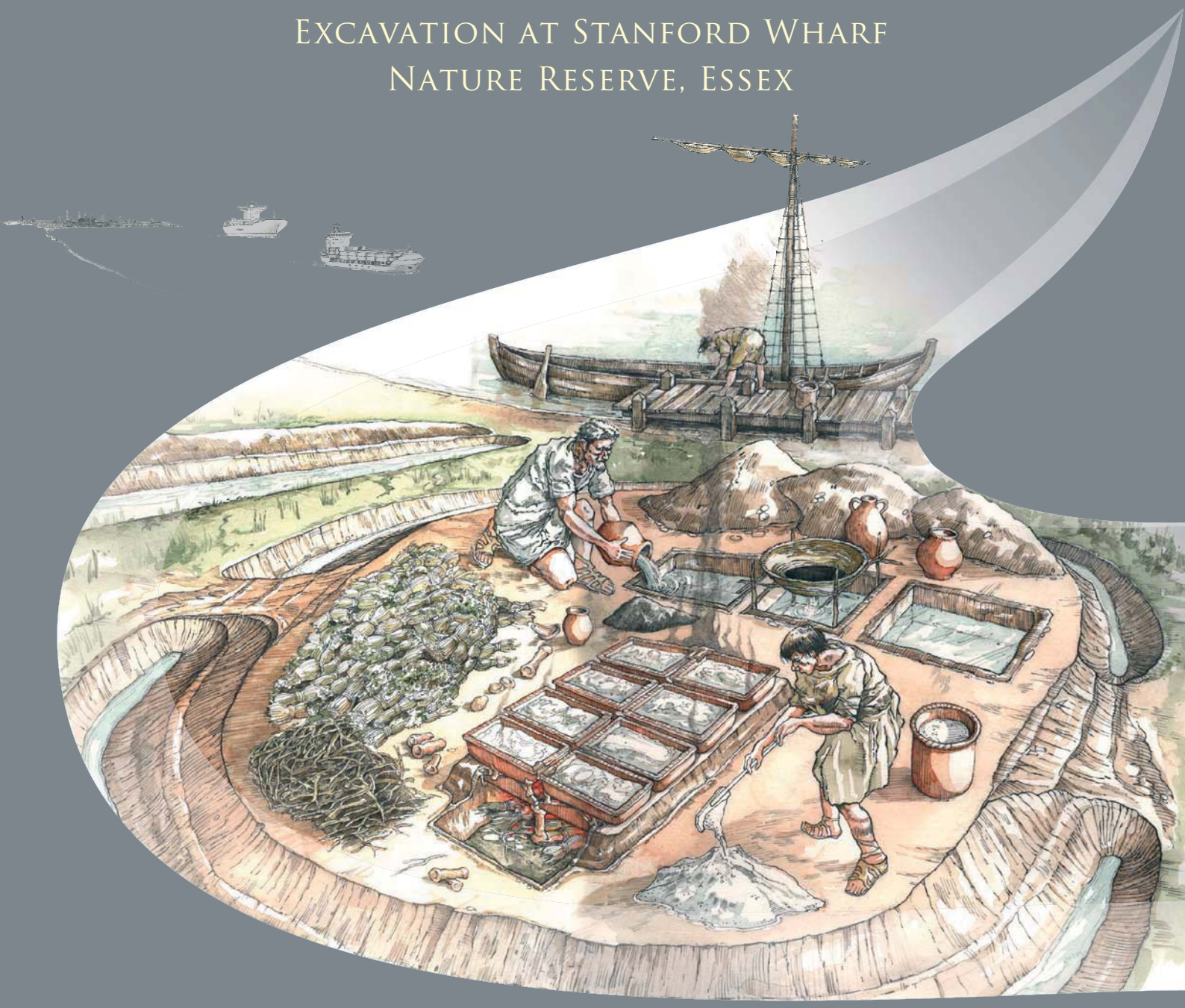
London Gateway

Iron Age and Roman Salt Making in the Thames Estuary

Excavation at Stanford Wharf Nature Reserve, Essex



Specialist Report 19

Plant Macrofossils

by Kath Hunter

Specialist Report 19
Plant Macrofossils

by Kath Hunter

Introduction

Following an assessment of 338 samples carried out by Wendy Smith (Smith 2010), 63 were selected for full analysis by author and from these the charred plant remains from 55 were extracted, recorded and analysed together with the anaerobically preserved (waterlogged) remains from eight samples. The plant remains are considered in relation to the changing landscape and environment at Stanford Wharf and to the use of plant remains in the activities being pursued at the site. In particular, it was hoped that the study of the charred plant remains would help to characterise the red hill deposits found across the site as well as to try to characterise how the use of plants in the salt-making process may have changed through the Iron Age and Roman periods. Additionally, a selection of ceramic fabrics including briquetage were also studied, since it was evident from impressions in the fabric that plants were used as temper. Finally, the plant assemblages recorded from this site are compared with other salt-making sites in eastern England and elsewhere in Europe.

Method

All the samples were processed by Oxford Archaeology using a flotation technique to separate the lighter material (flot) from the minerogenic portions of the soil sample. The flot and residue were recovered on a 250µm and 500µm meshes respectively. Charred plant remains seen while the residues were sorted by eye were retained and included with the material extracted from the flots. The extraction of some of the identifiable charred plant remains was carried out by Julia Meen, Sharon Cook and Laura Strafford under the supervision of the author. The remaining samples, including those containing waterlogged, mineralised and silicified plant remains, were extracted by the author, who is responsible for all the identifications.

The flots from each sample were examined using either a Leica XXEZ4D, a Prior or a MTL10 stereo microscope, and any identifiable plant remains were extracted and recorded. The identification of the plant macrofossils was carried out in

comparison with modern reference material and standard reference texts (Jacomet 2010; Beijerinck 1947; Schoch *et al.* 1988; Berggren 1981; Cappers *et al.* 2006; Ross-Craig 1969). The nomenclature for the identification of the plant remains follows Stace (2010). The term seed in this text may refer to achene, nutlet etc.

Notes on preservation and identification

The majority of the material examined from the site is charred, with silicified remains also associated with the fuel samples. Some of the cereals found may also represent remnants of ceramic temper. Seeds such as arrow sea grass (*Triglochin maritima*) are extremely fragile when charred, as are rush seed heads (*Juncus* sp.), and are probably under represented in many samples as they may well have been broken up by the excavation and the sieving process. The quality of waterlogged preservation varied across the samples, with the contents of the ceramic vessel in quarry pit 1249 clearly providing a more efficient preservation environment than others samples.

It should be noted that the identification of charred cereal grains to genus purely on their morphological characteristics could be problematic. Jones (1987) and Jacomet (2010) both highlight the variation and similarities of characteristics of cereal grains from different genera. Jones particularly highlights the similarity in shape of charred free threshing and glume wheat grains. The presence of more diagnostic chaff fragments may suggest the occurrence of a particular type of wheat (*Triticum* sp.), barley (*Hordeum* sp.) or oat (*Avena* sp.), but unless the chaff is still attached to the grain it would be unwise to use the presence of one to confirm the identity of the other. For this reason the wheat grains have only tentatively been assigned to genus where the preservation is of sufficient quality. The exception to this is where grains have been attributed to a free threshing wheat due to their rounded shape. Where the wheat chaff has retained sufficient diagnostic characteristics, it has been possible to suggest an identity to species, eg spelt (*T spelta*) and wild or domesticated oat (*A fatua*, *A sativa*). Some items such as oat awn fragments and monocotyledonous leaf/stem fragments were not counted, but a relative abundance was recorded, as an actual count would be difficult to relate to individual plants. Loose rush seeds and poorly preserved items of wheat chaff were counted but not extracted from the flots as it was not possible to take their identification to a higher level. The term monocotyledonous leaf/stem fragments is used throughout this report. It should be

noted that some of this material could have been derived from dicotyledonous plants such thrift (*Armeria maritima*), whose leaves form tubular bracts.

The identification of charred sedge nutlets (*Carex* sp.) is often problematic as the features needed to separate them is often not preserved; therefore the nutlets have only been separated into two- and three-sided types. Fat hen (*Chenopodium album*) and orache (*Atriplex* sp.) type seeds often look modern even when charred, which would make it necessary to break them open to see if they are charred. This type of seed is commonly found growing in coastal environments and the seed coats are very robust so there is a high risk of contamination. Therefore, they were excluded from the count unless they were obviously charred.

With charred grass caryopses (seeds), it is difficult to see diagnostic features. Two grasses have been tentatively identified as crested dog tail (*Cynosurus cristatus*) and rye grass type (*Lolium* sp.). From the morphology of the rest of the grass seeds it was possible to say that there were several more types represented, but for this project they have been assigned as Poaceae. Plants such as henbane (*Hyoscyamus niger*) and fat hen are commonly found on inland archaeological sites associated with the nitrogen rich deposits which are a feature of human occupation. However, they also occur naturally in coastal habitats, and this needs to be borne in mind when interpreting their presence in samples from this site.

The identification of charred rhizomes is problematic, requiring the use of scanning electron microscopy, and it may only be possible to identify the remains to family. Therefore it was not attempted for this assemblage. Where seeds or other plant remains have no identifiable characteristics remaining they have been assigned to indeterminate (indet.). This category may also contain seeds that further research might help to identify.

Results

Charred plant remains: Area A (Tables 19.1-3, 19.5-8 and 19.10)

Early prehistoric

Two of the samples, from contexts 1672 and 1909 (sedimentary unit G3), contained rare charred cereal remains, including a glume base from a glume wheat (emmer: *Triticum dicoccum* or spelt: *T spelta*). This unit has been dated to the Mesolithic by an

OSL date of 9550-6150 BC (9.8 ± 1.7ka; GL09089) and to the middle Neolithic by radiocarbon dating of charcoal from its surface (3520-3340 cal. BC, 95.4%; 4619 ± 32 BP: OxA-22432), which suggest that the deposits may be contaminated with material from a later period. The remaining sample 1067, from context 1554, contained hazelnut shell fragments along with charcoal.

Sedimentary unit G5 represents marine inundations dating from the later Bronze Age through to the post-Roman period. Three flots were recorded from this unit, including samples 1211 (5433), 1284 (5985) and 1292 (5985). The flot from sample 1211 consisted of fuel ash slag mixed with charred monocotyledonous stem/leaf fragments. It contained no identifiable cereal remains. The relatively large number of Poaceae caryopses (grass type) fragments were unfortunately not possible to identify beyond family level. Together with these frequent monocotyledonous leaf/stem fragments there were frequent rush seeds but no seed capsules. Sea lavender (*Limonium* sp.) and sea plantain (*Plantago maritima*) seeds were also present, but no seed capsules.

The flots from samples 1284 (5985) and 1292 (5985) were very similar to that from 1211, but both contained occasional wheat chaff, with spelt identified in 1284. The samples again contain a small number of sea lavender seeds, and rush without seed capsules are present in relatively large numbers. Both samples contain a few sedge nutlets. All samples contain a few grass caryopses. All three samples have produced assemblages that are similar to the "fuel" samples from elsewhere on the site characterised as red hill and redeposited red hill deposits.

Middle Iron Age

Red Hill 6717: Samples 1064 (1590), 1019 (1233), 1022 (1339) and 1372 (6027).

Sample 1064 has moderate quantities of cereal remains consisting mainly of wheat chaff fragments. Two possible emmer glume base fragments with spelt make up the rest of the identifiable remains. There was one wheat grain and two oat grains among the 37 cereal grain fragments from sample 1019. There were also four possible emmer glume base fragments along with 10 spelt type spikelets. This sample also includes abundant monocotyledonous leaf/stem fragments, together with only a few sea lavender and sea plantain seeds and a single stinking chamomile achene.

Cereal remains are absent from sample 1372, which is described as a dumped deposit of greenish clay and briquetage. Saltmarsh taxa are present and include sea

lavender (*Limonium* sp.), sea thrift and rush (*Juncus* sp.) seeds; the latter are represented by seeds only (without seed capsules) and are relatively frequent. A few grass caryopses are present including a single possible example of rye grass (cf. *Lolium* sp.).

Sample 1022 differs from the preceding three samples. It contains more cereal remains, notably grain fragments and wheat chaff, as well as weeds of crop. Six of the glume bases appear to be of an emmer type and 34 of spelt type. There are also 16 spelt spikelet forks and a single oat floret base, but the last is not well enough preserved to take the identification further. A single shell fragment from hawthorn is also present. Wild seeds include cleavers (*Galium aparine*), stinking chamomile (*Athemis cotula*) and scentless mayweed (*Tripleurospermum inodorum*), along with four possible rye grass caryopses. Possibly the most notable feature of this red hill deposit when compared with the other two is the lack of fuel ash slag, monocotyledonous leaf/stem fragments and seeds of saltmarsh plants. Taken together this might suggest that this context is not in fact a typical middle Iron Age red hill deposit.

Deposits overlain by red hill 6717: Samples 1373 (6028) and 1153 (6038).

Sample 1373 has a moderately rich assemblage of wheat grain with oat and possible barley also present; chaff is relatively scarce but includes spelt and possible emmer glume bases. There are abundant cereal/grass type stem fragments, occasional culm nodes and 46 grass caryopses. The sample contains frequent monocotyledonous leaf/stem fragments with fuel ash slag. Along with 30 scentless mayweed seeds there are dock (*Rumex* sp.), goosefoot types (Chenopodiaceae) and sea lavender. There are also single nuts of floating club rush (*Eleogiton fluitans*) and possibly Hare's tail cotton grass (cf. *Eriophorum vaginatum*). Sample 1153 also includes occasional monocotyledonous leaf/stem fragments, as well as grains and chaff from glume wheat, in particular spelt, although five possible emmer glume base fragments and four indeterminate barley rachis fragments have also been identified. Sample 1153 also contains various legume seeds, including a single garden pea (*Pisum sativum*) and a large legume fragment in addition to a possible hawthorn (*Crataegus monogyna*) stone, selfheal nutlets (*Prunella vulgaris*), dock (*Rumex* sp.) and black bindweed (*Fallopia convolvulus*) seeds.

Red hill 9504: Samples 1117 (1745), 1119 (1875) and 1322

Samples 1117 and 1119 include a few cereal (including wheat) grains, and sample 1322 in particular includes moderate quantities of cereal chaff (particularly from spelt). This last sample also includes a single free-threshing wheat rachis fragment, oat grains and a single floret from what is probably wild oat. As in the earlier samples, a few seeds from sea lavender and sea plantain are present in all samples, while sedge nutlets occur only in 1117. Rush seeds (*Juncus* sp.) without seed capsules are present in relatively large numbers; a single seed capsule was recorded in 1322. All three samples include a few grass caryopses with single examples of possible rye grass capyopsis in 1117. Sample 1119 includes three lesser sea spurry (*Spergularia marina*) seeds, and the same number of possible glasswort achenes (cf. *Salicornia* sp.), a plant also possibly represented in sample 1322. Indeterminate charred rhyzome fragments are relatively abundant in sample 1322.

Middle Iron Age layer associated with red hill 9504: Sample 1213 (5538)

Wheat, possible oat and barley grains are present in this sample. The chaff is mainly spelt with one possible emmer spikelet fork. Well-preserved barley rachides appear to be of a lax six-row type. Detached cereal embryos and colyoptile fragments are also present. Non-cultivated plants are represented by small numbers of seeds from dock, fat hen and black bindweed, while saltmarsh taxa include sea lavender grass and rush (a single seed). Occasional monocotyledonous leaf/stem fragments were also observed.

Redeposited red hill: Sample1337 (6255)

All of the identifiable cereal grains are wheat or possible wheat, but a single barley rachis and oat florets are also present. The rest of the chaff is glume wheat type with two glume base fragments being possibly spelt. As sample 1119 (above) the sample includes abundant monocotyledonous leaf/stem fragments, and this sample also includes over 500 rush seeds As above, grasses are present in relatively small numbers as also are seeds of sea lavender.

Iron Age

Sample 1210, layer 5434

This sample contained what appears to be modern cereal remains in this sample, but no charred cereal remains. However, it includes abundant monocotyledonous leaf/stem fragments, with fuel ash slag and ashy plant impressions. The seeds include 500+ rush seeds with one seed head and more than 300 sedge type seeds.

Middle Iron Age to Mid/late Roman

Redeposited red hill 1384: Samples 1012 (1264), 1144 (5024), 1147 (5026) and 1139 (5005)

Out of the seven grain fragments present in sample 1012, only one was possibly from wheat. A single glume base is a spelt type, while the remaining two are indeterminate. Also present in this sample are three sea lavender seeds, 22 rush seeds and six monocotyledonous leaf/stem fragments in addition to two poorly preserved sea plantain like seeds. Fuel ash slag was common in this sample flot.

Sample 1147 is also poor in cereal grain; one grain fragment and a single wheat glume base fragment are the only remains identified. There are again occasional to frequent fuel ash slag, with relatively small amounts of monocotyledonous leaf/stem fragments and rush seeds, but no seed capsules. Salt marsh plants include sea plantain and two sea lavender, although both are represented by a very few seeds.

