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Ancient Monuments Laboratory
Report 98/89

# THE STANSTED AIRPORT PROJECT, ESSEX: PART 4; THE AIRPORT CATERING SERVICES SITE.

Peter Murphy BSc MPhil

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Summary

The site was an enclosed settlement, dated c75BC-50/60 AD. Sparse assemblages of carbonised cereals (mainly Triticum spelta with some Hordeum sp., Triticum aestivum s.l., Triticum dicoccum), weed seeds, and wild fruits and nuts were recovered. Sample composition suggests the assemblages represent charred semi-cleaned crop products: no deposits of crop cleaning waste were found. In view of this, and considering the predominance of heavy clay soils in the vicinity, it is tentatively suggested that arable farming may not have been the main feature of the site's economy. Mollusca from the enclosure ditch indicate natural infilling, conditions in the ditch becoming progressively more open and less damp.

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## Carbonised plant remains

### Introduction

Excavation of this late Iron Age/early Roman settlement, dated on pottery evidence to 75BC - 50/60AD provided an opportunity to examine several questions relating to agriculture on the Boulder Clay soils of N.W. Essex at this time. It was hoped that the results might indicate

1) Whether the Roman conquest had any perceptible effects on native farming locally over this period.

2) Whether a clay-land site would produce a different range of crops from contemporary sites on chalk or gravel soils (which have been more extensively studied)

3) Whether the economic status of the site as a nett consumer or producer of cereals could be established.

In the event, because of the limited scale of sampling and the low density of plant material in the deposits at this site only small assemblages of plant remains were obtained. Nevertheless, the results do give some basis for considering these questions.

### Sampling and retrieval methods

The scale of sampling at ACS was limited by practical considerations. The clay loam matrix of the deposits is difficult to disaggregate, making sample processing very time-consuming, a constraint which does not apply at comparable late prehistoric enclosed settlements on light soils, where extensive, large-scale sampling is usually possible. At this site, given the limited resources available, it was decided that only fifty samples could be processed and these samples were smaller than would normally be examined. They were selected so as to include all major types of features (round-house gulleys, the foundation trench of the central building, ditches, post-holes, pits and hearths) from both site periods.

The samples were initially disaggregated by pre-soaking in Calgon solution, followed by flotation/washover using a 0.5mm mesh. The residues, including some undisaggregated clay, were wet-sieved in a 0.5mm mesh. After drying the residues were re-processed in the laboratory, again using 0.5mm meshes, though even after this second treatment complete disaggregation was not achieved. The dried flots were sorted under a binocular microscope at low power and the residues were sorted without magnification. Macrofossils (bone, shell, carbonised plant material) from the samples are listed in Table 1, and detailed lists of carbonised plant remains are given in Table 2.

The crop plants

Cereals

The carbonised cereals in these samples are almost all very poorly preserved, usually fragmentary and with porous or abraded surfaces. Most of the cereal grains are not identifiable to genus.

(a) Wheats (*Triticum* spp.)

Due to fragmentation and deformation most of the wheat grains are of indeterminate type. However, in most samples elongate grains with fairly flat ventral surfaces predominate. In the sample from 818 there is a significant proportion of very short grains of a free-threshing hexaploid wheat (*Triticum aestivum* s. l.) and other samples contained occasional grains of this type. The glume bases, spikelet bases (badly degraded spikelet forks lacking rachis internodes and with only the extreme basal parts of the glumes) and rachis nodes are, again, often damaged and fragmentary. However, the intact glume bases are almost all broad, with prominent primary keels, strongly developed tertiary nerves and have the glume faces on either side of the primary keel at an angle of more than 90°. These are of spelt, *Triticum spelta* L. A single glume base of emmer, *Triticum dicoccum* Schübl, came from 272. Context 509 produced three rachis nodes of *Triticum aestivum* s. l. with fragments of the internodes attached.

(b) Barley (*Hordeum* sp(p))

Barley grains are uncommon in these samples. They all show the angular cross-sections characteristic of hulled barley, and contexts 626 and 1008 include asymmetrical grains, establishing the presence of six-row hulled barley (*Hordeum vulgare* L. emend Lam.). Rachis nodes were present in samples from 409, 431, and 509, but there were no intact rachis internodes.

(c) Oats (*Avena* sp(p))

Oat grains and awn fragments occurred sporadically in small numbers, but in the absence of floret bases it is not possible to establish whether a wild or cultivated oat is represented.

? Pea (*Pisum*-type)

Large leguminous cotyledons of irregularly hemispherical shape, 3.0-3.9mm in length, came from context 818. On size criteria alone these could be of peas.

