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Ancient Monuments Laboratory
Report 65/95

FOLLY LANE, ST ALBANS HERTFORDSHIRE: PLANT MACROFOSSILS FROM A HIGH-STATUS 1ST CENTURY AD CREMATION BURIAL AND ASSOCIATED CONTEXTS.

P Murphy

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Summary

Charred plant macrofossils associated with the burial comprised cereal chaff and a few grains, fruits/seeds of grassland and weed plants, pinnules of bracken, grass culm nodes, rhizomatous material, remains of sloe and hazel, buds and thorns. This assemblage appears to represent charred residues of fuel/kindling with remains of vegetation charred in situ beneath the pyre. Mineral-replaced plant material from the burial included structural wood and monocotyledonous leaf tissue, but identification was not possible. Samples from ditches and gullies pre-dating the burial included charred cereal remains, fruits/seeds of weed and grassland plants (notably abundant Poaceae fruits), perhaps related to burning of weedy grassland vegetation prior to construction of the burial complex. Other contexts included macrofossils preserved by phosphatic mineral-replacement and charring.

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Introduction

Excavations at Folly Lane revealed an extensive series of features of Late Bronze Age/Early Iron Age to Romano-British date including a large ritual enclosure of nearly five acres delineated by a massive ditch. Within this enclosure was a burial chamber and a pit containing a cremation with a large collection of grave goods dated to *circa* 50 A.D.

Deposits at the site were well-drained and aerated. Plant macrofossils were preserved by charring and mineral-replacement. Quantitative analysis was undertaken on samples from the fills of the grave pit (DAB 134 and DAC 135) and three associated contexts. A further group of fifteen samples from features of first to second century A.D. date not directly associated with the burial chamber were included in the analysis in the post assessment period. These included the fills of wells, pits, ditches, gullies, a hearth and oven.

Methods

The samples from the grave pit were processed by manual water flotation/washover, collecting the flots, and wet-sieving the residues, on 500 micron meshes. Despite the large volume of the samples, manual processing was necessary to minimise damage to associated artefacts (fragments of ivory, fused metallic globules and chain mail) and cremated bone fragments. The flots from the remaining samples were collected in a 300 micron mesh sieve. The dried flots were sorted under a binocular microscope at low power. Macrofossils extracted were identified by comparison with modern reference specimens and are listed on Tables 1-4.

Samples of mineral-replaced wood and other plant tissues from the burial chamber, collected by hand during excavation or during artefact conservation and cleaning were first inspected by low-power light microscopy. Subsequently selected samples were examined by scanning electron microscopy.

Assessment of the samples from the burial chamber and associated pit showed that charred, un-charred and mineral replaced plant macrofossils were present. The uncharred material included some undoubted modern contaminants: fibrous roots, seeds/fruits (especially of Atriplex sp., Fumaria sp. and Polygonum aviculare), stem and leaf fragments and arthropods. In addition the samples contained uncharred fragments of acorn testa (Quercus sp.) and fruitstones of sloe (Prunus spinosa) with rodent teeth-marks. It was thought probable that these had been introduced by small mammals. However, there remained the possibility that high concentrations of metal ions from metallic grave-goods might have inhibited microbial activity (as in the case of wood from the burial chamber) and that these macrofossils were contemporary with the burial. An accelerator radiocarbon date of 775 $\pm$ 50 BP (OxA - 5212) on acorn testa fragments demonstrated that this was not so. Consequently, uncharred plant material which was not mineral-replaced has been disregarded.

Macrofossils from the burial chamber and pit.

a) Charred macrofossils from soil samples (Table 1).