Sample 1144 (5024) contained no cereal grains and only five spelt glume bases and spikelet fragments. Rare monocotyledonous leaf/stem fragments are also present and, as above, fuel ash is frequent. Saltmarsh taxa are represented by 18 rush seeds (no seed capsules) with no other saltmarsh plants present.

Sample 1139, like the others in this group, is also poor in cereal remains; in fact none were identified. Occasional monocotyledonous leaf/stem fragments are present, and again fuel ash slag nodules are common together with over 150 rush seeds, but no seed capsules. The only other plant represented is sea lavender, by four seeds.

Late Roman

Sample 1345, layer 6099, probably representing the fill of a hearth

Barley is the dominant cereal grain in this sample, with possible side grains and well

preserved barley rachis, suggesting the presence of a six-row hulled type. Spelt dominates the glume wheat chaff, but there are also two emmer spikelets. There is a single fragment of a large legume possibly pea or broad bean type, a single fruit stone fragment which appears to be of a black thorn (*Prunus spinosa*) type, and 12 fragments of hazel nutshell. Black bindweed, stinking chamomile, scentless mayweed, docks and fat hen seeds are also present or common. Rush seeds, including a single seed head, and sea plantain are the only typically saltmarsh remains.

Late Roman Phase 1 (LR1)

Fill of ditch 5476: Sample 1222 (5477)

Only four grain fragments represent cereals in this sample. The sample is dominated by salt marsh plant remains with frequent monocotyledonous stems/leaf fragments. Sea lavender and sea plantain are present in moderate amounts. There are a lot of rush seeds but only two seed capsules. There is a single possible glasswort achene.

Posthole of fenceline 9502 within square enclosure 9506: Sample 1070 [1681]

Sample 1070 (1681) includes wheat and oat grains with spelt chaff. Arable weeds include scentless mayweed and stinking chamomile; saltmarsh plants include sea lavender, thrift type and a few rush seeds. No cereal remains are present in sample 1193 (5374), but there are occasional monocotyledonous leaf/stem fragments with more than 500 rush seeds and one seed each of sea plantain and scentless mayweed. Sample 1113 (1784) contains very few cereals remains, all of which are poorly preserved. A few grains could possibly be of a wheat or barley type. The only chaff consists of three wheat glume bases. There are, however, over 300 rush seeds, together with a few of sea plantain and grass seeds and individual seeds of sea lavender and vetch. A few monocotyledonous leaf/stem fragments are also present.

Enclosure ditch 9506, samples 1126 (1942) [1941] and1 277(5872) [5621]

Sample 1277 contains exceptionally well preserved cereal remains, which consist of what appear to be the remains of complete or near complete ears of spelt, together with with straw. These include articulated rachis nodes with glumes still persisting, some containing mature grains as well as grains which looked immature, but were probably instead stressed during development, perhaps as a result of growing in a

marginal situation (Mark Robinson and Rachel Ballantyne pers. comm.). A number of primary rachis nodes with and without sterile spikelets are also present, together with examples of double-grained and single grained spikelets; in the latter the second grain either did not exist or failed to develop. The single grained spikelets probably came from higher up the ear, possibly near to the top. The preservation of the spikelets is so good that hairs on the grain have survived. Complete detached glumes, which still retain the glume beak, and wheat awn fragments are also present, as are a large number of charred and silicified lemna and palea fragments. Of the 126 loose wheat grains, 11 show evidence of sprouting, and there are also at least eight detached coleoptiles (sprouts). A number of straw nodes and internode fragments are also present. There are also what appear to be immature wild oat florets, some still containing grain, as well as over 200 loose grains, three of which have sprouted. By contrast, barley is only represented by a few rachis fragments of a six-row type. Twenty-two achenes of stinking chamomile, along with a nutlet each of madder (*Rubia peregrina*) and lady's bedstraw (*Galium verum*), sow thistle (*Sonchus* sp.), hawks beard (*Crepis* sp.) and scentless mayweed were also present. The sample also produced a single fern/bracken type frond tip.

Spread, probably associated with enclosure 9506: Sample 1208 (5536)
Together with hazel nutshell fragments, there are several shell fragments of what appear to be walnut (*Juglans regia*). This may be an example of an exotic food source or a potential component for domestic ritual practice (Robinson 2002). The sample also includes wheat grains with some possible barley and oat mixed with spelt chaff. Other seeds present include legumes and stinking mayweed, which may suggest weed contaminants or fodder crops. A possible club sea-rush nutlet was also identified.

Late Roman Phase 2

Rake-out from tile-built hearth 6061: Sample1353 (6057)
This sample produced only two wheat and eight oat-type (*Avena/Bromus*) grains. Where the wheat chaff could be identified further, all is from spelt. There are also a couple of oat awn fragments, but no barley chaff. Other seeds include various vetch type, with dock, lesser stitchwort, ribwort plantain, cleavers, sedge and a single stinking chamomile achene also present. No salt marsh species have been noted.

Pottery rich deposit: Sample 1111 (1531)

This deposit includes glume wheat type grains, including one sprouted example, together with a few barley and oat grains. The wheat chaff, where identifiable, is from spelt. The barley is too poorly preserved to take the identification beyond genus level. Legume seeds, black bindweed, dock field madder and stinking chamomile are all present together with a few sea lavender, sea plantain, rush, Spike-rush (*Eleocharis* sp.) and grass seeds.

Dumping at the western edge of 5989 (associated with saltern 6090): Sample 1297 (6052)

The identifiable cereal grains appear to be of wheat, with possible oat/brome and a single wild oat floret. The majority of the chaff is glume wheat type, with some identified as spelt. The few weed seeds include stinking chamomile, and rush, possible rye grass and lady's bedstraw (*Galium verum*) are also present.

Fill of settling tank 1316: Sample 1233 (1331)

This sample includes a reasonable quantity of cereal remains. However, much is not further identifiable. One of the only two grains of wheat appears to have been damaged by insect activity. The wheat chaff is of glume wheat type. There is only one identifiable oat grain. A single achene of creeping thistle type was recovered and there are over thousand grass caryopses. However, the majority of the remains in this sample are from salt marsh plants, with abundant monocotyledonous stem/leaf fragments, over 1000 rush seeds with 48 seed capsules, many sea plantain seeds and capsules and a relatively low number of sea lavender seeds. Twenty seeds of lesser sea spurry are also present, while sea milkwort and sea arrow grass are represented by one example each.

Deposit within hollow 1408, part of circular building 5760: Sample 1030 (1375)

Sample 1030 contains a relatively small amount of wheat with one barley and a few oat grains. Spelt and barley chaff is also present in small quantities. Unidentifiable legumes were present along with dock (*Rumex*) nutlets.

Rake-out deposits within circular building 5760: Samples 1096 (1643); 1060 (1567);

1029 (1374); 1037 (1437); 1159 (5042)

Sample 1037 differs from the other rake out samples in this group in that it produced a large number of cultivated pea seeds and numerous large legumes and legume fragments. The majority of the wheat grains from this sample appeared to be of a free threshing type. All the samples contain wheat grain and chaff, which is spelt type where identifiable. Sample 1060 contains a relatively large number of oat pedicel fragments. The nutlets of *Galium uliginosum* (fen bedstraw) in sample 1096 come from a plant which prefers base rich marshy places. The sample also contains one seed of ribwort plantain (*Plantago lanceolata*), often found in meadows and short trampled grassland. Sample 1159 contains a mixture of a few cereals, mainly wheat with oat with a few monocotyledonous fragments, thrift seeds (Fig. 19.1), sea lavender, and sea plantain. A nutlet of self heal is the only example of a grassland/woodland species.

In situ burnt layer within building 5760: Sample 1097 (1568)

Cereal remains in this sample include 11 oat grains and five wheat grains, one of which has a compact rounded shaped that might suggest that it is of a free threshing type. The majority of chaff is from wheat, although there are also several barley rachises. A few seeds of arable and or grassy places such as field madder (*Sherardia arvensis*), selfheal and stinking chamomile are present, as well as relatively small quantities of grass and rush seeds.

Posthole or small pit 5235 within building 5760: Sample 1178 (5234)

Cereals are represented only by a few wheat and barley grains, together with spelt chaff, barley rachis and an indeterminate wild or cultivated oat floret base. However, salt marsh taxa were abundant: over 1000 rush seeds, over 200 sea plantain, 164 sea lavender and 155 sea thrift seeds were recorded. Occasional monocotyledonous stem/leaf fragments and 68 grass caryopses are also present.

Occupation layer within building 5760: Sample 1156 (5039)

Cereal grains are sparse, comprising ten wheat grains and one possible barley grain; spelt is dominant in the chaff. Moderate numbers of grass seeds and a few seeds from blinks, dock, stinking chamomile, rush and sea lavender seeds are present. A single rose type spine was noted.

Layer south of saltern 6090: Sample 1166 (3154)

This sample contains wheat and oat with some barley grains, together with spelt chaff and a single well-preserved barley rachis that appears to be from a hulled six row type. Seeds of lesser spearwort (*Ranunculus flammula*) and blinks (*Montia fontana* ssp. *fontana*) indicate a damp environment, while single seeds of lesser stitchwort (*Stellaria graminea*) and eyebright/bartsia (*Euphrasia/odontities*) are from plants more typically found in a grassy habitat. Salt marsh plants include sea lavender and possible glasswort. Only two rush seed capsules with a few loose seeds are present in this sample. One of the capsules appears to be *Juncus maritimus* (sea rush).

Gully 5245, part of saltern 6090: Sample 1282 (5388)

A small number of wheat grains with a single possible oat were present. All identified chaff was from spelt wheat, with three indeterminate barley rachis fragments also identified. Weed seeds include a mallow (*Malva* sp.) nutlet with dock and stinking chamomile.

Ditch 5191, part of saltern 6513/8515/8516: Samples 1163 (1536) and 1170 (1536)

Wheat, barley and oat/brome grain are present in relatively small numbers in sample 1163, but the assemblage is dominated by spelt chaff, with one possible emmer glume base and barley rachis fragments also present. A small number of vetch seeds, a single cleavers nutlet and stinking chamomile achene are the only other remains identified.

The cereal grains from sample 1170 are poorly preserved and have tentatively been identified as possibly wheat with a number of small oat or brome seeds and possible barley. A possible emmer glume base with a small amount of spelt chaff was noted. A single nutlet of cleavers and one stinking chamomile achene are the only weed seeds recorded. No mineralised remains were noted from this sample, although the context description suggested faecal input.

Outer ditch (1112) of roundhouse 9501: Samples 1215 (5566) [5510]; 1192 (5429) [5427]

Sample 1215 includes a few wheat grains, as well as possible oat or brome seeds. The glume wheat chaff was spelt where identifiable. Sea lavender and sea plantain seeds were present in small quantities as well as moderate amount of rush seeds, but not

seed capsules. Self heal, stinking chamomile and scentless mayweed are present in small numbers, along with 33 grass caryopses. Ditch terminus sample 1192 has one possible free threshing wheat grain out of the 43 identified this sample. The sample also produced also produced 20 detached cereal embryos and two detached coleoptiles, which may suggest evidence for the early stages of deliberate or accidental germination. Twenty-eight oat grains and four possible barley grains are also present. As with sample 1215, there are relatively large numbers of wheat chaff fragments, which include one possible emmer spikelet fork, while the rest of the identifiable chaff is of spelt type. Sample 1192 contains relatively large numbers of the salt marsh seeds, including sea arrow grass and sea thrift. There are also a moderate amount of stinking chamomile seeds, probably associated with the cereal remains as a weed of crop. The rush seeds and seed capsules in sample 1192 are the better preserved and. there were also more monocotyledonous stem/leaf fragments in sample 1192 than in 1215.

Pit 5368: Sample 1189 (5364)

The sample includes a relatively small quantity of cereal grains and chaff, comprising wheat, barley and oat grain with possibly an emmer spikelet and a spelt glume base. The rest of the wheat chaff is of glume wheat type. Arable/grassland weed seeds include *Aphanes* sp. (parsley-pierts type) and stinking chamomile. Two sea plantain seeds, 136 rush seeds and frequent monocotyledonous stem/leaf fragments are also present.

Posthole 1889 in between outer ditch and inner gully of roundhouse 9501: Sample 1121 (1890)

The cereals from this sample are fairly poorly preserved so identification is tentative; with the exception of one oat grain. There is a single example each of emmer type spikelet and glume base along side 114 indeterminate glume wheat chaff fragments. A single scentless mayweed seed, two sea plantain seeds and 16 rush seeds are also present.

Waterlogged Plant Remains: Area A (Table 19.11)

Late Bronze Age

Peat under alluvium (G39a), sequence 8: Sample 1137 (1915)

This is a sample of relatively poorly preserved peat, much of it consisting of partially humified monocotyledonous leaf and stem fragment. A few seeds of wet habitats including water crowfoot (*Ranunculus* subgen. Batrachium), water mint (*Mentha aquatica*), sedges and common spike rush have also been identified.

Late Roman Phase 1

Quarry pit 1249, fills and pot contents: Samples 1357 (1248); 1368 (1252); 1377 (6584)

All three samples from this pit fill include relatively well-preserved plant remains. Each sample contains similar species, but the contents of the pot (sample 1377) are significantly better preserved and include what is possibly cereal bran, grass type stems and leaves (pers.com Wendy Carruthers and Kate Giffiths)along with a possible fumitory flower(cf.*Fumaria* sp),. Small amounts of waterlogged and charred wheat chaff were both present. Potential arable/grass land weeds include stinking chamomile, ox-eye daisy (*Leucanthemum vulgare*), swine cress (*Lepidium coronopus*), small nettle (*Urtica urens*), common fumitory (*Fumaria muralis*), mallow, knotweed and dock. Sea arrow grass, sea-milkwort (*Glaux maritima*) are plants found on salt-splashed grassland, while wild celery (*Apium graveolens*) is found in brackish conditions.

Coriander (*Coriandrum sativum*) seeds occur (Fig. 19.2) in all three samples. Various fruit stones including domestic plum (*Prunus domestica* ssp. domestica), black thorn, and wild cherry (*Prunus avium*) are also present, along with apple (*Malus pumila*), brambles (*Rubus* sp.) and rose (*Rosa* sp.). A single possible fig (*Ficus carica*) seed was found in sample 1377. Yellow horned poppy (*Glaucium flavum*) and henbane are indicative of a shingle beach environment.

Late Roman Phase 2

Dump of waste material associated with circular building 5760: Sample 1238 (5660)

The waterlogged flot from this dumped deposit includes weeds of dryland and arable, including common ramping-fumitory, creeping thistle, field penny-cress and stinking

chamomile. Sea-milkwort, a salt tolerant plant, is also present.

Charred plant remains: Area B (Table 19.4)

Early Roman

Ditch 4844: Samples 4038 (4618) and 4098 (4755)

There are no cereal remains in sample 4038. However, there are abundant monocotyledonous leaf/stem fragments, as well as salt marsh seeds, including sea lavender, sea plantain, sea-milkwort and over 100 rush seeds with sea rush seed capsules

Sample 4098 contains a very small quantity of cereal, with only three oat grains that were preserved well enough to be identified. There were, however, abundant monocotyledonous leaf/stem fragments with numerous rush seed heads, sea plantain, sea lavender and over 200 grass seeds. Lady's bedstraw and slender hare's ear (*Bulpleurum tenuissiimum*) are both plants of maritime habitats, as is the possible glasswort.

Ditch 4845: Sample 4036 (4599)

Frequent monocotyledonous leaf/stem fragments characterise this sample, with seeds from maritime plants: sea lavender, sea-milkwort, glasswort, sea plantain and rush, together with a single grain fragment (the only cereal present).

Late Roman

Deposit north of kiln 4227, rake-out hollow 4229, group 4224: Sample 4014 (4230)

This sample includes a relatively large number of cereal remains with free threshing wheat type grains, six row barley grains and oat. There were two emmer type glume bases and spelt and six-row barley rachides. There are also large numbers of indeterminate wheat grain and glume wheat chaff fragments and barley rachis fragments. There are also many legume seeds as well as wild radish (*Raphanus raphanistrum*) mericarp fragments that may have been retained with the cereal grains during processing. Lesser stitchwort, ribwort plantain, selfheal, stinking chamomile are all weeds of arable or grassland habitats. Salt marsh seeds include sea plantain

seeds and capsules, two rush seeds and one sea-milkwort seed. Monocotyledonous leaf/stem fragments are rare.

Ditch 4061, saltern 6711: Sample 4001 (4069)
A single oat grain with indeterminate grain fragments and two free threshing type rachis fragments are the only cereal remains present. Arable weeds, including stinking chamomile and scentless mayweed, are also present. Occasional monocotyledonous leaf/stem fragments are present and there are some seeds from salt marsh flora including sea lavender and sea plantain. There were no rush seed heads or loose rush seeds.

Settling tank fill 4336: Samples 4009 (4329); 4010 (4331); 4096 (4721)
The only cereal remain recovered from from the tank samples is a single spelt type glume base from sample 4009. Most of the seeds from all three samples appear to be of salt marsh types, with sea lavender, sea plantain, sea-milkwort and rush present. At least one sea rush seed capsule is present (from sample 4096) and there are also relatively large numbers of grass seeds. Sample 4096 includes frequent monocotyledonous leaf/stem fragments and abundant fuel ash slag, but sample 4009 contains very little of both.