The wild flora

The samples produced a restricted weed flora in which *Vicia/Lathyrus* spp. and *Bromus* spp. predominate. Taxa characteristic of poorly-drained soils - *Montia fontana*

subsp. chondrosperma, Rhinanthus-type, Eleocharis palustris/uniglumis and Carex sp. - occur at low frequencies. The predominance of large-seeded weeds in these sparse assemblages, implies that smaller seeds had been eliminated during crop processing, prior to carbonisation. Wild fruits and nuts are represented by hazel nutshell fragments (Corylus avellana), endocarp fragments of sloe (Prunus spinosa) and a probable seed of strawberry (Fragaria vesca)

Other carbonised material

Apart from wood charcoal the samples also produced occasional charred stem fragments, buds and thorns. Samples 34 and 35 from context 651 include some possible charred root fragments, up to about 3.5mm in diameter. In TS these show a central area with large radiating cavities and an outer area of more compact tissue. Several samples included lumps of porous, vesicular, usually amorphous carbonised material. A fragment of such material from context 806 contains some monocotyledonous (?grass/cereal) stem fragments. It has the appearance of charred herbivore dung.

Discussion

The assemblages of carbonised cereals and weed seeds obtained from this site are, in general, sparse. This is in part a result of the small sample size necessitated by practical considerations, but also a consequence of the low densities of plant material in the soil. For most site periods mean densities of under one grain, chaff element and weed seed per litre of soil were recorded (Table 3). Deposits of Period 1b contained slightly higher mean densities of macrofossils, and the maximum densities of 16.9 grains/litre, 1.2 spikelet elements per litre and 2.4 weed seeds per litre came from pit 818, of this site period. Even these densities, however, are not high for a late Iron Age-early Roman site.

The frequencies of the cereal taxa and elements are summarised in Table 4. Indeterminate cereal remains occur in the majority of samples. Wheat grains and chaff fragments are notably more frequent than barley, whilst the few grains and awn fragments of oats may well be of a weed species. Asymmetrical grains from lateral spikelets establish the presence of six-row hulled barley (Hordeum vulgare). The wheat grains, though poorly preserved, are mostly elongate forms of spelt-type. with a proportion of short-grains of free-threshing hexaploid wheat in some samples. The only rachis nodes of Triticum aestivum s. l. came from an undated hearth, 509. Most of the identified wheat chaff fragments are of spelt, Triticum spelta, with one glume base of emmer, Triticum dicoccum from the period 2 enclosure ditch fill 272.

In summary these samples, from contexts dated to c.75BC - c.50/60AD, contain fairly consistently low densities of cereal remains and there is no evidence for any change

| | 1a | 1a/1b | 1b | 1b/2 | 2 |
|---|---|---|---|---|---|
| Cereal grains | 38 (67.8%) | 14 (60.9%) | 368 (69.7%) | 59 (53.6%) | 76 (40%) |
| Cereal chaff elements | 9 (16.1%) | 2 (8.7%) | 60 (11.4%) | 18 (16.3%) | 49 (25.8%) |
| Weed seeds | 9 (16.1%) | 7 (30.4%) | 100 (18.9%) | 33 (30%) | 65 (34.2%) |
| Total | 56 | 23 | 528 | 110 | 190 |

Table 3 : Proportions of cereal grain, chaff and weed seeds expressed (in brackets) as percentages of the total counts of macrofossils from samples of each site period.
Chaff elements calculated as glume bases + rachis nodes + rachis internodes + (spikelets x 3).

| | 1a | 1a/1b | 1b | 1b/2 | 2 |
|---|---|---|---|---|---|
| Indet. cereal grains | 4 | 7 | 13 | 6 | 10 |
| Cereal/grass culm frags | 1 | - | 1 | - | - |
| Triticum spp. (grains) | 3 | 4 | 8 | 4 | 6 |
| Triticum spp. (chaff) | 2 | - | 8 | 4 | 5 |
| Triticum spelta (chaff) | 1 | 1 | 5 | 2 | 6 |
| Triticum dicoccum (chaff) | - | - | - | - | 1 |
| Hordeum sp(p) (grains) | 1 | - | 1(+2) | - | - |
| Hordeum sp(p) (chaff) | - | 1 | - | 1 | - |
| Avena sp(p) (grains) | - | - | 1 | - | (1) |
| Avena sp(p) (awns) | - | - | - | 1 | 1 |
| Total no. of samples | 5 | 7 | 14 | 7 | 12 |

Table 4 : Presence (frequency) of cereal taxa and elements in samples of each site period. Tentative identifications in brackets.

| | 1a | 1a/1b | 1b | 1b/2 | 2 |
|---|---|---|---|---|---|
| Cereal grains | 0.81 | 0.30 | 3.17 | 0.91 | 0.70 |
| Cereal chaff elements | 0.19 | 0.04 | 0.52 | 0.28 | 0.45 |
| Weed seeds | 0.19 | 0.15 | 0.86 | 0.31 | 0.60 |
| No. of samples | 5 | 7 | 14 | 7 | 12 |
| Total soil volume(l) | 47 | 46 | 116 | 65 | 108 |

Table 3: Mean densities of macrofossils (nos of grains, chaff elements or seeds per litre of soil) in each site period

through time in the relative proportions of different cereal crops: wheat (mainly spelt) is the main crop represented in samples of all site periods. Nor do these samples provide any evidence for a distinctive clay-land agricultural system, for spelt- and barley-dominated assemblages have been recorded from contemporary rural sites on a wide variety of soil types (cf. Jones 1978, Murphy 1983).

