with possible mineral preserved horn handle and leather sheath.

60:1

Iron spearhead with no remaining mineral preserved wood.

61:13a-d

Copper alloy purse fittings with mineral preserved organic material, probably leather.

61:13e

Iron rod with no mineral preserved organic material.

62-64:1a

Iron knife with no mineral preserved organic material remaining.

62-64:2

Two latchlifters with mineral preserved textile.

62-64:9a,b

Iron buckle and ring with random mineral preserved organic material, possibly straw.

65/66:1

Iron knife with mineral preserved leather sheath, but the organic material on the tang is unidentifiable.

65/66:2

Fragments of iron buckle, but the mineral preserved organic material is unidentifiable.

65/66:7a,b

Iron rod and two strips with possible mineral preserved textile.

67:1

Iron spearhead with mineral preserved wood in socket, Fraxinus sp. (ash).

67:2

Iron knife with possible mineral preserved horn handle.

67:3

Three iron nails with no mineral preserved organic material.

- 68:1
Iron knife with possible mineral preserved horn handle and leather sheath.
- 68:2e,g-m
Various pieces of ironwork with no mineral preserved organic material
- 68:2n-q
Fragments of iron with possible mineral preserved leather and textile.
- 69:1
Iron spearhead with no mineral preserved wood in socket.
- 69:2a
Iron shield boss flange with some mineral preserved wood, but too little to sample.
- 69:3
Iron buckle with mineral preserved leather and textile.
- 69:4
Iron nails with no mineral preserved organic material.
- 69:5
Iron knife with mineral preserved organic material, but too degraded to identify.
- 74:1
Iron spearhead with no mineral preserved wood remaining.
- 74:2,3
Iron objects with no mineral preserved organic material.
- 82:1
Iron spear ferrule with no mineral preserved wood remaining in socket.
- 88:2,3,6a-d
Two sets of shield studs arranged in pairs on either side of the boss, and placed face down in the grave. The studs have random mineral preserved organic material on the front, possibly grass or straw. Also on the studs are the remains of the shield board, probably Tilia sp. (lime).
SEM No. B101,B102
- 90:1
Iron knife with mineral preserved leather sheath covered in pupae cases.
- 91:1
Iron stud with no mineral preserved organic material.
- 91:6b
Iron buckle with the possible remains of a leather belt.
- 91:10
Fragment of iron knife with possible leather sheath.

91:14

Iron buckle with copper alloy rivet, with the remains of a leather belt, pupae cases and a fine weave textile.

91:19

Iron object with no mineral preserved organic material.

100:1-8

Iron shield boss, spearhead and other iron objects with no organic material remaining.

103:1

Iron spearhead with mineral preserved wood in socket, Alnus sp. (alder) and made from coppiced wood.

SEM No. B103

104:2-7

Iron studs with no mineral preserved organic material.

105:2

Iron pennanular brooch with no mineral preserved organic material.

106:1

Iron fragments with no mineral preserved organic material.

109:3

Iron knife with the remains of a possible mineral preserved horn handle.

110:3

Iron knife with the remains of a possible mineral preserved horn handle.

112:6-8

Various iron objects with no mineral preserved organic material.

112:9

Iron knife with the remains of a leather sheath, and possible horn handle.

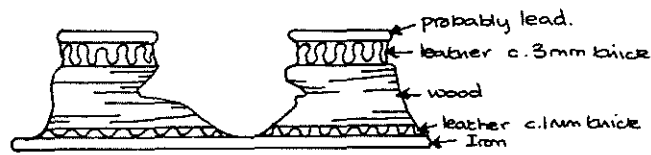
115:1-3

Iron knife and buckle with no mineral preserved organic material.

116/117:2-4

Iron shield boss, grip and decorative fittings with preserved organic material. The original shield boards were probably made of Tilia sp. (lime), and covered on both sides with leather.

SEM Nos. B104, B105



117:4a Mineral preserved organic material on shield fitting.

H3:1,2

Iron objects with mineral preserved organic material, but not identifiable.

H3:3, 6, 7

Various iron objects with no mineral preserved organic material.

H3:5

Iron bridle bit with no mineral preserved organic material remaining.

Artefacts from non-burial contexts: Area 1

U/S:1

Iron strip with no mineral preserved organic material.

U/S:4

Iron stud with mineral preserved wood, but the sample is too small to identify.

U/S:9a, 10b

Three iron nails with no mineral preserved organic material.

U/S:11a

Iron knife with possible mineral preserved leather sheath.

U/S:14c

Two iron rivets with no mineral preserved organic material.

U/S:23

Iron buckle with remains of leather belt.

U/S:29c

Iron fragments with no mineral preserved organic material.

U/S:33

Iron knife with coarse mineral preserved textile, possibly a twill, on blade.

U/S:35

Iron socket with mineral preserved wood: Corylus sp.
(hazel).

SEM No. B107

U/S:39

Iron knife with mineral preserved horn handle and
possible leather sheath.

U/S:41

Iron ring with no mineral preserved organic material.

U/S:43

Fragments of an iron knife with remains of a mineral
preserved horn handle and possible leather sheath.

U/S:48

Iron strip with random organic material, possibly straw
or grass.

U/S:56

Two iron nails with no mineral preserved organic
material.

U/S:58a

Iron object with unidentifiable mineral preserved
organic material.

U/S:61

Copper alloy strap fittings with mineral preserved
leather.

U/S:62

Iron buckle with no mineral preserved organic material.