Layer within late Roman ditch 4415: Sample 4035 (4441)
Wheat, barley and oat grains are relatively frequent in this sample, together with spelt chaff. Four of the grains and ten rachis fragments appear to be of a free threshing type. Barley chaff includes evidence for a six row and a two row types. There were also possible rye (*Secale cereale*) rachis fragments. Stinking chamomile, scentless mayweed and possible long headed poppy (*Papaver* cf. dubium) are all arable weeds. Sea lavender, lesser sea spurry, sea plantain, sea arrow grass and sea aster (*Aster tripolium*) are salt marsh maritime plants. The rush seed heads from this sample were particularly well preserved and salt marsh rush (*Juncus gerardii*) and sea rush (*Juncus maritimus*) are both represented. There are also frequent monocotyledonous leaf/stem fragments.

Plant remains used in briquetage temper

Generally the quantity and type of plant remains from briquetage appears to vary through time. The early examples, dating from the Iron Age, are made with a grassy temper, while both grass type temper and cereal chaff are used in later periods. The amount of chaff temper appears to increase through the Roman period. Most of the chaff-tempered fabrics contain examples of glume wheat with both spelt and emmer identified (Fig. 19.3). There is also possible oat chaff in one case. There is, however, no evidence that the salt marsh species which are seen in the 'fuel' samples were used in the temper for the ceramics examined, which may suggest that the small fragments of ceramic material with monocotyledonous leaf/stem impressions may derive from other plants present during the burning of the fuel. It should be noted though that this study was carried out on a relatively small set of ceramic types. A more in depth study of the changes in temper use through time would make a useful future project.

Discussion

The charred and waterlogged plant assemblages recovered from Stanford Wharf Nature Reserve are, in general, extremely well preserved; in addition to cereals and arable weeds, charred wild taxa such as rushes, grasses, sea lavender, sea plantain and other maritime taxa are common. This has provided an opportunity to investigate not only the local environment over time but also the possible uses of plants as fuel and or a raw material for the Iron Age and Roman salt-making industry.

Several distinct vegetation zones are indicated by the assemblages. The charred assemblage includes seeds and other plant remains from arable fields, grassland or pasture, waste ground, salt marsh, peaty bog and shingle beach. While a much small number of waterlogged samples were analysed, the remains include plants of beaches, arable, grassland, hedgerow, orchard and possibly kitchen garden. The possibility of imported plant remains may also be hinted at by fig and walnut remains.

During the analysis it had been hoped to investigate the changing salt marsh environment through time by reconstructing past habitats using the recovered salt marsh flora to compare with that found in modern habitat zones. Unfortunately, however, the lack of identifiable grasses from the samples mean that it proved difficult to characterise the archaeological assemblage using modern criteria. Another potential issue is that some kind of plant remains may have been lost, either through the original charring process or from subsequent taphonomic processes. Furthermore,

fuel plants could be gathered from different several vegetation zones, and these can occur in quite close proximity to each other. The construction of a sea wall and changes in the climate over the centuries will also have affected the vegetation response in the local area. That apart, many of the salt marsh plants identified in the samples are plants that survive today in areas near to the site (Rodwell 2001).

When reconstructing the plant assemblage it should also be remembered that the site would have been a centre of activity into which a wide variety of plant remains would have been brought, potentially by a number of vectors, including accidental and deliberate human activities such as fuel gathering or the transportation of fodder/raw materials for processes conducted on site. Food plants either for immediate consumption or to be processed in some way would also have been brought on to the site, and the evidence suggests that some exotic plants, possibly intended for ritual use, were lost or discarded there. Non human vectors may also be at work; for example cleavers are a plant that is completely covered in both spines or hooks which are designed to allow the plant to scramble up though other vegetation and for the seeds to disperse by attaching on to animal fur or clothing. The seeds are therefore easily carried well away from the source. For a site such as this, situated close to the estuary and subject to flooding, plant material could potentially be deposited in floodwaters. Repeated episodes of marine inundation might bring in plant debris and some of this could then have been incorporated into the archaeological assemblage.

Charred plant remains

"Fuel" samples

The "fuel" samples are characterised by the presence of what appear to be monocotyledonous stem or leaf fragments mixed with globules of glassy fuel ash slag, often containing fragments of charcoal and red fired-clay-like material, much of which retains the impression of monocotyledonous stem and/or leaf fragments similar to the charred examples (Figs 19.4 and 19.5). The leaf/stem fragments are often oval to round in cross section. No triangular sections were noted that would suggest the presence of sedges (*Carex* sp.), which have been represented in some samples as charred nutlets. The presence of cross sections of sea rush leaves preserved in soil micromorphology samples (Fig. 19.6) (Macphail *et al.*, specialist report 24), coupled

with the immature seed heads of the same, confirm its presence at least in some of the samples. The relatively large number of grass type seeds, along with species such as thrift, sea lavender and sea plantain all have the characteristic circular to oval stems and/or leaves. As such they could all be contributing to the characteristic leaf/stem material. Murphy (2001) notes that this type of material is present at Morton in Lincolnshire Similar material may also be hinted at from the 1975-78 excavations at Billingbourgh, Lincolnshire (Chowne *et al.* 2001). In contrast to the present site at Stanford Wharf and Morton, other sites where plant macrofossil analysis has taken place, such as at East Huntspill, Somerset, the results have suggested (as remove) peat or turf used as fuel. The relatively small amount of charred tuber/rhizome/root material compared with the quantity and distribution of the monocotyledon type material at Stanford Wharf suggests that they did not form a significant element in the "fuel" and in fact the low numbers of these types of remains might suggest that whole plants were harvested, in some cases possibly in error whilst harvesting the plant material. The cutting of growing plant stems/leaves throughout the growing season could produce a source of fuel which would regenerate for subsequent seasons. The presence of immature seed heads, more mature ones and loose seeds may suggest the practice of harvesting of the plant material throughout the growing season. Bradley (1974) suggests that the optimum salt producing season at various sites on the Hampshire/Sussex borderlands encompasses the months May through to September. The question of how the plant material was treated once harvested is more difficult to ascertain. Was it used 'green' or was it dried? If the latter, this could also suggest potential for storage over winter. Was it used as tinder to start the fires, did it form the bulk of a hot quick burning fuel or did it have the duel purpose of raw material for salt and fuel for the evaporation process? Certainly this plant material does not seem to be a major component in the temper of the briquetage; a fact noted by Bradley (1974) as well. The large amount of fuel ash associated with the characteristic fuel deposits may be in part due to the remnants of silica rich plant remains reacting with other materials in the fire and possibly with the salt. The fuel ash nodules often have small fragments of charcoal and other plant remains caught up within the matrix.

The "fuel/raw material" for salterns appears in part to be leaf/stem with seed heads of salt marsh plant harvested nearby. The scarcity of rhizome/root fragments suggest that the plants were not lifted up together with turf or peat; both turf and peat cutting are by their nature more destructive and possibly finite, whereas the cutting of

above ground plant material would allow regeneration for future seasons and possibly the same season. The presence of seed heads of rush, plantain and thrift at various stages of maturity may suggest that the material was harvested throughout the growing season. Bradley's suggestion of summer to early autumn being the optimum time to produce salt in Britain would seem to fit with this.

Cereal processing waste/fuel/temper

The quality of preservation of the charred remains was highly variable within individual samples as well as from sample to sample. While some of the plant remains were well enough preserved to allow identification to species, other seeds/grain retained very few identifiable characteristics. This is particularly noticeable with regard to the cereal remains. Across the site and across the different phases of occupation the dominant cereal found in the samples is spelt wheat, although there is also some emmer and possibly bread wheat represented. Where the condition allowed identification, the barley appears to be hulled with some of the better preserved rachis fragments, suggesting a six-row type (*Hordeum vulgare*); the presence of twisted side grains supports this identification. There are also some rachis fragments suggesting a two-row type (*Hordium distichum*).

Only a couple of the oat florets are indicative of a cultivated type. Others exhibited the distinctive sucker formation identifying them as a wild type of oat. Oat grains and oat type grains occur in many of the charred samples and oat chaff also appears to have been used as temper in some of the ceramics. A few possible rye rachides suggest that this cereal may have been present in small quantities.

The majority of identifiable wheat chaff appears to be of a spelt type with a few examples of emmer glumes. Emmer appears to have been a more prominent crop before the growing of spelt increased during the Roman period. Some of the wheat chaff also suggests the presence of a free threshing type of wheat with rachis fragments and distinctive rounded grains. This wheat may be under represented in the archaeological assemblage since as a free-threshing type the cereal does not need parching. One exceptional deposit (sample 1277) (Fig. 19.7) appears to consist of charred ears of spelt, possibly still originally with attached stems, mixed with a small amount of wild oat. The presence of the primary rachis segments with sterile glumes, together with double and single grained spelt glumes, some of which appear to be immature, suggest that this may be a weedy assemblage of wheat that was burnt to

destroy cereal unsuitable for processing. Alternatively it could represent plants gathered from the edge of the field, perhaps under shade, where their development was retarded again making it unsuitable for processing.

Sample 1277 (see below) includes extremely well preserved cereal remains, including articulated rachis fragments and hairs on some of the wheat grains (Fig. 19.7). This sample possibly represents the charred remains of whole spelt ears with wild oat. The excellent preservation in this sample particularly highlights how much material has potentially been lost before the archaeobotanist comes to identify most charred assemblages. It is difficult to quantify the loss of the less robust material due to taphonomic processes during or after the charring process. On the whole, charred cereal remains are present on this site only in moderate or sparse quantities. They are often associated with charcoal, suggesting that the cereal remains are the result of the charring of general cereal waste rather than primary crop processing. The presence of waterlogged chaff fragments in the quarry pit samples suggests that there may be a general background assemblage of cereal waste across the site, possibly from stable bedding/unused temper or fuel waste. The dominance of spelt is probably due to the likelihood of the glume wheat coming into contact with fire when it is parched to remove the grain from the glume. Barley, oat and rye, on the other hand, do not need to be parched and so are less likely to end up charred. In the process of parching the glumes will potentially produce large quantities of waste chaff, which could in turn be used as a source of fuel, tinder or temper. Therefore it is possible at this site that the chaff was brought in as a raw material specifically for one or more of these purposes.

There is evidence of both emmer and spelt chaff being used in the tempering of ceramics from the site. However, as usually the identification was made from a negative impression, it is difficult to ascertain what proportion of each is represented. The relatively low quantities of cereal remains on the site suggest that large scale cereal processing was not taking place here, although the constant presence of cereals across most of the excavated area site suggest that cereals were brought in probably already processed as material for temper or for stable bedding or use in small quantities as tinder in the kilns. It could also have be used as packaging to protect ceramic vessels.

Other food plants

The large number of peas and large legume fragments from sample 1037 provide

evidence of a potential food crop. The preservation of the pea seeds was not very good and may suggest that the peas were being dried prior to storage or to prevent decay. Alternatively they may have been destroyed because of pest infestation or decay. There was, however, no evidence of the former and evidence of the latter is unlikely to survive the charring process.

Non food/weed seeds

The preservation of the non food/fodder seeds was fairly variable. Again, it was possible to identify some to variety, while with others it was not possible to even suggest their family, especially where fragmented or in cases where only the internal structure remained. There were several groups of wild plant taxa represented in the samples including seeds of weeds associated with cereal and fodder crops, such as wild radish (*Raphanus raphanistrum*) corn cockle (*Agrostemma githago*), scentless mayweed and stinking chamomile. Today scentless mayweed is found on lighter soils while the stinking chamomile prefers heavier base rich soils. There appears to be an increase in the occurrence of the latter plant from the middle Roman period onwards at this site, possibly indicating a shift to cultivating heavier soils (Carruthers pers comm). It may also suggest that the weed seeds and cereal chaff may have originated from more than one location. All the taxa present could have been either contaminants of a cereal crop or elements from burnt bedding or fodder. Fat hen prefers nitrogen rich soils often associated with occupation and agriculture; fat hen type seeds here may just represent a weed growing close to the area of cultivation but as this leafy plant can also be eaten, it may be evidence of a fodder crop or even a potential human food resource.

Corn cockle, represented by a single seed fragment, is a weed that in the past was commonly associated with arable crops. The relatively large size of the seed meant that it was often retained with cereal grains as they were processed. These poisonous seeds were later removed by hand picking. The large seeds of black bindweed and the wild oat could also potentially be retained with the cleaned cereal grain in the same way.

The relatively large numbers of henbane and nettle seeds in the waterlogged samples from quarry pit 1249 might suggest the presence of an area of middening nearby, as has been suggested at inland sites such as Pottern (McCobb *et al.* 2003). However, like the chenopods (Chenopodiaceae), henbane originated as a shoreline

plant that adapted to colonise and moved with human settlement. Henbane is also a potential medicinal but highly toxic plant.

The tank samples

All tank assemblages from areas A and B are dominated by salt marsh flora with sea arrow grass seeds and immature rush seed heads identified, showing that some more fragile plant remains were able to survive in these features. The plant remains were visibly better preserved than those in the red hill and redeposited red hill assemblages, though the species represented are very similar. This suggests that the tank deposits were protected from more active erosion from the inundation of the sea and mechanical damage from trampling for example. The relatively low numbers of rhizome and root fragments in all of the fuel type samples is echoed in the tank samples suggesting that they were not a major constituent of the fuel. This suggests that peat and turf were not being used on a large scale on the site and rather that, live plants were being cut above ground level to produce fuel/a raw material for salt production.

Waterlogged samples

Bronze Age peat

The only waterlogged prehistoric sample selected for analysis was Bronze Age peat sample 1137 (1915). While plant remains were not very numerous or well preserved, those which were present are indicative of a wet boggy environment probably immediately adjacent to the deposition site.

Late Roman samples, including pit 1249

In contrast to the prehistoric sample, the assemblages of waterlogged plant remains from the late Roman phases, particularly the fills of late Roman pit 1249 in enclosure 9506, have provided an insight both into the kinds of plants being utilised by the local population and the plants growing nearby.

The analysed plant assemblages from pit 1249 included material from the fills outside and inside pot SF1596, but the results suggest that on the whole the same species are represented (see above). Notably, however, the sample from within the pot is significantly better preserved and contains what appears to be comminuted plant

material including cereal bran, grass leaves and stems and fragments of seeds from the pink family (Caryophyllaceae)(Wendy Carruthers and Kate Griffiths pers. comm.), as well as insect remains (Allison, specialist report 18). This suggests that the pot has served to protect the waterlogged remains from decay to a greater extent than the deposits around it. It also suggests that the pot content does not represent a discrete deposit of selected plant remains, but has instead become filled with the surrounding matrix, which would fit with the pit being used as a rubbish and/or cesspit, filled with human and/or animal stabling waste, as suggested by the insect analysis. The relatively large number of fruit stones and seeds recovered from samples within the feature are likely to suggest elements of a human diet. The lack of associated leaves spines, thorns, etc., suggest that the fruit remains did not enter the pit as, for example, the result of hedge clearance. The stone fruits such as plum and cherry would ripen in late summer to early autumn. It is possible they could have been preserved in some way but this would be difficult to prove from this type of deposit. The fruits would have been brought to the site for consumption, as it is unlikely that they were growing in the immediate area. A least two of the plum stones were of sufficient size to suggest that they were domestic varieties: plum, damson and greengage types would probably have been orchard grown. Some of the damson type fruits, the apple, rose, brambles, sloe and hawthorn could have been collected from hedgerows and scrub bordering the site on the landward side or from further inland. It is not possible to tell if the apple is a wild or domestic type. The cherry, blackberry, rose and sloe could have been collected from hedgerows further inland. The last two fruits would probably have needed drying and/or cooking before eating to make them more palatable. The possible cereal bran in the pit fill is likely to might be evidence of the consumption of cereal based foods, including bread, by people working on the site. The possible fig seed is likely to have been an imported fruit. However, it is a single seed from a fruit that naturally produces a high number of seeds, so the seed may not be an indication of consumption of this fruit on or near the site. The coriander may represent “kitchen waste” or seeds from a garden/pot escape growing on the site. Interestingly, it is a herb that was used in the production of *garum* during the Roman period (Anna Morris pers. comm.), but the mericarps in the pot sample showed no evidence of damage.