The role of the site in the late Iron Age/early Roman agrarian economy - specifically whether it was a nett producer or consumer of cereals - may be assessed by considering the composition of the cereal/weed seed assemblages and also the location of the site with respect to soil-types. The conventional method of presenting sample composition is to calculate, for each sample, the relative proportions of cereal grain, chaff elements and weed seeds, displaying the results as percentages on triangular diagrams (Jones 1985). At this site very few individual samples contained sufficient macrofossils for percentage calculations to be meaningful, but by combining counts from all samples of each period an overall impression of sample composition can be gained (Table 5).

Clearly in all periods cereal grains form the main component of the samples whilst in period 2 chaff and weed seeds are slightly more abundant. There are no individual samples in which chaff and weed seeds form a clearly predominant component: the larger samples (mainly of period 1b) all consist largely of grain. Moreover amongst the weed seeds 'large-seeded' taxa (Vicia and Lathyrus spp., Galium aparine and Bromus) generally predominate: small weed seeds ar rare. Cereal culm fragments are very uncommon.

From these characteristics the plant material from this site appears to represent semi-cleaned crop products, and there is no evidence for disposal of waste from the early stages of crop processing.

The site is located centrally within an area mapped by the Soil Survey as the Hanslope Association (Thomasson 1969). The parent material of soils within this association is the Chalky Boulder Clay or colluvial deposits derived from it. Drainage is generally imperfect, often poor, though better towards the edges of the association, where the till is thin. The heavy texture and slow permeability of these soils have obviously posed problems for arable farming in the historic period, and may have resulted in these heavy clay soils being marginal for arable production in the late Iron Age/early Roman period. The composition of the weed flora might potentially give some indication of soil conditions in the arable area, though at this site the rarity of small weed seeds suggests that, as a result of crop cleaning, the list of weed taxa is incomplete. Nevertheless the absence of Anthemis cotula, a weed very characteristic of alkaline clay soils (Kay 1971), may be significant: in semi-cleaned samples of medieval cereals from Colchester Hall and Molehill Green A. cotula was one of the more frequent weeds (Murphy 1988).

Obviously only tentative conclusions may be drawn from the limited results obtained. However, in view of the absence of Anthemis cotula and of waste from the initial stages of crop-cleaning, and the predominance of assemblages thought to represent semi-cleaned crop products it may be suggested that cereal production may not have been the main element of the site's economy. It is possible that the site was supplied with cereals by farms on lighter soils at the margins of the till plateau.

To obtain more conclusive results from sites of this type on clay soils it will clearly be necessary to process more, and larger, samples than was possible here. Further experimentation to devise methods permitting more rapid processing of samples of deposit derived from the Chalky Boulder Clay is necessary.

Molluscs

Molluscs were extracted from the flots of the bulk samples, which had been taken primarily for retrieval of carbonised plant remains. Examination of portions of the residues from these samples produced few shells, though it is likely that some dense elements (eg. Limacid plates) have not been retrieved. Mollusca from the fills of the enclosure ditch F106 (176, 269, 272) and the lowest fill of the trench F712 (736) bisecting the main enclosure are listed in Table 6.

272, the lowest fill of F106, produced a mixed assemblage of freshwater, open-country terrestrial and shade-requiring terrestrial molluscs. Armiger crista is the main freshwater species and is associated with shells of Aplexa hypnorum, Lymnaea truncatula, Anisus leucostoma and Succineidae. This range of taxa implies the existence of small bodies of freshwater in the ditch, large enough to support a population of the diminutive A.crista, though the remaining snails can all tolerate stagnant habitats which periodically dry out. Shade-requiring terrestrial snails, including Carychium sp., Discus rotundatus, Zonitidae and Clausilia bidentata are present, and may be related to the development of scrub alongside the enclosure ditch, or conceivably to a palisade or thorn hedge. Shells of Vallonia spp. and the Trichia hispida group are probably derived from adjacent grassland. In the overlying layer 269 Aplexa hypnorum, Lymnaea truncatula and Anisus leucastoma all increase in frequency whilst Armiger crista declines. Infilling of the ditch had by this stage raised the level of its base and it appears to have contained a stagnant, impersistent area of water. Shade-requiring snails are reduced in frequency, but Vallonia and Trichia spp. remain common. These two genera dominate the assemblage from the topmost fill, 176, which is largely composed of open-country terrestrial species. The snail assemblages from the fill of this enclosure ditch seem to indicate a natural process of in-filling, conditions in the ditch becoming progressively dryer and less shaded.

