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Ancient Monuments Laboratory
Report 38/86

FISHERGATE, NORWICH (SITE 732N). ENVIRONMENTAL STUDIES.

Peter Murphy BSc MPhil

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Summary

This waterfront site on the north bank of the River Wensum, excavated by Brian Ayers for the Norfolk Archaeological Unit in the summer of 1985, revealed Middle Saxon to post-medieval deposits overlying monocot peats on river gravel. Samples were collected for on-site bulk sieving and laboratory analysis and the final excavation report will include reports on mammal, bird, reptile, amphibian and fish bones, mollusca, coprolites, avian eggshell, mosses, pollen, plant macrofossils, wood and dendrochronology. In this AML Report the writer's work on the sediments, molluscs, coprolites, plant macrofossils and wood is described.

The beginning of peat development will be defined by a radiocarbon date, not yet received. Peat initially formed under open reedswamp growing in shallow water but by about the 10th century conditions in the valley floor were much drier (a widespread phase in the East Norfolk river valleys) and features of this phase produced macrofossil assemblages of grassland plants. Subsequently, in the 10th/ 11th century large-scale dumping of spoil and organic refuse began. A Dark Earth layer sealed these dumped layers, and on this were layers of chalk. Rich plant macrofossil assemblages were retrieved, including a wide range of cultivated plants. Particularly noteworthy are macrofossils of *Beta vulgaris*, *Panicum miliaceum* and *Triticum* cf. *spelta* from medieval contexts. Seeds of halophytes indicate contacts with the Lower Yare Estuary as do assemblages of small infaunal molluscs (*Macoma*, *Nucula*, *Abra*, *Tellina*). Other unusual molluscs include *Ensis siliqua*, apparently a minor economic species. The dumped layers produced coprolites probably of pig and dog. The wood from the site indicates use mainly of roundwood (mostly *Corylus*) in the earlier phases, and larger timber of *Quercus*, *Fraxinus* and *Pinus* in the later.

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Fishergate, Norwich (732N): Environmental studies

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* Included in this report.

1. Introduction

Compared to the extensive recent excavations on the site of the new Magistrates' Courts, Site 450N, (Ayers forthcoming$_A$) work at Fishergate was on a small scale: a single exploratory trench was dug in order to assess the depth, character and date of waterfront deposits in this area. These deposits and their biota provided a source of information on local habitat change and human activity from about to the medieval period. In addition some samples were examined from the fills of the few archaeological features exposed in plan, notably two tenth century linear features and a medieval barrel.

2. Methods

To investigate the main sequence of deposits two parallel column samples (numbered together sample 12) were collected from the section face close to the southern edge of the trench for analysis of pollen and macrofossils. Sampling the lowest 20-30cm. of the sequence was difficult because the compacted peat 175 acted as a seal over the subjacent gravels and when this peat was removed water gushed out. The peat/gravel contact was under water in the deeper parts of the trench even with pumps in operation and the lowest samples had to be collected by levering up blocks of peat from below the water with a spade. It is not surprising that this has led to a discrepancy in the depth of peat recorded in the two columns of sample 12. Samples were also obtained for laboratory processing from the period II linear features 90 and 123, and from 162, the organic fill of the period VI barrel. In addition smaller samples were taken where conspicuous concentrations of macrofossils occurred, including locally shell-rich deposits (121) and discrete groups of fish-bones (55, 99, 111). Large samples from 78 and 106 were collected for bulk-sieving/flotation (c. 70 litres and 25 litres respectively).

As at earlier excavations on the Norwich waterfront, macrofossils were extracted from the deposits using the methods of Kenward et al (1980). Exactly the same procedures were followed at Fishergate as at the Magistrates' Courts and Whitefriars St. Car Park sites (see Murphy, in Ayers forthcoming$_A$; Ayers and Murphy 1983 for full details).

3. The deposits and their biota: general characteristics

The deposits at this site included a wide range of natural and semi-natural sediments and archaeological layers formed in very different depositional environments. Before discussing in detail the results of analyses of macro- and micro-fossils it will be helpful to describe the general characteristics

45-56cm.	(52)	Very dark greyish-brown silt loam; stony, with small chalk pebbles and rare small angular and subangular flints; bone, mollusc shells and charcoal fragments; sharp boundary.
56-65cm.	(54)	Layer of crushed chalk in a greyish-brown silty matrix; some very dark greyish-brown patches; brownish and ochreous staining on surfaces of chalk fragments; sharp boundary.
65-93cm.	(78)	Black humose loam; stony, with small to medium angular to sub-rounded flints and quartzite pebbles; (small flecks of vivianite); charcoal fragments common; mollusc shells and bone; narrow boundary.
93-104cm.	(95)	Black structured organic loam; slightly stony, with small angular to rounded flint and quartzite pebbles; rare small chalk fragments; (calcium phosphate concretions); scraps of decayed wood and fibrous plant material; charcoal fragments common; fly puparia abundant; mollusc shells; sharp boundary.
104-113cm.	(96)	Very dark grey structureless humose loam; very stony with small to medium subangular to rounded flints and quartzite pebbles; rare small chalk fragments; scraps of decayed wood; mollusc shells; sharp boundary.
113cm.		Thin layer of Phragmites culm and leaf fragments with other indeterminate monocotyledonous plant remains; sharp boundary.
113-135cm.	(97)	Very dark greyish-brown structured organic deposit; slightly sandy; stoneless; abundant twigs, wood and bark fragments at top, decreasing towards base; becoming more compacted towards base; merging boundary.
133-163cm.	(175)	Very dark brown compacted peat; slightly sandy; Phragmites stems and rhizomes and other monocotyledonous plant remains common; indistinct boundary.
163-183cm.	(175)	Very dark brown compacted peat; slightly sandy with discrete irregular patches of yellowish-brown coarse sand; rare small rounded and subangular flint pebbles; reddish concretions; rare small twigs; some monocotyledonous plant remains; red fibrous plant material; one large (6cm. diameter) branch fragment; indistinct boundary.
183-195cm. (approx)	(175)	Very dark brown compacted peat; very slightly sandy; very rare small subangular flints; some monocotyledonous plant remains and woody roots.
195cm.+(approx)		Gravel in a coarse greyish-brown sand matrix.

Table 1 : The deposits and sediments sampled in column sample 12.

The main features of these deposits visible without magnification are recorded. Features noted in brackets were not apparent in the untreated samples, but were obvious after sieving. The peat/gravel contact was not seen, being under water even with pumps operating. Measurements of depths were taken from the top of the section exposed.

	52	54	78	95	96	97	175
Wood	+	-	-	+	+	++	+
Charcoal	+	+	++	++	+	+	+
Carbonised cereals	+	+	+++	+++	+	+	-
Seeds etc.	+	+	++	+++	++	++	++
Nutshells (Corylus)	+	-	+	+	-	+	-
Mosses	-	-	-	-	-	+	+
Charophytes	-	-	-	-	-	-	+
Phragmites etc.	-	-	-	-	-	+	++
Foraminifera	-	-	+	-	-	-	-
Insects etc.	-	+	+	++	+	++	++
Marine molluscs	++	+	++	++	++	++	+
Land/freshwater molluscs	+	+	-	-	+	-	-
Fishbone	++	+	++	++	++	+	-
Other bone	++	+	++	+	++	+	-
Avian eggshell	-	-	+	+	+	+	-

Table 2: Distribution of macrofossils in sub-samples of column sample 12.

The number of '+' gives an appropriate indication of the relative abundance of different types of macrofossil.

of these deposits, to outline the distribution of biota in them and to draw some inferences from these characteristics about the conditions in which the deposits were formed.

Field descriptions of deposits sampled in column sample 12 are given in Table 1. Percent dry weight and percent loss on ignition were determined by drying samples in an oven at 100°C for 24 hours and ashing in a muffle furnace at 500°C for 4 hours. The results are given in Table 1 (fiche). Loss on ignition is partly determined by the organic content of the deposits but is also related here to the presence of other components such as charcoal, wood, chalk and shell. The residue after ignition from most samples of 175 consisted mainly of a red powder and this is thought to indicate that 175 included a high proportion of hydrated iron oxides precipitated in this peat from water percolating through the local terrace sands and gravels. These terrace deposits are known to have a high limonite content in places, which was exploited as a low-grade iron ore in the Late Saxon period (Fisher 1985).

The distributions of macrofossils in column sample 12 are summarised in Table 2. In part these distributions reflect depositional factors: charcoal, carbonised cereals, nutshells, mollusca, bone and avian eggshell are obviously common in the archaeological deposits but rare or absent in the underlying peat 175. Differential preservation has also affected these distributions, however. In the permanently waterlogged anaerobic deposits at the base of the section uncarbonised seeds and insects are well preserved but they are rare or poorly preserved in the predominantly mineral deposits towards its top.

From the characteristics described in Tables 1 - 2, it is possible to assess in outline the changing conditions of deposition.

1. Fluvial sandy gravel, deposited in a vigorously-flowing channel presumably in the Late Devensian or early Holocene.

2. Peat below 183cm. (175: Period 1). A radiocarbon date of ± bp or ad (HAR-) was obtained on a peat sample from the base of 175. The peat below 183cm. was a highly compacted littoral peat with a weight loss on ignition of around 60%. Macrofossil analysis, discussed further below (p. 12) suggests deposition in, or adjacent to, open reed swamp growing in shallow water, isolated from the main river channel.

3. Peat between 133 and 183cm. (175: Period 1). The loss on ignition

decreases above 183cm., reaching a minimum value of 32% at 143-153cm., before increasing above 143cm. These variations are partly due to the presence of iron compounds and partly to variations in the sand content of the deposit. Between 163 and 183cm. discrete patches of sand and pieces of wood were present, apparently indicating some human activity in the vicinity. There was, however, no food refuse in 175 at this level, nor any artefacts, which implies that this activity was not domestic in character. Above 143cm. peat development appears to have continued undisturbed, though the plant macrofossil assemblage from the top of 175 implies lowered water levels and a comparatively dry marsh surface (see below, p. 15). The top surface of 175 was dated to ± bp or ad (HAR-).

Hudson (1898) describes a section just upstream from this site, at Fye Bridge, which showed peat deposits of this general type ("peaty bog") extending across the valley floor for about 100m. with an average depth of about 1.5m.

4. Organic deposits between 113 and 135cm. (97: Period III(1)). No deposits of period II (10th century) were present at this point in the section, though linear features, 90 and 123, whose fills incorporated domestic and other refuse were sampled at other locations in the trench. 97 contained quite large quantities of carbonised cereals, wood, marine mollusc shells, bone and avian eggshell, and this layer thus appears to represent the earliest large-scale refuse dumping on the marsh surface, during the late 10th or early 11th century.