Other waterlogged seeds from the fill of pit 1249 provide evidence of the local environment. Henbane and yellow horned poppy seeds suggest that a shingle beach

was located nearby and it is possible that bramble and rose might grow in the higher reaches of such an environment. Dry grassland species such as selfheal, knapweed types and lesser stitchwort may have been brought to the site with hay for fodder, and seeds such as creeping thistle could likewise have arrived this way. Plants such as wild celery which is tolerant of brackish conditions), sea arrow grass and possible sea milkwort are all potentially salt marsh plants. Unlike many of the charred assemblages from the site, only very few rush type seeds were present in the pit fill samples, which may suggest that they were not growing in the immediate vicinity of the feature. The presence of a zygomorphic flower, possibly of fumitory type (cf. *Fulmaria* sp.) indicates how well some material has survived. The glume wheat rachis fragments, often not preserved under waterlogged conditions, are likely to be associated with a number of weeds of cultivation and disturbed ground identified in the same samples. In particular, corn cockle, stinking chamomile and scentless mayweed are seeds of arable fields and waste ground and are commonly associated with cereal waste in charred assemblages. The scentless mayweed prefers lighter soils associated with earlier agricultural practices in Britain, while stinking chamomile prefers the heavier base rich soils which were increasingly cultivated with the advent of the use of metal ploughs (Wendy Carruthers pers. comm) from the mid Roman period onwards. A single fruit of *Lepidium coronopus* (swine cress), a plant associated today with waste ground and field margins and gateways, again suggests the importation of plant material to the site, while the relatively large number of henbane seeds may come from plants growing naturally in the vicinity of the pit. The presence of nettle seeds suggests that there may have been concentrations of nitrogen rich deposits nearby, such as midden deposits, possibly from stabling waste. Another habitat suggested by assemblage from pit 1249 is that of freshwater marsh and bog, represented by seeds from a mint type possibly penny royal (*Mentha* cf. pulegium) and possibly golden dock (cf. *Rumex maritiumus*).

Waterlogged dumping layer sample 1238 (5660) included seeds from plants of cultivated or waste ground, including stinking chamomile, common ramping-fumitory, field pennycress (*Thalaspi arvense*), black bindweed and creeping thistle (*Cirsium arvense*), possibly from redeposited soil. A few possible sea-milkwort seeds suggest sediment derived from a saline, probably saltmarsh, environment.

Culinary, exotics and/or ritual plants

A single cone scale of stone pine (from fish-rich late Roman ditch fill 5103), a few shell fragments of walnut and a single possible fig seed in the fills of the quarry pit 1249 (see above) all come from species used in Roman domestic offerings (Robinson 2001). The stone pine cone scale was not charred, so may represent something that had been lost or discarded and become accidentally incorporated into the ditch fill. A single stone pine scale was similarly recovered from a waterlogged deposit from Roman Gloucester (Hunter 2000).

The presence of whole mericarps of coriander (see above, pit 1249), may suggest culinary or ritual use, but it should be noted that it could have being growing near the pit as an escape from pot-grown plants. On the whole, however, the food plants in themselves do not suggest a high-status diet, but rather one supplemented by wild gathered fruits. Obviously other elements such as leafy vegetables would be unlikely to survive so we can only speculate about the full range of the inhabitants diet.

Comparative sites

Though Fawn (1990) attempted to characterise the red hill deposits in Essex by looking at the physical attributes of the deposits, the author and the volume's other contributors did not consider the plant remains within them. However, before this, Kay de Brisay had identified plant remains associated with a salt evaporation hearth at Crouch site 2, where a few cereal remains interpreted as kindling and vegetable tempered briquetage fabric was also reported, with the plant remains identified as spelt and emmer glumes and barley. Plant-tempered ceramics were also reported at Blackwater site 11, where cereal chaff was identified, and at Osea Road, where oat grain was identified in the temper (de Brisay 1978). Rowena Gale has suggested that the relatively high silica content of monocotyledonous plants such as cereals, rushes and grasses produces an ash that would retain heat for longer than most types of wood (Gale 2001). This could be one reason why such plant remains are common at Stanford Wharf.

Peter Murphy's work at Morton, Nordelph and Bourne-Morton Canal, Lincolnshire produced monocotyledonous fragments which may be similar to the ones found at the present site, in addition to the charred remains of salt marsh and dryland plants. He also looked at plant impressions in briquetage, noting wheat and oat chaff,

and also that the plant temper from the Iron Age site of Cowbit had less of a cereal component than the Roman sites of Morton Saltern and Middleton (Murphy 2001). Further afield, a medieval salt working site at Kolhorn in the Netherlands has produced evidence of eel-grass (*Zostera marina*) being used in the production of salt (van Geel and Borger 2005; van der Meer 2009). Ethnographic studies in New Guinea and Africa have documented the practice of gathering salt-rich plants and burning them to create ash which is then steeped in freshwater, brine or sea water. The resultant solution is strained and then evaporated to produce salt, with a suggestion that plant material may have been used to help strain the salt rich liquid prior to evaporation (Alexander1975; Gouletquer 1975; Godelier 1981). Leech *et al.* (1983) have interpreted the plant remains from a saltern site in Somerset as being of peat origin and suggest that this was the main fuel. Work on the briquetage from the site also showed that cereal chaff and grain were used as temper.

Conclusions

In conclusion, the analysis of rich charred and waterlogged plant assemblages from Stanford Wharf Nature Reserve has contributed significantly to the investigation of local habitats and environments, industrial practices and elements of the diet of the people working at the site.

During the period of saltworking the site was clearly surrounded by salt marsh, so the cereal remains and associated weeds of crop were probably deliberately imported on to the site for fuel, fodder or bedding. Fruits too would have been imported, probably from the hinterland, and may well have been eaten by the people working there. A few exotic plants may have been brought to the site for 'ritual' purposes or to add variety to the diet.

The large number of samples taken at the site has allowed the nature of the red hill deposits to be examined in some detail. The results of the analysis indicate that salt marsh plants, probably harvested locally, at least made up some of the fuel/raw material for salt production from the Iron Age through to the late Roman period. The question of whether the plants represented here would themselves contain a high enough salt content to make them useful as a raw material for salt making would be a useful topic for future research. Whether these plants could have been burnt on the evaporation fires and simultaneously produce further salt-rich ash needed to continue

the process, as Richard Macphail has suggested (pers. comm.), is also a subject worthy of study.

References

Alexander, J A,1975 The salt industries of Africa: their significance for European prehistory, in de Brisay and Evans 1975, 81-83

Beijerinck, W, 1947 Zaden Atlas der Nederlandsche Flora. Wageningen, *Biol. Stat Wijster* **30**

Berggren, G, 1981 *Atlas of seeds and small fruits of Northwest-European plant species with morphological descriptions, Part 2, Cyperaceae,* Berlings

Berggren, G, 1981 *Atlas of seeds and small fruits of Northwest-European plant species with morphological descriptions, Part 3, Salicaceae- Cruciferae*, Berlings

Bradley, R, 1974 Salt and settlement in the Hampshire Sussex borderland, in de Brisay and Evans 1975, 20-27

Cappers, R T J, Bekker R M and Jans J E A 2006 *Digitale Zandenatlas Van Nederland*, Groningen University

Chowne, P, Cleal, R M J, Fitzpatrick, A P, Andrews P, 2001 *Excavations at Billingborough,Lincolnshire, 1975-8: a Bronze-Iron Age Settlement and Salt working Site*, East Anglian Archaeology **94**

Brisay, K de, 1978 The excavation of a red hill at Peldon, Essex, with notes on some other sites, *The Antiquaries Journal* **58**, 31-60

Brisay, K W de and Evans, K A, 1975 *Salt: the study of an ancient history*, Colchester

Fawn, A J, 1990 *The Red Hills of Essex:salt-making in antiquity*, Colchester Archaeological Group

Gale R, 2001 The derivation and uses of some plant based fuels, in Lane and Morris 2001, 41

Godelier M, 1981 *Perspectives in Marxist Anthropology*, CUP, Cambridge

Gouletquer, P L, 1975 Niger, Country of Salt, in de Brisay and Evans 1975, 47-51

Hunter, K L, 2002 An Assessment of the Plant Macrofossils, Other Environmental Remains and Finds from Quay Street, Gloucester 8/89. Archive report. Gloucester City Council Archaeology Unit.

Jacomet S, 2006 Identification of Cereal Remains From Archaeological Sites, unpubl. 2nd edition Archaeology Laboratory, IPAS, Basel University

Jones, M, 1978 The Plant Remains, in *The excavation of an Iron Age settlement, Bronze Age Ring Ditches and Roman features at Ashville Trading Estate, Abingdon (Oxfordshire) 1974-76* (M Parrington), CBA Research Report **28**, 93-109

Lane, T W and Morris, E L, 2001 *A Millennium of Saltmaking: Prehistoric and Romano-British salt production in the Fenland*, Heritage Trust of Lincolnshire

Leech R, Bell M, and Evans J, 1983 *The sectioning of a Romano-British salt making mound at East Huntspill*, Somerset Levels Paper 9 (ed. J M Coles J.M), Austin

McCobb, L M E, Briggs, D E G, Carruthers, W J, and Evershed, R P, 2003 Phosphatisation of seeds and roots in a Late Bronze Age deposit at Potterne, Wiltshire, UK, *Journal of Archaeological Science* **30 (10)**, 1269-1281

Murphy, P, 2001, in Lane and Morris 2001, 85-87, 151-154, 320-321

Robinson, M, 2002 Domestic burnt offerings and sacrifices at Roman and Pre Roman Pompeii, Italy, *Vegetation History and Archaeobotany* **11**, 93-99

Rodwell, J S (ed), 2001 *British Plant Communities Vol 5, Maritime communities and vegetation of open habitats*, CUP, Cambridge

Schoch, W H, Pawlik, B, Schweingruber, F H, 1988 *Botanical macro–remains*, Haupt

Smith, W, 2010 Charred and waterlogged plant remains, in Stanford Wharf Nature Reserve London Gateway Stanford-le-Hope Essex. Volume 2: Artefactual, geoarchaeological and palaeoenvironmental appendices. Post excavation assessment (ed. E Biddulph), unpubl. report, Oxford Archaeology

Stace, C, 2010 *New Flora of the British Isles*, CUP, Cambridge

Ross Craig, S, 1969 *Drawings of British Plants*, G Bell & Sons

van der Meer, W, 2009 Harvesting underwater meadows, use of eelgrass (Zostera spp.) as indicated by the Dutch archaeological record, *Journal of Archaeology in the Low Countries* **1-1**, 97-105

van Geel,B and Borger, G J, 2005 Evidence for Medieval Salt-making by Burning Eel Grass (Zostera marina L.) in the Netherlands, *Netherlands Journal of Geosciences- Geologie en Mijnbouw* **84-1**, 43-49

Wilkinson T J and Murphy P, 1995 *Archaeology of the Essex Coast vol. 1*, East Anglian Archaeology **71**, Chelmsford

Plant Macrofossils Tables

TABLE 19.1: EARLY PREHISTORIC (AREA A):CHARRED PLANT REMAINS

					Phase	Early Prehistoric		
					Sample	1067	1079	1122
					Context	1554	1672	1909
					Feature	test pit	test pit sedimentary unit G3	test pit sedimentary unit G3
Family	**Taxa**	**Common name**	**Componant**	**Habi-tat**				
	Cereal NFI	Unidentified cereal	grain fragments (Charred)	C				2
	Triticum spelta/ dicoccum	spelt/emmer	glume base	C			1	
Betulaceae	*Corylus avellana* L.	hazelnut	Shell frags	SW		9		
	Unident	seed	seed				1	
	charcoal					****	**	**
	waterlogged wood							***

TABLE 19.2: IRON AGE (AREA A): CHARRED PLANT REMAINS, RED HILLS 1384 AND 9504

					Phase	MIA	MIA	MIA	MIA-M/LR	MIA-M/LR	MIA-M/LR	MIA-M/LR	
					Sample	1119	1322	1213	1144	1139	1012	1147	1337
					context	1875	6202	5538	5024	5005	1264	5026	6255
					Feature	RH 9504	RH 9504	layer associated with RH 9504	Redep RH 1384	Redep RH 1384	Redep RH 1384	Redep RH 1384	redeposited Red Hill
Family	**Taxa**	**common name**	**componant**	**Habitat**									
	Triticum sp.	wheat	grain	c				7		10	1		6
	cf. Triticum sp.	possible wheat	grain	c			2	1					1
	cf. Hordeum sp.	possible barley	grain	c				1					1
	cf.Avena sp.	possible oat	grain	c/g			15	1					
	Avena sp.	oat	grain	c/g			6						
	Avena/Bromus sp.	Oat/brome	grain	c/g			17						
	cereal NFI	Unidentified cereal	grain fragments (charred)	c		6	200	29			6	1	43
	Triticum cf. dicoccum	*possible emmer*	Spikelet fork	c				1					2
	Triticum cf. dicoccum	*possible emmer*	glume base	c			5						
	Triticum spelta	spelt	glume base	c				14		1			
	Triticum spelta	spelt	Spikelet fork	c				35					
	Triticum cf.spelta	*possible spelt*	glume base	c			5		4		2		64
	Triticum cf.spelta	*possible spelt*	Spikelet fork	c			12	17	1				9
	Triticum spelta/dicoccum	spelt/emmer	glume base	c		6	77	319	7		1	1	
	Triticum spelta/dicoccum	spelt/emmer	Spikelet fork	c			31						
	Triticum cf. aestivum	possible bread wheat	rachis fragment	c			1						
	Triticum sp.	wheat	rachis fragment	c				1					
	Hordeum vulgare	six row barley	rachis fragment					4					

					Phase	MIA	MIA	MIA	MIA-M/LR	MIA-M/LR	MIA-M/LR	MIA-M/LR	
					Sample	1119	1322	1213	1144	1139	1012	1147	1337
					context	1875	6202	5538	5024	5005	1264	5026	6255
					Feature	RH 9504	RH 9504	layer associated with RH 9504	Redep RH 1384	Redep RH 1384	Redep RH 1384	Redep RH 1384	redeposited Red Hill
Family	**Taxa**	**common name**	**componant**	**Habitat**									
	Hordeum sp.	barley	rachis fragment (lax-eared Hulled)	c				1					
	Hordeum sp.	barley	rachis fragment	c			4	4		1			1
	Avena fatua	wild oat	floret base	arable, rough and waste ground			1						
	Avena sp.	oat	floret base										1
	Avena sp.	oat	awn fragments	c,arable, rough and waste ground			*	*					
	cereal NFI	Unidentified cereal	detached embryo	c				11					3
	cereal NFI	Unidentified cereal	detached coleoptile	c				1	1				
	cereal NFI	Unidentified cereal	straw culm node					2					
Fabaceae	*Vica/Lathyrus sp.*	vetch/pea	seed 2mm	Da,c								1	
Plumbaginacee	*Limonium sp*	sea lavender	seed	coastal		6	11	1		4	3	2	1
Polygonaceae			Achene					1					
	Fallopia convolvulus (L.) Love.	black bindweed.	Achene	Da				1					
	Rumex sp.	dock type	Achene	DaGMSW				1	1				
	cf. Rumex sp.	dock type	Achene							1			
Caryophyllaceae	*Spergularia marina* (L.) Besser	Lesser sea spurry	seed	sandy and muddy maritime places		3	27						

					Phase	MIA	MIA	MIA	MIA-M/LR	MIA-M/LR	MIA-M/LR	MIA-M/LR	
					Sample	1119	1322	1213	1144	1139	1012	1147	1337
					context	1875	6202	5538	5024	5005	1264	5026	6255
					Feature	RH 9504	RH 9504	layer associated with RH 9504	Redep RH 1384	Redep RH 1384	Redep RH 1384	Redep RH 1384	redeposited Red Hill
Family	**Taxa**	**common name**	**componant**	**Habitat**									
Ameranthaceae		goosefoot family	seed						1	1			
	Chenopodium album L.	fat hen	Seed	Da,n			2	3					
	Chenopodium sp.	goosefoots	Seed	n				4					1
	Atriplex sp.	orache	Seed										1
	Chenopodium/Atriplex sp.	goosefoots/orache type	Seed			1	1						
	cf. Salicornia sp.	glassworts	Seed			3	1						
Plantaginaceae	*Plantago maritima* L.	sea plantain	seed (capsule)				7(1)						5
	cf.Plantago maritima L.	possible sea plantain	seed								2	2	
	Tripleurospermum inodorum(L.) Scz-Bip	Scentless mayweed	Achene	Da			1						
	Juncus maritimus Lam.	sea rush	seed capsule	salt marsh									9
	Juncus sp.	Rush	(capsule)/ seeds			(1) 103	(1)74	1	18	169	22	51	500+
Cyperaceae			nutlet										2
	Carex sp. (trigonus)	sedge	nutlet			1							1
Poaceae		Grass	caryopsis			4	1	2		2			11
	Monocotyledonous leaf/stem fragments		stem/leaf			****	**	**	*	**	**	**	***
	Unident	seed	seed			4		15	2				14
	Unident	tuber/rhyzome/ root fragments					24						6

					Phase	MIA	MIA	MIA	MIA-M/LR	MIA-M/LR	MIA-M/LR	MIA-M/LR	
					Sample	1119	1322	1213	1144	1139	1012	1147	1337
					context	1875	6202	5538	5024	5005	1264	5026	6255
					Feature	RH 9504	RH 9504	layer associated with RH 9504	Redep RH 1384	Redep RH 1384	Redep RH 1384	Redep RH 1384	redeposited Red Hill
Family	**Taxa**	**common name**	**componant**	**Habitat**									
	Unident	charred organic fragments						2					
	Unident	fuel ash slag									***	****	
	charred insect					1							