The function of the trench F712 is uncertain: it might

represent a fence-line or a drain. Either way its fill presumably post-dates its functional life. The molluscs from the lowest fill (736) indicate infilling in open conditions. As it was a fairly shallow feature it would not have held permanent standing water, though a few shells of Lymnaea truncatula indicate slightly damp conditions.

| Context no | 176 | 269 | 272 | 736 |
|---|---|---|---|---|
| Sample no | 46 | 47 | 48 | 45 |
| Carychium minimum Müller | 1 | - | 1 | - |
| Carychium sp. | - | 3 | 10 | - |
| Aplexa hypnorum (Linné) | - | 50 | 1 | - |
| Lymnaea truncatula (Müller) | 3 | 183 | 28 | 7 |
| Lymnaea palustris (Müller) | - | 1 | - | - |
| Anisus leucostoma (Millet) | - | 208 | 54 | - |
| Armiger crista (Linné) | - | 11 | 210 | - |
| Succineidae indet | 2 | 3 | 5 | - |
| Cochlicopa sp(p) | 2 | 10 | 4 | 15 |
| Vertigo pygmaea (Draparnaud) | 1 | 6 | - | 2 |
| Vertigo sp. | 4 | 8 | - | 3 |
| Pupilla muscorum (Linné) | 2 | 11 | - | 2 |
| Vallonia costata Müller | 3 | 42 | 91 | 77 |
| Vallonia pulchella (Müller) | 9 | 3 | 2 | 1 |
| Vallonia excentrica Sterki | 44 | 26 | 10 | 51 |
| Vallonia sp. | 98 | 126 | 110 | 203 |
| Punctum pygmaeum (Draparnaud) | 3 | - | - | - |
| Discus rotundatus (Müller) | - | 2 | 44 | - |
| Arionidae indet | - | + | + | + |
| Vitrina pellucida (Müller) | - | - | - | 1 |
| Vitrea cf. contracta (Westerlund) | - | - | 2 | - |
| Vitrea sp. | - | - | 1 | - |
| Aegopinella pura (Alder) | - | 5 | - | - |
| Aegopinella sp. | 3 | 3 | 3 | 7 |
| Zonitidae indet | 2 | 15 | 5 | 8 |
| Cecilioides acicula (Müller) | 5 | - | - | - |
| Clausilia bidentata (Ström) | - | - | 1 | - |
| Helicella itala (Linné) | 4 | - | - | 1 |
| Trichia hispida group | 44 | 57 | 13 | 31 |
| Cepaea sp. | - | - | 1 | - |
| Sphaeriidae | - | - | 2 | - |
| Indet gastropod apical frags | 4 | 16 | 5 | 2 |
| Ostracods | - | + | + | - |

Table 6 : Mollusca etc. from the enclosure ditch and central dividing ditch

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Table 1: Plant and animal macrofossils from ACS

| Sample no. | Context no. | Sample volume (l) | Mammal bone | Sm. mammal/ amphibian bone etc. | Fish-bone | Land + freshwater molluscs | Marine molluscs | Charcoal | Carbonised seeds, cereals etc |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 443 | 5 | + | + | - | + | - | + | + |
| 2 | 445 | 6 | + | - | - | + | - | + | + |
| 3 | 800 | 10 | + | + | - | + | - | + | + |
| 4 | 802 | 10 | + | - | - | + | - | + | + |
| 5 | 804 | 5 | + | - | - | + | - | + | + |
| 6 | 806 | 10 | + | + | - | + | - | + | + |
| 7 | 808 | 10 | + | + | - | + | - | + | + |
| 8 | 246 | 7 | + | - | - | + | - | + | + |
| 9 | 246 | 6 | + | + | - | + | - | + | + |
| 10 | 358 (Ent) | 10 | + | - | - | + | - | + | + |
| 11 | 363 | 8 | + | + | - | + | - | + | - |
| 12 | 367 | 5 | + | + | - | + | - | + | + |
| 13 | 374 (Ent) | 6 | + | - | - | + | - | + | - |
| 14 | 453 (Ent) | 7 | + | + | - | + | - | + | + |
| 15 | 453 | 5 | + | + | - | + | - | + | + |
| 16 | 505 | 8 | + | + | - | + | - | + | + |
| 17 | 505 (Ent) | 9 | + | + | - | + | - | + | + |
| 18 | 505 (Ent) | 8 | + | + | - | + | - | + | + |
| 19 | 626 (Ent) | 10 | + | + | - | + | - | + | + |
| 20 | 735 (Ent) | 11 | + | + | - | + | - | + | + |
| 21 | 735 | 10 | + | + | - | + | - | + | + |
| 22 | 768 | 8 | - | + | - | + | - | + | + |
| 23 | 769 | 6 | - | - | - | + | - | + | + |
| 24 | 409 | 7 | + | + | - | + | - | + | + |
| 25 | 409 | 7 | + | + | - | + | - | + | + |
| 26 | 409 (Ent) | 8 | + | + | - | + | - | + | + |
| 27 | 409 (Ent) | 5 | + | + | - | + | - | + | + |
| 28 | 1018 | 10 | + | + | - | + | - | + | + |
| 29 | 28 | 10 | + | + | - | + | - | + | ++ |
| 30 | 385 | 10 | + | + | - | + | - | + | + |
| 31 | 388 | 7 | + | + | - | + | - | + | + |
| 32 | 411 | 8 | + | + | - | + | - | + | ++ |
| 33 | 479 | 10 | + | + | - | + | - | + | + |
| 34 | 651 | 11 | - | - | - | - | - | + | - |
| 35 | 651 | | | | | | | | |
| 36 | 818 | 10 | + | - | - | + | - | + | ++ |
| 37 | 843 | 10 | + | + | - | + | - | + | + |
| 38 | 431 | 10 | + | - | - | + | - | + | + |
| 39 | 509 | 12 | + | - | - | + | - | + | + |
| 40 | 845 | 6 | + | + | - | + | - | + | + |
| 41 | 847 | 10 | + | + | - | + | - | + | + |
| 42 | 849 | 6 | + | + | - | + | - | + | + |
| 43 | 851 | 11 | + | + | - | + | - | + | + |
| 44 | 163 | 10 | + | - | - | + | + | + | + |
| 45 | 736 | 10 | + | - | - | + | - | + | + |
| 46 | 176 | 8 | + | + | - | + | - | - | + |
| 47 | 269 | 9 | + | + | + | + | - | - | + |
| 48 | 272 | 14 | + | + | - | + | - | + | + |
| 49 | 501 | 13 | + | + | - | + | - | + | + |
| 50 | 1008 | 12 | + | + | - | + | - | + | + |