U/S:63

Iron knife with no mineral preserved organic material.

U/S:71

Iron knife with mineral preserved horn handle and
possible leather sheath.

U/S:72

Four iron nails with no mineral preserved wood.

U/S:74

Iron spearhead with no mineral preserved wood in socket.

U/S:75a

Iron buckle with remains of leather belt.

U/S:75b

Iron ring with random organic material, possibly grass
or straw.

U/S:76

Iron knife with mineral preserved organic material, but
too degraded to identify.

U/S:77

Iron knife with possible leather sheath.

U/S:81b

Iron fragments with no mineral preserved organic material.

U/S:109

Iron spearhead with mineral preserved wood in socket which has been consolidated and is difficult to confirm the species: possibly Salix sp. (willow) or Populus sp. (poplar).

SEM No. B108

U/S:110

Iron spearhead with mineral preserved wood in socket which has been consolidated and is difficult to confirm the species: possibly Salix sp. (willow) or Populus sp. (poplar).

SEM No. B109

U/S:111

Iron spearhead with no mineral preserved wood in socket.

U/S:112

Iron spearhead with no mineral preserved wood in socket.

U/S:113a,b

Iron shield boss and stud with no mineral preserved organic material remaining.

U/S:114

Iron knife with no mineral preserved organic material.

Artefacts from non-burial contexts: Area 2

AI:2

Iron ring with spike - no mineral preserved organic material.

AP:7a-c

Two copper alloy buckles with mineral preserved leather. The large buckle also has mineral preserved textile, but has been heavily consolidated.

AP:9

Fragment of spearhead socket with mineral preserved wood, Corylus sp. (hazel).

SEM No. B106

AT:1

Iron spike with no mineral preserved organic in socket.

AX:1

Iron nail with no mineral preserved organic material.

AX:2

Iron stud with no mineral preserved organic material.

U/S:204

Iron ring on loop with no mineral preserved organic material.

Artefacts from non-burial contexts: Area 4

SF:71

Iron knife with no mineral preserved organic material.

SF:205

Iron rod with no mineral preserved organic material.

Artefacts without secure provenance.

NP:17b

Iron rod fragments with no recognisable organic material.

NP:20

Iron spearhead with no mineral preserved wood remaining in the socket.

NP:21

Iron spearhead with no mineral preserved wood remaining in the socket.

NP:22

Iron spearhead with possible mineral preserved wood in socket, but not identifiable.

NP:23

Iron spearhead with mineral preserved wood in socket, Fraxinus sp. (ash).

NP:24

Iron spearhead with mineral preserved wood in socket, but too consolidated to identify.

NP:25

Iron spearhead with no wood remaining in the socket.

NP:26

Iron spearhead with no wood remaining in the socket.

NP:27

Iron spearhead with mineral preserved textile and straw, but no wood in the socket.

NP:28

Iron spearhead with mineral preserved wood in socket, possibly Salix sp. or Populus sp..

NP:29

Iron spearhead with mineral preserved wood in socket, but not identifiable.

NP:30

Iron spearhead with mineral preserved wood in socket, but too consolidated to identify.

NP:31

Iron knife with mineral preserved horn handle and possible leather sheath.

NP:32

Possible fragments of a knife, but no identifiable organic material.

NP:33

Iron knife with mineral preserved leather sheath and wooden handle, Salix sp. or Populus sp..

SEM No. B111

NP:34

Iron knife with possible leather sheath.

NP:35

Two iron knives, both with horn handles and possible leather sheaths.

NP:36

Fragment of iron knife with no mineral preserved organic material.

NP:37

Tip of iron knife with possible mineral preserved leather.

NP:38

Iron object with unidentifiable mineral preserved organic material.

NP:39-41

Three iron nails with no mineral preserved organic material.

NP:42b

Iron awl with mineral preserved wooden handle, Corylus sp. (hazel), from branchwood.

SEM No. B112

NP:42c

Iron awl with mineral preserved wooden handle, Corylus sp. (hazel), from branchwood.

SEM No. B113

NP:42d

Iron awl with mineral preserved wooden handle, Corylus sp. (hazel).

SEM No. B114

- NP:42e
Iron awl with mineral preserved wooden handle, probably
Corylus sp. (hazel).
SEM No. B115
- NP:42f
Iron awl with mineral preserved wooden handle, possibly
Corylus sp. (hazel).
SEM No. B116
- NP:42g
Iron awl with mineral preserved wooden handle,
Corylus sp. (hazel) or Alnus sp. (alder).
SEM No. B117
- NP:42h
Iron awl with mineral preserved wooden handle, Alnus sp.
(alder), from branchwood.
SEM No. B118
- NP:42i
Iron awl with mineral preserved wooden handle,
Corylus sp. (hazel),
SEM No. B119
- NP:43
Iron nail with no mineral preserved wood.
- NP:44
Nine iron nails with no mineral preserved wood.
- NP:45
Iron rivets and nails with no mineral preserved organic
material.
- NP:47-49
Three iron objects with no mineral preserved organic
material.
- NP:50
Iron rod with possible mineral preserved leather.
- NP:51
Various iron objects with no mineral preserved organic
material.
- NP:52
Iron shield fittings with mineral preserved organic
material - the shield boards were possibly Tilia sp.
(lime), and originally covered in leather.
SEM No. B120
- NP:53
Iron nail with no mineral preserved organic material.
- NP:63b
Iron object with no mineral preserved organic material.