TABLE 19.3: IRON AGE (AREA A): CHARRED PLANT REMAINS, RED HILL 6717

					Phase	MIA	MIA	MIA	MIA	MIA	MIA
					Sample	1153	1373	1022	1064	1372	1019
					Context			1339	1590	6027	1233
					Feature	below RH 6717	below RH 6717	RH 6717	RH 6717	RH 6717	RH 6717
Family	**Taxa**	**Common name**	**Componant**	**Habitat**							
	Triticum sp.	wheat	grain	C		12	78	46			1
	cf. Triticum sp.	possible wheat	grain	C		15	10	17			
	cf. Hordeum sp.	possible barley	grain	C			5	1			
	Avena sp.	oat	grain	C/G		1	49				2
	Avena/Bromus sp.	Oat/brome	grain	C/G		6		118			
	Cereal NFI	Unidentified cereal	grain fragments (Charred)	C		200	500+	500+	7		34
	Triticum cf. dicoccum	*possible emmer*	glume base	c			1	6	2		4
	Triticum spelta	spelt	glume base	C		5	2	34			
	Triticum spelta	spelt	spikelet fork	C			4	16			
	Triticum cf.spelta	*possible spelt*	glume base	C		1			5		
	Triticum cf.spelta	*possible spelt*	spikelet fork	C			2	9			10
	Triticum spelta/dicoccum	spelt/emmer	glume base	C		74	6	500+	100		135
	Triticum spelta/dicoccum	spelt/emmer	spikelet fork	C		6		59	34		9
	Hordeum sp.	barley	rachis fragment	C		4					
	Avena cf. sativa	oat	floret base					1			
	Avena sp.	oat	awn fragments	C,arable, rough and waste ground		*		*			
	Cereal NFI	Unidentified cereal	detached embryo	C		4	2				
	Cereal NFI	Unidentified cereal	detached coleoptile	C		1		1			
	Cereal NFI	Unidentified cereal	straw primary culm node				2				

					Phase	MIA	MIA	MIA	MIA	MIA	MIA
					Sample	1153	1373	1022	1064	1372	1019
					Context			1339	1590	6027	1233
					Feature	below RH 6717	below RH 6717	RH 6717	RH 6717	RH 6717	RH 6717
Family	**Taxa**	**Common name**	**Componant**	**Habitat**							
	Cereal NFI	Unidentified cereal	straw culm node			1	40				
	Cereal NFI	Unidentified cereal	straw culm internode				****				
Fabaceae	*Vica/Lathyrus* sp.	vetch/pea	seed 2mm	Da,C		13		2			
	Vica/Lathyrus sp.	vetch/pea	seed 4mm	Da,C		11					
	Pisum sativum L.	Garden Pea	seed	C		1					
	Vicia faba/Pisum sativum	Broad bean/garden pea	seed fragments	C		1					
	Trifolium/Lotus sp.	clover/birdsfoot trefoil	seed			1	1	2		1	1
		legume	seed fragments			20					
Rosaceae	*Crataegus monogyna* Jacq.	hawthorn	stone fragment					1			
Plumbaginacee	*Limonium sp*	sea lavender	seed	coastal		3				2	2
	Armeria maritima (Mill.) Willd.	Thrift	seed	salt marsh						1	
Polygonaceae			achene				1				
	Fallopia convolvulus (L.) Love.	black bindweed.	achene	Da		1					
	Rumex sp.	dock type	achene	DaGMSW		1	17	5			
	Chenopodium album L.	fat hen	seed	Da,n				4			1
	Chenopodium sp.	goosefoots	seed	n			5				
	cf. Salicornia sp.	glassworts	seed			1					
Plantaginaceae	*Plantago maritima* L.	sea plantain	seed (capsule)				6			1	1
	cf.Plantago maritima L.	possible sea plantain	seed						1		1
Rubiaceae	*Galium aperine* L.	cleavers	nutlet	DaH				1			

					Phase	MIA	MIA	MIA	MIA	MIA	MIA
					Sample	1153	1373	1022	1064	1372	1019
					Context			1339	1590	6027	1233
					Feature	below RH 6717	below RH 6717	RH 6717	RH 6717	RH 6717	RH 6717
Family	**Taxa**	**Common name**	**Componant**	**Habitat**							
Laminaceae	*Prunella vulgaris*	self heal	seed	G,woodland clearings		1					
	cf.Prunella vulgaris	self heal	seed			1					
Asteraceae			achene				1	3			
	Anthemis cotula L.	stinking chamomile	achene	A,heavy soils				12			1
	Tripleurospermum inodorum(L.) SCz-Bip	Scentless mayweed	achene	Da			30	1			
	Juncus sp.	Rush	(Capsule)/ seeds			16			18	156	
Cyperaceae			nutlet			1					
	cf. Eriophorum vaginatum L.	cottongrass	nut	wet peaty places			1				
	Eleogiton fluitans (L.) Link	floating club-rush	nut	in or by peaty ponds, lakes or ditches			1				
	Carex sp. (trigonus)	sedge	nutlet			1					
Poaceae		Grass	caryopsis			4	46	2	2	6	
	cf.Lolium sp.	possible rye grass	caryopsis					4		1	
	Monocotyledonous leaf/stem fragments		stem/leaf			**	***		3	****	****
	Unident	seed	seed						1	4	
	Unident	tuber/rhyzome/ root fragments					**	1	1	***	
	Unident	spine				1					
	Unident	charred organic fragments					2		**		
	Unident	fuel ash slag					***			**	***

TABLE 19.4: EARLY AND LATE ROMAN (AREA B): CHARRED PLANT REMAINS

					Phase	ER	ER	ER	LR	LR	LR	LR	LR
					Sample	4098	4038	4036	4014	4035	4001	4096	4009
					Context	4755	4618	4599	4230	4441	4069	4721	4329
					Feature	Pit 4754	Ditch4844	Ditch4845	4229 north of kiln 4227	layer within ditch 4415	Ditch 4061	Tank 4336.	Tank 4336
Family	**Taxa**	**Common name**	**Componant**	**Habitat**									
	Triticum sp.	free threshing wheat type	Grain	Cult						4			
	Triticum sp.	wheat nfi	Grain	Cult						6			
	Triticum sp.	wheat	grain	Cult					31				
	cf. *Triticum* sp.	possible wheat	grain	Cult						3			
	Hordeum sp.	barley	grain	Cult					16	7			
	Hordeum vulgare	barley, six row	grain(twisted)	Cult					(12)				
	cf. *Hordeum* sp.	possible barley	grain(sprouted)	Cult					49	(1)			
	Avena sp.	oat	grain	Cult		3			28	9			
	cf.*Avena* sp.	possible oat	grain	C/G					2	6	1		
	Cereal NFI	Unidentified cereal	grain fragments (Charred)	Cult		6		1	500+	24	12		
	Triticum cf. *dicoccum* Schubl	possible emmer	glume base	Cult					2				
	Triticum spelta	spelt	Spikelet fork	Cult					6	5			
	Triticum cf.*spelta*	possible spelt	Spikelet fork	Cult					2				
	Triticum spelta	spelt	glume base	Cult					12	10			
	Triticum cf.*spelta*	possible spelt	glume base	Cult					13				1
	Triticum spelta/dicoccum	spelt/emmer	spikelet fork	Cult					2				
	Triticum spelta/dicoccum	spelt/emmer	glume base	Cult					102	95			
	*Triticum*sp.	Free threshing wheat	rachis fragment	Cult						10	2		
	Hordeum vulgare	barley, six row	rachis fragment (lax-eared Hulled)	Cult						1			

					Phase	ER	ER	ER	LR	LR	LR	LR	LR
					Sample	4098	4038	4036	4014	4035	4001	4096	4009
					Context	4755	4618	4599	4230	4441	4069	4721	4329
					Feature	Pit 4754	Ditch4844	Ditch4845	4229 north of kiln 4227	layer within ditch 4415	Ditch 4061	Tank 4336.	Tank 4336
Family	**Taxa**	**Common name**	**Componant**	**Habitat**									
	Hordeum vulgare	barley, six row	rachis fragment (dense-eared Hulled)	Cult					30				
	Hordeum	barley, two row	rachis fragment (lax-eared Hulled)	Cult						1			
	Hordeum sp.	barley	rachis fragment (lax-eared Hulled)	Cult						1			
	Hordeum sp.	barley	rachis fragment	Cult					175	32			
	cf. *Secale cereale*	poss.rye	rachis fragment	Cult						5			
	Cereal NFI	Unidentified cereal	detached embryo	Cult					11				
	Cereal NFI	Unidentified cereal	detached coleoptile fragments	Cult						4			
	Cereal NFI	Unidentified cereal	straw culm node	Cult					7	5			
Ranunculaceae	*Ranunculus* cf.*repens*								9				
Papaveraceae	*Papaver* cf. *dubium*	long-headed poppy	seed	arable ground roadsides and waste places						1			
Fabaceae	*Vicia/Lathyrus* sp. *(4mm)*	vetch/pea	Seed	Da,Cult					6				
	Vicia/Lathyrus sp. *(2mm)*	vetch/pea	Seed	Da,Cult					5		2		
		? Tare							1				
	Trifolium/Lotus sp. L	clover/birdsfoot trefoil	Seed						61	10	1		1
		legume	pod fragments							1			

					Phase	ER	ER	ER	LR	LR	LR	LR	LR
					Sample	4098	4038	4036	4014	4035	4001	4096	4009
					Context	4755	4618	4599	4230	4441	4069	4721	4329
					Feature	Pit 4754	Ditch4844	Ditch4845	4229 north of kiln 4227	layer within ditch 4415	Ditch 4061	Tank 4336.	Tank 4336
Family	**Taxa**	**Common name**	**Componant**	**Habitat**									
		legume	seed fragments								3		
Rosaceae	*Rosa* sp.	rose type	spine						1				
	Prunus spinosa L.	blackthorn	Stone (fragments)	WS					(2)				
	Rubus sp.	blackberry type							1				
Brassicaceae	*Raphanus raphanistrum* spp.*raphanistrum* L.	Wild radish	mericarp fragment (intact)	cultivated,rough ground, waste places.					18(6)				
Betulaceae	cf.*Alnus glutinosa*	Alder	cone scale	damp woods, by lakes and rivers						1			
Myrsinaceae	*cf.Glaux maritima*	sea-milkwort	seed	Saline sandy,muddy,rockyor grassy places.			1	1	1	6		1	
	cf. *Glaux maritima*	sea-milkwort	seedhead	Saline sandy,muddy,rockyor grassy places.				1					
Plumbaginaceae	*Limonium* sp	sea lavender	seed	coastal		40	48	11		86		74	30
	Armeria maritima (Mill.) Willd.	Thrift	seed	salt marsh						10		17	32
	Rumex sp.	dock type	Achene	DaGMSW					33				1

					Phase	ER	ER	ER	LR	LR	LR	LR	LR
					Sample	4098	4038	4036	4014	4035	4001	4096	4009
					Context	4755	4618	4599	4230	4441	4069	4721	4329
					Feature	Pit 4754	Ditch4844	Ditch4845	4229 north of kiln 4227	layer within ditch 4415	Ditch 4061	Tank 4336.	Tank 4336
Family	**Taxa**	**Common name**	**Componant**	**Habitat**									
Polygonaceae	cf. *Rumex* sp.	dock type	Tepal/perianth fragment										
	Chenopodium album L.	fat hen	Seed	Da,n					6				
	Atriplex sp.	orache	Seed	n									
	Chenopodium sp.	goosefoots	Seed	n									
	Chenopodium /Atriplex sp.		Seed	n									
	cf.*Salicornia* sp.	Glassworts	?achene	saltmarsh		1		11					
Caryophyllaceae	*Stellaria graminea* L.	lesser stitchwort	Seed	GW					9				
	cf.*Stellaria* sp.	stitchworts	Seed										2
	cf. *Spergularia marina* (L.) Besser	possible Lesser sea spurry	seed	sandy and muddy maratime places and inland saline areas						24			
	cf. *Silene* sp.	campion type	seed										
Primulaceae			seed							6			
Veronicaceae	cf. *Veronica beccabunga*	brooklime	seed										6
Plantaginaceae	*Plantago maritima* L.	sea plantain	intact capsule	salt marsh		27	9		2	58	1	33	34
	Plantago maritima L.	sea plantain	capsule base	salt marsh		19	25	1	2	23		7	24
	Plantago maritima L.	sea plantain	seed	salt marsh		96	15	7	17	60			48
	cf. *Plantago maritima* L.	possible sea plantain	seed					4				41	93

					Phase	ER	ER	ER	LR	LR	LR	LR	LR
					Sample	4098	4038	4036	4014	4035	4001	4096	4009
					Context	4755	4618	4599	4230	4441	4069	4721	4329
					Feature	Pit 4754	Ditch4844	Ditch4845	4229 north of kiln 4227	layer within ditch 4415	Ditch 4061	Tank 4336.	Tank 4336
Family	**Taxa**	**Common name**	**Componant**	**Habitat**									
	Plantago lanceolata L.	Ribwort Plantain	Seed	G short or grazed. Da					3				
Rubiaceae	cf. *Galium uliginosum* L.	Fen bedstraw	nutlet	fens and base rich marshy places					2				
	Galium verum cf.var. maritium	lady's bedstraw	nutlet	maritime dunes and cliff tops		1							
Laminaceae	*Prunella vulgaris* L.	Self heal	seed	G,Woodland clearings					2				
Asteraceae										2	1		
	Aster tripolium	sea aster	achene	saltmarsh						5			
	Anthemis cotula L.	Stinking chamomile	achene (Charred)	Da					24	13	12		
	Tripleurospermum inodorum(L.) Scultz-Bip	Scentless mayweed	Achene	Da						2	1		
Apiaceae			mericarp							1			
	cf.*Bupleurum tenuissimum*	Slender hare's-ear	mericarp	grassy or barish brackish ground		1							
Juncaginaceae	*Triglochin maritima* L.	Sea arrow grass	seed	Saltmarsh and salt-sprayed grassland						10			

					Phase	ER	ER	ER	LR	LR	LR	LR	LR
					Sample	4098	4038	4036	4014	4035	4001	4096	4009
					Context	4755	4618	4599	4230	4441	4069	4721	4329
					Feature	Pit 4754	Ditch4844	Ditch4845	4229 north of kiln 4227	layer within ditch 4415	Ditch 4061	Tank 4336.	Tank 4336
Family	**Taxa**	**Common name**	**Componant**	**Habitat**									
Juncaginaceae	*Triglochin maritima* L.	Sea arrow grass	seed head	Saltmarsh and salt-sprayed grassland						2			
Juncaceae	*Juncus gerardii* Loisel.	saltmarsh rush	capsule	saltmarsh and inland saline area						7			
	Juncus maritimus	sea rush	capule	saltmarsh			4			13			
	Juncus sp.	Rush	seeds			2	1000+	11	2			50	119
	Juncus sp.	Rush	Capsule			70	43	9		45		11	17
	Juncus sp.	Rush	Capsule fragments			24	73			45			
Cyperaceae	*Eleocharis palustris* (L.) Roemer & Schultes	Common Spike Rush	Nut	A, shallow water. MG wet									
	Carex sp. (Trigonus)	Sedge	Nut	MBWG esp. damp/wet soils		3				4		14	2
	Carex sp. (bi-convex)	Sedge	Nut	MBWG esp. damp/wet soils			1						
	cf. *Carex* sp.											14	
Poaceae		Grass	caryopsis			222	28	6		191	1	116	131
		Grass	?glume				3						
		Grass	?rachis							1	1		

					Phase	ER	ER	ER	LR	LR	LR	LR	LR
					Sample	4098	4038	4036	4014	4035	4001	4096	4009
					Context	4755	4618	4599	4230	4441	4069	4721	4329
					Feature	Pit 4754	Ditch4844	Ditch4845	4229 north of kiln 4227	layer within ditch 4415	Ditch 4061	Tank 4336.	Tank 4336
Family	**Taxa**	**Common name**	**Componant**	**Habitat**									
	Cf. *Lolium* sp.	Possible rye grass type	caryopsis							6		1	
	Monocotyledonous leaf/stem fragments		stem/leaf			****	****	***	*	***	**	***	**
	Unident	seed	seed				7			11		19	
	Unident		seed head							1			
	Unident		leaf shoot							2			
	Unident		spine							1			
	Unident	Bread like fragments							2				
	Unident	Tuber/Rhyzome /root fragments				24		3	1	108			9
	Unident	rhyzome/culm fragment								1			
	Unident	charred organic fragments					3						
	Fuel ash slag					****	****	***	**			****	*
	charcoal												
	Briquetage fragments					*	****	**					
	insect charred					3	2			1			

