APPENDIX 1 - MACROSCOPIC PLANT REMAINS AND CHARCOAL

1.1 Assessment of the Charred Plant Remains

By Ruth Pelling

Introduction

1.1.1 All of the samples taken during excavation (963) were processed for the recovery of charred plant remains from cremation urns, pits and associated features. Following a preliminary scan of all samples for presence/ absence of charred material, 320 were chosen for assessment of charred plant remains and charcoal. Samples were processed by flotation in a modified Siraf-type machine. The flots were collected onto a 250µm mesh and allowed to air dry slowly. The same samples, most of which were from Roman cremations, were assessed for identifiable charcoal by Dana Challinor (see below). Charred remains other than charcoal were observed in 23 samples. Of these 21 were submitted for detailed assessment.

1.1.2 The Fieldwork Event Aims which the assemblage can be expected to contribute to are as follows:

- Fieldwork Event Aim 5: To recover other palaeo-economic indicators known to be well preserved: (eg. animal bone, molluscs, charred plant remains) to establish the fullest possible picture of the urban economy.
- Fieldwork Event Aim 6: To recover palaeo-environmental indicators to elucidate the interaction of the town within the local environment.
- Fieldwork Event Aim 9: To establish if spatial variations exist within the cemetery in relation to burial practice.
- Fieldwork Event Aim 11: To establish the nature and distribution of structural features located within the cemetery.
- Fieldwork Event Aim 12: To identify ancillary features associated with a specific burial practice.
- Fieldwork Event Aim 14: To determine the nature of activity and land utilisation, other than that directly forming part of the cemetery, associated with the Roman town of Springhead.

Methodology

1.1.3 All cremation deposits encountered during the excavations were sampled for the recovery of charred plant remains and cremated bone, with some cremation urns sampled in 20 mm spits, so producing multiple samples. The charred remains were dominated by charcoal hence initial assessment was carried out by a charcoal specialist. A total of 21 samples in which charred remains other than charcoal were noted were submitted for further assessment. Flots submitted were first put through a stack of sieves from 500µm to 2mm mesh size in order to break them into manageable fractions. Each fraction was then scanned under a binocular microscope at x10 to x20 magnification. Any seeds or chaff noted were provisionally identified based on morphological characteristics and an estimate of abundance was made.

Quantification

1.1.4 Quantifiable grain was identified in 5 of the 21 samples assessed for charred seeds and chaff. In each case the number of items noted was less than 10. *Hordeum*

vulgare (barley), *Triticum spelta* (spelt wheat) and a short grained *Triticum* sp. (wheat) were identified. The short grained *Triticum* is probably of a free-threshing species. Chaff was present in two samples, again in each case less than 10 items. The species identified in both samples was *Triticum spelta*. Weed seeds were also rare, and were present in small numbers in six samples. The species identified include *Rumex* sp. (docks), *Polygonum aviculare* (knotgrass), *Medicago/Trifolium* sp. (medick/clover) and *Bromus* sp. (brome grass). Occasional pulses were present in three samples (ARCPHL97 sample 35, ARCNBR98 samples 399 and 398). Preservation was poor, so identification is unlikely to be possible beyond the level of *Vicia/Pisum* sp. (bean/pea), with the exception of sample 399, in which two or more species appear to be present. A particularly interesting and unusual find from this sample were several (up to 50) seeds of *Vitis vinifera* (grape) including examples with some flesh still attached.

1.1.5 The preservation of cereal remains and the pulses was generally poor. The *Vitis vinifera* seeds tended to be very well preserved.

Provenance

1.1.6 The occasional cereal remains within the deposits are likely to represent occasional cereal processing debris which was present as background noise, or had perhaps entered the cremation pyres as kindling. Sample 399, context 11728 (ARCNBR98) is more curious however. The presence of grape flesh still attached to some of the seeds might indicate that whole grapes were placed on the funeral pyre, perhaps as a funerary offering. The pulses in this context may have derived from a similar origin. This sample was taken from a cremation pit. The remaining samples which produced seeds and chaff were from cremation pits, one grave and two cremation urns.