5. Thin layer of Phragmites stems and leaves at 113cm. These seem to represent a brief phase of stability during which refuse dumping ceased and reeds colonised the dumped deposits, which presumably remained wet by capillary action.

6. Dumped deposits between 93 and 103cm. (95, 96: Period III(1)). These deposits are clearly dumped layers with a comparatively high mineral content.

7. Dark Earth between 65 and 93cm. (78: Period III(2)). This very uniform deposit, some 30cm. thick at this point, closely resembles the organic Dark Earth described by MacPhail (1983, 46) from the site at Whitefriars Street Car Park (site 421N). It has a similar uniformly dark colour and very similar loss on ignition (6.8-8.9% compared to 6.9% at site 421N). Like the Whitefriars Street Dark Earth that at Fishergate includes vivianite and large quantities of charcoal and food refuse. It seems to

consist predominantly of dumped material.

8. Deposits above 65cm. (52, 54; Period IV (11th-12th century)). 54 consists of a densely packed deposit of crushed chalk, laid down presumably to provide a firm surface for riverside activities. On this surface deposits of refuse, with a high chalk content (52) accumulated.

In summary, the deposits in this section show that peat began to develop over terrace gravels in this part of the valley at about ad. Despite some artificial disturbance during period I, large-scale refuse dumping does not seem to have begun at the site before period III(1) (10th-11th century). In subsequent periods the archaeological deposits, which include a Dark Earth layer, were almost completely artificial.

6. Mollusca

Shells and fragments of marine, freshwater and terrestrial molluscs were recovered by hand during excavation and by sieving soil samples. Full species lists and counts are given in Tables 2 and 3 (microfiche).

The results from the hand-collected material are summarised in Table . Deposits of periods I and II produced only small quantities of oyster, mussel and whelk shells, but the dumped layers of refuse from periods III to IV contained much larger amounts of shell. In all periods the oyster is the predominant species, with some mussels and whelks (Buccinum and Neptunea), the latter becoming more abundant in the latest site phases. Infaunal molluscs characteristic of sandy coasts (Cerastoderma, Ensis) are completely absent before period V (12th century) and rare thereafter, suggesting that estuarine shell fisheries in the lower Yare were of primary importance. The species composition of shell assemblages from Whitefriars Street Car Park supports this conclusion (Ayers and Murphy 1983, 34-6).

Fragments of Solenacea (cf. Ensis siliqua) occurred at this site in period V and VI deposits. They have also been identified in medieval deposits at other sites in Norwich, notably at site 176N, where an assemblage of 21 E. siliqua valves was recovered, and in 11th century refuse deposits at Castle Acre Castle (both Murphy, unpublished). It is thus clear that razorshells formed a widespread, if minor, component of the medieval diet in Norfolk.

From deposits of periods III and IV a few shells of the small inedible bivalve Macoma balthica were collected and two soil samples from phase III(1) (10th/early 11th century) included shells of this and similar species: 99 and 121. (Table 4) 99 produced only one abraded hinge fragment, probably of Macoma balthica, with some non-hinge fragments of tellinid bivalves, but a 0.9kg sample from 121 contained valves and fragments from numerous individuals of M. balthica, associated with valves of Nucula turgida, Tellina fabula and Abra alba. 121 was a layer of organic sandy silt with wood fragments, charcoal and rare small subangular flint pebbles. Some of the bivalve shells from this layer had an internal encrustation of light greyish-brown sandy clay which probably is the type of sediment from which these bivalve shells originally came.

M. balthica, the predominant species in this assemblage is an infaunal bivalve particularly common in intertidal mud in estuaries (Tebble 1976, 150), where it can occur in densities of more than 6000 individuals per square metre

Period	I	II	III(1)	III(2)	IV	V	VI
Mytilus edulis L	2	7	11	13	2	4	8
Ostrea edulis L	10	29	258	959	274	339	325
Pecten maximus (L)	-	-	-	-	-	1	-
Cerastoderma sp	-	-	-	-	-	1	1
Macoma balthica (L)	-	-	2	1	1	-	-
cf. Ensis siliqua (L)(frags)	-	-	-	-	-	1	2
Nucella lapillus (L)	-	-	1	-	-	-	-
Neptunea antiqua (L)	-	-	-	-	-	-	8
Buccinum undatum L	1	1	4	8	2	17	44

Table 3 : Summary table listing marine mollusca collected by hand during excavation (minimum numbers of individuals).

	99	121
Nucula turgida Leckenby and Marshall	-	15
Mytilus edulis L	-	+
Ostrea edulis L	-	+
Tellina (Fabulina) fabula Gmelin	-	1
Tellina sp	-	1
Macoma balthica (L)	1cf	378
Tellinidae indet (fragments)	+	819
Abra alba (Wood)	-	3
Abra sp	-	3
Scrobiculariidae indet (fragments)	-	23

Table 4 : Marine mollusca from contexts 99 (Sample 5) and 121 (Sample 6).

Counts refer to numbers of valves.

(Yonge 1949, 267). Abra alba and Tellina fabula can occur in similar sediments from low in the intertidal zone to depths of about 65 and 55m respectively. (Tebble 1976, 144 and 152.) Nucula turgida is found in sandier substrates down to depths of about 90m (ibid, 28). Estuarine conditions would not have extended up the River Yare beyond the area of Breydon Water in the 10th century (Coles and Funnell 1981, 127-9) and it is thus clear that these bivalves must have reached the Fishergate site by some artificial means. The most likely interpretation is that these shells were accidentally brought to the site in mud adhering to vessels, fishing gear or footwear. Fish hooks, net weights and bone netting needles from the site establish the presence of fishermen at the site as, of course, does the street name Fishergate.

Soil samples produced a very few shells of freshwater and terrestrial molluscs, including Lymnaea truncatula, Succineidae, Cochlicopa sp, Acanthinula sp, Limacidae and Helix aspersa, and some shells of Cepaea spp were collected by hand. The assemblages are, however, too sparse to provide any useful palaeoecological information.

7. Miscellaneous faunal remains

(a) Coprolites and other faecal concretions

Fragments of coprolites were recovered by hand during excavation from five contexts and, in addition, samples from the organic fill of a barrel (162) included a high proportion of flat platey faecal concretions. The plant macrofossils associated with the concretions from 162 establish that the deposit included human faeces mixed with plant material used for flooring or litter (Pteridium, Calluna, grass/cereal culm). The coprolites seem, however, to be of animal origin (see Table 4 (microfiche) for details). They fall into two main groups. The coprolite from 123 contains large fragments of monocotyledonous (grass?) culm and leaf but no bone or seed fragments. High power examination of a suspension of acid-insoluble material from this coprolite showed the presence of a Trichuris ovum, phytoliths and angular sand grains. It is possible that this coprolite was dropped by a herbivore. The remaining coprolites, from 33, 94, 96 and 121 all include bone fragments up to about 25mm. The fragments in 33 are rounded, but those from the other three coprolites are sharp and angular. No plant tissue was observed in 33 and 121, but in 94 and 96 testa fragments from seeds of arable weeds are present, together with some monocotyledonous stem tissue and flecks of charcoal. It seems reasonable to suggest that these bone-rich coprolites were dropped by dogs and/or pigs scavenging on the deposits of refuse dumped along the waterfront from period III onwards.

(b) Avian eggshell

Small quantities of eggshell fragments were recovered from the period II features 90 and 123, from dumped layers of period III (97, 96, 95, 78, 121), from a period III gulley (108) and from the organic barrel fill 162, of period VI. There were no concentrations of fragments. The sample from 162 also contained eggshell membrane, which commonly occurs in cess-pit deposits (Allan Hall, pers.comm).

10. Plant macrofossils (excluding wood and mosses)

Plant macrofossils were extracted from column sample 12, which included sub-samples from the period I peat 175 together with samples from the overlying dumped deposits of periods III and IV, and also from several archaeological features of periods II, III and VI. Full lists of identifications are given in Tables 5 - 9 (fiche). The results are summarised in Tables -

Local vegetation

The assemblages of plant macrofossils from column sample 12 and from samples from Period II features provide information on changes in local vegetation between Periods I and IV (i.e. pre-10th century - 12th century). The results from sample 12 are summarised in Fig 2. Percentage frequencies of some of the more abundant or ecologically characteristic taxa in successive sub-samples are plotted individually in this diagram but most species are plotted as ecological groups. The species composition of these groups is given in Table 2. Inevitably any such grouping is to an extent artificial, for many of the plants here represented by macrofossils can occur in more than one type of plant community. For this reason grouping in very general ecological categories has been preferred to attempts at reconstructing particular communities or associations.

The earliest macrofossil assemblage comes from the base of the peat 175 at 183-195cm, a sample of which has yielded a radiocarbon date of or ad (HAR-). The assemblage is dominated by fruits of Scirpus cf lacustris, a characteristic plant of open reed-swamp. Fruits and seeds of the submerged and floating-leaved aquatic plants, Ranunculus subgenus Batrachium and Nymphaea alba are also present, together with seeds of wetland plants, particularly Lycopus europaeus and Carex spp. Formation of littoral peat adjacent to open reed-swamp had begun at this point in the valley by about ad, probably in a back-swamp isolated from the main river channel.

The peat just above this, at 173-183cm, produced a quite different assemblage of macrofossils with very few remains of wetland and reedswamp plants. Poorly-preserved nutlets of Urtica dioica dominate the assemblage. It appears that at this level the peat surface had dried out to some extent, with resulting partial degradation of macrofossils. Evidence for nearby human activity, perhaps in response to these drier conditions, is provided by the presence of irregular patches of sand in the peat, associated with very thin charcoal scatters and large pieces of wood.