Cereal remains, predominantly chaff with a few grains were present in all but sample CQF. Taxa included Avena sp. (wild or cultivated oat), Hordeum sp (barley), Triticum sp. (wheat),

T. aestivum/compactum (bread wheat) type. T. diccocum (emmer) and T. spelta (spelt).

Seeds/fruits of weeds and grassland herbs were recovered from all samples. These comprised Aphanes arvensis (parsley-piert), Brassica sp. (cabbage/rape/turnip), Bromus sp. (brome), Fallopia convolvulus (black bindweed), Galium sp. (goosegrass), Malva sp. (mallow), Medicago/Trifolium/Lotus sp. (medick/clover/trefoil), Papaver argemone (long prickly-headed poppy), Plantago lanceolata (ribwort plantain), indeterminate grasses, Polygonum aviculare (knotgrass), Potentilla sp. (cinquefoil), Ranunculus acris/ repens/bulbosus (meadow/creeping/bulbous buttercup), Rumex sp. (dock), R. acetosella (sheep's sorrel), Sherardia arvensis (field madder), Stellaria sp. (chickweed), Tripleurospermum maritimum (scentless mayweed), Valerianella dentata (cornsalad) and Vicia/Lathyrus sp. (vetch/vetchling). Wetland/damp grassland species were also present and included Carex sp. (sedge), Eleocharis sp. (spike-rush), Mentha sp. (mint) and Montia fontana (blinks).

Nutshell and fruitstone fragments of Corylus avellana (hazel) and Prunus spinosa (sloe) were also noted. Other plant macrofossils included charcoal, charred roots and rhizomatous material, culm nodes, pinnule fragments of Pteridium aquilinum (bracken) and indeterminate buds, seeds and thorns. The soil samples also included black, porous 'cokey' material, possibly the residue of the partial combustion of organic material at a high temperature, unburnt and burnt bone fragments, metallic residues and fragments of burnt/fired clay, coal and mineralised concretions.

b) Mineral-replaced plant material

DAC 57 and 90 (planks from base of burial chamber).
These two samples comprised very thin strips of brown replaced wood, (maximum thickness *c.* 3mm), associated with a yellowish brown to brown clay matrix. Blueish flecks, probably of vivianite, were noted. Cell structure was badly disrupted, but wood from DAC 57 was somewhat better preserved. Most of it had been consolidated with PVA, but a small untreated sample was suitable for examination by scanning electron microscopy. The micrographs (Plate 00, a-b) show that the wood had undergone considerable degradation before mineral-replacement. In transverse section parenchymatous and ray tissue is discernable, but the cell walls are much thinned and sinuous, resembling wood illustrated by Schweingruber (1982, 193), where fungal degradation primarily by fungi had resulted in survival of the middle lamella only. In longitudinal section, cavities in the surviving cell walls are clearly visible. There appear to be no surviving features on which to base an identification.

DAR (wood from south revetment)

Samples from this structure comprised wood from planks A-H, a horizontal E-W timber on the south face of the pit, and two vertical timbers. Replaced wood was preserved within mineral concretions. These comprised an amorphous black, reddish or brown to pale brown matrix, usually with cemented sand grains and small pebbles. It is probable that iron and manganese compounds are the main components of the concretions. Replaced wood was brown in colour and showed some remnant cell structure, including vascular and ray tissue, particularly on radial longitudinal fractured surfaces. However, the definition of cell replacement was poor, and it proved impossible to obtain fractured transverse sections. The material was not thought to be identifiable.

DJE 1 (wood from possible post in burial chamber)

This sample comprised reddish-brown to buff coloured wood, mostly soft and crumbling, but more indurated next to a 5mm thick black 'pan'. In transverse section, the wood was clearly ring-porous, but due to its very friable character it was not possible to prepare clear sections for scanning electron microscopy.

DAG 138 (replaced material on surface of Samian platter)

The sample, removed during cleaning and conservation, included several components. Scraps of brown replaced wood, up to 12mm, were present, together with fragments of epidermal tissue, up to 5mm. The latter were translucent and flexible, and were therefore thought to be derived from modern intrusive roots. Small fragments, up to 2mm, of other mineral-replaced tissue were also noted (Plate 00, c-e). The micrographs show clear parallel veins of fibrous/vascular tissue, roughly rectangular isodiametric parenchymatous/epidermal cells and well-defined stomata. The material clearly represents leaf fragments from a monocotyledonous plant, but close identification is not thought possible.