Conservation

1.1.7 The flots are in a stable condition and can be archived for long term storage.

Comparative Material

1.1.8 The range of species identified are appropriate for the Romano-British period. *Hordeum vulgare* and *Triticum spelta* have been recorded from the other contemporary sites within the rail link project (eg. Thurnham Villa and Hockers Lane). They are the principal cereals recorded throughout southern Britain at this time (Greig, 1991). Finds of grape seeds from the period are not common, although occasional seeds have been identified from several sites and a large assemblage was recovered from a 2nd century pit in Southwark, London (Willcox 1978). Viticulture has recently been demonstrated for Roman Britain. Bedding trenches excavated at Wollaston, near Northampton, were confirmed to be the remains of vineyards with the identification of *Vitis* pollen (Meadows, 1996). No other examples of deposits of grape within cremation deposits are known in either Kent or in southern Britain. Other food products are known in ritual deposits, notably *Pinus pinea* (stone pine) which has been found associated with ritual or temple deposits (Kislev 1988). The choice of stone-pine cones is presumably partly because it emits a pleasant scent when burnt although it is possible that the relatively exotic nature of certain food items makes them a valuable offering.

Potential for Further Work

1.1.9 Generally the concentration of seeds and chaff is too low to offer any potential for detailed analysis. The one sample which produced grapes and pulses does merit closer examination. The aspect of possible funerary deposits deserves to be

explored. A detailed search through the published literature for comparable deposits is also recommended. This work should take two days of technical time and up to three days of specialist time.

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1.2 Charcoal

By Dana Challinor

Introduction

1.2.1 All of the samples taken during excavation (963) were processed for the recovery of charred plant remains from cremation urns, pits and associated features. Of these, 320 were chosen for the assessment of the wood charcoal. The purpose in sampling was to examine the evidence for change and continuity in burial practice. The samples were processed by flotation in a modified Siraf-type machine, with the flots collected onto a 250μm mesh.

1.2.2 The Fieldwork Event Aims to which the assemblage can be expected to contribute are as follows:

- Fieldwork Event Aim 5: To recover other palaeo-economic indicators known to be well preserved: (eg. animal bone, molluscs, charred plant remains) to establish the fullest possible picture of the urban economy.
- Fieldwork Event Aim 6: To recover palaeo-environmental indicators to elucidate the interaction of the town within the local environment.
- Fieldwork Event Aim 7: To establish the chronology of the cemetery.
- Fieldwork Event Aim 9: To establish if spatial variations exist within the cemetery in relation to burial practice.
- Fieldwork Event Aim 11: To establish the nature and distribution of structural features located within the cemetery.
- Fieldwork Event Aim 12: To identify ancillary features associated with a specific burial practice.
- Fieldwork Event Aim 14: To determine the nature of activity and land utilisation, other than that directly forming part of the cemetery, associated with the Roman town of Springhead.

Methodology

1.2.3 A total of 320 flots were assessed. The volume of soil processed varied considerably (from 0.05 kg to 100 litres) according to the feature type. All cremation deposits were sampled in entirety for the recovery of charred plant remains and cremated

bone; however, some of the cremation urns were sampled in spits of 20 mm, with the result that the individual samples were very small. For the assessment, only one spit from a single cremation burial was assessed, although several spits may need to be amalgamated to provide enough material in any further work. The flots were air-dried and divided into fractions using a set of sieves. Fragments of charcoal were randomly extracted, fractured and examined in transverse section under a binocular microscope at x10 and x20 magnification. Fragments caught in the >2mm sized sieves were quantified as identifiable. In the case of large flots, a sample of *c.* 20% was examined, although any quantification given is based on estimates of the entire flot. The flots were also scanned for the presence of any other charred plant remains.