1. Nymphaeceae (Nymphaea alba, Nuphar lutea).
2. Scirpus cf lacustris.
3. Other Aquatics.
   (Characeae), Ranunculus subg Batrachium, Oenanthe aquatica, Alisma plantago-aquatica, Potamogeton spp, Zannichellia palustris.
4. Lycopus europaeus.
5. Carex spp.
6. Other Wetland taxa.
   Caltha palustris, Ranunculus flammula, Ranunculus sceleratus, Rorippa islandica, Lychnis flos-cuculi, Filipendula ulmaria, Lythrum salicaria-type, Epilobium sp, Hydrocotyle vulgaris, Apium spp, Cicuta virosa, Menyanthes trifoliata, Scrophularia sp, Bidens cernua, Bidens sp, (Juncus spp), (Iris pseudacorus), Typha sp, Eleocharis sp, (Phragmites australis).
7. Mentha spp.
8. Grassland taxa (including heath species).
   (Pteridium aquilinum), Ranunculus acris/repens/bulbosus.
9. Urtica dioica.
10. Urtica urens.
11. Polygonum spp (P. aviculare, P. convolvulus, P. persicaria, P. lapathifolium).
12. Chenopodium album.
13. Stellaria media.
14. Lamium spp.
15. Other Weeds and other species of open habitats.
    Papaver argemone, Papaver sp, Brassica sp, Raphanus raphanistrum, Reseda luteola, Reseda sp, Agrostemma githago, Spergula arvensis, Chenopodium rubrum/glaucum, Atriplex sp, Chenopodiaceae indet, Aphanes arvensis/microcarpa, Conium maculatum, Euphorbia helioscopia, Rumex acetosella, Rumex sp, Anagallis arvensis-type, Hyoscyamus niger, Solanum nigrum, Galeopsis tetrahit/speciosa, Plantago major, Plantago lanceolata (c), Valerianella dentata, Anthemis cotula, Tripleurospermum maritimum, Centaurea cyanus, Lapsana communis, Sonchus oleraceus, Sonchus asper, Bromus spp (c).
16. Woodland and scrub taxa.
    (Ilex aquifolium), Rubus fruticosus, Rubus idaeus, Prunus sp, Alnus glutinosa, (Corylus avellana), Solanum dulcamara, Sambucus nigra.
17. Halophytes and other coastal plants.
    Beta vulgaris, Suaeda maritima, Glaux maritima, Triglochin maritima.
18. Cultivated plants.
    cf Pisum-type (c), Vicia faba var minor (c), Avena spp (c), Hordeum sp (c), Triticum sp (c), Secale cereale (c).

19. Incompletely identified specimens: several habitats possible. Ranunculus sp, Cruciferae indet, Hypericum sp, Silene sp, Stellaria palustris/graminea, Caryophyllaceae indet, Vicia/Lathyrus sp (c), Potentilla sp, Umbelliferae indet, Myosotis sp, Solanum sp, Labiatae indet, Compositae indet, Gramineae indet.

Table 5: Plant taxa from column sample 12 as grouped for ecological interpetation in Fig 2.

Taxa listed in brackets are not included in Fig 2 since they are represented by leaf or stem fragments or since counts of seeds etc were not obtained. Iris and Corylus were identified from small fragments of fruits and nutshells. Carbonised macrofossils are indicated thus: (c).

The remaining four assemblages from 175 between 173 and 133cm indicate an initial return to wetter conditions followed by a long-term drying of the peat surface. The assemblage from 163-173cm is fairly similar to that at the base of 175. Above this, however, there is a progressive reduction in the frequencies of aquatic and reedswamp plants, whilst frequencies of marsh, riverbank and grassland species increase, suggesting that the marsh surface had become drier by the end of Period I.

No deposits of Period II (10th century) were present in column sample 12 but two samples of this date came from the small linear features 90 and 123. Conditions were clearly quite dry on the marsh surface whilst these features became infilled. Fruits and seeds of obligate aquatic plants are absent, and macrofossils from species of marsh and littoral habitats, (including Ranunculus sceleratus, Ranunculus flammula, Hypericum sp, Lychnis flos-cuculi, Filipendula ulmaria, Apium cf. graveolens, Pedicularis palustris, Mentha sp, Lycopus europaeus, Juncus spp, Eleocharis sp, Scirpus/Schoenoplectus and Carex spp) are rare: in 90 these taxa account for only 1.8% of the total seed count (Σ = 1051), in 123 5.6% (Σ = 727). In 123 seeds of grassland plants are common, particularly uncarbonised grass caryopses (35.1%) with fruits of Ranunculus acris/repens/bulbosus (1.5%) and Prunella vulgaris (1.5%). Other taxa characteristic of meadows (Greig 1984, 222) in these samples include Trifolium sp (flower and pod fragments), Torilis japonica, Daucus carota, Achillea millefolium, Hypochaeris sp and Juncus spp. On this evidence it appears that reedswamp and marsh vegetation had been replaced by valley floor pasture or meadow in the vicinity of the site by the 10th century. There are high frequencies of weed taxa in both samples: in 90, for example, Anthemis cotula alone accounts for 39.3% of the seed count and Lapsana communis 22.7%. This, together with the presence of crop plant remains, abundant wood chips and charcoal provides evidence for human activity in the vicinity, though there does not appear to have been any significant dumping of plant wastes on the peat surface at this date.

The deposits of Periods III and IV (10th-12th century), sampled in the upper part of column sample 12 consist almost entirely of dumped material, however (see above p. 6). All samples above 123cm, from layers 97, 96, 95, 78, 54 and 52 produced assemblages in which seeds of wetland and grassland plants are very rare and in which seeds of annual weeds predominate. For example, the perennial Urtica dioica, abundant in the lower part of the column, is largely replaced in the upper layers by Urtica urens. The disturbed conditions associated with dumping on the waterfront clearly encouraged the development of an annual weed flora with some elder (Sambucus nigra) and bramble (Rubus fruticosus) in less-disturbed areas. Other plant remains in these upper layers -

macrofossils of cultivated plants and coastal species including halophytes - are also related to much more intensive human activity at the site.

In summary, then, the macrofossils from the Period I peat, 175, indicate progressively drier conditions in the valley floor. By the 10th century (Period II) reedswamp and marsh vegetation had been replaced at this site by grassland and weed vegetation, and groundwater levels were apparently not high enough for aquatic vegetation to develop in the gulleys 90 and 123. Dumping of refuse and spoil on the marsh surface from Period III(1) (10th/ early 11th century) resulted in the development of predominantly weedy vegetation. The evidence for low groundwater levels in the valley floor at this site in the 10th century is consistent with results from elsewhere in the east Norfolk river valleys: it was at about this time that the water table became sufficiently low for deep peat excavation in the Broads to begin (Coles and Funnell 1981, 129; Lambert et al 1960).

Cultivated and utilised wild plants

The distribution of macrofossils of cultivated plants and of some potentially useful wild species in samples from deposits of site periods I-VI is summarised in Table 6. Compared to earlier excavations on the Norwich waterfront the range of utilised plant taxa is limited (cf. Ayers and Murphy 1983; Murphy, in Ayers 198), mainly because few waterlogged deposits rich in plant wastes were available for sampling.

Samples from 175, natural and semi-natural peats of Period I, produced no remains of definitely cultivated plants. The few fruitstones and seeds of Rubus fruticosus (bramble), Rubus idaeus (raspberry) and Sambucus nigra (elderberry) in these samples could easily have been incorporated in the peats from local vegetation by natural processes of dispersal.

The assemblages of plant macrofossils from the period II (10th century) contexts 90 and 123 are quite different in character. Samples from the fills of these features produced remains of cereals, flax (Linum usitatissimum) and several potentially useful wild plant species. The cereal remains include a few carbonised grains and awn fragments of oats (Avena sp) and a grain of free-threshing wheat (Triticum aestivum s.l.). The sample from 123 also produced some non-carbonised fragments of rye rachis (Secale cereale), large culm nodes, probably of cereals, and seeds of common arable weeds. This material probably indicates some crop processing in the vicinity. The sparse remains of flax include seeds and fragments of capsules, but no stems or fibres were observed. This again could indicate local processing, or even flax-growing

Site Period		I	II	III	IV	VI
Date		Before 10th cent.	10th cent.	10th-11th cent.	11th/12th cent.	13th cent. onwards
Avena sativa	(cultivated oats)	-	-	++	-	+
Avena cf strigosa-group	(sand oat etc?)	-	-	++	-	-
Avena sp	(indeterminate oats)	-	+	+++	+	+
Hordeum spp	(barley)	-	-	+++	-	+
Secale cereale	(rye)	-	+	+	-	+
Triticum aestivum	(bread wheat)	-	+	+	-	+
Triticum sp	(glume wheat)	-	-	-	-	+
Panicum miliaceum	(millet)	-	-	-	-	+
Vicia faba var minor	(horse-bean)	-	-	+	+	-
Pisum-type	(?pea)	-	-	?	-	-
Linum usitatissimum	(flax)	-	++	+	-	+
Reseda luteola	(dyer's rocket)	-	+	+	-	+
Rubus fruticosus	(bramble)	+	-	+	-	+
Rubus idaeus	(raspberry)	+	-	+	-	+
Fragaria vesca	(strawberry)	-	+	-	-	+++
Malus sylvestris/domestica	(apple)	-	-	-	-	++
Prunus sp	(?sloe)	-	-	+	-	-
Ficus carica	(fig)	-	-	-	-	++
Sambucus nigra	(elder)	+	+	++	++	+
Corylus avellana	(hazel)	-	+	+	+	-
Brassica spp	(cabbage etc)	-	-	++	-	+++
Beta vulgaris	(beet)	-	-	+	+	-
Foeniculum vulgare	(fennel)	-	-	-	-	+
Humulus lupulus	(hop)	-	+	-	-	-

Table 6 : Summary of the distribution and relative abundance of macrofossils from crop-plants and potentially useful wild species in samples from 732N.

in the valley floor: macrofossil assemblages from these features and from the top of the peat 175 include rather few remains of wetland taxa, implying that the marsh surface would have been sufficiently dry in the 10th century for the cultivation of flax. Other potentially useful plants identified from macrofossils in these features are Reseda luteola (dyer's rocket), Fragaria vesca (strawberry), Sambucus nigra (elder), Corylus avellana (hazel) and Humulus lupulus (hop). However all these taxa are represented by few fruits or seeds, and these could have come from plants growing wild on the river terrace or in the valley floor.

The dumped deposits of period III (10th-11th century) and IV (11th-12th century) include waterlogged highly organic layers overlain by humified organic deposits, a Dark Earth layer and predominantly inorganic chalky and silty layers. From the lower organic deposits in sample 12 came occasional fruits, seeds and other macrofossils of Reseda luteola, Rubus spp, Prunus sp (a fruitstone fragment), Corylus avellana and Brassica spp, some or all of which may have been utilised. In addition 121 (Sample 6) produced a few flax capsule fragments. In the upper layers, particularly the Period III Dark Earth 78 and the underlying more organic loam 95, remains of carbonised cereals and pulses were common. These include large numbers of oat caryopses, with a few floret bases of Avena sativa and possibly of the Avena strigosa-group, with numerous caryopses of hulled barley most of which are symmetrical grains, which implies a predominance of Hordeum distichum. Samples from these layers also produced a few grains of wheat (Triticum aestivum s.l.) and rye (Secale cereale) with a seed of horse bean (Vicia faba var minor) and cotyledon fragments possibly of peas (Pisum sativum). A single barley rachis node, a few awn fragments of oats, a few small grass or cereal culm fragments and some carbonised seeds of arable weeds were also present, but the overwhelming predominance of grains in the assemblages from these layers implies that carbonisation occurred during domestic grain drying or cooking rather than the earlier stages of crop cleaning.