| | Period 1a | | | | | Period 1a/b | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Context No. | 735 | 735 | 768 | 769 | 1008 | 246 | 246 | 409 | 409 | 409 | 409 | 445 |
| Sample No. | 20 | 21 | 22 | 23 | 50 | 8 | 9 | 24 | 25 | 26 | 27 | 2 |
| Cereal indet. ca fr. | + | + | - | + | ++ | + | + | + | + | + | + | + |
| Cereal indet. ca | 4 | 1 | - | 1 | 19 | 1 | - | 3 | - | 1 | 1 | - |
| Cereal indet. spk fr | - | - | - | - | - | - | - | - | - | - | - | - |
| Cereal/grass cn fr. | - | - | - | - | 1 | - | - | - | - | - | - | - |
| Triticum sp(p) ca | 1 | 1 | - | - | 8 | - | 1 | 3 | - | 1 | 3 | - |
| Triticum spelta L. gb | - | - | 1 | - | - | - | 1 | - | - | - | - | - |
| Triticum dicoccum Schubl. gb | - | - | - | - | - | - | - | - | - | - | - | - |
| Triticum sp. gb. | - | - | - | - | 2fr | - | - | - | - | - | - | - |
| Triticum sp. spb | - | - | 2 | - | - | - | - | - | - | - | - | - |
| Triticum aestivum s. l. rn | - | - | - | - | - | - | - | - | - | - | - | - |
| Hordeum vulgare L. emend Lam ca | - | - | - | - | 3 | - | - | - | - | - | - | - |
| Hordeum sp. ca | - | - | - | - | - | - | - | - | - | - | - | - |
| Hordeum sp. rn | - | - | - | - | - | - | - | - | - | 1 | - | - |
| Avena sp. ca | - | - | - | - | - | - | - | - | - | - | - | - |
| Avena sp. a fr. | - | - | - | - | - | - | - | - | - | - | - | - |
| Montia fontana L. subsp. chondrosperma | - | - | - | - | - | - | - | - | - | - | - | - |
| Atriplex patula/hastata | - | - | - | - | - | - | - | - | - | - | - | - |
| Chenopodiaceae indet. | - | - | - | - | - | - | - | - | - | - | - | - |
| Medicago lupulina-type | - | - | - | - | - | - | - | - | - | - | - | - |
| Vicia/Lathyrus spp. s | - | - | - | - | - | - | - | - | - | - | - | - |
| co | - | - | - | - | - | - | - | - | - | - | - | - |
| Lathyrus nissolia L. s | - | - | - | - | - | - | - | - | - | - | - | - |
| co | - | - | - | - | - | - | - | - | - | - | - | - |
| Pisum-type co | - | - | - | - | - | - | - | - | - | - | - | - |
| Fragaria vesca L. | - | - | - | - | - | - | - | - | - | - | - | - |
| Prunus spinosa L. end. fr. | - | - | - | - | - | - | - | - | - | - | - | - |
| Polygonum convolvulus L. | - | - | - | - | - | - | - | - | - | - | - | - |
| Rumex sp. | - | - | - | - | - | - | - | - | - | 1 | - | - |
| Polygonaceae indet. | - | - | - | - | - | - | 1 | - | - | - | - | - |
| Corylus avellana L. ns.fr. | - | - | - | - | - | - | - | - | - | - | + | - |
| Solanum nigrum L. | - | - | - | - | 1 | - | - | - | - | - | - | - |
| Rhinanthus-type | - | - | - | - | - | - | - | - | - | - | - | - |
| Euphrasia/Odontites-type | - | - | - | - | - | - | - | - | - | - | - | - |
| Labiatae indet. | - | - | - | - | - | - | - | - | - | - | - | - |
| Galium aparine L. | - | - | - | - | - | - | - | - | - | - | - | - |
| Valerianella sp. | - | - | - | - | - | - | - | - | - | - | - | - |
| Eleocharis palustris/uniglumis | - | - | - | - | 1 | - | - | - | - | - | - | - |
| Carex sp. (trigonous) | - | - | - | - | - | - | - | - | - | - | - | - |
| Bromus mollis/secalinus | 1+1cf | - | - | - | 1cf | - | - | 1 | - | - | - | - |
| Arrhenatherum elatius var bulbosum tu | - | - | - | - | - | - | - | - | - | - | - | - |
| Gramineae indet. | 2 | - | - | - | - | - | 1 | - | - | - | - | - |
| Buds | - | - | - | - | - | - | - | - | - | - | - | - |
| Thorns | - | - | - | - | - | - | - | - | - | - | - | - |
| Stem fragments | - | - | - | - | - | - | - | - | - | - | - | - |
| ?Root fragments | - | - | - | - | - | - | - | - | - | - | - | - |
| Charred vesicular porous material | - | - | - | - | - | - | - | - | - | - | - | - |
| Indeterminate seeds etc. | - | - | - | - | 2 | - | 2 | - | 1 | - | - | - |
| Sample volume (litres) | 11 | 10 | 8 | 6 | 12 | 7 | 6 | 7 | 7 | 8 | 5 | 6 |