Charred and mineral-replaced macrofossils from other contexts

Charred cereal grains and chaff including oats, barley, bread wheat, emmer and spelt were moderately common in the ditch and gully fills (BEW 133, BQH 55, 56 and 57 and CKY 84) but rare elsewhere occurring at a very low density in pit fills ARV 25 and CRY 108 and well fills AIJ and AIK. Seeds/fruits of weed and grassland plants were present: taxa included Aphanes arvensis, Atriplex sp. (orache), Brassica sp., Bromus mollis/secalinus (lop-grass/rye-brome), Chenopodium album (fat hen), Euphrasia/Odontites sp. (eyebright/red bartsia) indeterminate large and small legumes, Fallopia convolvulus, Fumaria sp., Galium sp. (bedstraw type), Geranium sp. (cranesbill), Malva sp., Medicago/Trifolium/ Lotus sp., Plantago lanceolata, indeterminate grasses, Polygonum aviculare, Prunella vulgaris (self-heal), Ranunculus acris/ repens/bulbosus, Raphanus raphanistrum (wild radish), Rumex sp., R. acetosella, Sherardia arvensis, Stellaria graminea (lesser stitchwort), Stellaria media (chickweed), Tripleurospermum maritimum, Valerianella sp., Veronica hederifolia (ivy-leaved speedwell) and Vicia/Lathyrus sp. Wetland/damp grassland species included Carex sp., Eleocharis sp. and Montia fontana. Charred hazel nutshell was noted in one sample.

Macrofossils of Crataegus sp. (hawthorn), Malus sp. (apple), Prunus sp. (damson/bullace), Rubus sp. (bramble) and Sambucus nigra (elderberry) were preserved by phosphatic mineral-replacement in the pit fills (ABE 16, ADW, ARV 25 and CRY 108) and the fills of wells AIJ and DCH 121. Other plant macrofossils included charcoal, charred root, rhizome and stem and indeterminate buds and seeds. Other material included black, porous 'cokey' material, mineral replaced arthropods and mineralised/faecal concretions.

Conclusions

Charred plant macrofossils associated with the cremation comprised cereal chaff and occasional grains, fruits and seeds of grassland and weed plants, pinnules of bracken, grass culm nodes, indeterminate rhizomatous material, fragments of sloe fruitstone and hazel nutshell, buds and thorns. Comparably mixed assemblages have come from cremation/pyre sites of Late Iron Age date at Baldock, Hertfordshire (Murphy 1990) and Stanway, Essex

(Murphy 1992). These assemblages are interpreted as charred residues from fuel or kindling, mixed with remains of vegetation charred *in situ* beneath the pyre.

Wood and other plant materials within the burial chamber were preserved by a complex process of mineral-replacement. It appears that plant material provided a substrate for re-precipitation of translocated iron and manganese and, probably, ions derived by corrosion of metallic grave-goods. Unfortunately, it has not proved possible to identify mineral-replaced material from the burial. However, its survival at all does demonstrate that mineral-replacement in these circumstances was a relatively rapid process, which occurred before plant tissue was totally disrupted by microbial degradation.

The fills of the ditches and gullies pre-dating the ritual enclosure contained charred assemblages comprising relatively abundant grass fruits, fruits and seeds of grassland herbs and weeds, some charred cereal remains and a few scraps of hazel nutshell. These assemblages are likely to include material from more than one source, though it is possible (as suggested by the excavator) that burning of weedy grassland vegetation and back-filling of these features prior to construction of the burial complex may be represented.

Samples from 1st-2nd century pits and wells included mineral-replaced fruitstones and other macrofossils. Material of this type typically occurs in latrine deposits and other layers rich in organic material, where high concentrations of biogenic phosphates and calcium (either from groundwater or from lime used as a sterilising agent) result in phosphatic replacement (Green 1979). The presence of such material relates to the disuse fills of the features and may not indicate their original function. Charred macrofossils were exceedingly sparse in these features and are uninterpretable.