Layers 52 and 78 also produced some non-carbonised examples of durable fruits and seeds including fruit clusters of Beta vulgaris. Many of these clusters are fragmentary but the intact examples are mostly 3-fruited with a few 4-fruited clusters. Berggren (1981, 43) states that the wild ssp. maritima has 1-3 fruits per cluster whilst the cultivated ssp. vulgaris has 2-8: this, of course, ignores modern monogerm beets. Modern reference material of ssp. maritima from the Essex coast in the author's collection consists of fruit clusters with up to three fruits. From this characteristic it would appear that the Beta from Fishergate could represent a cultivated form. However in view of the extreme variability of this species, the inter-fertility of the sub-species and considering also the frequent occurrence of seeds of

coastal plants in the Fishergate samples (see below) the possible presence ssp. maritima cannot be excluded.

The latest deposits sampled were the fills of a barrel, 161, 162 and 163 dated to period VI. 161 and 163 were predominantly sandy and silty deposits with flint and chalk pebbles, samples of which contained few macrofossils. Most of these were seeds of common weeds with remains of Calluna and Pteridium, occasional carbonised cereal grains, Brassica seeds, Rubus fruitstones and, in 163, fragments of Malus endocarp tissue (apple core). 162 was different, consisting of a dark brown structured organic deposit with abundant cereal/grass culm fragments, pieces of bracken frond and fly puparia. The deposit was partly mineralised and included phosphatic concretions . A sample from this deposit produced abundant seeds of Fragaria vesca (strawberry) and Ficus carica (fig) with seeds and leathery endocarp, fragments of Malus sylvestris/domestica, cereal periderm fragments and small fragments of arable weed seeds, particularly Raphanus raphanistrum, Agrostemma githago, Rumex sp, Polygonum convolvulus and Centaurea cyanus. These macrofossils are clearly human faecal residues from the consumption of soft fruits and wholemeal grain foods. Fruits and seeds of fennel (Foeniculum vulgare), flax (Linum usitatissimum), elderberry (Sambucus nigra) were also identified and seeds of Brassica spp. (including some B. rapa) were common. Large Prunus fruitstones and nutshells of Corylus and Juglans, which often occur in comparable deposits, such as the 11th-15th century cess pits at the Magistrates' Courts site (Murphy, in Ayers forthcoming) were absent from the sample examined which implies that kitchen and table refuse was not discarded in this barrel. The assemblage from 162 does, however, include some plant material from other sources. Remains of bracken and heather, flowers and pods of Trifolium and Medicago perhaps from hay, and the abundant fragments of cereal straw with arable weed seeds and occasional cereal rachis fragments may all represent discarded flooring materials.

These uncharred cereal remains include short rachis sections of rye (Secale cereale) and, interestingly, remains of two cereals which would not normally be expected to occur in medieval deposits in this country. The first of these is a spikelet fork of a glume wheat, either spelt (Triticum spelta) or emmer (Triticum dicoccum). From the evidence available at present it appears that glume wheat cultivation had ceased in East Anglia before the Middle Saxon period: the latest record of T. spelta from a reliable context is from a mid-5th century layer at West Stow, Suffolk (Murphy 1985a). The presence of a glume wheat spikelet fork at Fishergate could indicate either that such wheats persisted in this area as minor contaminants of other cereal crops or could perhaps be related to the importation of cereals from the Continent.

The second unusual cereal from this context - Panicum miliaceum (broomcorn millet) - is more likely to be an import, for there seems to be no evidence that it was ever cultivated in this country during the Middle Ages or before. It is, perhaps, significant that the only other British medieval record of this crop, from a late medieval pit at Sewer Lane, Hull, is from an east coast city with extensive trading contacts on the Continent (Williams 1977). However, at both sites very few florets were recovered, which suggests that the crop was not of any great importance.

Coastal plants

Fruits and seeds of coastal plants occurred fairly consistently but at low frequencies (always under 2% of the total seed count) in samples from deposits of Periods, II to IV, that is, from the 10th-12th centuries (Table 7). Three of the taxa identified are halophytes, characteristic of salt-marsh vegetation: Suaeda maritima, Glaux maritima and Triglochin maritima. The fourth, Beta vulgaris, may, as noted above, represent the cultivated subspecies vulgaris but it is possible that some fruits of the subspecies maritima, a plant often found on sea-banks (Petch and Swann 1968, 122) are also present. Samples from the site also produced some fruits Daucus carota which is common in coastal habitats, though not confined to them (ibid, 163) and of the aquatic species Zannichellia palustris which occurs in both fresh and brackish water (Clapham, Tutin and Warburg 1962).

Well before the 10th century, in fact probably by about 1500BP, a range of factors probably including the development of the Yarmouth spit, had confined estuarine conditions to the area of the present-day Breydon Water (Coles and Funnell 1981, 127-9). Salt-marsh and other coastal vegetation would therefore not have extended to within less than about 20km from Norwich at this time, and consequently the fruits and seeds of coastal plants from Fishergate must have reached the site by some artificial means. At the Whitefriars St Car Park site (Ayers and Murphy 1983, 43) the presence of coastal species including Suaeda maritima, Armeria or Limonium sp and Triglochin maritima was tentatively attributed to the shipping upriver of livestock which had been pastured on salt-marsh: the seeds could have adhered to the coats or hooves of the animals or could perhaps have arrived at the site in their guts. Such an explanation could well account for the specimens from Fishergate, though there is another possibility. Numerous small shells of inedible intertidal bivalve molluscs were found in the period III contexts 99 and 121 and these are thought to have reached the site in intertidal mud encrusting vessels or fishing gear (see above p. 8). The coastal plant remains could have arrived by this means. Whatever the particular explanation, these plant

Site period	II	III(1)	III(1)	III(2)	IV
Context No.	90	97	95	78	52
Beta vulgaris cf ssp maritima	-	-	-	+	+
Suaeda maritima	-	+	-	+	-
Glaux maritima	-	-	+	-	-
Triglochin maritima	+	-	+	-	-

Table 7: Macrofossils of coastal plants from Fishergate.

remains do provide evidence for river traffic between the Breydon Water area and Norwich from the 10th century onwards.

Summary and conclusions

The main results of macrofossil analysis at this site are summarised in Table 8. From these results it is possible to draw some inferences about land use in the valley floor. In period I there is evidence for a temporary lowering of the valley floor water-table level at about 173-183cm and some associated human activity. There was no dumping of plant food wastes at this time. By period II, dry conditions prevailed and grassland formed a major part of vegetation in the valley floor. This would have been suitable for use as meadow or pasture. The presence of flax remains in period II features hints at the possibility of flax cultivation in the valley floor. Despite clear evidence for human activity at the site in period II there are no extensive layers of dumped refuse. This is perhaps another indication that the valley floor was considered to be of value for agricultural purposes. From period III onwards, however, large-scale dumping of refuse and spoil began. The presence of *Beta* fruits in 78 could perhaps reflect some nearby horticulture.

Acknowledgement

I am most grateful to Allan Hall and Phillippa Tomlinson for examining and identifying, where possible, some troublesome plant macrofossils from this site.

	Local vegetation	Valley-floor water-table	Macrofossils of Coastal plants	Macrofossils of Cultivated plants	Inferred land use
Period VI 13th century onwards	Predominantly weeds	(Rising water levels in E. Norfolk river valleys from 13th century onwards)	Apparently absent	Very common in cess pits etc.	
Period IV 11th/12th century	Predominantly weeds	(Probably low)	Present at low frequencies indicating some contact with lower Yare estuary	Present	Refuse dumping
Period III 10th/11th century	Predominantly weeds	(Probably low)		Present	?Horticulture? Refuse dumping
Period II 10th century	Mainly grassland and weeds: wetland plants rare	Low		Present	?Grazing and/or flax cultivation? No extensive dumping
Period I (pre-10th century)	Open reedswamp and aquatic vegetation, replaced by marsh and littoral vegetation	Initially high, decreasing	Apparently absent	Apparently absent	Some activity in dry phases. No refuse dumping

Table 8 : Summary of results of macrofossil analysis.

11. Wood

The quantity of wood recovered during this limited excavation was small and much of it is in rather poor condition, particularly the pieces from layers of period III onwards. Some of these upper deposits have apparently not remained permanently waterlogged and consequently many pieces from these layers were partly rotted, with spongy surfaces. The largest collection came from period II deposits, and was mostly of stakes driven into the peat surface and larger wood fragments strewn on this surface. The stake tips, which were well-embedded in the peat were well preserved, but many fragments from the peat surface were partly decayed, particularly on their upper surfaces. A full list of wood identifications is given in Table 10 (microfiche).

Periods I and II

The wood from deposits of these periods consisted largely of straight roundwood stakes with bark and 1-4 facetted tips. Most of these were of hazel (Corylus sp) generally 30-40mm in diameter but including some older stems. There were also a few roundwood stakes of Quercus sp (oak), Betula sp (birch), Prunus sp (?sloe) and the Crataegus-group. Period II deposits also included some squared oak stakes, mostly similar in size to the roundwood stakes but cut from larger timber. 168 produced some larger wood, including irregular fragments of branches with rotted surfaces, mostly of oak with some fragments of quartered oak branches, a hazel roundwood stake and a decayed branch fragment, probably of the Crataegus-group.

The Period II wattle fence, 157, was lifted intact on a block of soil for conservation. Due to its rather poor state of preservation it proved impossible to conserve this structure, but fragments retained by the conservator for identification were mostly of hazel roundwood stems, compressed but originally about 14-27mm in diameter, with one oak withy, triangular in cross-section, cut from larger wood.

Periods III-VI

The small collection of wood from these periods was mostly of oak with some Pinus sp (pine) and Fraxinus sp (ash), predominantly fragments from boards, stakes and large posts, cut from mature timber. Preservation was generally poor. 49 (Period IV) was a massive squared timber of oak, the only piece potentially suitable for dendrochronology: the remaining pieces were too small or too poorly preserved. A stave from the period VI barrel (from 117) was of oak.