Quantification

1.2.4 A total of 213 flots produced identifiable wood charcoal (Table 1). Six taxa were provisionally identified - *Quercus* sp. (oak), *Alnus/Corylus* (alder/hazel), cf. Salicaceae (willow, poplar), *Prunus* sp. (blackthorn, cherry), Maloideae (hawthorn, apple, pear etc.) and *Fraxinus excelsior* (ash). Some of the ring-porous taxa were difficult to identify as many fragments, and particularly small twigs, exhibited very slow growth and the full range of anatomical characteristics were not always visible. Some of the identified *Quercus*, for example, did not have the characteristic large pores and rays and will require examination at high magnification in all three planes.

1.2.5 There was some variation in the taxonomic composition between cremation deposits. Cremation pits produced the best preserved and largest quantity of charcoal, including some very large fragments with more than ten years growth evident. In contrast, cremation urns and vessels produced much smaller quantities of material and preservation was poorer. This may be due to the smaller soil sample sizes of the spit samples, but this was not always the case, as some of the cremation pit deposits which produced large assemblages were only a couple of kilogrammes in size. A few grave and pit samples also produced good assemblages, with similar taxonomic composition to the cremation deposits. *Quercus* was the most common taxon, present in almost all feature types, followed by Maloideae and *Fraxinus*. Some of the assemblages appeared to be dominated by a single taxon; in most cases this was *Quercus* but *Fraxinus* also predominated in some flots. No flot appeared to contain more than three taxa, but this will require confirmation through further analysis.

1.2.6 There was some cremated bone present in the cremation samples and one flot appeared to contain animal vertebrae (context 163). General charred amorphous material was present in most flots; some of this is likely to be carbonised liquid from the cremation process but it is also possible that other plant remains were present in the pyre. Coal was observed in most flots and modern seeds were common. The coal could be Roman in date although the very small quantities present suggest it is more likely to be modern. The presence of the modern seeds is probably due to contamination either when the site was first stripped or when some features were half sectioned. However, the integrity of the samples is unlikely to have been compromised. Small droplets of slag were noted in several cremation flots, suggesting that metallic objects may have been present on the cremation pyre, but these require examination by an appropriate specialist.

Provenance

1.2.7 The preservation of charcoal at this site was variable, with better preservation in the central part of the site. This may be due to local variations in soil type. The lower concentration of material is to be expected in the burial urns where the bone has

been carefully removed from the pyre remains. Indeed, it is possible that more than a single burning event is represented in the composition of the cremation pits, although the lack of taxonomic diversity suggests either a single event or the deliberate selection of a species for fuelwood. Certainly, the evidence from the charcoal suggests continuity in burial practice and there is potential for a comparison between deliberately deposited pyre remains and the accidental inclusion of pyre debris in burial urns.

Conservation

1.2.8 The flots are in a stable condition and present no problems for long-term storage and archive.

Comparative material

1.2.9 It is interesting that the same limited range of taxa identified in the Waterloo Connection cremation deposits have been identified in cremation burials from Tutt Hill, Chapel Mill and Boys Hall Balancing Pond, despite a range in date from the Bronze Age to the Roman period. Since individual assemblages show a lack of taxonomic diversity, the fuelwood must have been deliberately selected. Indeed, the predominance of a single taxon in prehistoric cremation assemblages, indicating the use of a single tree or specifically selected species in ritual activities, has been noted at Radley Barrow Hills (Thompson 1999, 352) and at Rollright Stones (Straker 1988). However, it has also been suggested that the abundance of oak or ash in cremation deposits, compared to other species, is a result of the pyre structure; the timber from these trees providing the supports in a central position, less likely to have been totally reduced to ash (Gale 1997, 82). The choice of fuelwood may have been determined by the burning properties of the wood (oak and ash burn very well), rather than ritual concepts.