TABLE 19.5: LATE ROMAN PHASE 1 (AREA A): CHARRED PLANT REMAINS, FEATURES 9502 AND 9506

					Phase	LR1	LR1	LR1	LR1	LR1	LR1
					Sample	1070	1113	1193	1208	1126	1277
					Context	1618	1784	5374	5536	1942	5872
					Feature	post hole of fence line 9502	post hole 1771 of fence line 9502	post hole 5373of fence line 9502	spread prob assoc with 9506	enclosure ditch 9506	enclosure ditch 9506
Family	**Taxa**	**Common name**	**Componant**	**Habitat**							
	Triticum sp.	wheat nfi	Grain	Cult					10	1	
	Triticum sp.	wheat	grain (sprouted)	C		15			15		133 (11)
	Triticum cf. spelta	possibly spelt	grain (tail grains)	C							(18) 90
	cf. *Triticum sp.*	possible wheat	grain (insect damage)	C		5	1		14		14
	cf. *Hordeum sp*	possible barley	grain	C			1		2		
	Avena cf. Sativa	possibly cultivated oat	grain with attached floret	C							4
	Avena fatua	wild oat	grain with attached floret	Da							9
	Avena sp.	oat	grain (attached floret) [sprouted]	C					6		(3) 201 [3]
	cf. *Avena sp.*	possible oat	grain	C/G					11		20
	Avena /Bromus sp.	oat/brome	grain	C/G		2					
	Cereal NFI	Unidentified cereal	grain fragments	C		89	2		126	9	27
	Triticum cf. *dicoccum*	possible emmer	Spikelet fork	Cult						1	
	Triticum spelta	Spelt	Spikelet fork	Cult							45
	Triticum spelta	Spelt	double Spikelet fork with grain	Cult							1
	Triticum spelta	Spelt	single grain Spikelet fork with grain	Cult							6
	Triticum spelta	spelt	glume base (attached grain)	C		1			2	26	436(1)

					Phase	LR1	LR1	LR1	LR1	LR1	LR1
					Sample	1070	1113	1193	1208	1126	1277
					Context	1618	1784	5374	5536	1942	5872
					Feature	post hole of fence line 9502	post hole 1771 of fence line 9502	post hole 5373of fence line 9502	spread prob assoc with 9506	enclosure ditch 9506	enclosure ditch 9506
Family	**Taxa**	**Common name**	**Componant**	**Habitat**							
	Triticum cf. spelta	possible spelt	Spikelet fork	Cult					1		
	Triticum cf. spelta	possible spelt	glume base			1			2		64
	Triticum spelta/dicoccum	spelt/emmer	spikelet fork(counted but not extracted)	C					4		
	Triticum spelta/dicoccum	spelt/emmer	glume base(counted but not extracted)	C		4	3		15	68	19
	Triticum cf. *Spelta*	Spelt	imature spikelet with rachis	C							34
	Triticum cf. *Spelta*	Spelt	articulated rachis								4
	Triticum cf. *Spelta*	Spelt	sterile spikelet with rachis	C							79
	Triticum sp.	wheat	?primary rachis	C							31
	Triticum sp.	wheat	rachis fragments (articulated fragments)	C							204 (131)
	Triticum sp.	wheat	awn fragments (silicified)	C							**** (**)
	Hordeum vulgare	six row barley	rachis fragment	C							3
	Hordeum vulgare	six row barley	lax eared rachis fragment	C							6
	Hordeum sp.	barley	lax eared rachis fragment	C							5
	Hordeum sp.	barley	dense eared rachis fragment	C							

					Phase	LR1	LR1	LR1	LR1	LR1	LR1
					Sample	1070	1113	1193	1208	1126	1277
					Context	1618	1784	5374	5536	1942	5872
					Feature	post hole of fence line 9502	post hole 1771 of fence line 9502	post hole 5373of fence line 9502	spread prob assoc with 9506	enclosure ditch 9506	enclosure ditch 9506
Family	**Taxa**	**Common name**	**Componant**	**Habitat**							
	Hordeum sp.	barley	rachis fragment	C						1	16
	Avena sp.	*oat*	? Pedicle fragments								18
	Avena fatua	wild oat	floret base	Da							2
	Avena sp.	oat	floret base								6
	Avena sp.	oat	straw								2
	Cereal NFI		lemna/palea fragments (silicified)								***(*)
	Cereal NFI		detatched cereal grain hairs								***
	Cereal NFI	Unidentified cereal	detached embryo	C						2	90
	Cereal NFI	Unidentified cereal	detached coleoptile	C							67
	Cereal NFI	Unidentified cereal	straw culm node								38
	Cereal NFI	Unidentified cereal	straw culm inter node								9
	Vicia/Lathyrus sp. *(4mm)*	vetch/pea	Seed	Da,Cult					4		
	Vicia/Lathyrus sp. *(2mm)*	vetch/pea	Seed	Da,Cult					11		1
	Vicia faba/Pisum sativum	Broad bean/pea	Seed fragments	Cult					2		
	Trifolium/Lotus sp. L.	clover/ birdsfoot trefoil	Seed			3					
		legume	seed fragments			4			4		
	cf.*Rubus* sp.		achene								1

					Phase	LR1	LR1	LR1	LR1	LR1	LR1
					Sample	1070	1113	1193	1208	1126	1277
					Context	1618	1784	5374	5536	1942	5872
					Feature	post hole of fence line 9502	post hole 1771 of fence line 9502	post hole 5373of fence line 9502	spread prob assoc with 9506	enclosure ditch 9506	enclosure ditch 9506
Family	**Taxa**	**Common name**	**Componant**	**Habitat**							
Juglandaceae	cf.*Juglans regia*	Possible walnut	shell fragments	Cult. Wild sown in warmer parts					2		
Betulaceae	*Corylus avellana* L.	hazelnut	Shell frags	SW					22		
Brassicaceae	*Raphanus raphanistrum* spp. *raphanistrum* L.	Wild radish	mericarp fragment	cultivated,rough ground, waste places.							1
Plumbaginaceae	*Limonium* sp	sea lavender	seed	coastal		1				2	
	cf. *Limonium sp*	sea lavender	seed								
	Armeria maritima (Mill.) Willd.	Thrift	seed	salt marsh							1
Polygonaceae			Achene			1			1		
	cf.Fallopia convolvulus	possible black bindweed	immature achene in tepals								5
	Rumex sp.	dock type	Achene	DaGMSW					5	1	8
	cf. *Rumex* sp.	dock type	tepal/perianth bladders								8
	Chenopodium album L.	fat hen	Seed (sprouted)	Da,n					3		9(1)
	Atriplex sp.	orache	Seed	n							3
	Chenopodium sp.	goosefoots	Seed	n					1		
Caryophyllaceae	*Stellaria graminea* L.	lesser stitchwort	Seed	GW					5		
Plantaginaceae	*Plantago maritima* L.	sea plantain	seed				2	1			
Asteraceae	*Cirsium* sp.	thistles	Achene								2

					Phase	LR1	LR1	LR1	LR1	LR1	LR1
					Sample	1070	1113	1193	1208	1126	1277
					Context	1618	1784	5374	5536	1942	5872
					Feature	post hole of fence line 9502	post hole 1771 of fence line 9502	post hole 5373of fence line 9502	spread prob assoc with 9506	enclosure ditch 9506	enclosure ditch 9506
Family	**Taxa**	**Common name**	**Componant**	**Habitat**							
	Crepis sp.	hawk's beard	Achene								1
	Anthemis cotula	stinking chamomile	Achene	A heavy soils		6			7		22
	Tripleurospermum inodorum(L.) Scultz-Bip	Scentless mayweed	Achene	Da		1		1	2	1	1
Juncaceae	*Juncus* sp.	Rush	(Capsule) seed			2	360	500*			
	Juncus sp.	Rush	seeds			18					
Cyperaceae			nut				2				
	cf.*Bolboschoenus maritimus*	sea club-rush	Nut	wet muddy places in estuaries or by sea					1		
	cf. *Carex sp. (Trigonus)*										
Poaceae	*Poaceae*	Grass	caryopsis			3	2				26
	cf. *Lolium* sp.	Possible rye grass type	caryopsis								1
	Monocotyledonous leaf/stem fragments		stem/leaf			*	*	*		*	
	Unident	seed	seed				4				
	Unident	Tuber/Rhyzome /root fragments				2					1
	Unident	?nut kernal fragments							2		
	Unident	charred organic fragments				5			**		
	insect charred										3

					Phase	LR1	LR1	LR1	LR1	LR1	LR1
					Sample	1070	1113	1193	1208	1126	1277
					Context	1618	1784	5374	5536	1942	5872
					Feature	post hole of fence line 9502	post hole 1771 of fence line 9502	post hole 5373of fence line 9502	spread prob assoc with 9506	enclosure ditch 9506	enclosure ditch 9506
Family	**Taxa**	**Common name**	**Componant**	**Habitat**							
	fern type		frond type								1

TABLE 19.6: LATE ROMAN PHASE 2 (AREA A): CHARRED PLANT REMAINS, SALTERNS 9501 AND 6090, AND FEATURE 5191

					Phase	LR2	LR2	LR2	LR	LR2	LR2
					Sample	1166	1282	1170	1163	1192	1215
					Context	5143	5388	5136	1536	5429	5566
					Feature	layer south of building 6090	gully 5245 building 6090	within ditch 5191	within ditch 5191	ditch terminus round house 9501	outer ditch of round house 9501
Family	**Taxa**	**Common name**	**Component**	**Habitat**							
	Triticum sp.	free threshing wheat type	grain	Cult						1	
	Triticum sp.	wheat nfi	grain	Cult		10				42	8
	Triticum sp.	wheat	grain (sprouted)	C			4				
	cf. Triticum sp.	possible wheat	grain (insect damage)	C		3	2	5			
	Hordeum Sp.	barley	grain	C		2					
	cf. Hordeum sp	possible barley	grain	C		5		2		4	
	Avena sp.	oat	grain (attached floret) [sprouted]	C		5				28	
	cf. Avena sp.	possible oat	grain	C/G		9	1				
	Avena /Bromus sp.	oat/brome	grain	C/G				11		1	
	cf.Avena /Bromus sp.	oat/brome	grain								8
	Cereal NFI	Unidentified cereal	grain fragments	C		194	29	11		****	246
	Triticum cf. dicoccum	possible emmer	spikelet fork	Cult						1	
	Triticum cf. dicoccum	possible emmer	glume base	Cult				1			
	Triticum spelta	Spelt	spikelet fork	Cult				5		14	

					Phase	LR2	LR2	LR2	LR	LR2	LR2
					Sample	1166	1282	1170	1163	1192	1215
					Context	5143	5388	5136	1536	5429	5566
					Feature	layer south of building 6090	gully 5245 building 6090	within ditch 5191	within ditch 5191	ditch terminus round house 9501	outer ditch of round house 9501
Family	**Taxa**	**Common name**	**Component**	**Habitat**							
	Triticum spelta	spelt	glume base (attached grain)	C		20	17	12		13	33
	Triticum cf.spelta	possible spelt	spikelet fork	Cult		3					1
	Triticum cf.spelta	possible spelt	glume base					9			
	Triticum spelta/dicoccum	spelt/emmer	spikelet fork(counted but not extracted)	C		9		27		(***)	24
	Triticum spelta/dicoccum	spelt/emmer	glume base(counted but not extracted)	C		154	343	52		(***)92	316
	Triticum cf. Spelta	Spelt	immature spikelet with rachis	C						1	
	Hordeum vulgare	six row barley	rachis fragment	C		1					
	Hordeum sp.	barley	dense eared rachis fragment	C		4	3	6		7	4
	Avena sp.	oat	awn fragments	C, arable, rough and waste ground			*	*		*	*
	Avena sp.	*oat*	? Pedicle fragments							8	
	cf. Secale cereale	rye type	rachis fragment								1
	Cereal NFI	Unidentified cereal	detached embryo	C			3	2		20	2

					Phase	LR2	LR2	LR2	LR	LR2	LR2
					Sample	1166	1282	1170	1163	1192	1215
					Context	5143	5388	5136	1536	5429	5566
					Feature	layer south of building 6090	gully 5245 building 6090	within ditch 5191	within ditch 5191	ditch terminus round house 9501	outer ditch of round house 9501
Family	**Taxa**	**Common name**	**Component**	**Habitat**							
	Cereal NFI	Unidentified cereal	detached coleoptile	C				2		2	2
Ranunculaceae	*cf. Ranunculus flammula L.*	Lesser spearwort	achene	all kinds of damp places		1					
Fabaceae	*Vicia/Lathyrus sp. (4mm)*	vetch/pea	seed	Da,Cult		4	3	4		1	1
	Vicia/Lathyrus sp. (2mm)	vetch/pea	seed	Da,Cult		2		3		3	5
	Trifolium/Lotus sp. L.	clover/ birdsfoot trefoil	seed			1		2		1	3
		legume	seed fragments			5					5
Betulaceae	*Corylus avellana* L.	hazelnut	shell frags	SW							1
Malvaceae	*Malva sp.*	mallow	nutlet	DG			1				
Plumbaginaceae	*Limonium* sp	sea lavender	seed	coastal		1				34	4
	cf. Limonium sp	sea lavender	seed								3
	Armeria maritima (Mill.) Willd.	Thrift	seed	salt marsh						43	
	Rumex sp.	dock type	achene	DaGMSW		3	3			9	6
	cf. Rumex sp.	dock type				2					
	Chenopodium album L.	fat hen	seed (sprouted)	Da,n						7	
	Chenopodium sp.	goosefoots	seed	n			1				
	Chenopodium /Atriplex sp.		seed	n						36	

					Phase	LR2	LR2	LR2	LR	LR2	LR2
					Sample	1166	1282	1170	1163	1192	1215
					Context	5143	5388	5136	1536	5429	5566
					Feature	layer south of building 6090	gully 5245 building 6090	within ditch 5191	within ditch 5191	ditch terminus round house 9501	outer ditch of round house 9501
Family	**Taxa**	**Common name**	**Component**	**Habitat**							
	cf.Salicornia sp.	Glassworts	?achene	saltmarsh		2				1	
Caryophyllaceae	*cf.caryophyllaceae*		capsule fragment							1	
	Stellaria graminea L.	lesser stitchwort	seed	GW		1				1	2
	Spergularia marina(L.)Besser	Lesser sea spurry	seed	sandy and muddy maratime places and inland saline areas						12	
	Spergularia sp.		seed							9	
Montiaceae	*Montia fontana* ssp *fontana* L.	blinks	seed	Damp places		1				2	
Plantaginaceae	*Plantago maritima* L.	sea plantain	seed							276	8
	Plantago maritima L.	sea plantain	seed capsule complete							86	
	Plantago maritima L.	sea plantain	empty capsule base							27	
	Plantago lanceolata L.	Ribwort Plantain	seed	G short or grazed. Da						1	
Orobanchaceae	*Euphrasia / Odontites* L.	Eyebright/ Bartsia	seed	Da G		1					
	Galium uliginosum L.	Fen bedstraw	nutlet	fens and base rich marshy places						1	
	Galium aperine L.	Cleavers	nutlet	Da,H				1			

					Phase	LR2	LR2	LR2	LR	LR2	LR2
					Sample	1166	1282	1170	1163	1192	1215
					Context	5143	5388	5136	1536	5429	5566
					Feature	layer south of building 6090	gully 5245 building 6090	within ditch 5191	within ditch 5191	ditch terminus round house 9501	outer ditch of round house 9501
Family	**Taxa**	**Common name**	**Component**	**Habitat**							
Laminaceae	*Prunella vulgaris* L.	Selfheal		grassland,wood-clearings, rough ground							1
Asteraceae		indet								4	
	Anthemis cotula	stinking chamomile	achene	A heavy soils		1	3	1		30	5
	Tripleurospermum inodorum(L.) *Scultz-Bip*	Scentless mayweed	achene	Da						5	1
Juncaginaceae	*Triglochin maritima* L.	Sea arrow grass	seed	Saltmarsh and salt-sprayed grassland						5	
	Juncus maritimus	sea rush	capsule/ seed	saltmarsh		1				2	
	Juncus sp.	Rush	(Capsule) seed			1				84	
	Juncus sp.	Rush	seeds			5				45	226
	Carex sp. *(*Trigonus)	Sedge	nut	MBWG esp. damp/wet soils						2	
Poaceae	*Poaceae*	Grass	caryopsis			3	5				33
	cf.Cyosurus cristatus L.	possible crested dog tail	caryopsis							1	
	Monocotyledonous leaf/stem fragments		stem/leaf							****	***
	Unident	seed	seed			10				8	
	Unident	Bread like fragments						1			

					Phase	LR2	LR2	LR2	LR	LR2	LR2
					Sample	1166	1282	1170	1163	1192	1215
					Context	5143	5388	5136	1536	5429	5566
					Feature	layer south of building 6090	gully 5245 building 6090	within ditch 5191	within ditch 5191	ditch terminus round house 9501	outer ditch of round house 9501
Family	**Taxa**	**Common name**	**Component**	**Habitat**							
	Unident	Tuber/Rhyzome /root fragments				3				1	1
	Unident	tree leaf buds									1
	Unident	?nut kernal									4
	insect charred										1