Context 36 (Period VI), a group of timbers of indeterminate function,included board fragments of oak and pine (Pinus sp). Pine has not previously been identified at a waterfront site in Norwich, though in the 1507 fire debris at Pottergate (Site 149N) coniferous softwood charcoal, probably pine, was present (Murphy 1985). At Bridge Street, Ipswich (Site 1AS 6202) pine boards came from 14th/15th century structures (Murphy, unpublished). As yet pine has not been identified in early medieval contexts at either Norwich or Ipswich. It is probable that these pine samples all represent imported timber. Coniferous softwoods are not thought to have grown in this area in the earlier middle ages and there is historical evidence for a medieval trade in softwood boards from the Baltic (Rackham 1980, 151).

There were also a few roundwood stakes from period III, cut from young stems of oak and hazel.

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Context	Depth (cm)	% dry weight	% loss on ignition
78	65-75	66.6	6.8
78	75-85	63.7	8.2
78	85-93	60.2	8.9
95	93-104	51.2	20.3
96	104-113	60.7	12.9
97	113-123	43.2	27.9
97	123-133	22.3	69.3
175	133-143	28.6	49.0
175	143-153	39.7	32.0
175	153-163	35.3	42.1
175	163-173	36.9	37.3
175	173-183	28.2	57.0
175	183-195	25.6	64.8

(microfiche)

Table 1 : % dry weight and % loss on ignition of deposits in column sample 12.

Sample no.	3	5	6	12	12	12	12	12	12	13	14	16	-
Context no.	90	99	121	52	54	78	95	96	97	123	78	162	102
Nucula turgida Leckenby and Marshall	-	-	15(d)	-	-	-	-	-	-	-	-	-	-
Mytilus edulis L	+	-	+	+	1	1	1	+	1	+	24	+	1(e)
Ostrea edulis L	+	-	+	+	-	3	+	+	+	1	17	-	-
Cerastoderma sp	-	-	-	-	-	+	-	-	-	-	+	-	-
Tellina (Fabulina) fabula Gmelin	-	-	1	-	-	-	-	-	-	-	-	-	-
Tellina sp	-	-	1	-	-	-	-	-	-	-	-	-	-
Macoma balthica (L)	-	1cf	378	-	-	-	-	-	-	-	-	-	-
Tellinidae indet. (a)	-	+	819	-	-	-	-	-	-	-	-	-	-
Abra alba (Wood)	-	-	3	-	-	-	-	-	-	-	-	-	-
Abra sp	-	-	3	-	-	-	-	-	-	-	-	-	-
Scrobiculariidae indet. (b)	-	-	23	-	-	-	-	-	-	-	-	-	-
Indet. marine bivalves (c)	-	-	-	-	-	-	-	-	-	-	2	-	-
Buccinum undatum L	-	-	-	-	-	-	-	-	-	-	2	-	-
Indet. marine gastropod (c)	-	-	-	-	-	-	-	-	-	-	1	-	-
Barnacle plates	-	-	-	-	-	+	-	+	-	+	+	-	-
Lymnaea truncatula (Müller)	-	-	1	-	-	-	-	-	-	-	-	-	-
Succineidae indet.	-	-	-	-	-	-	-	-	-	-	1	-	-
Cochlicopa sp	-	-	-	-	-	-	-	-	-	-	1	-	-
Acanthinula sp	-	-	-	-	-	-	-	-	-	-	-	1	-
Limacidae indet.	1	-	-	-	-	-	-	1	-	-	-	-	-
Helix aspersa (Müller)	-	-	-	+	-	-	-	-	-	+	2	-	-

Table 2 (microfiche): Mollusca and marine crustacea from soil samples

The counts refer to gastropod apices and bivalve hinges. Other fragments are indicated by a +.

Notes: (a) Hinge fragments with only the cardinal teeth surviving or juvenile valves. These are probably mostly M.balthica but they are too incomplete or juvenile to be confidently identified. (b) Mostly very small fragments with chondrophore. (c) Badly abraded. (d) Mostly paired articulated valves. (e) Juvenile valve, 7mm, collected by hand.

Table 3 (microfiche): Marine mollusc shells collected by hand

Period 1

Context no.	Ostrea uv.	Ostrea lv.	Mytilus	Cerastoderma	Buccinum	Neptunea	Other
88	1	-	-	-	-	-	-
104	1	4	1	-	1	-	-
106	3	1	-	-	-	-	-
129	2	-	3	-	-	-	-
Total MNI	10		2	-	1	-	-

Period II

Context no.	Ostrea uv.	Ostrea lv.	Mytilus	Cerastoderma	Buccinum	Neptunea	Other
89	2	1	-	-	1	-	-
90	3	2	-	-	-	-	-
113	10	6	-	-	-	-	-
123	9	12	14	-	-	-	-
125	1	-	-	-	-	-	-
131	1	-	-	-	-	-	-
Total MNI	29		7	-	1	-	-

Period III(1)

Context no.	Ostrea uv.	Ostrea lv.	Mytilus	Cerastoderma	Buccinum	Neptunea	Other
87	13	9	1	-	-	-	-
91	8	9	-	-	-	-	-
95	14	8	-	-	-	-	-
96	6	9	4	-	1	-	-
97	9	6	1	-	-	-	-
99	9	11	2	-	-	-	-
100	66	32	2	-	3	-	-
103	2	3	5	-	-	-	-
108	19	26	1	-	-	-	Nucella lapillus 1
110	-	2	-	-	-	-	-
111	72	59	2	-	-	-	-
114	7	7	3	-	-	-	-
119	1	3	-	-	-	-	-
120	3	5	-	-	-	-	-
121	1	2	-	-	-	-	Macoma balthica 3
167	4	7	-	-	-	-	-
Total MNI	258		11	-	4	-	-

Period III(2)

Context no.	Ostrea uv.	Ostrea lv.	Mytilus	Cerastoderma	Buccinum	Neptunea	Other
20	372	316	5	-	1	-	-
75	185	142	2	-	-	-	Macoma balthica 1
78	292	270	14	-	1	-	-
92	10	7	3	-	-	-	-
94	6	6	1	-	-	-	-
102	-	1	-	-	-	-	-
165	15	11	-	-	-	-	-
166	6	13	-	-	1	-	-
180	29	22	-	-	4	-	-
181	30	27	(1)	-	1	-	-
182	3	6	-	-	-	-	-
Total MNI		959	13	-	8	-	-

Period IV

Context no.	Ostrea uv.	Ostrea lv.	Mytilus	Cerastoderma	Buccinum	Neptunea	Other
37	117	114	(1)	-	1	-	-
48	3	1	-	-	-	-	-
51	3	-	-	-	-	-	-
52	4	2	1	-	-	-	Macoma balthica 1
53	1	-	-	-	-	-	-
54	2	-	-	-	-	-	-
55	119	76	(1)	-	(1)	-	-
57	1	1	-	-	-	-	-
63	4	6	-	-	-	-	-
65	2	1	-	-	-	-	-
67	1	1	-	-	-	-	-
69	1	1	-	-	-	-	-
71	-	1	-	-	-	-	-
73	4	4	-	-	-	-	-
77	1	1	-	-	-	-	-
80	4	3	-	-	-	-	-
84	1	-	-	-	-	-	-
85	3	2	-	-	-	-	-
Total MNI	274		2	-	2	-	-

Period V

Context no.	Ostrea uv.	Ostrea lv.	Mytilus	Cerastoderma	Buccinum	Neptunea	Other
2	237	185	1	1	5	-	(Solenaceae (+) (Pecten maximus (1)
26	1	-	-	-	-	-	-
35	78	75	4	-	12	-	-
40	23	14	3	-	-	-	-
Total MNI	339		4	1	17	-	-

Period VI

Context no.	Ostrea uv.	Ostrea lv.	Mytilus	Cerastoderma	Buccinum	Neptunea	Other
1	238	133	5	-	21	1	-
4	2	1	-	-	-	-	-
7	6	6	8	-	-	-	-
9	7	8	-	-	1	-	-
11	1	2	-	-	-	-	-
13	10	2	-	-	-	-	-
15	-	1	-	-	-	-	-
19	3	1	-	-	-	-	-
21	3	6	-	-	-	-	-
23	3	6	-	-	-	-	-
33	5	11	-	-	-	-	-
38	7	3	-	-	-	-	-
160	4	6	-	-	-	-	-
161	2	1	-	-	-	-	-
173	-	2	-	2	-	4	-
177	4	2	(1)	-	-	-	cf. Ensis siliqua (1)
178	3	10	2	-	-	3	cf. Ensis siliqua (1)
179	1	-	-	-	22	-	-
Total MNI	325		8	1	44	8	-

Context No.	
33 (Period VI)	Small fragment of large coprolite with rounded surface, c.20 x 15mm. Colour buff to off-white with porous structure. Abraded fragment of bone, 6mm. No plant tissue fragments apparent.
94 (Period III(2))	Large fragments, up to c.50 x 35mm. Colour brown with porous structure. Abundant bone fragments, up to 25mm, with sharp, almost unabraded surfaces. Contained charcoal fragments up to 3mm, testa fragments of Agrostemma and Brassica, a Gramineae floret, and monocotyledonous stem/leaf tissue. Fragaria achene loosely attached to surface.
96 (Period III(1))	Large fragments up to c.35 x 25mm. Colour buff to brown with porous structure. Abundant angular, almost unabraded bone fragments up to 20mm. with some smaller abraded fragments. Charcoal fragments up to c.3mm. Monocotyledonous plant tissue.
121 (Period III(1))	Small fragments. Colour buff to off-white with porous structure. Includes bone fragments up to 11mm, fairly sharp and unabraded.
123 (Period II)	Small fragment c.25 x 20mm. Dark brown with open porous structure including glossy dense non-porous areas. Large fragments of monocotyledonous plant stem and leaf tissue with ?cereal inflorescence bracts. No bone visible.
162 (Period VI)	Flat plate-like concretions up to about 20mm. thick. Structure open and porous with glossy dense non-porous areas. Chalk fragments up to 10mm, small angular flint chips. Fly puparia abundant. Some beetles. Small mammal bone. Small oyster-shell fragments. Large fragments of Pteridium frond, Calluna stem and grass/cereal culm. Seeds of Malus, Galium aparine, Chenopodium album. Whole cereal caryopses. Scraps of Agrostemma testa and cereal periderm.

Table 4 (microfiche): Coprolites and faecal concretions: macroscopic features.