Table 2 : ACS: Carbonised plant remains (Period 1a and 1a/b)

Unless otherwise indicated taxa are represented by fruits or seeds

Abbreviations: a - awn; ca - caryopsis; cn - culm node;
co - cotyledon; end - endocarp; fr - fragment;
gb - glume base; ns - nutshell, rn - rachis node;
s - seed; spb - spikelet base; spk - spikelet;
tu - tuber (swollen basal internode)

| Context No. | 28 | 163 | 453 | 454 | 479 | 626 | 651 | 651 | 802 | 818 | 845 | 847 | 849 | 851 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | 29 | 44 | 14 | 15 | 33 | 19 | 34 | 35 | 4 | 36 | 40 | 41 | 42 | 43 |
| Cereal indet. ca fr. | +++ | + | + | + | + | +++ | + | - | + | +++ | + | + | + | + |
| Cereal indet. ca | 43 | 3 | 5 | 1(g) | 12 | 36 | - | - | - | 73 | 1 | - | 2 | 2 |
| Cereal indet. spk fr | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Cereal/grass cn fr. | - | - | - | - | - | - | - | - | - | + | - | - | - | - |
| Triticum sp(p) ca | 56(g) | 2 | - | - | 8 | 16 | - | - | - | 96 | 2 | 2 | - | 2 |
| Triticum spelta L. gb | 8 | 1 | - | - | 2 | 1 | - | - | - | 4 | - | - | - | - |
| Triticum dicoccum Schubl. gb | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Triticum sp. gb. | - | 3 | - | 1fr | 6 | - | - | - | - | 2 | 1 | 1 | - | - |
| Triticum sp. spb | 2 | 1 | - | - | 3 | 1 | - | - | - | 1+1fr | - | - | - | - |
| Triticum aestivum s. l. rn | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hordeum vulgare L. emend Lam ca | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - |
| Hordeum sp. ca | - | 1cf | 1cf | - | - | - | - | - | - | - | - | - | - | - |
| Hordeum sp. rn | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Avena sp. ca | - | - | - | - | - | 1+2cf | - | - | - | - | - | - | - | - |
| Avena sp. a fr. | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Montia fontana L. subsp. chondrosperma | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - |
| Atriplex patula/hastata | - | - | - | - | - | - | - | - | - | 1 | - | - | 1 | - |
| Chenopodiaceae indet. | - | - | - | - | - | 1 | - | - | - | 1 | - | - | - | - |
| Medicago lupulina-type | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - |
| Vicia/Lathyrus spp. s | 3 | - | 2 | - | - | 1 | - | - | - | 2 | - | - | - | - |
| co | 11 | 1 | 6 | 3 | 11 | 2 | 3 | - | - | 4 | - | - | - | - |
| Lathyrus nissolia L. s | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - |
| co | 7 | - | - | - | - | 1 | - | - | - | 2 | - | - | - | - |
| Pisum-type co | - | - | - | - | - | - | - | - | - | 8+fr | - | - | - | - |
| Fragaria vesca L. | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Prunus spinosa L. end. fr. | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Polygonum convolvulus L. | - | - | - | - | - | - | - | - | - | 1+1fr | - | - | - | - |
| Rumex sp. | 1 | - | - | - | 1 | 1+1fr | - | - | - | 2 | - | - | 1 | - |
| Polygonaceae indet. | - | - | - | - | 1 | - | - | - | - | 1 | - | - | - | - |
| Corylus avellana L. ns.fr. | - | - | - | - | - | + | - | - | - | + | - | - | + | - |
| Solanum nigrum L. | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Rhinanthus-type | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - |
| Euphrasia/Odontites-type | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Labiatae indet. | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Galium aparine L. | 1 | - | - | fr | - | - | - | - | - | - | - | - | - | - |
| Valerianella sp. | - | - | - | - | - | - | - | - | - | 1cf | - | - | - | - |
| Eleocharis palustris/uniglumis | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - |
| Carex sp. (trigonous) | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Bromus mollis/secalinus | 3+fr | - | 1 | 1 | 1fr | 2fr | - | - | - | 2fr | - | - | - | - |
| Arrhenatherum elatius var bulbosum tu | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Gramineae indet. | 1 | - | - | - | 2 | - | - | - | - | 7 | - | - | - | - |
| Buds | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Thorns | - | - | - | - | - | - | - | + | - | + | - | - | - | - |
| Stem fragments | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| ?Root fragments | - | - | - | - | - | - | + | + | - | - | - | - | - | - |
| Charred vesicular porous material | - | - | - | - | - | + | - | - | - | - | - | - | - | - |
| Indeterminate seeds etc. | 1 | 1 | 3 | - | 2 | 1 | - | - | - | 1 | - | - | 2 | - |
| Sample volume (litres) | 10 | 10 | 7 | 3 | 10 | 10 | 11 | | 10 | 10 | 6 | 10 | 6 | 11 |