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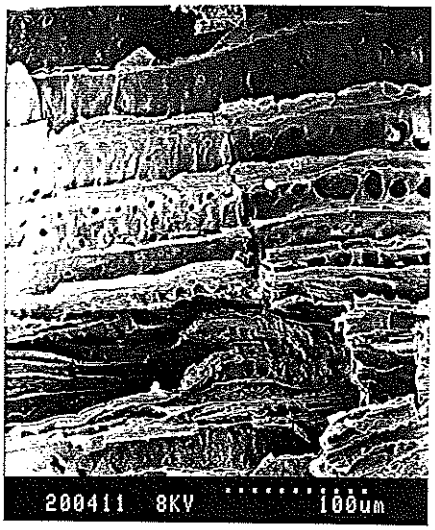
a



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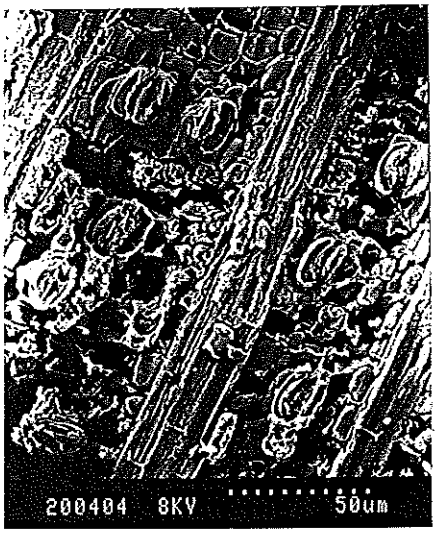

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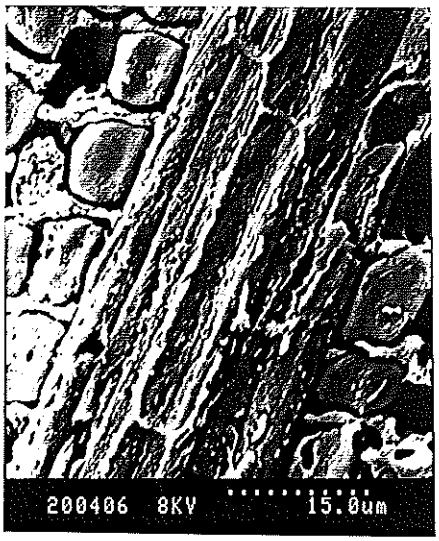

d

e

Plate 00.

a-b. DAC 57. Mineral-replaced wood in TS and LS.
c-e. DAG 138. Mineral replaced tissue, showing parenchyma, sclerenchyma and stomata.

SAMPLE NO.	CQF	DAB 134	DAC 135	DAC <17>	DAC <52>
TREES/SHRUBS					
Corylus avellana L.		1cf	2cf		
Prunus sp.					2fg
P.spinosa L.			2+3fg		
HERBS					
Aphanes arvensis L.		8	8	1+1 cf	12
Apiaceae indet.		2			
Brassica sp.			2		
Bromus sp.		1	2		1
Caryophyllaceae indet.		2	2		1
Fallopia convolvulus (L.)A.Love		3cf	3+3fg		
Galium sp.			2cf fg		
Lamiaceae indet.			2		1
Malva sp.		1			
Medicago/Trifolium/ Lotus sp.		10+9 cf	11+5 cf		2
Papaver sp.			2		
P. argemone L.				2	4
Plantago lanceolata L.	1cf				7
Large Poaceae indet.		11	15	1	
Small Poaceae indet.	1cf	15	20		2
Polygonum aviculare L.		28	49	1	17
Polygonaceae indet.	1	9	10		6
Potentilla sp.			1cf		1cf
Ranunculus sp.				1cf	