Cereal indet.	ca	87
Triticum aestivum s.l.	ca	6
Secale cereale L	ca	9
Hordeum spp	ca (a)	110
Avena spp	ca	496
Avena spp	fb	10
Avena sativa L	fb	12
Avena cf strigosa-group	fb	10
Raphanus raphanistrum L	sj	4 + fr
cf Spergula arvensis L		1
Agrostemma githago L		2
Vicia faba L var minor		1
Leguminosae indet.	(b)	5 co + fr
Vicia/Lathyrus sp		5 s + 3 co
Polygonum persicaria/lapathifolium		10
Polygonum convolvulus L		2
Rumex sp		2
Corylus avellana L		fr
Plantago lanceolata L		2
Galium aparine L		1
Bromus mollis/secalinus		16
Gramineae indet.	ca	13
Gramineae/Cereal indet.	cfr	+
Indeterminate seeds etc		3
Sample volume (litres)		70 (approx)

Table 5 (microfiche): Carbonised plant remains recovered by flotation/bulk sieving with 1mm. meshes from 78 (sample 14).

For identifications of uncarbonised macrofossils in this layer see sample 12.
Uncarbonised Beta vulgaris fruits were common in sample 14.
Abbreviations: c - culm; ca - caryopses; co - cotyledon; fr - fragment; fb - floret base; s - seed; sj - siliqua joint.
Notes: (a) Mostly median grains; laterals very uncommon.
(b) Pulse cotyledons.

Ranunculus acris/repens/bulbosus		7
Brassica sp		11
Raphanus raphanistrum L (siliqua joints)		3 + frags
Rorippa islandica (Oeder) Borbas		2
Reseda luteola L		1
Agrostemma githago L		cf 2
Stellaria media-type		15
Stellaria sp		1
Spergula arvensis L		14
Chenopodium album L		11
Chenopodium rubrum/glaucum		2
Atriplex sp		1
Chenopodiaceae indet.		2
Potentilla sp		4
Rubus sp		1 frag
Hydrocotyle vulgaris L		1
Aethusa cynapium L		1
Polygonum sp		11
Rumex acetosella agg		56
Rumex sp		1
Polygonaceae indet.		4
Urtica urens L		5
Urtica dioica L		56
Corylus avellana L (nutshell frags)		+
Solanum nigrum L		2
Mentha sp		1
Labiatae indet.		1
Plantago sp		1
Sambucus nigra L		13 + frags
Eupatorium cannabinum L		1
Anthemis cotula L		15
Lapsana communis L		6
Sonchus oleraceus L		2
Sonchus asper (L) Hill		2
Compositae indet.		1
Juncus spp		+
Typha sp		1
Carex spp		8
Eleocharis sp		1
Avena sp	(carbonised grains)	1 + 1 cf
Hordeum sp	(carbonised grains)	1
Linum usitatissimum (L)	(capsule frags)	+

Indeterminate seeds etc	18
Sample wt (kg)	0.7

Table 6 microfiche: Plant macrofossils from 121 (sample 6).

Context no.		90	123
Sample no.		3	13
Pteridium aquilinum (L) Kuhn	(a)	-	+
Filicales indet.	(a)	-	+
Ranunculus acris/repens/bulbosus		2	11
Ranunculus sceleratus L		1	-
Ranunculus flammula L		-	3
Papaver argemone L		10(?)	-
Brassica/Sinapis sp		22	16
Raphanus raphanistrum L	(b)	4	6+frags+1(o)
	(c)	-	1
Thlaspi arvense L		10	-
Cruciferae indet.		-	1
Reseda luteola L		-	1
Hypericum sp		1	-
Silene sp		2	2
Lychnis flos-cuculi L		1	-
Agrostemma githago L		-	10+frags
Stellaria media-type		34	7
Stellaria graminea/palustris		7	9
Stellaria/Cerastium sp		-	3
Spergula arvensis L		-	5
Scleranthus annuus L		1	1
Caryophyllaceae indet.		4	1
Chenopodium album L		10	37
Atriplex sp		7	8
Chenopodiaceae indet.		9	7
Linum usitatissimum	(c)	+	3+frags
	(d)	+	+
Ilex aquifolium L	(e)	-	+
Trifolium sp	(f)	-	+
	(g)	-	+
Leguminosae indet.	(h)	1	-
Leguminosae indet.	(i)	-	+
Filipendula ulmaria (L) Maxim		-	1
Potentilla sp		2	4
Fragaria vesca L		-	1
Aphanes arvensis/microcarpa		-	6
Torilis cf. japonica (Houtt) DC		8	-
Apium cf. graveolens L		3	6
Aethusa cynapium L		1	-
Daucus carota L		1	-

Umbelliferae indet.		3	-
Polygonum aviculare agg.		9	7
Polygonum persicaria L		-	22
Polygonum lapathifolium L		4	25
Polygonum convolvulus L		-	9+frags
Polygonum sp		7	9
Rumex acetosella agg.		55	23
Rumex sp		27	8
Urtica urens L		6	2
Urtica dioica L		38	6
Humulus lupulus L		-	3
Corylus avellana L	(j)	+	+
Quercus sp	(c)	-	+
Calluna vulgaris (L) Hull	(k)	-	+
Anagallis arvensis-type		2	6
Solanum sp		-	1
Pedicularis palustris L		1	2
Euphrasia/Odontites sp		2	-
Mentha arvensis/aquatica		1	-
Lycopus europaeus L		1	-
Prunella vulgaris L		-	11
Galeopsis tetrahit/speciosa		6	8
Teucrium sp		-	3
Labiatae indet.		-	2
Plantago major L		5	2
Galium sp		-	1
Sambucus nigra L		5	-
Anthemis cotula L		413+1(o)	68
Achillea millefolium L		1	2
Centaurea sp	(l)	+	-
Lapsana communis L		239	10
Hypochaeris sp		-	2
Sonchus asper L		6	1
Compositae indet.		3	1
Triglochin maritima L		2	-
Juncus sp		+	+
Eleocharis sp		2	4
Scirpus/Schoenoplectus sp		-	1
Carex sp	(m)	-	9
Carex sp	(n)	8	15
Anisantha sterilis (L)Nevski	(o)	1	-
Gramineae indet.	(p)	18	213
Gramineae indet.	(q)	1(o)	10+1(o)
Gramineae indet.	(r)	-	15

Gramineae/Cereal	(s)	-	17
Triticum aestivum s.l.	(o)	-	1
Avena sp	(o)	2	5
Avena sp	(o,t)	+	-
Avena sp	(u)	1+frags	frags
Secale cereale L		-	+(v)
Indeterminate seeds		41	51
Indeterminate buds/budscales		+	+
Indeterminate stems etc.		+	+
Sample weight (kg)		1	1

Table 7 microfiche: Plant macrofossils from 10th century contexts (Period II).

Taxa are represented by fruits or seeds except where indicated.

Notes: (a) Pinnule and stem fragments; (b) Siliqua joints; (c) Seeds; (d) Capsule fragments; (e) Leaf fragments; (f) Flowers; (g) Pod fragments; (h) Carbonised cotyledon; (i) Fragments of sclerenchyma from pods of ?Genista or Ulex; (j) Nutshell fragments; (k) Stem and leaves; (l) Fragments; (m) Bifacial; (n) Trifacial; (o) Carbonised; (p) Small Poa-sized caryopses; (q) Medium-sized; (r) Large Bromus-type caryopses; (s) Culm nodes; (t) Awn fragments; (u) Fragments of florets; (v) Rachis fragments comprising approximately 26 nodes.

Context no.		161	162	163	163
Depth (cm)		60-70	70-80	80-90	90-96
Sample no.		10	16	10	10
Pteridium aquilinum (L) Kuhn	(a)	+	+	+	-
Papaver argemone L		4+1cf	2	-	-
Brassica spp		9	118	+	-
(including B. rapa)				-	-
Raphanus raphanistrum L	(b)	-	1	+	-
	(c)	+	+++	+	-
Reseda luteola L		1	-	-	-
Reseda sp		-	-	1	-
Silene sp		2	7	-	-
Lychnis flos-cuculi L		1+1cf	-	-	-
Agrostemma githago L		1+fr	4+fr	-	+
Stellaria media-type		9	2	3	3
Caryophyllaceae indet.		1	-	-	-
Montia fontana L subsp chondrosperma		-	-	1	-
Chenopodium album L		49	45	12	10
Chenopodium cf. murale L		-	-	5	1
Atriplex sp		4	3	2	-
Chenopodiaceae indet.		4	-	4	1
Linum usitatissimum L	(b)	-	4	-	-
Medicago lupulina-type	(e)	-	1	-	-
Trifolium sp	(f)	-	3	-	-
Rubus cf idaeus L		-	-	-	1
Rubus fruticosus agg		-	-	-	1
Potentilla sp		2	-	-	-
Fragaria vesca L		-	104	-	-
Malus sylvestris/domestica	(b)	-	9+fr	-	-
	(g)	-	+	+	-
Foeniculum vulgare Miller		-	2	-	-
Aethusa cynapium L		3	-	-	-
Chaerophyllum-type		-	1	-	-
Umbelliferae indet.		1	-	-	-
Euphorbia helioscopia L		-	fr	1	-
Polygonum aviculare agg		2	2	-	-
Polygonum lapathifolium L		2	19	2	-
Polygonum convolvulus L		-	3+fr	-	-
Polygonum sp		-	1	1	-
Rumex acetosella agg		5	1	1	2
Rumex sp		4	2+fr	1	1
Polygonaceae indet.		-	-	-	1
Urtica dioica L		2	1	8	5

Urtica urens L		11	-	10	25
Calluna vulgaris (L) Hull	(h)	+	+	+	+
Hyoscyamus niger L		1	-	-	-
Solanum nigrum L		1	1	4	3
Lithospermum-type	(i)	-	1	-	-
Mentha arvensis/aquatica		-	1	-	-
Stachys sp		1	4	-	-
Lamium sp		1	-	1	2
Plantago major L		-	1cf	-	-
Sambucus nigra L		-	1fr	5+fr	8
Valerianella dentata (L) Poll		-	-	1	-
Bidens tripartita L		-	1	-	-
Anthemis cotula L		4	8	1	-
Chrysanthemum segetum L		2	-	-	-
Centaurea cyanus L		1+fr	14+fr	-	-
Lapsana communis L		1	-	-	2
Sonchus asper (L) Hill		-	1	-	-
Compositae indet.		1	4	-	-
Juncus spp		-	-	-	+
Carex spp		4	1	-	1
Avena sativa L	(j,k)	-	-	1	-
Avena sp	(k,l)	1	-	4	1cf
Triticum aestivum s.l.	(k,l)	-	-	-	1+1cf
Hordeum sp	(k,l)	-	-	-	1
Bromus sp	(k,l)	-	-	-	1cf
Gramineae indet.	(k,l)	1	-	-	-
Panicum miliaceum L	(l)	-	2	-	-
Gramineae	(l,m)	-	1	-	-
Gramineae	(l,n)	-	47	-	-
?Cereal indet.	(o)	-	+	-	-
Cereal indet.	(p)	-	+	-	-
Gramineae/Cereal indet.	(q)	-	19	-	-
Secale cereale L	(r)	-	+	-	-
Triticum sp	(s)	-	1	-	-
Ficus carica L		-	28	-	-
Indeterminate seeds etc		17	30	10	2
stem fragments		+	+	-	-
epidermis fragments		-	+	-	-
buds		+	-	-	-
wood chips		+	-	+	-
Mineralised twine/string		-	+	-	-
Sample weight (kg)		0.5	1.0	0.5	0.5

Table 8 (microfiche): Plant macrofossils from contexts 161, 162 and 163, fills within a wooden barrel (Period VI).