TABLE 19.7: LATE ROMAN PHASE 2 (AREA A): CHARRED PLANT REMAINS, SALTERN 5760

					Phase	LR2	LR2	LR2	LR2	LR2	LR2	LR2	LR2	LR2
					Sample	1029	1037	1159	1030	1060	1096	1097	1156	1178
					Context	1374	1437	5042	1375	1567	1643	1568	5039	5234
					Feature	rake out debris. Ass with building 5760	rake out debris. Ass with building 5760	rake out debris. Ass with building 5760	hollow 1408 part of building 5760	rake out debris. Ass with building 5760	rake out debris. Ass with building 5760	insitu burnt layer in building 5760	occupation building 5760	pit/ small post hole building 5760
Family	**Taxa**	**Common name**	**Componant**	**Habitat**										
	Triticum sp.	free threshing wheat type	Grain	Cult			20					1		
	Triticum sp.	wheat nfi	Grain	Cult				3						
	Triticum sp.	wheat	grain (sprouted)	C		60			17		8	4	6	2
	cf. Triticum sp.	possible wheat	grain (insect damage)	C		11	5	1	4		5		4	
	Hordeum Sp.	barley	grain	C		2	1		1		6			
	cf. Hordeum sp	possible barley	grain	C							9		1	2
	Avena sp.	oat	grain (attached floret) [sprouted]	C				3	6		11	11		
	cf. Avena sp.	possible oat	grain	C/G		4		4	8		13			3
	Avena /Bromus sp.	oat/brome	grain	C/G										5
	cf.Avena /Bromus sp.	oat/brome	grain				1							
	Cereal NFI	Unidentified cereal	grain fragments	C		185	90	49	265	****	238	143	51	64
	Triticum spelta	Spelt	Spikelet fork	Cult			1	6						
	Triticum spelta	spelt	glume base (attached grain)	C			2	33	2				28	5
	Triticum cf.spelta	possible spelt	Spikelet fork	Cult					8					

					Phase	LR2	LR2	LR2	LR2	LR2	LR2	LR2	LR2	LR2
					Sample	1029	1037	1159	1030	1060	1096	1097	1156	1178
					Context	1374	1437	5042	1375	1567	1643	1568	5039	5234
					Feature	rake out debris. Ass with building 5760	rake out debris. Ass with building 5760	rake out debris. Ass with building 5760	hollow 1408 part of building 5760	rake out debris. Ass with building 5760	rake out debris. Ass with building 5760	insitu burnt layer in building 5760	occupation building 5760	pit/ small post hole building 5760
Family	**Taxa**	**Common name**	**Componant**	**Habitat**										
	Triticum cf.spelta	possible spelt	glume base					5						
	Triticum spelta/dicoccum	spelt/emmer	spikelet fork(counted but not extracted)	C		9	5		7	****			18	
	Triticum spelta/dicoccum	spelt/emmer	glume base (counted but not extracted)	C		6	3		15	****		168	106	69
	Triticum sp.	wheat	?primary rachis	C				1						
	Hordeum sp.	barley	dense eared rachis fragment	C					1			2	3	2
	Avena sp.	oat	awn fragments	C,arable, rough and waste ground								*	*	
	Avena sp.	*oat*	? Pedicle fragments							40				
	Avena sp.	oat	floret base										1	1
	Cereal NFI	Unidentified cereal	detached embryo	C								2	3	1
	Cereal NFI	Unidentified cereal	detached coleoptile	C								1		5
	Cereal NFI	Unidentified cereal	straw culm node									1		
Fabaceae			seed									1		

					Phase	LR2	LR2	LR2	LR2	LR2	LR2	LR2	LR2	LR2
					Sample	1029	1037	1159	1030	1060	1096	1097	1156	1178
					Context	1374	1437	5042	1375	1567	1643	1568	5039	5234
					Feature	rake out debris. Ass with building 5760	rake out debris. Ass with building 5760	rake out debris. Ass with building 5760	hollow 1408 part of building 5760	rake out debris. Ass with building 5760	rake out debris. Ass with building 5760	insitu burnt layer in building 5760	occupation building 5760	pit/ small post hole building 5760
Family	**Taxa**	**Common name**	**Componant**	**Habitat**										
	Vicia/Lathyrus sp. (4mm)	vetch/pea	Seed	Da,Cult			7	4	1		5	1		
	Vicia/Lathyrus sp. (2mm)	vetch/pea	Seed	Da,Cult		5	9	7	3			7	2	3
	Pisum sativum L.	Garden Pea	Seed	Cult			58							
	Vicia faba/Pisum sativum	Broad bean/pea	Seed fragments	Cult			212							
	Trifolium/Lotus sp. L.	clover/ birdsfoot trefoil	Seed			1		13			6	8		2
		legume	seed fragments						4					
	cf.Vicia faba/Pisum sativum	Possible broad bean/pea	seed fragments				4							
Rosaceae	*Rosa* sp.	rose type	spine										1	
Betulaceae	*Corylus avellana* L.	hazelnut	Shell frags	SW									1	
Myrsinaceae	*cf.Glaux maritima*	sea-milkwort	seed	Saline sandy,muddy,rockyor grassy places.							1			1
Plumbaginaceae	*Limonium* sp	sea lavender	seed	coastal				76					2	167
	Armeria maritima (Mill.) Willd.	Thrift	seed	salt marsh				5						115
Polygonaceae			Achene									1		
	Rumex sp.	dock type	Achene	DaGMSW		3		2	3		2	1	1	

					Phase	LR2	LR2	LR2	LR2	LR2	LR2	LR2	LR2	LR2
					Sample	1029	1037	1159	1030	1060	1096	1097	1156	1178
					Context	1374	1437	5042	1375	1567	1643	1568	5039	5234
					Feature	rake out debris. Ass with building 5760	rake out debris. Ass with building 5760	rake out debris. Ass with building 5760	hollow 1408 part of building 5760	rake out debris. Ass with building 5760	rake out debris. Ass with building 5760	insitu burnt layer in building 5760	occupation building 5760	pit/ small post hole building 5760
Family	**Taxa**	**Common name**	**Componant**	**Habitat**										
	cf. Rumex sp.	dock type									1			
	Atriplex sp.	orache	Seed	n							1			
Ameranthaceae	*Chenopodium* sp.	goosefoots	Seed	n			1							
	Chenopodium /Atriplex sp.		Seed	n		1					4			
Montiaceae	*Montia fontana* ssp *fontana* L.	blinks	Seed	Damp places									1	
Plantaginaceae	*Plantago maritima* L.	sea plantain	seed					5						252
	Plantago maritima L.	sea plantain	seed capsule complete					6						90
	Plantago maritima L.	sea plantain	empty capsule base					1						9
	Plantago lanceolata L.	Ribwort Plantain	Seed	G short or grazed. Da							1			
Rubiaceae	*Sherardia arvensis* L.	field madder	nutlet	arable fields,waste places,thin grassland and lawns								2		
	Galium uliginosum L.	Fen bedstraw	nutlet	fens and base rich marshy places							4			
	Galium aperine L.	Cleavers	Nutlet	Da,H		1	1							
Laminaceae	*Prunella vulgaris* L.	Selfheal		grassland,wood-clearings, rough ground				1						

					Phase	LR2	LR2	LR2	LR2	LR2	LR2	LR2	LR2	LR2
					Sample	1029	1037	1159	1030	1060	1096	1097	1156	1178
					Context	1374	1437	5042	1375	1567	1643	1568	5039	5234
					Feature	rake out debris. Ass with building 5760	rake out debris. Ass with building 5760	rake out debris. Ass with building 5760	hollow 1408 part of building 5760	rake out debris. Ass with building 5760	rake out debris. Ass with building 5760	insitu burnt layer in building 5760	occupation building 5760	pit/ small post hole building 5760
Family	**Taxa**	**Common name**	**Componant**	**Habitat**										
	cf. Prunella vulgaris L.	Selfheal										1		
Asteraceae		indet						3			2	1		
	Anthemis cotula	stinking chamomile	Achene	A, heavy soils								2	5	
	Juncus sp.	Rush	(Capsule) seed					5						88
	Juncus sp.	Rush	seeds			1						3	2	1000+
Cyperaceae			nut											
	Carex sp. *(*Trigonus)	Sedge	Nut	MBWG esp. damp/wet soils		1								
	cf. Carex sp. (Trigonus)					5								
Poaceae	*Poaceae*	Grass	caryopsis			1		23				5	18	68
	cf. Lolium sp	Possible rye grass type	caryopsis								1			
	Monocotyledonous leaf/stem fragments		stem/leaf					9						**
	Unident	seed	seed				7	7				11		2
	Unident	Tuber/Rhyzome /root fragments				1		9	1		4			12
	Unident	?nut shell /fruit stone fragments							5					
	Unident	charred organic fragments				2		6	5		3		15	
	Unident	tree leaf buds					5						2	

					Phase	LR2	LR2	LR2	LR2	LR2	LR2	LR2	LR2	LR2
					Sample	1029	1037	1159	1030	1060	1096	1097	1156	1178
					Context	1374	1437	5042	1375	1567	1643	1568	5039	5234
					Feature	rake out debris. Ass with building 5760	rake out debris. Ass with building 5760	rake out debris. Ass with building 5760	hollow 1408 part of building 5760	rake out debris. Ass with building 5760	rake out debris. Ass with building 5760	insitu burnt layer in building 5760	occupation building 5760	pit/ small post hole building 5760
Family	**Taxa**	**Common name**	**Componant**	**Habitat**										
	Unident	?tree bark					****							

TABLE 19.8: LATE ROMAN PHASE 1 and 2 (AREA A): CHARRED PLANT REMAINS, OTHER SAMPLES

					Phase	LR1	LR2	LR2	LR2	LR2	LR2	LR2	LR
					Sample	1222	1111	1297	1353	1189	1121	1233	1345
					Context	5477	1531	6052	6057	5364	1890	1331	6099
					Feature	Ditch 5476	pottery rich deposit	dumping at western edge of 5989	rake out from tile-built hearth 6061	Pit 5368	post hole 1889	Tank 1316	layer from hearth
Family	**Taxa**	**Common name**	**Componant**	**Habitat**									
	Triticum sp.	free threshing wheat type	grain	Cult				3					
	Triticum sp.	wheat nfi	grain	Cult						1			
	Triticum sp.	wheat	grain (sprouted)	C			6(1)	4	2			1	19
	cf. *Triticum* sp.	possible wheat	grain (insect damage)	C			10				2	(1)	9
	Hordeum sp.	barley	grain	C			3						37
	Hordeum vulgare	barley	side grain										11
	cf. *Hordeum* sp	possible barley	grain	C						1	1		14
	Avena sp.	oat	grain (attached floret) [sprouted]	C			2			1	1	1	9
	cf. Avena sp.	possible oat	grain	C/G				2		1	3		11
	Avena /Bromus sp.	oat/brome	grain	C/G				8	3				
	cf.*Avena /Bromus* sp.	oat/brome	grain						5				
	Cereal NFI	Unidentified cereal	grain fragments	C		4	263	100	39	79	62		478
	Triticum dicoccum Schulb.	emmer	spikelet fork	C									2
	Triticum cf. *dicoccum*	possible emmer	spikelet fork	Cult							1		
	Triticum cf. *dicoccum*	possible emmer	glume base	Cult						1			

					Phase	LR1	LR2	LR2	LR2	LR2	LR2	LR2	LR
					Sample	1222	1111	1297	1353	1189	1121	1233	1345
					Context	5477	1531	6052	6057	5364	1890	1331	6099
					Feature	Ditch 5476	pottery rich deposit	dumping at western edge of 5989	rake out from tile-built hearth 6061	Pit 5368	post hole 1889	Tank 1316	layer from hearth
Family	**Taxa**	**Common name**	**Componant**	**Habitat**									
	Triticum spelta	Spelt	spikelet fork	Cult			3		6				
	Triticum cf.spelta	possible spelt	glume base									10	
	Triticum spelta/dicoccum	spelt/emmer	spikelet fork(counted but not extracted)	C			12	33					39
	Triticum spelta/dicoccum	spelt/emmer	glume base(counted but not extracted)	C			220	84	149	54	114	100+	372
	Hordeum vulgare	six row barley	rachis fragment	C							1		
	Hordeum vulgare	six row barley	lax eared rachis fragment	C									20
	Hordeum sp.	barley	lax eared rachis fragment	C									4
	Hordeum sp.	barley	dense eared rachis fragment	C							1		10
	Hordeum sp.	barley	rachis fragment	C			18	1					92
	Avena sp.	oat	awn fragments	C,arable, rough and waste ground					*	*	*		*
	Avena sp.	*oat*	? Pedicle fragments										

					Phase	LR1	LR2	LR2	LR2	LR2	LR2	LR2	LR
					Sample	1222	1111	1297	1353	1189	1121	1233	1345
					Context	5477	1531	6052	6057	5364	1890	1331	6099
					Feature	Ditch 5476	pottery rich deposit	dumping at western edge of 5989	rake out from tile-built hearth 6061	Pit 5368	post hole 1889	Tank 1316	layer from hearth
Family	**Taxa**	**Common name**	**Componant**	**Habitat**									
	Avena fatua	wild oat	floret base	Da				1					
	Avena sp.	oat	floret base					2					1
	Cereal NFI	Unidentified cereal	detached embryo	C				3	1	6	1		2
	Cereal NFI	Unidentified cereal	detached coleoptile	C				4	1	3			1
	Cereal NFI	Unidentified cereal	straw culm node								1		
	Cereal NFI	Unidentified cereal	straw culm inter node						1				
Fabaceae	*Vicia/Lathyrus sp. (4mm)*	vetch/pea	seed	Da,Cult			5		10	3			
	Vicia/Lathyrus sp. (2mm)	vetch/pea	seed	Da,Cult			6	1	8	3	3		4
	Vicia faba/Pisum sativum	Broad bean/pea	seed fragments	Cult							1		
	Trifolium/Lotus sp. L.	clover/ birdsfoot trefoil	seed				2		15		1	76	3
		legume	seed fragments				16	2		5			5
	cf.*Vicia faba/Pisum sativum*	Possible broad bean/pea	seed fragments										1
Rosaceae	*Prunus cf. Spinosa L.*	possible black thorn	stone										1
	cf. *Aphans sp.*	Parsley-pierts	achene							1			
	Rosa sp.	rose type	spine										1
Betulaceae	*Corylus avellana* L.	hazelnut	shell frags	SW									12

					Phase	LR1	LR2	LR2	LR2	LR2	LR2	LR2	LR
					Sample	1222	1111	1297	1353	1189	1121	1233	1345
					Context	5477	1531	6052	6057	5364	1890	1331	6099
					Feature	Ditch 5476	pottery rich deposit	dumping at western edge of 5989	rake out from tile-built hearth 6061	Pit 5368	post hole 1889	Tank 1316	layer from hearth
Family	**Taxa**	**Common name**	**Componant**	**Habitat**									
	cf. *Alnus glutinosa*	Alder	cone scale	damp woods,by lakes and rivers									1
Brassicaceae	*Raphanus raphanistrum* spp.*raphanistrum* L.	Wild radish	mericarp fragment	cultivated,rough ground, waste places.							1		
Myrsinaceae	cf.*Glaux maritima*	sea-milkwort	seed	Saline sandy,muddy, rocky or grassy places.								1	
Plumbaginaceae	*Limonium* sp	sea lavender	seed	coastal		34	3					14	
	cf. *Limonium sp*	sea lavender	seed										5
	Armeria maritima (Mill.) Willd.	Thrift	seed	salt marsh								19	
Polygonaceae	*Persicaria* sp.	knotweeds	achene										1
	Fallopia convolvulus (L.)A.Love	black bindweed	achene				1						2
	Rumex sp.	dock type	achene	DaGMSW			3		34				
	cf. *Rumex sp.*	dock type											1
	cf. *Rumex sp.*	dock type	tepal/perianth				2						
Ameranthaceae	*Chenopodium album* L.	fat hen	seed (sprouted)	Da,n									21
	Chenopodium /Atriplex sp.		seed	n					3		2		
	cf.Salicornia sp.	Glassworts	?achene	saltmarsh		1							
Caryophyllaceae	cf.*caryophyllaceae*		capsule fragment						1				

					Phase	LR1	LR2	LR2	LR2	LR2	LR2	LR2	LR
					Sample	1222	1111	1297	1353	1189	1121	1233	1345
					Context	5477	1531	6052	6057	5364	1890	1331	6099
					Feature	Ditch 5476	pottery rich deposit	dumping at western edge of 5989	rake out from tile-built hearth 6061	Pit 5368	post hole 1889	Tank 1316	layer from hearth
Family	**Taxa**	**Common name**	**Componant**	**Habitat**									
	Stellaria graminea L.	lesser stitchwort	seed	GW					4				
	Spergularia marina(L.)Besser	Lesser sea spurry	seed	sandy and muddy maratime places and inland saline areas								27	
Plantaginaceae	*Plantago maritima* L.	sea plantain	seed			21	3			2	2	216	
	Plantago maritima L.	sea plantain	seed capsule complete									74	
	Plantago maritima L.	sea plantain	empty capsule base									12	
	Plantago lanceolata L.	Ribwort Plantain	seed	G short or grazed. Da					3				1
Orobanchaceae	*Euphrasia / Odontites* L.	Eyebright/ Bartsia	seed	Da G									4
Rubiaceae	*Sherardia arvensis* L.	field madder	nutlet	arable fields,waste places,thin grassland and lawns			1						
	Galium verum var.*maritium*	lady's bedstraw	nutlet	maritime dunes and cliff tops				1					
	Galium aperine L.	Cleavers	nutlet	Da,H					1				
Asteraceae		indet							1				
	Cirsium cf. *Arvense*	creeping thistle type	achene									1	
	Anthemis cotula	stinking chamomile	achene	A heavy soils			2	3	1	6			7