R. acris/repens/ bulbosus			5		
Rumex sp.	1		7	1	
R. acetosella L.		6	10	1cf	4
Sheradia arvensis L.	12	56	87		18
Stellaria sp.		9	10	1	8
Tripleurospermum maritimum (L.) Koch					1cf
Valerianella dentata (L.) Pollich		31	48	5	20
Vicia/Lathyrus sp.		5+5 coty	5+2 coty		
WETLAND/AQUATIC PLANTS					
Carex sp.		5	3		
Eleocharis sp.	1	5+1fg	3+2cf		3
Mentha sp.			2cf		
Montia fontana L.			1		
CEREALS					
Avena sp. (caryopses)			1		
Hordeum sp. (caryopses)		1			
(rachis nodes)		7	3		1cf
Triticum sp.(glume bases)		8	13	2	5
(glume fgs.)			+		
(spikelet bases)		1	5	1	
(rachis internodes)			4		
Triticum aestivum/compactum (rachis nodes)			2		1
T. dicoccum Schubl (glume bases)			3		1
(spikelet bases)		2	4		1
(spikelet forks)			1		
T. spelta L. (glume bases)		16	25	1	6

(spikelet bases)			2		
Cereal indet. (caryopses)		2	1		
(rachis internodes)		3	2		1
OTHER PLANT MACROFOSSILS					
Charcoal		++	++	++	++
Charred root/rhizome/stem		++	++	++	++
Culm nodes			2		1
Indet. buds		3	6		
Indet. seeds		17	30	4	15
Indet. thorns			1		
Pteridium aquilinum (L.)Kuhn (pinnules)		1	1		1
OTHER MATERIAL					
Black,porous 'cokey' material		+		+	+
Bone		+	+	+	
Burnt/fired clay		++	+++	++	+
Metallic residues		+	+	+	+
Mineral concretions				++	
Small coal fgs.		+	+		
Sample volume (lit.)	2	63.5	104.5	0.3	3
% flot sorted	100%	25%	25%	100%	100%

Table 1.

Macrofossils from the burial pit and associated deposits. Folly Lane, St. Albans, Herts.

KEY
Taxa are represented by charred fruits/seeds except where indicated. coty = cotyledon. fg = fragment.
+ = present ++ = common +++ = abundant

N.B. Separation of Sherardia arvensis and Plantago lanceolata proved difficult due to deformation during charring.

SAMPLE No.	BEW 133	BQH 55	BQH 56	BQH 57	CKY 84
TREES/SHRUBS					
Corylus avellana L.	3fg				
HERBS					
Atriplex sp.					1fg
Bromus sp.	4+9 fg		3+4 fg	9fg	14
Chenopodium album L.	1				
Chenopodiaceae indet.					2
Euphrasia/Odontites sp.					1
Large Fabaceae indet.	1				
Small Fabaceae indet.					1+2 coty
Fallopia convolvulus (L.)A.Love			1fg		2+2 fg
Galium sp.(bedstraw)					1
Geranium sp.					1cf
Medicago/Trifolium/ Lotus sp.	1			1cf	2cf
Plantago lanceolata L.	1				2
Large Poaceae indet.	65	4	36	25	51
Small Poaceae indet.	16	2	3		10
Polygonum aviculare L.					10
Polygonaceae indet.			1	1	1
Prunella vulgaris L.					2cf
Ranunculus acris/repens/ bulbosus					1fg cf
Raphanus raphanistrum L.		1			
Rumex sp.				3	13
R. acetosella L.	1cf			5	2