Taxa are represented by fruits or seeds except where indicated.

Notes: (a) Pinnule and stem fragments; (b) Seeds; (c) Siliqua and stem fragments; (d) Capsule fragments; (e) Partly degraded pod with seed; (f) Flower fragments; (g) Endocarp tissue; (h) Shoots, stems and leaves; (i) Mineralised internal tissues; (j) Floret; (k) Carbonised; (l) Caryopses; (m) Small caryopses; (n) Large caryopses, some mineralised; Bromus sp present. (o) Degraded and fragmentary tissue ?cereal inflorescence bracts; (p) Periderm fragments; (q) Culm nodes; (r) Rachis fragments comprising five nodes; (s) Glume wheat spikelet fork.

Context no.		52	54	78	78	78	95
Depth (cm)		45-56	56-65	65-75	75-85	85-93	93-104
Characeae	(a)	-	-	-	-	-	-
Pteridium aquilinum (L) Kuhn	(b)	-	-	-	-	-	-
Caltha palustris L		-	-	-	-	-	-
Ranunculus acris/repens/bulbosus		-	-	-	-	1	4
Ranunculus flammula L		-	-	-	-	-	-
Ranunculus sceleratus L		2	-	-	-	-	2
Ranunculus subg Batrachium		-	-	-	-	-	-
Ranunculus sp		-	-	-	-	-	1
Nymphaea alba L		-	-	-	-	-	-
Nuphar lutea (L) Sm.		-	-	-	-	-	-
Papaver argemone L		-	-	-	-	5	1
Papaver sp		-	-	-	-	-	1
Brassica sp		-	-	-	-	6	6
Raphanus raphanistrum L		-	-	-	-	+	2+1(e)
Rorippa islandica (Oeder) Borbas		-	-	-	-	-	-
Cruciferae indet.		-	-	-	-	-	-
Reseda luteola L		-	-	-	-	-	-
Reseda sp		-	-	-	-	1	1
Hypericum sp		-	-	-	-	-	1
Silene sp		-	-	-	-	2	1
Lychnis flos-cuculi L		-	-	-	-	-	-
Agrostemma githago L		-	-	-	-	1(e)	+
Stellaria media-type		1	-	-	-	99	125
Stellaria palustris/graminea		-	-	-	-	-	-
Spergula arvensis L		-	-	-	-	-	1
Caryophyllaceae indet.		-	-	-	-	1	5
Chenopodium album L		16	1	20	9	56	79
Chenopodium rubrum/glaucum		-	-	-	-	-	-
Beta vulgaris L	(c)	3(j)	-	1+2(j)	1	-	-
Suaeda maritima (L) Dumort		-	-	1	-	-	-
Atriplex sp		-	-	-	-	1	3
Chenopodiaceae indet.		2	-	5	-	12	31
Ilex aquifolium	(d)	-	-	-	-	-	-
Vicia/Lathyrus sp	(e)	-	-	-	3(k)	-	-
cf Pisum-type		-	-	1	-	-	-
Vicia faba L var minor	(e)	1	-	-	-	-	-
Filipendula ulmaria (L) Maxim		-	-	-	-	-	-
Rubus fruticosus agg		-	-	1	3	-	5
Rubus idaeus L		-	-	-	-	-	-
Rubus sp		-	-	-	-	1	-
Potentilla sp		-	-	-	-	-	-

96	97	97	175	175	175	175	175	175
104-113	113-123	123-133	133-143	143-153	153-163	163-173	173-183	183-195
-	-	-	-	4	1	-	-	-
-	+	-	-	-	+	-	-	-
-	-	-	-	2	1cf	-	-	1
3	27	6	1	19	5	8	-	1
-	1	-	-	-	-	-	-	-
-	1	-	-	-	-	-	-	-
-	-	-	1	21	10	22	-	4
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	16
-	-	-	-	2	-	2	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
1	10	-	-	-	-	-	-	-
-	1	-	-	-	-	-	-	-
-	1	-	-	-	-	-	-	-
-	-	-	-	1	-	-	-	-
-	2	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
1	-	2	1	3	1	-	-	-
-	-	-	-	-	-	-	-	-
-	-	18	1	13	4	3	-	-
-	2	-	-	-	-	-	-	-
23	29	-	-	1	-	-	-	-
-	1	-	-	-	1	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	1	-	-	-	-
87	106	-	-	1	-	1	1	-
-	1	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	-	-	-
3	11	-	-	-	-	-	-	-
23	33	-	-	-	-	-	-	-
-	+	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	1	-	-	1	-	-	-	1
2	3	-	-	1	-	1	-	-
1cf	-	-	-	-	-	1cf	-	-
2	-	-	-	-	-	-	-	-
-	2	-	-	-	-	-	-	-

Aphanes arvensis/microcarpa	-	-	-	-	-	-
Prunus sp	-	-	-	-	-	-
Lythrum salicaria-type	-	-	-	-	-	-
Epilobium sp	-	-	-	-	-	-
Hydrocotyle vulgaris L	-	-	-	-	-	-
Conium maculatum L	-	1	-	-	-	-
Apium sp	-	-	-	-	-	1cf
Apium/Berula sp	-	-	-	-	-	-
Oenanthe aquatica (L) Poiret	-	-	-	-	-	-
Cicuta virosa L	-	-	-	-	-	-
Umbelliferae indet.	-	-	-	-	-	1
Euphorbia helioscopia L	-	-	1	-	1	-
Polygonum aviculare agg.	-	-	-	-	-	-
Polygonum persicaria/lapathifolium-type	-	-	-	-	-	-
Polygonum convolvulus L	-	-	-	-	-	-
Polygonum sp	-	-	-	1(e)	11	6
Rumex acetosella agg.	-	-	-	-	-	11
Rumex sp	-	-	2+1(e)	-	1	118
Urtica urens L	32	1	29	36	304	1415
Urtica dioica L	67	8	14	19	44	52
Alnus glutinosa (L) Gaertner	-	-	-	-	1	-
Corylus avellana L	+	-	+(e)	+(e)	+	-
Anagallis arvensis-type	-	-	-	-	-	-
Glaux maritima L	-	-	-	-	-	1
Menyanthes trifoliata L	-	-	1	-	-	-
Myosotis sp	-	-	-	-	-	-
Hyoscyamus niger L	-	-	-	-	-	1
Solanum dulcamara L	-	-	-	-	-	-
Solanum nigrum L	2	1	-	1	-	1
Solanum sp	-	-	-	-	-	-
Scrophularia sp	-	-	-	-	-	-
Mentha arvensis/aquatica	1	-	-	2	1	2
Lycopus europaeus L	-	-	-	-	-	-
Lamium sp	40	5	9	10	78	7
Galeopsis tetrahit/speciosa	-	-	-	-	-	-
Labiatae indet.	1	-	-	1	-	-
Plantago major L	-	-	-	-	-	4
Plantago lanceolata L (e)	-	-	-	1	-	-
Sambucus nigra L	8	1	14	12	13	11
Valerianella dentata (L)	-	-	-	-	1	-
Bidens cernua L	-	-	-	-	-	-
Bidens sp	-	-	-	-	-	-
Anthemis cotula L	-	-	3(e)	-	2(e)	6+1(e)
Tripleurospermum maritimum (L) Koch	-	-	-	-	-	-

-	5	-	-	-	-	-	-	-
-	+	-	-	-	-	-	-	-
-	-	-	-	1	3	2	-	-
-	-	10	1	7	1	-	-	-
-	-	-	-	-	1	-	-	-
-	1	-	-	-	-	-	-	-
-	1cf	3	-	-	-	-	-	-
-	-	-	3	1	-	-	-	-
-	-	-	-	7	4	5	-	-
-	-	-	5	-	-	-	1	-
-	-	2	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-
-	5	-	-	-	-	-	-	-
-	186	-	-	-	-	-	-	-
-	2	-	-	-	-	-	-	-
-	-	6	-	-	3	-	-	-
-	14	-	-	3	-	-	-	-
-	19+1(e)	9	1+1(e)	6	2	6	2	-
15	19	-	-	-	-	-	-	-
30	76	95	189	85	35	33	89	4
-	-	-	-	-	-	-	-	-
-	+	-	-	-	-	-	-	-
-	4	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	1	-	-	-	3	11
-	-	-	-	15	4	-	-	-
1	-	-	-	-	-	-	-	-
-	-	-	-	-	-	1cf	-	-
-	-	-	-	1	-	-	-	-
-	1	-	-	-	1	-	-	-
-	-	2	5	-	-	-	-	-
2	5	19	5	10	5	4	-	-
-	1	1	2	1	-	2	-	20
2	1	-	-	-	-	-	-	-
-	4	-	-	-	-	-	-	-
-	2	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
29	26	-	3	-	-	2	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	1	-	-	-	-
-	-	-	-	2	-	-	-	-
-	24	-	-	-	-	-	-	-
1(e)	-	-	-	-	-	-	-	-