Table 2 (cont.) : ACS: Carbonised plant remains (Period 1b)

Unless otherwise indicated taxa are represented by fruits or seeds

Abbreviations: a - awn; ca - caryopsis; cn - culm node;
co - cotyledon; end - endocarp; fr - fragment;
g - includes germinated grains; gb - glume base;
ns - nutshell, rn - rachis node; s - seed;
spb - spikelet base; spk - spikelet;
tu - tuber (swollen basal internode)

| Context No. | | 388 | 411 | 431 | 736 | 806 | 808 | 1018 |
|---|---|---|---|---|---|---|---|---|
| Sample No. | | 31 | 32 | 38 | 45 | 6 | 7 | 28 |
| Cereal indet. | ca fr. | - | + | + | + | + | + | + |
| Cereal indet. | ca | 2 | 10 | - | 5 | 5 | 10 | 2 |
| Cereal indet. | spk fr | - | - | - | - | - | - | - |
| Cereal/grass | cn fr. | - | - | - | - | - | - | - |
| Triticum sp(p) | ca | - | 16 | - | 1 | 3 | 5 | - |
| Triticum spelta L. | gb | - | - | - | 2 | - | 1 | - |
| Triticum dicoccum Schubl. | gb | - | - | - | - | - | - | - |
| Triticum sp. | gb. | - | 3 | - | 2 | 1fr | 2fr | - |
| Triticum sp. | spb | - | 1 | - | 1 | - | - | - |
| Triticum aestivum s. l. | rn | - | - | - | - | - | - | - |
| Hordeum vulgare L. emend Lam | ca | - | - | - | - | - | - | - |
| Hordeum sp. | ca | - | - | - | - | - | - | - |
| Hordeum sp. | rn | - | - | 1 | - | - | - | - |
| Avena sp. | ca | - | - | - | - | - | - | - |
| Avena sp. | a fr. | - | + | - | - | - | - | - |
| Montia fontana L. subsp. chondrosperma | | - | - | - | - | - | - | - |
| Atriplex patula/hastata | | - | - | - | - | - | - | - |
| Chenopodiaceae indet. | | - | - | - | - | - | - | - |
| Medicago lupulina-type | | - | - | - | - | - | - | - |
| Vicia/Lathyrus spp. | s | - | - | - | - | - | - | 3 |
| | co | - | - | - | - | - | 1fr | 2+fr |
| Lathyrus nissolia L. | s | - | - | - | - | - | - | - |
| | co | 1 | - | - | 2 | - | - | - |
| Pisum-type | co | - | - | - | - | - | - | - |
| Fragaria vesca L. | | - | - | - | - | - | - | - |
| Prunus spinosa L. | end. fr. | - | - | - | - | - | - | - |
| Polygonum convolvulus L. | | - | - | - | - | - | - | - |
| Rumex sp. | | - | 1 | - | - | - | 1 | - |
| Polygonaceae indet. | | - | - | - | - | - | - | 1 |
| Corylus avellana L. | ns.fr. | + | + | - | - | + | - | - |
| Solanum nigrum L. | | - | - | - | - | - | - | - |
| Rhinanthus-type | | - | - | - | - | - | - | - |
| Euphrasia/Odontites-type | | - | - | - | - | - | - | 12cf |
| Labiatae indet. | | - | - | - | - | - | - | - |
| Galium aparine L. | | - | - | - | - | - | - | - |
| Valerianella sp. | | - | - | - | - | - | - | - |
| Eleocharis palustris/uniglumis | | - | - | - | - | - | - | - |
| Carex sp. (trigonous) | | - | - | - | - | - | - | - |
| Bromus mollis/secalinus | | 1 | - | - | 1fr | 2+2cf | - | - |
| Arrhenatherum elatius var bulbosum | tu | - | - | - | - | - | - | - |
| Gramineae indet. | | - | 1 | - | - | - | - | - |
| Buds | | - | - | - | - | + | - | - |
| Thorns | | - | - | - | - | - | - | - |
| Stem fragments | | - | - | - | - | - | - | - |
| ?Root fragments | | - | - | - | - | - | - | - |
| Charred vesicular porous material | | - | - | - | - | + | - | + |
| Indeterminate seeds etc. | | - | - | - | - | 1 | - | 2 |
| Sample volume (litres) | | 7 | 8 | 10 | 10 | 10 | 10 | 10 |

Table 2 (cont) : ACS: Carbonised plant remains (Period 1b/2)