					Phase	LR1	LR2	LR2	LR2	LR2	LR2	LR2	LR
					Sample	1222	1111	1297	1353	1189	1121	1233	1345
					Context	5477	1531	6052	6057	5364	1890	1331	6099
					Feature	Ditch 5476	pottery rich deposit	dumping at western edge of 5989	rake out from tile-built hearth 6061	Pit 5368	post hole 1889	Tank 1316	layer from hearth
Family	**Taxa**	**Common name**	**Componant**	**Habitat**									
	Tripleurospermum inodorum(L.) Scultz-Bip	Scentless mayweed	achene	Da							1		5
Caprifoliaceae	*Sambucus niger* L.	elder	seed	W,H			1						
Juncaginaceae	*Triglochin maritima* L.	Sea arrow grass	seed	Saltmarsh and salt-sprayed grassland								1	
Juncaceae	*Juncus* sp.	Rush	(Capsule) seed			2	4	4				(48) 1000+	(1)18
	Juncus sp.	Rush	seeds			500+				136	16		
Cyperaceae	*Eleocharis* sp.	spike-rush	nut				1						
	Carex sp. (Trigonus)	Sedge	nut	MBWG esp. damp/wet soils								3	4
	cf. *Carex sp.* (Trigonus)												2
Poaceae	Poaceae	Grass	caryopsis			3	6	2	112	10	1	1000+	9
	cf. *Lolium* sp	Possible rye grass type	caryopsis					1				2	
	Monocotyledonous leaf/stem fragments		stem/leaf			***				***	1	****	*
	Unident	seed	seed			3		4				500+	6
	Unident	Tuber/Rhyzome /root fragments					**	*	*				
	Unident	charred organic fragments											3
	Unident	tree leaf buds						2	1				

TABLE 19.9: CHARRED PLANT REMAINS, SEDIMENTARY UNIT G5

					Phase	G5	G5	G5
					Sample	1211	1284	1292
					Context	5433	5985	5985
Family	**Taxa**	**Common name**	**Componant**	**Habitat**				
	Triticum sp.	wheat	grain	cult			9	16
	cf.*Triticum* sp.	possible wheat	grain	C			12	
	Cereal NFI	Unidentified cereal grain	grain fragments (Charred)	C		3		11
	Triticum spelta	spelt	glume base	C			3	
	Triticum spelta/dicoccum	spelt/emmer	glume base	C			5	2
		legume	seedfragments			1		
Rosaceae	cf.*Crataegus monogyna* Jacq	possible hawthorn	stone fragment					
Plumbaginaceae	*Limonium* sp.	sea lavender	seed	coastal		6	3	2
Ameranthaceae		goose foot family	seed			12		
Ericaceae	cf.Ericaeae	Heather family	stem fragments			1		
Plantaginaceae	*Plantago maritima* L.	sea plantain	seed	salt marsh		22	4	
	cf. *Plantago maritima* L.	possible sea plantain	seed					
Rubiacaea	*Galium aperine* L.	Cleavers	nutlet	Da,H			1	
Junc	*Juncus maritimus*	sea rush	seed capsule					
Juncaceae	*Juncus* sp.	Rush	seed(capsule)			***	500+	412
Cyperacece		Cyperaceae type	nut				1	
	cf. *Carex* sp.	possible sedge	nut				2	1
Poaceae		Grass	caryopsis			149	1	6
	Monocotyledonous leaf/stem fragments		stem/leaf			***	***	***
	Unident	seed	seed				8	
	Unident	Tuber/Rhyzome /root fragments				6	2	
	Fuel ash slag					***		***
	charcoal						*	**
	Briquetage fragments					****		

TABLE 19.10: CHARRED PLANT REMAINS, AREA A, NON-RED HILL SAMPLES

					Phase	LR1	IA
					Sample	1193	1210
					Context	5374	5434
					Feature	Post hole 5373 of fenceline 9502	layer
Family	**Taxa**	**Common name**	**Componant**	**Habitat**			
Plantaginaceae	*Plantago maritima* L.	sea plantain	seed (capsule)			1	
Asteraceae	*Tripleurospermum inodorum*(L.) *Scultz-Bip*	Scentless mayweed	achene	Da		1	
Juncaceae	*Juncus maritimus* Lam.	sea rush	seed capsule	salt marsh			
	Juncus sp.	Rush	(Capsule)/ seeds			500+	(1)500+
Cyperaceae			nutlet				130
	Monocotyledonous leaf/stem fragments		stem/leaf			**	***
	Unident	fuel ash slag					***

TABLE 19.11: WATERLOGGED PLANT REMAINS

				Phase	Bronze Age	LR1	LR1	LR1	LR2
				Sample	1137	1377	1357	1368	1238
				Context	1915	6584	1248	1252	5660
				Feature	peat	pot fill	fill around pot	Quarry pit	layer
FAMILY	**TAXA**	**COMMON NAME**	**COMPONANT**	**HABITAT**					
	Triticum spelta/ dicoccum	glume wheat	glume base (charred)	cult			1(2)	1(1)	1	
	cereal nfi		grain charred					1		
	cereal nfi		colyoptile charred					1		
	cereal nfi		culm node				3			
Papavaveraceae	*Glaucium flavum* Crantz.	yellow horned poppy		maritime shingle,				1		
	Fulmaria cf.*muralis* Sonder ex Koch	common ramping-fumitory	achene	arable and waste ground and hedge-banks						5
	Fulmaria cf.*officinales*	common fumitory	achene	cultivated andwaste ground			1	4	3	
Ranunculaceae	*Ranunculus acris L./repens* L.	Buttercup meadow/creeping	achene	G (damp),B			12	39	9	
	Ranunculus sp. subgen batrachium	Water crowfoots	achene	P,R		8			2	
	Ranunculus sp.	buttercup type	achene							1
Fabaceae		legume	pod fragments				2			
Rosaceae	*Prunus* sp.							13		
	Prunus spinosa	blackthorn		hedge,scrub,woods			23	4		
	Prunus cf.*spinosa*	possible blackthorn					1			
	Prunus domestica cf. Ssp.domestica	Plum	stone				1	2	1	
	Prunus domestica cf. Ssp.Insitita	Damson type/bullace	stone				5			
	Prunus domestica	plumtype	stone				17		7	
	Prunus domestica cf *italica*	greengage type	stone				1	2		
	Prunus avium	wild cherry					34	2		

					Phase	Bronze Age	LR1	LR1	LR1	LR2
					Sample	1137	1377	1357	1368	1238
					Context	1915	6584	1248	1252	5660
					Feature	peat	pot fill	fill around pot	Quarry pit	layer
FAMILY	**TAXA**	**COMMON NAME**	**COMPONANT**	**HABITAT**						
	Malus cf. *Pumila*	Apple	pip				17	3	1	
	Malus cf. *Pumila*	Apple	ovary wall segments				35	4	18	
	Crataegus monogyna Jacq.	hawthorn	stone	woodland borders,scrub, hedges			5		1	
	Rubus sp.	Brambles	seed				334	138	90	
	Rosa sp.	Rose	achene				3	4		
Moraceae	Cf.*Fiscus carica*	fig	seed				1			
	Urtica urens L.	small nettle	achene	cultivated,waste places.			20	58	26	
	*Betula*cf. *pendula*	siver birch	fruit							1
Malvaceae	*Malva* cf. *Sylvestris*	common mallow	nutlet	waste and rough ground			4			
Brassicaceae	*Lepidium coronopus* (L.)Al-Sahbaz	swine-cress	fruit	W,(paths, around trodden gateways)			1			
	Thlaspi arvense L.	Field penny-cress	seed	W,A						2
	Cf. *Thlaspi arvense* L.	Field penny-cress	seed							1
Plumbaginaceae	*Limonium* sp.	sea lavender	seed(charred)	coastal						1
Polygonaceae								13	2	2
	Fallopia convolvulus (L.) *Love.*	black bindweed.	Achene	Da						2
	*Polygonum aviculare*L.	Knotweed	achene	all sorts of open ground			5			
	Rumex sp.	Dock	achene					4		6
	Rumex sp.	Dock	tepal						2	
	Rumex acetosella spp *pyrenaicus* (Pourr.) Ackeroyd	sheep's sorrel	achene with tepal	heathy open ground, acid soils			5	83	3	

					Phase	Bronze Age	LR1	LR1	LR1	LR2
					Sample	1137	1377	1357	1368	1238
					Context	1915	6584	1248	1252	5660
					Feature	peat	pot fill	fill around pot	Quarry pit	layer
FAMILY	**TAXA**	**COMMON NAME**	**COMPONANT**	**HABITAT**						
	Rumex cf. *Maritimus* L.	Golden dock	achene in tepal	edges of ponds,ditches,marshy fields			3			
Caryophyllaceae	Cf. caryophyllaceae		seed capsule				3			
	Cf. *Stellaria* sp.		seed				6			
	Stellaria graminea L.	lesser stitchwort	Seed	GW			33	103	1	
	Cf.*Agrostemma githago L.*	corn cockle	seed fragment	Da			1			
	Cf. *Silene* sp.	campion type	seed					1		
Amaranthaceae										5
	Chenopodium sp.L. (Blitum L.)	Goosefoots	seed					35	5	
	Atriplex sp.	Orache	seed				9			27
Primulaceae	Cf. *Glaux maritima*	sea-milkwort	seed	Saline sandy,muddy,rockyor grassy places.			1	1		8
Solanaceae										2
	Hyoscyamus niger L.	Henbane	seed	maritime sand and shingle,inland rough andwaste ground.			65	136	30	
Laminaceae	*Prunella vulgaris* L.	Self heal	seed	G,Woodland clearings			6	8	1	
	Mentha cf.*aquatica* L.	Water mint	seed	marsh, ditches, wet fields		2				1

				Phase	Bronze Age	LR1	LR1	LR1	LR2
				Sample	1137	1377	1357	1368	1238
				Context	1915	6584	1248	1252	5660
				Feature	peat	pot fill	fill around pot	Quarry pit	layer
FAMILY	**TAXA**	**COMMON NAME**	**COMPONANT**	**HABITAT**						
	Mentha cf.*pulegium*	penny royal	seed	damp grassy or heathy places and by ponds,often near sea			3			
Asteraceae							1			
	Cirsium sp.	Thistles	achene					4		
	Cirsium arvense (L.)Scop.	creeping thistle	achene	grassland,hedgerows.arable,waste and rough ground			2			3
	Soncus cf. *Asper* (L.) Hill	Prickly sowthistle	achene	W,Dc			2			
	Anthemis cotula L.	Stinking chamomile	achene (Charred)	Da			7	6	1	1
	Leucanthemum vulgare Lam.	oxeye daisy	achene	grassy places esp. Rich soils			11	2		
Caprifoliaceae	*Sambucus nigra* L.	Elder	seed	W,H						3
Apiaceae							1			2
	Coriandrum sativum	coriander	mericarp (fragments)	introduced. Tips and waste places.			28(24)	1	-6	
	Apium graveolens L.	Wild celery	fruit	brackish			4			
	Cf. *Apium graveolens* L.	Wild celery	fruit	brackish			8			
	Cf. *Apium* sp.							1		
Juncaginaceae	*Triglochin maritima* L.	Sea arrow grass	seed	Saltmarsh and salt-sprayed grassland			1			
Juncaceae	*Juncus sp.*	Rush	seed				1	1	1	
Cyperaceae	*Eleocharis* cf. *Palustris*(L.) Roem.& Schult.	common spike-rush	nut	in or by water,marshes, ditches ,riversides		4				

					Phase	Bronze Age	LR1	LR1	LR1	LR2
					Sample	1137	1377	1357	1368	1238
					Context	1915	6584	1248	1252	5660
					Feature	peat	pot fill	fill around pot	Quarry pit	layer
FAMILY	**TAXA**	**COMMON NAME**	**COMPONANT**	**HABITAT**						
	Carex sp.		nutlet (biconvex)			4				
	Carex sp.		nutlet (trigonous)			3	3	1		
	Cf.*Carex* sp.		nutlet (biconvex)			1				
	cyperaceae		tepal				9			
poaceae		grass type	caryopsis(charred)				1			-2
	indet.		seed			6		12	4	8
			zygomorphic flower				1			
	Moss	Moss	leaf/stem				1		**	1
		dicotyledon	leaf fragments				1			
			tree leaf bud							1
		WL wood					1			
	berry fragments						2	2	2	

a

b

Figure 19.1: a. Sea thrift (*Armeria maritama*) (photo: Ballookey Klugeypop), b. Seeds of thrift recovered from archaeological deposits at Stanford Wharf

Figue 19.2: Coriander seeds

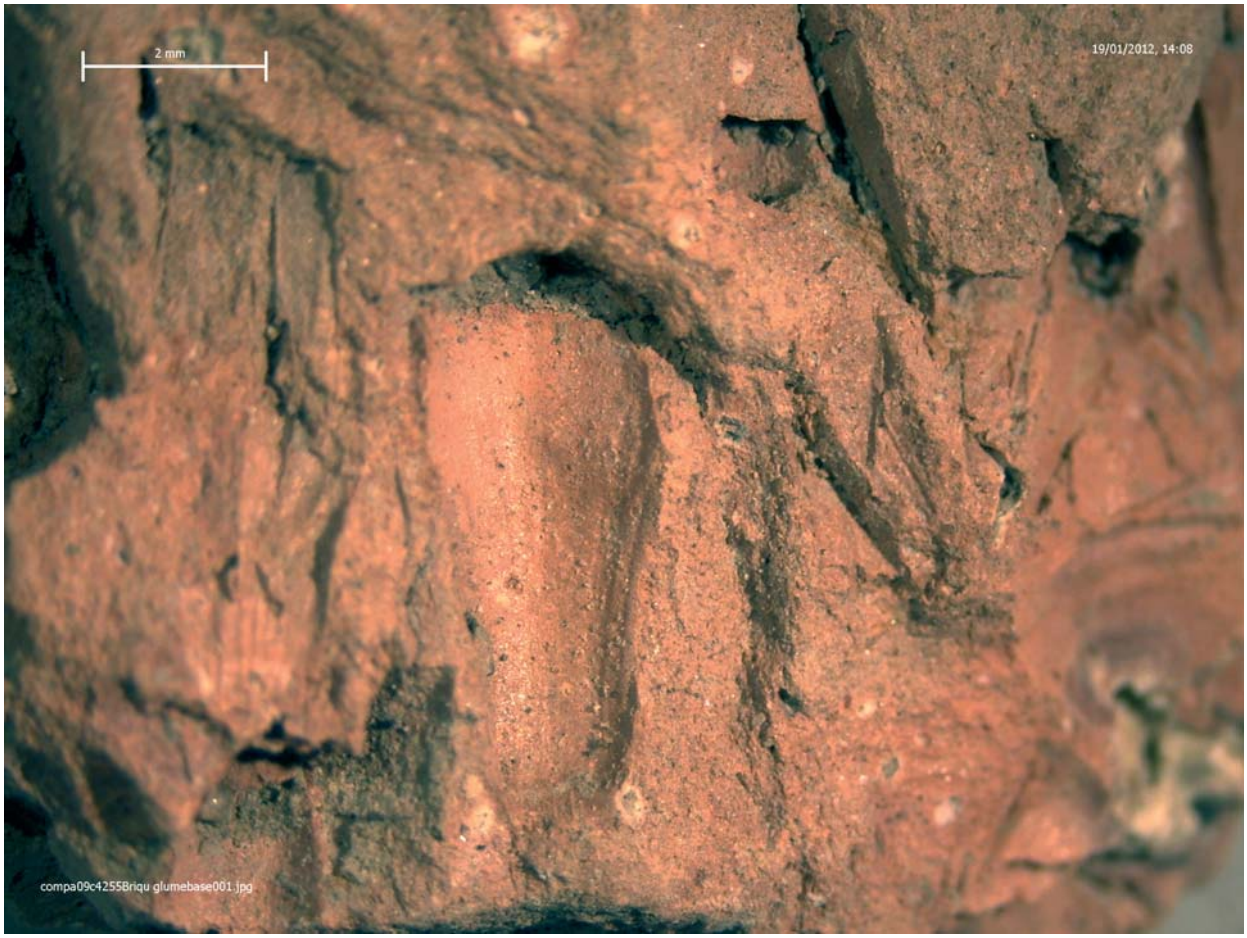


Figure 19.3: Chaff-tempered briquetage

Figure 19.4: Impressions of monocotyledonous stem and leaf fragments

Figure 19.5: Further impressions of monocotyledonous stem and leaf fragments

Figure 19.6: Photomicrograph of monocotyledonous fuel ash waste

Figure 19.7: Well preserved cereal remains (drawn by Kath Hunter)

Oxford Archaeology Monograph No.18

This is one of 26 specialist reports within a digital volume that supports the findings presented in
London Gateway:
Iron Age and Roman salt making in the Thames Estuary
(ISBN 978-0-904220-71-1)

The digital volume can be accessed here:
http://library.thehumanjourney.net/909

Janus House, Osney Mead, Oxford OX2 0ES
ISBN 978-0-904220-71-1