Centaurea cyanus L		-	-	-	-	-	2+1(e)
Centaurea cf cyanus L		-	-	-	-	-	8
Lapsana communis L		-	-	1(e)	-	-	37
Sonchus oleraceus L		-	-	-	-	-	-
Sonchus asper (L) Hill		-	-	-	-	-	-
Compositae indet.		-	-	-	-	-	-
Alisma plantago-aquatica L		-	-	-	-	-	-
Alismataceae indet.		1	-	-	-	-	-
Triglochin maritima L		-	-	-	-	-	1
Potamogeton sp		-	-	-	-	-	-
Zannichellia palustris L		-	-	-	-	-	-
Juncus spp		+	+	-	-	-	+
Iris pseudacorus L		-	-	-	-	-	-
Typha sp		-	-	-	-	-	-
Eleocharis sp		-	-	-	-	-	3
Scirpus cf lacustris (L)		2	-	-	-	-	2
Carex vesicaria/rostrata		-	-	-	-	-	-
Carex sp (trifacial)		3	-	5	1	6	1
Carex sp (bifacial)		-	-	-	-	1	-
Phragmites australis (Cav) Steudel		-	-	-	-	-	-
Gramineae indet.		1	-	2(e)	1(e)	3(e)	7+1(e)
Bromus mollis/secalinus	(e)	-	-	4	2	1	7
Cereal indet.	(e)	-	-	5	2	2	6+fr(1)
Avena sp	(e,f)	1	1	17	24	20	21
Avena sp	(e,g)	-	-	2	1	4	3
Avena sp	(e,i)	-	-	+	-	-	-
Hordeum sp	(e,f)	-	-	9	1	4	7
Hordeum sp	(e,h)	-	-	1	-	-	-
Triticum sp	(e,f)	-	-	2	-	-	-
Secale cereale L	(e,f)	-	-	-	-	-	-
Indeterminate seeds etc		11	-	6	7	17	43
stem/rhizome frags		-	-	-	-	-	-
leaf frags		-	-	-	-	-	-
twigs		-	-	-	-	-	-
wood		-	-	-	-	-	-
thorns		-	-	-	-	-	-
buds		-	-	-	-	-	-
catkin frags		-	-	-	-	-	-
Sample wt (kg)		1.0	1.0	1.0	1.0	1.0	1.0

Table 9 (microfiche): 732N: Plant macrofossils from column sample 12.

Taxa are represented by fruits or seeds except where indicated.

-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	2	-	-	-	-	-	-	-
1	1	-	-	-	-	-	-	-
-	1	-	-	-	-	1	-	-
1(e)	-	1	-	1	1	-	-	1
-	1	-	1	6	7	6	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	1	2	-	4
-	-	-	-	1	1	-	-	-
+	+	+	-	+	+	+	-	-
-	-	-	-	+(cf)	+(cf)	-	-	-
-	-	1	1	2	-	-	1	2
-	3	-	-	-	2	3	1	-
2	-	-	1	-	1	16	2	104
-	-	-	-	-	-	-	-	6
10	3	45	43	30	32	7	-	24
1	2	4	2	-	-	1	-	-
-	+	-	+	+	-	-	-	-
-	7+1(e)	-	3	17	3	1	-	-
-	3	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	-	-	-
8	21	20	14	42	22	17	-	15
-	-	-	-	+	-	-	+	-
-	+	-	-	-	+	+	+	-
-	-	-	-	-	-	+	+	-
-	-	-	-	-	-	+	-	-
-	+	-	-	-	-	-	-	-
-	+	-	-	-	+	-	-	-
-	+	-	-	-	-	-	-	-
1.0	1.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5

Notes: (a) Oogonia. (b) Pinnules and petiole fragments. (c) Nos. refer to whole aggregate fruits except for (j). (d) Leaf fragments. (e) Carbonised. (f) Caryopsis. (g) Floret bases. (h) Rachis nodes. (i) Awn fragments. (j) "Fruit lids". (k) Cotyledons. (l) Mineralised fragments.

Context no.	Description	Cross-sectional Dimensions (well preserved pieces only)	Taxon
5	Large vertical oak post. Surfaces decayed and spongy.	-	*Quercus* sp
24	Large irregular wood fragment. Decayed, spongy surfaces.	-	*Quercus* sp
27	Badly rotted fragments of plank/board.	-	*Quercus* sp
29	Badly decayed stake tip.	-	*Quercus* sp
36a	Large rotted piece of wood.	-	*Quercus* sp
36b	Plank/board. Tangential.	85 x 33mm	*Pinus* sp
36c	Two badly decayed planks/boards with broad surfaces pressed together.	-	*Pinus* sp and *Quercus* sp
36d	Fragments of thin plank/board - badly decayed.	*c.* 5mm thick	*Quercus* sp(?)
36e	Small shapeless wood fragment.	-	*Pinus* sp
49	Very large squared timber. Some bark.	*c.* 250 x 340mm	*Quercus* sp
75	Fragment probably of board.	45 x 20mm	*Quercus* sp
86	Long badly distorted stake.	-	*Quercus* sp
91 (T30)	Decayed fragment of board. Radial.	*c.* 65 x 20mm	*Quercus* sp
97	(1) Slivers and chips of waste wood. (2) Twigs, compressed.	(2) 5 - 17mm diam.	(1) *Quercus* sp
102	Plank/board fragment. Tangential. Adze-marks on one face.	100 x 23mm	*Fraxinus* sp (narrow rings)
106	Roundwood stake with bark. Tip with one cut face.	Diam. 47 and 35mm (compressed)	*Corylus* sp
106	Extreme tip of stake. 3 cut faces.	-	?*Crataegus* group

106 (T26)	Straight branch fragment. Bark. Half rotted away. Probable transverse cut at one end but badly rotted.	c. 90mm (estimated from surviving half of cross-section.	?Corylus sp
115	Large stake with multi-facetted tip. Roundwood, but bark and sapwood have rotted away.	-	Quercus sp
116	Large stake with multi-facetted tip. Roundwood, but bark and sapwood have rotted away.	-	Quercus sp
117 (T12)	?Barrel binding. Split from large branch.	-	Indeterminate
117	?Barrel stave.	25 x 10mm	Quercus sp
123 (T11)	Stake cut from large wood (square cross-section). Tip with four faces.	30 x 25mm	Quercus sp
128	Roundwood stake. Tip with three faces. Bark.	35mm diam.	Corylus sp
129 (T9)	Roundwood stake. Tip with three faces. Bark.	c. 85mm diam.	Indeterminate
129 (T10)	Roundwood stake. Tip with four faces. Bark.	32mm diam.	Corylus sp
134	Small fragment.	-	Quercus sp
133	Stake tip with one cut face. Stake made from split segment of oak.	-	Quercus sp
133	Roundwood stake. Tip with two faces. Bark.	30mm diameter	Corylus sp
134	(1) Roundwood stake. Tip with one face. Bark. (2) Tip of roundwood stake. Three faces.	(1) c. 45mm diam.	Both Quercus sp
135	Decayed fragment of stake-tip.	-	Prunus sp
136	Roundwood stake. Tip with two faces. Bark.	c. 40mm diam.	Corylus sp
137	Roundwood stake. Tip with one cut face. Bark.	32mm diam.	Corylus sp

138	Very tip of stake.	-	*Corylus* sp
139	Very tip of roundwood stake with some bark.	-	*Corylus* sp
140	Roundwood stake. Tip with two faces. Bark.	39mm diam.	Indeterminate
141	Roundwood stake. Tip with two faces. Bark.	36mm diam.	*Corylus* sp
144	Roundwood stake. Tip with four faces. Bark.	30mm diam.	*Corylus* sp
145a	Roundwood stake. Tip with one face. Bark.	47mm diam.	*Betula* sp
145b	Roundwood stake. Tip with two faces. Bark.	40mm diam.	*Corylus* sp
146	Large stake made from mature wood, squared.	60 x 50mm	*Quercus* sp
147	(1) Fragmentary stake-tip. (2) Wood chips.	- -	*Corylus* sp *Corylus* sp
148	Roundwood stake. Tip with three faces. Bark (dried out during storage).	-	Indetermine diffuse porous
149	Roundwood stake. Tip with four faces. Bark.	43mm diam.	*Corylus* sp
150	Roundwood stake. Tip with three faces. Bark.	37mm diam.	*Corylus* sp
151	(1) Roundwood stake. Tip with three faces. Bark. (2) Waste sliver of wood from trimming stake-tip.	(1) *c*. 55mm diam. -	(1) *Corylus* sp
152	Roundwood stake. Tip with three faces. Bark.	-	*Corylus* sp
153	Roundwood stake. Tip with two faces. Bark.	34mm diam.	*Corylus* sp
154	Roundwood stake. Tip with two faces. Bark.	*c*. 75mm diam.	*Crataegus*-group
155	(1) Roundwood stake. Tip with three faces. Bark. (2) Waste slivers of wood from trimming stake-tip.	52mm diam.	(1) *Corylus* sp (2) Indet. diffuse porous
156 (T14)	Roundwood stake. Tip with one cut face. Bark.	*c*. 65mm diam.	*Corylus* sp

157a	Roundwood stems with bark from wattle fence. Mostly compressed, some deformed.	a	32 x 21mm	Corylus sp
b		b	25 x 15mm	Corylus sp
c		c	17 x 10mm	Corylus sp
d		d	17 x 10mm	Indet. diffuse porous
e		e	20 x 11mm	?Corylus sp
f		f	25 x 15mm	?Corylus sp
g		g	17 x 14mm	Corylus sp
h		h	28 x 20mm	Corylus sp
i	Withy, triangular cross-section, cut from large wood.	i	28 x 8mm (max)	Quercus sp
158 (T15)	Very large irregular piece of branch.		-	Indeterminate (grain twisted)
168 (T16)	Large fragment of branch. Rotted surfaces.		-	Quercus sp
168 (T17)	Large irregular fragment of branch. Rotted surfaces.		-	Quercus sp
168 (T18)	Large very irregular wood fragment with part-rotted and part-charred surfaces. Knotty with twisted grain.		-	Quercus sp
168 (T19)	Large branch fragment, half rotted away. Two transverse oblique cuts at one end.		?c. 200mm diam. (estimated from surviving cross-section)	Indeterminate
168 (T20)	Beam with notch in one side. Split from quartered branch or trunk.		90 x 55mm	Quercus sp
168 (T21)	Badly decayed small wood fragments.		-	Indeterminate
168 (T22)	Fragment of quartered branch. Poorly preserved surfaces.		Original stem ?c. 60mm diam.	Quercus sp
168 (T23)	Stake-tip from badly rotted roundwood stake.		?c. 95mm diam.	Corylus sp
168 (T24)	Fragments of straight branches with bark, but half rotted away.		Up to c. 55mm diam.	Quercus sp
168 (T25)	Branch fragment. Crushed, with rotted surfaces. Some trimming cuts barely survive.		c. 75mm diam.	?Crataegus-group
170 (T27)	Roundwood stake. Tip with one cut face. Bark.		c. 42mm diam.	?Corylus sp

170 (T28)	Stake-tip with four faces. Partly decayed.	-	*Quercus* sp

Table 10 : Wood.