Sherardia arvensis L.			1cf		1cf
Stellaria sp.			1	2	
S. graminea L.					1
S. media (L.) Villars					1
Valerianella sp.	1cf	2	1		1cf
Veronica hederifolia L.				2fg cf	
Vicia/Lathyrus sp.	2+ 1cfm			1 coty	
WETLAND/AQUATIC PLANTS					
Eleocharis sp.		1m	1+2 fg	4fg cf	3+5 fg
Montia fontana L.			1	1	
CEREALS					
Avena sp.(caryopses)	1cf				
Hordeum sp. (caryopses)	3			1	
(rachis internodes)	1cf				
Triticum sp. (caryopses)	1			3	5
(glume bases)	1		4	8	1
(spikelet bases)	1				1
(rachis internodes)				1	1
Triticum aestivum/compactum (rachis nodes)					2
T. dicoccum Schubl. (glume bases)	1				
T. spelta L. (glume bases)	8	1	16	14	18
(glume fgs.)					+
Cereal indet. (caryopses)	22	2	2	14	16
(rachis internodes)					5
OTHER PLANT MACROFOSSILS					
Charcoal	+	+		+	+

Charred root/rhizome/stem	+		+	+	+
Indet. seeds		1	3	8	11
Indet. buds			1	1	
OTHER MATERIAL					
Black,porous,'cokey' material	+			+	+++
Sample volume (lit.)	2.5	1	3	5	3.5
% flot sorted	100%	100 %	100 %	100%	100%

Table 2.

Macrofossils the ditches and gullies.
Folly Lane, St. Albans, Herts.

KEY
Taxa are represented by charred fruits or seeds, except where indicated.
coty = cotyledon
fg = fragments
m = mineral replaced
+ = present
+++ = abundant

SAMPLE No.	ABE 16	ADW	ARV 25	CRY 108
TREES/SHRUBS				
Malus sp.			2cf fgm	
Prunus sp.	1+14 fgm	30 + 56fg m	2cfm +4fgm	4+8 fg
cf. Prunus sp.	3m	3fgm		
Rubus sp.	13m	10m	3+2cf m	17m
HERBS				
Stellaria sp.		1m		
CEREALS				
Hordeum sp.(caryopses)				1
T. spelta L. (glume bases)			2	
OTHER PLANT MACROFOSSILS				
Charcoal			+	
Indet. seeds		10m		10m
OTHER MATERIAL				
Mineral/faecal concretions				+
Sample volume (lit.)	1	11	3	3.5
% flot sorted	100%	100%	100%	100%

Table 3.

Macrofossils from the pits.
Folly Lane, St. Albans, Herts.

KEY
Taxa are represented by charred fruits/seeds except where indicated.
fg = fragments
m = mineral replaced
+ = present

SAMPLE No.	AIJ	AIK	APF 27	BVC 59	DCH 121
TREES/SHRUBS					
Crataegus sp.	1cf m				
Malus sp.	4fg cfm				
Prunus sp.	15+ 7cf m				3+13 fg cfm
Rubus sp.	12m	8m			12m
Sambucus nigra L.					1cfm
HERBS					
Aphanes arvensis L.				1cf	
Asteraceae indet.		1		1	
Brassica sp.			1		
Brassicaceae indet.			1		
Bromus mollis/seclinus					1
Fumaria sp.	1m				
Lamiaceae indet.					1m
Malva sp.					1m
Large Poaceae indet.	5m		2		1+1m
Small Poaceae indet.		1		4	
Poaceae indet.(spike fg.)					1m
Polygonum aviculare L.				1	
Rumex sp.			2		
Tripleurospermum maritimum (L.)Koch				1	
Veronica hederifolia L.				3	
WETLAND/AQUATIC PLANTS					

Carex sp.			1cf		
CEREALS					
Cereal indet.(caryopses)	1+1 m	1			
OTHER PLANT MACROFOSSILS					
Charcoal					+
Charred root/rhizome/stem				++	
Indet. seeds	5		2		
OTHER MATERIAL					
Mineral replaced arthropods					+
Sample volume (lit.)	4	4	3	6	4
% flot sorted	100 %	100 %	100 %	100%	100%

Table 4.

Macrofossils from the wells, hearth and oven.
Folly Lane, St. Albans, Herts.

KEY
Taxa are represented by charred fruits/seeds except where indicated.
fg = fragments
m = mineral replaced
+ = present
++ = common