Potential for further work

1.2.10 Since there has been little publication on Iron Age and Roman charcoal from cremation deposits (Gale 1997, 77), the charcoal from Waterloo Connection will provide a valuable addition. Indeed, the charcoal from this site has high potential to add to our understanding of regional Roman cremation practices, and the continuity and change within burial practices over time by comparison with earlier burials. It is recommended that the remaining unassessed flots are scanned to determine if any variation or trends have been missed in the sample covered in this assessment. More detailed analysis should then be carried out on a selection of assemblages to confirm identifications, to establish the presence of any additional taxa, to consider the evidence for deliberate selection of fuelwood and to explore regional trends and the possibility for woodland management practices.

1.2.11 It is been proposed that a programme of radiocarbon dating is undertaken to improve the chronology of the site. Advice has been sought from the Scientific Dating Co-ordinator at English Heritage (A Bayliss). The programme would require both high precision dating and the AMS measurement of cremated bone and involves the application of newly developed statistical techniques (Bayesian modelling) to the results to substantially reduce the probable date range (Lanting and Brindley 1998).

1.2.12 It should be possible to establish the date of individual samples to within a century or so by using high-precision measurements which would require 10-50 g of identified short-lived charcoal per burial.

1.2.13 It is likely that by submitting approximately 20 samples it will be possible to confirm both the start date and the end date of the period of use of the cemetery. Some measurements would be taken on human bone and some on charcoal. If AMS measurements (on either bone or charcoal) are applied, this scale of programme would be required to counteract the effects of statistical scatter on the measurements. A similar number of further dates could be required to address specific questions, such as the chronological range of *bustum* burials within the cemetery, although samples will wherever possible be selected to address multiple aims. Dating might be desirable for discrete groups of graves, or to assess the chronology of identified ritual practices; dating may also be useful to date human bone from the well/shaft, and to confirm the date of suspected Iron Age features.

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Table 8.1: Charred seeds and chaff noted in the Assessment

Site-code	Sample	Context	Sample size	Flot size (ml)	PERIOD	Grain	Id-Grain	Chaff	Id-Chaff	Weed seeds	Other	Id-Other	Charcoal	Comments
ARCNBR98	455	12205	35	1	1st-2ndC	+	T.spelta							
ARCNBR98	69	10564	40	240	1st-2ndC					+			++++	modern chenopodium
ARCNBR98	253	11181	23	190	1st-2ndC					+			++++	modern chenopodium
ARCNBR98	396	11701	20	120	1st-2ndC					+			+++	modern weeds
ARCNBR98	398	11758		15							+	Vicia/Pisum		
ARCNBR98	399	11728	15	155						+	++	Vitis Vicia/Pisum	++++	whole grape?
ARCPHL97	35	10436	25	100	1st-2ndC	+	Hordeum			+	+	Vicia/Pisum	+++	
ARCPHL97	47	10511	12	40	1st-2ndC			+	T. spelta				++	
ARCPHL97	42	173	23	40	1st-2ndC	+	Hordeum						+	
ARCPHL97	82	338		5						+				
ARCPHL97	85	406	30	25		+	Hordeum	+	T.spelta					modern chenopodium
ARCPHL97	6	45	7	15		+	Triticum sp.							modern chenopodium

+ = 1-10; ++ = 1-50; +++ = 51-100; ++++ = 101-1000; 1000+ = >1000

Table 8.2: Summary of samples with charcoal

Quantification	Feature type								
	Coffin	**Cremation pit**	**cremation urn**	**ditch**	**grave**	**pit**	**Post hole**	**vessel**	**wooden box**
1-10	1	54	17	1	10	2		14	
11-50		30	5		4	5		3	1
51-100		19	1	1	5	2		1	
101-1000		11	1	1	4	5	1		
>1000		10				1			
Total no. of flots with charcoal	1	124	24	3	23	15	1	18	1
Quercus sp.	X	X	X	X	X	X	X	X	
Cf. Salicaceae			X						
Alnus/ Corylus		X		X		X			X
Maloideae	X	X	X	X	X	X			X
Prunus sp.		X							
Fraxinus excelsior		X	X		X	X		X	

x = denotes presence of taxon only