Unless otherwise indicated taxa are represented by fruits or seeds

Abbreviations: a - awn; ca - caryopsis; cn - culm node;
co - cotyledon; end - endocarp; fr - fragment;

gb - glume base; ns - nutshell, rn - rachis node;
s - seed; spb - spikelet base; spk - spikelet;
tu - tuber (swollen basal internode)

| | Period 2 | | | | | Undated | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Context No. | 176 | 269 | 272 | 358 | 367 | 385 | 501 | 505 | 505 | 505 | 443 | 509 | 800 | 804 | 843 |
| Sample No. | 46 | 47 | 48 | 10 | 12 | 30 | 49 | 16 | 17 | 18 | 1 | 39 | 3 | 5 | 37 |
| Cereal indet. ca fr. | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Cereal indet. ca | 1 | 3 | 1 | 1 | - | 1 | 20 | 6 | 1 | 9 | - | - | 1 | 1 | - |
| Cereal indet. spk fr | - | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - |
| Cereal/grass cn fr. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Triticum sp(p) ca | 6 | 2 | - | - | - | 5 | 12 | 3 | - | 4 | - | - | - | - | 3 |
| Triticum spelta L. gb | 1 | 5 | 2 | 1 | - | - | 2 | - | - | 1 | - | - | - | - | - |
| Triticum dicoccum Schubl. gb | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Triticum sp. gb. | - | 7 | 1 | - | - | 1fr | 3 | - | - | - | - | - | - | - | 2 |
| Triticum sp. spb | 2 | 5 | - | - | - | - | - | - | - | - | - | - | - | - | 2 |
| Triticum sp. ri | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Triticum aestivum s. l. rn | - | - | - | - | - | - | - | - | - | - | - | 3 | - | - | - |
| Hordeum vulgare L. emend Lam ca | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hordeum sp. ca | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hordeum sp. rn | - | - | - | - | - | - | - | - | - | - | - | 2 | - | - | - |
| Avena sp. ca | - | 1cf | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Avena sp. a fr. | - | - | - | - | - | - | + | - | - | - | - | - | - | - | - |
| Montia fontana L. subsp. chondrosperma | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atriplex patula/hastata | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Chenopodiaceae indet. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Medicago lupulina-type | - | - | - | - | - | - | 1 | - | 1 | 1 | - | 1 | - | - | - |
| Vicia/Lathyrus spp. s | - | 1 | - | - | - | - | 4 | - | - | 1 | - | - | - | - | - |
| co | 3 | 3 | - | - | - | - | 8 | - | - | - | - | - | - | - | 1 |
| Lathyrus nissolia L. s | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - |
| co | 1+fr | - | - | - | - | - | 2 | - | - | - | - | - | - | - | 1 |
| Pisum-type co | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Fragaria vesca L. | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Prunus spinosa L. end. fr. | - | - | - | - | - | - | - | + | - | - | - | - | - | - | - |
| Polygonum convolvulus L. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Rumex sp. | 2 | - | 1 | - | - | - | 3 | - | - | 6 | - | - | - | - | 1 |
| Polygonaceae indet. | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - |
| Corylus avellana L. ns.fr. | ?+ | - | - | - | - | - | - | + | - | + | - | - | - | - | + |
| Solanum nigrum L. | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - |
| Rhinanthus-type | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Euphrasia/Odontites-type | - | - | - | - | - | - | 1cf | - | - | - | - | - | - | - | - |
| Labiatae indet. | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - |
| Galium aparine L. | - | - | - | - | - | 1 | 3 | - | - | - | - | - | - | - | - |
| Valerianella sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Eleocharis palustris/uniglumis | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Carex sp. (trigonous) | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - |
| Bromus mollis/secalinus | - | 1 | - | - | - | - | 2fr | - | - | - | - | - | - | 1fr | - |
| Arrhenatherum elatius var bulbosum tu | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Gramineae indet. | - | 3 | - | - | - | - | 2 | - | - | - | 1 | - | - | - | - |
| Buds | - | - | - | - | - | - | + | - | - | - | - | - | - | - | - |
| Thorns | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Stem fragments | - | - | - | - | - | - | + | - | - | - | - | + | - | - | - |
| ?Root fragments | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Charred vesicular porous material | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Indeterminate seeds etc. | - | 2 | - | 2 | - | 2 | 6 | 1 | - | 2 | - | 3 | - | - | - |
| Sample volume (litres) | 8 | 9 | 11 | 10 | 5 | 10 | 13 | 8 | 9 | 8 | 5 | 12 | 10 | 5 | 10 |

Table 2 (cont.) : ACS: Carbonised plant remains (Period 2) and undated

Unless otherwise indicated taxa are represented by fruits or seeds.

Abbreviations: a - awn; ca - caryopsis; cn - culm node;
co - cotyledon; end - endocarp; fr - fragment;
gb - glume base; ns - nutshell, rn - rachis node;
s - seed; spb - spikelet base; spk - spikelet;
tu - tuber (swollen basal internode)

Samples 1) (Context 363 - 8 litres) and 13 (371 - 6 litres) contained